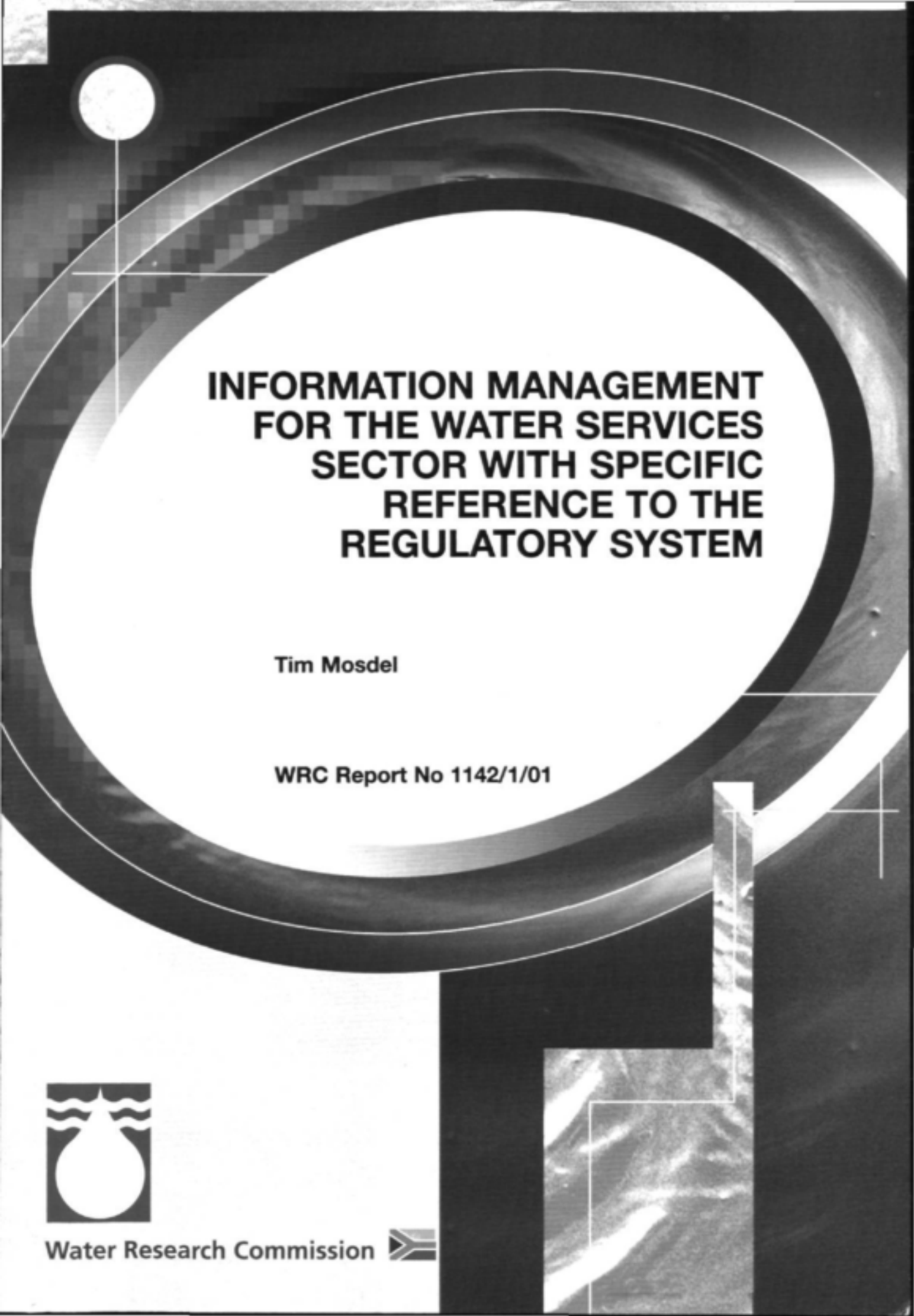




INFORMATION MANAGEMENT FOR THE WATER SERVICES SECTOR WITH SPECIFIC REFERENCE TO THE REGULATORY SYSTEM

Tim Mosdel

WRC Report No 1142/1/01



Water Research Commission 

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WATER RESEARCH COMMISSION

**Information Management for the Water
Services Sector with Specific Reference to
the Regulatory System**

Research Report to the Water Research Commission

Prepared by:

*Tim Mosdell
Palmer Development Group*

October 2001

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Executive Summary

Broadly speaking, the objective of this report is to provide the basis for debates and discussions to pave the way for a national information system that will, *inter alia*, a) be instrumental in providing support for the water sector and, b) support the regulatory function applicable to the water sector. The point of departure for this investigation is the legislative framework that provides for both the establishment of a national information system (NIS) for the water sector and for regulation of the sector. The legislation, however, sketches only the broadest outline of what needs to be done regarding these functions and fails to provide the detail required in order to design and implement the required systems. This report begins by outlining the legislative requirements impacting on the water sector as far as management information and regulation are concerned.

The international experience, through a range of country case-studies, is explored in order to identify parallels with the South African situation and to get a sense of good and best practice world-wide in terms of management information and regulation of the water sector. Issues including the independence of the regulator, the use of competition as a mechanism to improve quality and efficiency, incentives and sanctions as mechanisms to improve the performance of utilities, are touched on in the various country case studies. The types and categories of data held for management and regulatory purposes are also explored and, where possible, examples of relevant key performance indicators (KPIs) are listed.

From the outset it is important to clarify possible ambiguities in terminology. For the purposes of this report the 'National Information System or NIS' refers to the national system established in terms of the legislation aimed at providing a strategic planning function for the Department of Water Affairs and Forestry (DEAF). References to a 'Management Information System or MIS' refers to a broader management information function that could, *inter alia*, provide a general support function to the water services sector as a whole. This could include management information required for functions such as regulation and benchmarking.

Management information initiatives within South Africa, including work related to water services provision and to water resource management, are examined in some detail. The fragmented nature of this work and the absence of integrative mechanisms soon becomes patently obvious. Consequently, these initiatives, all of which are useful in their own right, cannot be said to form a single management information, or regulatory system.

It would be incorrect to suggest that there is no effective regulation of the water sector in South Africa at present. Indeed the report identifies and comments on various regulatory tools or instruments that are currently in place, including legislation and contracts between parties. In this section, relationships between various parties requiring regulation are identified and examined. Further the distinction between management information for regulation and management information for support is opened up and explored.

It becomes apparent that the South African experience is quite different to many of the country case studies, particularly those in the developed world. In developing countries such as South Africa it can be argued that regulatory initiative ought to be as much about regulating price and quality as about developing the capacity of water service institutions. This introduces the notion of 'developmental regulation'.

The report sets out and explores a number of methods of regulation based on; outcomes, outputs, rate-of-return, and inputs. It is argued that as each of these options has specific information requirements, increasing progressively as one moves from outcomes based to input based regulation. This strongly indicates that the method used for regulation has to be determined before a dedicated information system can be developed.

A number of financing options for resourcing the national information system are discussed including direct funding from the fiscus, funding from a levy on bulk water supply, and fees paid by WSPs based on retail sales.

A survey of water services institutions was conducted in order to explore further some of the issues mentioned above. Four Water Boards and six water services authorities were visited and interviewed. From these interviews, it emerged that water services institutions have fairly divergent views on; management information systems, who the regulator should be, what ought to be regulated, and who should cover the costs of regulation.

In conclusion, the report highlights some of the key issues emerging from the study which require further debate and discussion. The study team makes a number of recommendations on both the issue of a national management information system and on regulatory issues.

The report, recognising the requirements outlined in various pieces of legislation, recommends that control and ownership of a national management information system aimed at supporting the Department of Water Affairs and Forestry (DWAF) ought to remain within the Department and that the National Information System (NIS) established by the Department be used for this purpose. Collaboration between the NIS function and other organisations supporting the sector - including the South African Local Government Association (SALGA), the Association of Water Boards, and the Water Research Commission (WRC) among others - ought to be strongly encouraged to ensure that these organisations have access to these management information holdings.

In terms of the regulation of the sector, the report recommends that an outcomes based regulatory method should be employed. A single regulator needs to be established either within DWAF or as an independent body.

It is recommended that an organisation take responsibility for providing the framework and accompanying data required for a management information system aimed at, among other things, general support to the sector as a whole and the effective regulation of the sector. This body would, *inter alia*, develop a

benchmarking methodology for measuring the performance of various aspects of the sector. The survey of water service authorities and water boards suggest that the WRC is the organisation best placed within which to locate this function. The WRC would then form an important link between the various source of information on the sector (including the NIS) and the regulator.

PREFACE

Palmer Development Group was commissioned by the Water Research Commission to undertake a study aimed at supporting the development of a management information system, which could effectively support a regulatory framework for the water sector. (Project K5/1142).

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Mr J Bhagwan	Water Research Commission
Mr GN Steenveld	Water Research Commission
Mr I Palmer	Palmer Development Group
Mr A Davis	Water and Sanitation Services
Mr J Fourie	Department of Water Affairs and Forestry
Mr MS Furumele	Semenya Furumele Consulting
Mr B Jackson	Development Bank of South Africa
Mr A Magadagela	Department of Water Affairs and Forestry
Mr H Muller	Department of Water Affairs and Forestry
Mr PJ Pybus	Consultant
Mr A Wensley	Department of Water Affairs and Forestry – NIS
Ms U Wium	Water Research Commission – Committee Secretary
Mr P de Klerk	South African Local Government Association (SALGA)
Mr NA Macleod	Durban Metropolitan Council
Mr NJ Manson	University of the Witwatersrand
Mr L Marah	Marah, Sigodi and Martin Developments cc
Mr G Moloi	Department of Provincial and Local Government
Mr A Roberts	Department of Water Affairs and Forestry
Mr DC Vorster	Mhlathuze Water

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Project team

The project team responsible for this research project comprised Tim Mosdell, Mthobeli Kolisa, and Ian Palmer, all from Palmer Development Group.

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1. Background and introduction to the study

There is currently an urgent need to deal with regulatory issues in the water services sector. Regulation was a key topic of debate in the process leading up to the preparation of the Water Services Act but it has not received much attention since. This in spite of the fact that there is increasing private sector activity in the sector, and attention is being given to specific regulatory tools, such as water services development plans.

There are also some important issues to be addressed relating to the concept of 'developmental regulation' which, as far as the concept is understood, implies an approach where 'punitive' measures are integrated with supportive measures.

The Department of Water Affairs and Forestry (DWAF) and other government departments (notably the Department of Provincial and Local Government and the National Treasury) are in the process of addressing regulatory strategy but there is still a large amount of work to be done.

In addressing a regulatory strategy, information plays a key role. The regulator, whoever that may be, requires information to monitor the performance of water services providers and/or the water services authorities who appoint them. This information, and the system used to manage it, is central to the effective functioning of the regulator. The information system needs to be set up in such a way that it is responsive both to the requirements of the regulator and to those who are regulated. It is also essential for it to be designed with the regulatory objectives in mind and that the right amount and type of information is collected.

This study intended to address the information requirements of the industry as a whole, through research to establish industry requirements and international experience. It is intended that the research is responsive to the needs of the regulator and those regulated. At the time of the research being undertaken there was expected to be considerable activity in this field.

The aims of the project were as follows:

- To clarify the regulatory objectives, by interacting with the Department of Water Affairs and Forestry, other government departments, representatives of local government and water services industry representatives;
- Undertake an international review of information management arrangements used by regulators and organisations representing water services elsewhere;
- Based on the objectives, and international review, to assess the overall information management arrangements which are needed in South Africa;
- To prepare proposals on the objectives of an information management system, how such a system should function, and what is required to get it into place. The proposals will need to include recommendations relating to key performance indicators and the way they will be used;
- To get the approval for the proposals from stakeholders (those regulating and those to be regulated) at workshops and meetings, and get their comment and ultimately their approval for the proposals, and

- To finalise the proposed overall arrangement and draw up terms of reference for further work which will need to be done.

In essence the study has two broad areas of focus. On the one hand, the study explores the issue of management of information in a fairly broad sense examining good practice in terms of management information systems generally. This part of the study explores generic issues pertaining to the general requirements and uses of an information management system for the water services sector.

On the other hand, the study focuses in part on regulatory issues currently facing the water services sector. Issues related to the emerging regulatory framework in the sector and the information management system that would be required to support this framework are explored in some depth.

From the outset it is important to clarify possible ambiguities in terminology. For the purposes of this report the 'National Information System or NIS' refers to the national system established in terms of the legislation aimed at providing a strategic planning function for the Department of Water Affairs and Forestry (DEAF). References to a 'Management Information System or MIS' refers to a broader management information function that could, *inter alia*, provide a general support function to the water services sector as a whole. This could include management information required for functions such as regulation and benchmarking.

The project has a macro focus as it is held that the overall concept of a management information system must be developed first before moving to issues such as database design and specific items of information. Nevertheless the approach to using key performance indicators and benchmarking are addressed. As such the work will build on other initiatives funded by the WRC.

Further, the project supports the emerging National Information System that is being established in terms of the Water Services Act. It aims to link the information management requirements to the System if this is considered to be appropriate.

The project relates to the information requirements of local government. Based on views of key persons in local government, what is needed is a simple system that collects the right sort of information across a wide spectrum of services authorities and feeds it back rapidly. This is important from the point of view of this research project.

2. The legislative environment

2.1 Management information for the water sector

2.1.1 The Water Services Act

The provisions in the Water Services Act regarding a national information system (NIS) are as follows:

2.1.1.1 Establishment of a NIS

- The Minister must ensure that there is a NIS on water services;
- This information system may form part of a larger system relating to water generally;
- The public is entitled to reasonable access to this information subject to the limitations necessitated by the rights enshrined in the Constitution; and
- The Minister must take reasonable steps to ensure that the information provided is in an accessible format.

2.1.1.2 Objectives

The purpose of the NIS is:

- To record and provide data for the development, implementation and monitoring of national policy on water services; and
- To provide information to water services institutions, consumers and the public:
 - To enable them to monitor the performance of water services institutions;
 - For research purposes; and
 - For any other lawful reason.

2.1.1.3 Provision of information

The Minister may require any Province, water services institution and consumer to furnish information to be included in the NIS.

2.1.1.4 Funding

- The Minister may fund reasonable expenditure incurred in establishing and maintaining the NIS from money appropriated by Parliament for that purpose or received from any other source for that purpose; and
- The Minister or the provider of the NIS may charge a reasonable fee for making information available.

2.2 The National Water Act

The provisions in the National Water Act regarding the establishment of national information systems on water resources are as follows:

2.2.1 Establishment of national information systems

The Act requires the Minister, as soon as practically possible to establish national information systems in a range of water resources areas including:

- A hydrological information system;
- A water resource quality information system;
- A groundwater information system; and
- A register of water use authorisations.

2.2.2 Objectives

The objectives of these information systems are –

To store and provide data and information for the protection, sustainable use and management of water resources;

To provide information for the development and implementation of the national water resource strategy; and

To provide information to water management institutions, water users and the public –

- For research and development;
- For planning and environmental impact assessments;
- For public safety and disaster management; and
- On the status of water resources.

2.3 Regulation of the water sector

2.3.1 The Water Services Act

2.3.1.1 Water services development plan (WSDP)

In addition to the information system requirements set out in the Water Services Act, the legislation stipulates that every water services authority must prepare a draft water services development plan for its area of jurisdiction and a summary of the plan. The contents of the plan are set out in the legislation. These plans and the reporting requirements could well form part of the regulatory framework. This issue is discussed in more detail in a subsequent section.

2.3.2 Proposed regulations dealing with contracts between water services authorities and water services providers

The process, whereby government has been progressing from a situation in which central government runs a significant proportion of services, to one in which responsibility is placed under local government, has meant that delivery varies enormously both in terms of capacity, and in terms of methods of delivery. This may range from providing the service itself; to a management contract for the operation of a single plant; to the large metropolitan area seeking to contract with a suitable company to build, operate and manage facilities under a concession-type agreement. The proposed regulations need to ensure that all the responsibilities are clearly allocated while being simultaneously comprehensive and reasonable.

2.3.2.1 Objectives

In terms of an introductory policy note regarding the regulation of water services providers, the objective of the regulation is to promote the best interests of customers and to ensure fair treatment of water services providers (WSPs). The aim is to achieve a water supply and sanitation services sector that:

- Is efficient and financially sustainable;
- Provides universal coverage with services that people want and are willing to pay for;
- Allows a range of different methods of service provision, levels of service and a choice of service providers, and
- Treats public and private providers in a similar manner.

The Draft Regulations specify the nature of contracts between WSAs and WSPs indicating what items need to be specified in the contracts. In a sense, these contracts are a key mechanisms to regulate the relationship between WSPs and WSAs.

The Draft Regulations state that these contracts shall set out performance targets and performance indicators, including improvements in the level of service and standards of services to be achieved by the water services providers over fixed periods. The regulations also call for periodic performance reviews.

2.3.2.2 Introductory policy note regarding regulation of water services providers

This document sets out the roles and responsibilities with respect to regulation of water services, as shown in the following table:

Role	Who	Responsibilities
Constitution of South Africa	Ministers of Water Affairs and Forestry and Provincial and Local Government	• To set national norms and standards • To fill the role of water services authority if service at the local level fails • To provide support to local government in relation to water services • To legislate with regard to municipal functions (including minimum procurement rules) • To monitor performance
	Municipal government	• To be responsible for the provision of basic level of service to all South Africans
Regulator	Minister of Water Affairs and Forestry	• Set minimum levels of service • Set minimum reporting requirements • Set tariff policy • Monitor performance • Encourage regionalisation to achieve economies of scale
WSA	Municipal government	• To achieve requirements set by regulators • To balance the needs of stakeholders • To enter into contracts with WSPs best able to achieve these requirements • To monitor performance of the WSP in terms of the contract with the WSA • To report to regulators
WSP	Public, private, or mixed entities, or municipal government itself	• To provide the services and perform the duties as required in the contract, the WSA and the constitution

Figure 1 - Roles and responsibilities with respect to regulation of water services

The note goes on to say that, in addition to the above roles and responsibilities, national departments, including DWAF, Provincial, and Local Government (PDLG) and Finance provide support to municipalities in the form of capacity building,

financial assistance and operational support. Other departments such as Environment, Health, and Labour also regulate elements of this sector.

2.3.3 Compulsory national standards relating to the nature, operation, sustainability, operational efficiency and economic viability of water services in terms of section 9(1)(d).

These standards require that a water services authority (WSA) must undertake an annual water services audit. The audit must contain the following details:

- Water use by sector (domestic, industrial or other);
- The seasonal variation in demand;
- Quantity of water provided to the WSA by another water services institution;
- Quantity of water provided to consumers and other uses by the WSA;
- Quantity of effluent not discharged to sewage treatment plants and approved for use by the WSA;
- Quantity of effluent discharged to sewage treatment plants;
- Percentage and number of user connections by sector;
- Percentage and number of user connections by sector with a pre-payment meter;
- Percentage and number of households with consumer connections;
- Percentage and number of households served by communal water services works;
- Number and percentage of households provided with water through water service works or consumer installations designed to provide a controlled volume of water;
- Number and percentage of households provided with water through water service works or consumer installations designed to provide an uncontrolled volume of water;
- The number and percentage of households with access to basic sanitation services;
- The number and percentage of households provided with sanitation services through consumer installations;
- The number and percentage of households provided with sanitation services through discharge to a sewage treatment plant;
- The number of new connections made;
- The number of consumers connected to a reticulation system with periodic pressures above 900 kPa at the consumer connection;
- The number of consumers identified in the sub-regulation above who are not supplied through a pressure reducing valve that limits the downstream pressure to below 600kPa;
- The tariff structures for each sector;
- The cost recovery procedure applied to each sector;
- The percentage of non-payment and unpaid debts for water used;
- Meter testing and replacement programme;
- The quality of potable water provided;
- A description of health and hygiene education provided;
- Water related disease reports from local health institutions;
- The results of the water balance;
- The total quantity of water unaccounted for;
- The demand management activities undertaken; and
- The progress made in the installation of water saving devices.

3. Literature review

3.1 International experience

3.1.1 Melbourne – Australia

3.1.1.1 Background

Public sector reforms have resulted in the restructuring of the Melbourne metropolitan water industry. In 1994 the Victorian Government launched a program to transform the water industry with the objectives of increasing efficiency, maximising benefit to consumers and reducing the State's debt burden.

As of early 1995, Melbourne water was split into five government-owned businesses including the Melbourne Water Corporation, Melbourne Parks and Waterways, and three retail water and sewerage companies.

The three retail water and sewerage companies include City West Water, South East Water and Yarra Valley Water. Each of these companies is government-owned and has its own customer base determined by its allocated geographical area. The companies do not compete directly for each other's customers but they do compete by comparison in the service they offer their customers. Each is required to operate on commercial principles and is responsible for retail water supply to customers and limited sewage collection and treatment.

Melbourne Water Corporation is responsible for the collection, storage and wholesale selling of Melbourne's water and for the operation of major sewage treatment and drainage facilities.

3.1.1.2 Regulation

The Office of the Regulator-General, Victoria was established as an independent regulator in 1994. The objectives of the Office include:

- Promoting competitive market conduct;
- Prevent misuse of monopoly or market power;
- Facilitate entry into the relevant market;
- Facilitate efficiency in regulated industries; and
- Ensure that users and consumers benefit from competition and efficiency.

The Regulator-General is independent of the government and of the industries regulated by the office. This independence is protected by an Act of Parliament. The Office covers a range of sectors including electricity, water, grain, ports, gas, and rail.

At this point, the Office has regulatory responsibility for the three retail water and sewerage licensees operating in the Melbourne metropolitan area.

The Office is empowered by legislation to issue licences. These licences include conditions that require the water companies to observe standards and conditions of service and supply which enable the Office to regulate the companies' market conduct.

Each customer of a retail company is deemed to have entered into a contract with the company. The regulator, along with the retail companies and customer representatives have developed a Benchmark Customer Contract and a Benchmark Customer Charter (a summary of the former). The retail companies report to the regulator annually against these benchmarks.

A feature of the regulatory framework in Melbourne is the notion of 'Competition by Comparison'. The aim of this process is to stimulate competition and to inform customers about the service levels they receive.

3.1.1.3 Competition by Comparison

A performance report is published annually by the regulator comparing the performance of Melbourne's three retail water and sewerage licensees. The performance report focuses on the key customer service issues of :

- Water and effluent quality;
- The reliability of water and sewerage services; and
- The affordability of services.

The report is based largely on two sources of information namely, performance data reported by the licensees against performance indicators specified by the office, and the findings of operational audits of the licensees' compliance with:

- Service standards defined in their customer contracts which must meet the minimum standards set out in the Office's benchmark customer contract;
- The quality of the performance indicator data reported to the regulator's office; and
- Progress against identified asset management improvement areas.

The purpose of the operational audits referred to above is to provide independent expert assurance that the licensees are complying with the performance requirements and are reporting reliable performance data to the regulator.

3.1.2 Western Australia

Water institutions in Western Australia require that specific benchmarking data related to business and operational performance are reported annually to the Coordinator of Water Services in the Office of Water Regulation (OWR).

Benchmarking data enables the OWR to compare performance in a number of areas including relative performance in respect of certain key indicators. There are three primary means by which this is done including:

3.1.2.1 Historical longitude

The historic performance of a particular provider is benchmarked against itself across time, showing whether there has been an improvement over time.

3.1.2.2 Internal

The performance of a particular provider is benchmarked at a disaggregated level. For any provider this means a comparison of its performance on a regional, town, or scheme basis.

3.1.2.3 Competitive

The performance of one provider is benchmarked against other provider/s for the same indicators.

3.1.3 England and Wales

3.1.3.1 Background

The regulator in England and Wales is the Director General of the Office of Water Services (OFWAT). He obtains the information he requires from a number of sources including: Department of the Environment, Transport and the Regions, the Welsh Office, the quality regulators (the Environment Agency and Drinking Water Inspectorate), the water companies, and customers, as well as specialist advisors and commentators. The Director needs to collect information to enable him to:

- Monitor companies' progress towards achieving higher quality objectives;
- Compare company performance in carrying out their functions;
- Measure and compare their costs;
- Ensure that the prices companies charge their customers avoid undue preference and undue discrimination and that they are in line with the price limits set by the Director;
- Ensure that customers' standards of service are protected; and
- Prepare for the next review of price limits.

3.1.3.2 Information required for regulation

All the water companies in England and Wales are required by their licence to make an annual return each July to the regulator. The information required in the return is divided into:

- Key outputs;
- Non-financial measures;
- The regulatory accounts; and
- Financial measures.

These categories are spelt out in more detail in an appendix of this document.

In addition to these categories of information, Ofwat also collects annually a Principal Statement which contains companies intentions and the rationale behind their tariff proposals for the coming year. This is used to ensure that price increases are within the limits available, and that companies comply with licence conditions which prohibits undue preference and undue discrimination in their charges.

Water quality is regulated by the Drinking Water Inspectorate and the Environment Agency regulates quality of drinking and wastewater respectively. They supply to

Ofwat annual assessments of the companies' compliance with current quality standards and their progress with programmes to meet new statutory obligations.

After analysing companies' returns, Ofwat publishes reports setting out companies' performance in delivering service to customers, on leakage and water efficiency, the costs of service provision and efficiencies achieved by the companies and a comparison of the financial performance and capital investments of companies in delivering outputs. Ofwat also annually publishes a report in the companies' tariff structure and charges.

3.1.4 Jamaica

3.1.4.1 Background

The National Water Commission (NWC) is a utility that has primary responsibility for the construction, operation and maintenance of Jamaica's potable water and wastewater systems. The NWC serves 65% of the population via household connections. The other 35% are served by other methods, which include standpipes, wayside tanks and community catchment tanks. NWC customers are categorised as domestic, commercial, schools, condominium or staff. Different rates are applied to each category. The NWC manages water supply through its five operating regions; metro, southern, central, western and northern. It also operated forty-nine sewage treatment plants country wide.

The Office of Utilities Regulation (OUR) is in the process of establishing service standards for the NWC. This is deemed important as the utility does not face competitive pressures that would otherwise ensure that the standard of service provided to consumers was adequate.

3.1.4.2 Service Standards

Two categories of service standards for the water utility provider, the NWC, are proposed. These are overall and guaranteed standards. Failure to meet guaranteed standards will result in the NWC making a compensatory payment to the customer that has suffered a sub-standard level of service. Overall standards will be monitored as a measure of the NWC's performance, but failure to satisfy these standards will not result in a penalty payment. Over time, overall standards may be converted into guaranteed standards. It is proposed that the minimum level of the compensatory payment for failing to satisfy a guaranteed standard be equal to the service charge.

The proposed standards can be divided into three major areas and cover the entire operation of the Utility, namely the production process, service supplied and customer interface. The OUR will monitor the conformity of the utility to all the set standards. It will, however, only determine those relating to customer service and intrinsic quality. Health and safety standards and environmental impact will be monitored by the OUR but determined by the Ministry of Health and the Natural Resources Conservation Authority. The quality of service standards that the OUR intends introducing are outlined in some detail in appendix?:

Each of these standards includes an objective, a definition and a guarantee. For example, 'access' is identified as a key area to be monitored and has as its objective - *To ensure that new customers are promptly connected to NWC's system.* The standard

is called 'connection to supply' which is defined as follows – *NWC is required to connect all new customers, where water supply is available at the property boundary, within 5 working days after signing the contract for connection. The guarantee is as follows – If NWC fails to connect a customer within the specified period, NWC will automatically pay the customer X\$.*

3.1.5 Chile

3.1.5.1 Regulatory environment

The regulatory environment in Chile as applied in Santiago is characterised by the following:

- A regulatory system designed for a private firm but applied to a state owned enterprise.
- An independent, sector specific, regulatory agency called the Superintendency of Sanitary Services (SSS).
- A contract between the regulatory agency and EMOS. EMOS is a state-owned public enterprise providing both water supply and sanitation services to Santiago.
- Good quality professional staff in SSS, due to their ability to offer competitive remuneration. This has given them the ability to relate to water companies on a equal footing.
- Regulatory contract provides for neutral and automatic enforcement. There is a right of appeal against a decision by regulator.
- Lack of regulatory discretion with regard to tariff calculations: the financial model is used to set tariffs and this can not be easily manipulated.
- A sound system of setting tariffs: tariff are set based on a marginal cost analysis using a financial model and with a target rate of return. This is done every five years and the tariff increases are capped for the five year period.

3.1.5.2 Best practice

Two important features of the regulatory framework stand out and undoubtedly contribute to the success of regulation in improving access to and quality of water services. Firstly, the regulator has access to solid, timely and accurate management information, and secondly, the regulator offers competitive salaries to its staff in order to ensure that the best people for the job are recruited.

3.1.6 Argentina

3.1.6.1 Background

In Argentina the responsibilities for electricity and gas, water and sanitation and telecommunication services is divided between the national and the provincial governments. Water services privatization and regulation in Buenos Aires Metropolitan area is the main subject of interest here is the responsibility of the national government. Water services in the Greater Buenos Aires Metropolitan area were privatized under a concession contract in 1993. This was the first of its kind and it was accompanied by a creation of a national regulatory mechanism to regulate infrastructure related service provision including electricity, gas and Telecommunication. The country created industry specific regulatory agencies for the

four industries electricity (ENRE), gas (ENERGAS), Telecommunication (CNT) and water and sanitation (ETOSS). The approach with each of these has been to opt for a regulatory commission instead of a single regulator as in United Kingdom.

3.1.6.2 Strategy

The main objective of the water services reform was "to reduce the cost to the government of operating the services while minimizing the price of service delivery." To achieve this, the government was looking for a company that would offer the largest discount to the public tariffs and assume responsibility for "operating and maintaining the fixed assets and expanding coverage, guarantee water quality and develop sewage treatment" Essentially, this meant a 'rate-of-return' regulation to the winning bidder. The impact of the concession is, in addition to public tariffs discount as compared with the tariffs before privatization, reported using the following process indicators.

- Increase in production capacity
- Water pipes rehabilitated
- Sewers drained
- Decline in clogged drains
- Staff reduction
- Residents with new water connections
- Residents with new sewer connections

The type of service is a standard in-house connection. The quality of water also has a set minimum. The contract is the central regulatory tool. Some observers argue that the contract focuses too much on process and detailed targets, which indicates the government's reluctance to give up management of service delivery. The challenge is to keep a balance between monopolies who would like to keep regulators at bay and the regulators getting too involved in management matters.

3.1.6.3 Financing the process

A user fee levied on consumer finances the independent regulatory agency (ETOSS). The concessionaire levies consumers 2.67% of the bill and passes the income to the agency.

3.1.6.4 Governance

ETOSS is governed by a directorate appointed to a six-year term, with the option of one renewable term. It monitors the concessionaire, enforces the concession contract and regulatory decisions, and levies fines when necessary. Appeals go to the minister. The agency does engage services of international experts to advise them on decisions. The commission represents the interest of three different levels of government: National government (as owner of assets), the municipality of Buenos Aires, and the province. Most provinces have adopted a similar institutional set-up as national government. A perceived weakness in the Argentinean regulatory system is that there is still a lack of adequate accounting standards and procedures.

3.1.6.5 *Competition in aid of regulation*

Cost-plus regulation, rate-of-return, and price cap regulation are all about regulating deviations from an established price. This raises the question - how does the price or rate-of-return get established in the first place? Argentina used bidding as a form of competition to establish the rate of return. A viable bidder who offered the highest discount to the consumers won the bid. This resulted in an effective 26,9% discount on tariffs.

3.1.7 American Water Works Association (AWWA)

3.1.7.1 *Background*

The AWWA is an international non-profit scientific and educational society dedicated to the improvement of drinking water quality and supply. The AWWA Research Foundation is dedicated to the implementation of a research effort to help utilities respond to regulatory requirements. One of the significant projects of the Foundation has focused on the issue of benchmarking in the water industry. A report entitled *Performance Benchmarking for Water Utilities* represents the culmination of a research project aimed at facilitating the use of performance benchmarking within the water industry. The project was constructed with the following objectives:

- To identify those water utility processes suitable for benchmarking;
- To illustrate the use of metric benchmarks by quantifying a limited number of possible benchmark measures;
- To investigate the availability of key data for metric benchmarking;
- To identify data shortfalls and to prepare a program for the collection of additional data; and
- To investigate the extent of, and challenges to, benchmarking in the US water industry.

3.1.7.2 *Benchmarking*

The report differentiates between two distinct types of benchmarking namely metric benchmarking and process benchmarking.

Metric Benchmarking is a quantitative comparative assessment that enables utilities to track internal performance over time and to compare this performance against that of similar utilities. Areas of relatively good performance compared to that of the other utilities can be identified, as can those where there is particular room for improvement in performance. In addition, through the comparison process, target levels of performance can be established.

Process benchmarking involves first identifying specific work procedures to be improved through a step-by-step 'process mapping' and then locating external examples of excellence in these process elements for standard setting and possible emulation.

The study came to the conclusion that all processes of a water utility are suitable for benchmarking of either type. Metric benchmarking tends to focus on simple performance ratios of inputs to outputs (e.g. cost per km of main). These ratios, the report argues, despite being frequently used in the water industry, need to be treated

with caution given the diversity of topography, customer demographics, ownership structures, organisational structures, and environmental and financial regulations.

The study identified outcome measures as being key to measuring a utilities performance. Outcome measures seek to describe the performance of a utility at the interfaces with its stakeholders (e.g. quality of service provided to customers). The report identifies these measures as being a critical component of performance measurement in service industries and makes the point that these measures are neither uniformly identified and accepted nor uniformly collected in the US water industry as they are in the UK.

The report made the following recommendations:

- The industry should consider the adoption and regular reporting of a series of outcome measures which measure the performance of the utility at its interface with water customers and other stakeholders;
- The presentation of a set of efficiency and outcome measures should form part of the Self-Assessment and Peer Review program currently being implemented by AWWA;
- The industry should act uniformly to share information being provided by the multitude of surveys that are currently being carried out by individual organisations. A clearinghouse of surveys should be established, possibly within AWWA.

3.1.7.3 Information holdings

The AWWA has compiled a large water utility database, covering over a thousand utilities. Since 1989, the AWWA Research Foundation have surveyed water utilities for basic profile information collecting data in the following categories.

- General information
- Revenue data
- Financial data
- Water Quality
- Treatment Practices
- Distribution

3.1.8 World Bank

3.1.8.1 Background

The World Bank has developed a water and sanitation benchmarking kit aimed at empowering water and wastewater utilities in compiling cost and performance data. It is aimed at building better and more accessible comparison and evaluation tools for the water sector.

The Bank argues that firms operating in competitive marketplaces are under constant pressure to outperform each other. Water utilities are usually sheltered from these pressures with the result that many of them fall behind best practice. Access to comparative data, they argue will support the development of well-run companies by providing key stakeholder with the information they need to do their jobs better. The kit offered by the bank has been set up in an effort to ensure that such comparison is possible. The kit contains the following:

- A set of core indicators on which stakeholders can build their own customised measurement and monitoring system;
- A data listing complete with robust data definitions;
- A data capture system ; and
- A route to share information via the World Bank Water Help Desk.

The indicators in the kit are presented under a number of headings which are presented below. They are considered a minimum core set and were developed in discussion with Bank staff, consultants, and country partners. Likely availability of data was a critical factor in the selection of indicators.

3.1.8.2 Core indicators

The core indicator categories identified by the World Bank are as follows:

- Coverage;
- Water consumption and production;
- Unaccounted for water;
- Metering practices;
- Pipe network performance;
- Cost and staffing;
- Quality of service;
- Billing and collections;
- Financial performance; and
- Capital investment.

3.2 Local literature

3.2.1 Water Services

3.2.1.1 Department of Water Affairs and Forestry (DWAF), Chief Directorate: Water Services

Apart from the information requirements related to the compilation of water services development plans (ESDPs), the Chief Directorate: Water Services has published a number of documents related to information management in the water services sector. These include:

- Master System Plan for the NIS for Water Services, 1999;
- Technical Architecture for the NIS for Water Services, 2000;
- NIS for Water Services Prospectus, 2000.

The Prospectus, which to a degree is a précis of the Master System Plan, is aimed at:

- Defining the scope and the vision of the NIS for the water services sector;
- Providing a conceptual review of the core functions that the NIS should support;
- Providing a starter document for general circulation for the development and implementation of the NIS

3.2.1.2 *Benchmarking in municipal water services practice – Pybus and Bhagwan (2000)*

3.2.1.2.1 Background

Pybus and Bhagwan have conducted a study aimed at establishing local authorities awareness of benchmarking and the extent to which they intend applying the technique. They make the point that legislation has been introduced in the past few years creating the environment for regulation and the publication of the performance of local authorities.

Those interviewed in the study welcomed the concept, but reservations were made concerning the capacity of local authorities to implement performance benchmarking.

A follow up study is being funded by the Water Research Commission to establish acceptable performance indicators and benchmarks with universal application and to prepare guidelines for the performance benchmarking process.

3.2.1.3 *Monitoring PPP water contracts - Stewart Gibson (2000)*

Gibson identifies three levels of regulation in the South African regulatory landscape for the water sector. At the first level, national legislation drives regulation through the Act which are enforced through the legal system via Courts of Law. The second level comprises policies and regulation. At this level departmental policies and published regulations form the basis of regulation and will be enforced by a regulatory body. The third level is the contract monitoring which is specific to each contract with rights and responsibilities spelled out in each set of contract documents. Gibson argues that this third level of monitoring has to comply with, and operate within, the regulations set by levels one and two but, in fact, represents the most direct form of regulation and is the area within which the contract monitoring operation must work.

Gibson makes the argument that for every private-public-partnership (PPP) contract a monitoring unit should be established, and for the larger and more complicated contracts, this unit should be dedicated to the monitoring task. The monitoring unit should ideally be independent of both contracting parties. The proposed monitoring units will have to ensure the following in a typical concession contract:

- Contract compliance;
- Technical compliance;
- Financial compliance; and
- Customer service compliance.

Gibson argues that the cost of contract monitoring would be borne by the Authority and, ultimately through tariffs, to the consumer. These costs are justified by the financial benefits achieved through the effective control exercised over the operator.

3.2.2 Water Resources

3.2.2.1 *The development of a monitoring and information strategy to support water resource management in the implementation of the National Water Act – Harris and Howman (2000)*

Harris and Howman argue that, in addition to the information system requirements set out in the National Water Act, the legislation fundamentally changes the perspectives of water resource management from one where water was considered a commodity to encourage development, to one where water is considered a finite resource that must be used in a sustainable manner. They make the point that the mechanisms described in the Act to carry out the objectives for equity and beneficial and sustainable water use require a substantially larger set of information from that previously used.

While there are a number of structures and systems providing aspects of the required information, the efforts are largely uncoordinated and disparate. Dissemination of information is weak in many cases. As a consequence, a strategy and implementation plan to describe the components of the information system is urgently required.

It is against this background that the development of a Monitoring and Information System (MAIS) aimed at supporting DWAF's responsibilities in terms of water resource management information was initiated in late 1999.

The core functions of DWAF relating to resource management will be used as a framework within which to identify information requirements. These core functions are outlined below:

- Water resource planning;
- Water resource development;
- Water resource assessment;
- Integrated water resource management; and
- Regional implementation.

Harris and Howman believe that the MAIS strategy will provide the mechanisms to facilitate a seamless interface that will allow use of all the relevant data for water resources management.

3.2.2.2 Assessment of water use authorisations and licence applications – JC Perkins (2000)

The National Water act identifies a range of considerations that must be applied in the assessment of licence applications for water use (Section 27.1). Perkins outlines these considerations along with a statement which serves as an indicator definition to ensure that the considerations are in fact being met. These considerations are listed below:

- The catchment management strategy applicable to the relevant water resource;
- The quality and quantity of water in the water resource which may be required for the reserve;
- The quantity and quality of water in the water resource which may be required for meeting international obligations;
- The class and the resource quality objectives of the water resource;
- The strategic importance of the water use to be authorised;
- Existing lawful water uses;
- The likely effect of the water use to be authorised on the water resource and on other water users;
- Compliance with the requirements contained in regulations made under section 26 of the Environmental Conservation Act, 1989 (No73 of 1989);

- Comments/objections from stakeholder and interested and affected parties;
- The need to redress the results of past racial and gender discrimination;
- Efficient and beneficial use of water in the public interest;
- The socio-economic impact of the water use or uses if authorised;
- The socio-economic impacts of the failure to authorise the water use or uses;
- The investments already made and to be made by the water user in respect of the water use in question;
- The probable duration of the undertaking for which a water use is to be authorised;
- Compliance with other relevant legislation;
- Water services development plans (WSDPs) – a consideration drawn from the Water Services Act; and
- Technical Information.

3.3 Comparing the South African water services regulatory environment with international experience

International literature summarizes the aim of regulation to be:

- to protect consumers from abuse by monopoly firms
- to support investment by protecting investors from arbitrary action by government
- to promote economic efficiency (Smith, 1997; Alexander et al 1996; Klein et al 1996)

The literature further narrows down the targets of regulation in pursuit of the above aims to be *price of services*, *quality of service*, and *quality of water*. This means that all relations which have a bearing on price and quality should enjoy regulatory oversight.

The demand for regulatory services and expertise has historically developed parallel to private sector participation in infrastructure/public services (water and sanitation, energy, transport and telecommunications). It is therefore not surprising that the bulk of the available literature centres around regulating private sector involvement and focuses on regulating with the aim of promoting the viability of private sector involvement in infrastructure services (see Gray 1998). This may be a disadvantage in terms of drawing lessons for the South African water services regulatory environment in that the South African water services environment is dominated by the public sector and is likely to remain largely as such in the short and medium term. On the other hand, this may facilitate the country's effort to reform the water services environment. South Africa is moving towards clear separation of roles between water services providers and water services authorities, and between providers and regulators. This transition period could offer an opportunity to prepare for the high standards of regulation that the private sector may require.

In South Africa, particularly in the rural areas (which are now going to be an integral part of the majority of municipalities), the water services institutions and in particular water services providers are at an embryonic state. It can and has been argued that they need to be nurtured and developed rather than be thrown into a hostile and punitive regulatory environment akin to private sector regulation. The sector

transitional/reform period requires a balance between nurturing water services providers and protecting consumers while improving economic efficiency.

The other distinguishing feature of the South African water services environment is that while most international experience seems to be based on single national/state regulatory frameworks (UK, US, Jamaica), the South African *de facto* water services regulatory system is unique in its two-tier set-up. Water services authorities are meant to regulate water services providers while the *de facto* national regulator (DWA) regulates water services authorities and indirectly water services providers in a co-operative governance set-up. As in many other countries (Silva et al; 1998), national government recently decentralized water services to municipal government, which historically have little or no experience in service regulation.

3.3.1.1 Competition and Regulation

Webb and Ehrhardt (1998) argue that "much effort has gone into regulation to stop utilities from abusing their monopoly power, but relatively little into considering ways to reduce that monopoly power". They suggest that there must now be emphasis on introducing competition as a way of reducing monopoly power. They identify four means of introducing competition:

- competing networks
- private supply
- retail competition
- common carriage competition

They do however concur that some complex forms of competition would require skilled policy making and well-developed regulatory capacity. This illustrates that the market approach is not a substitute to regulation, rather the two ought to be used together. Another factor that reduces the efficiency impact of competition is that the cost of installing competing networks is prohibitively high.

Comparative competition is one way of using both regulation and competition to improve economic efficiency and protect consumers. Regulators can compare utilities to judge their performance. Some of the ways of doing this include:

- Publication of comparisons of companies in the media. This can be a powerful tool to put pressure on WSA's to act on non-performing WSP's.
- Setting the price WSP may charge on the basis of the costs of similar WSP's. Profits improve through lowering cost which could in turn lead to overall cost reduction.
- Regulatory benchmarking of companies against one another to estimate efficiency and set price-caps/rates-of-return accordingly. This might be more appropriate at a micro/local level because it might require the regulator/WSA to monitor detailed indicators as in the example given by the following figure:



Figure 2 - Simple unit performance measures - Webb and Erhardt (1998)

If this above approach is to be followed it would be desirable to do an in-depth study of the statistical techniques of benchmarking which takes into account differences in companies operating environments. Such techniques have worked in countries such as England and Wales.

Competitive bidding is another way of using competition to set a basis for regulation. Rate of return/ benchmarking/ price caps are basically based on some level of a pre-existing efficiency or non-efficiency. The secret of course is to determine whether existing efficiency levels are themselves appropriate. Klein (1996) suggests that

competitive bidding/ auctions at the beginning would help establish the achievable efficiency level. This however seems more workable in developed service environments, which are qualitatively different from the SA environment in terms of efficiency capacity. Improving efficiency in this way can only be possible once water services institutions have taken root.

3.3.1.2 Price-caps, Rate-of-return regulation and the cost of Capital in South Africa

Price-caps and rate-of-return regulations are two ways of preventing monopolistic infrastructure utility firms from charging excessively high prices. In the price-cap approach as it is used in United Kingdom, the regulated price is adjusted each year by the rate of inflation plus or minus some predetermined amount and without regard to changes in the utility's profits (Alexander et al; 1996). The rate-of-return regulation approach as it is used in Canada, Japan and United States requires that regulatory agencies fix the rate of return that a utility can earn on its assets (Alexander, 1996). A price is set in such a way that the utility can only earn a specified rate of return on its investment.

Price caps are thought to be incentives to improve efficiency because as the costs go down the benefits accrue to the utility. But what are the implications in terms of the cost of capital and therefore tariffs and affordability to consumers? A study by Oxford Economic Research Associates for the World Bank compared Britain and US firms in terms of investment risk (Alexander; 1996). Essentially the study compared betas. A beta is a statistic used to measure the risk that affects the firm's capital cost. Investors use it worldwide. 'A firm's beta measures the extent to which the firm's returns vary relative to those of a diversified portfolio of equity holdings. It indicates whether an investor with a diversified portfolio would take more risk by investing in a particular firm. The higher the beta, the bigger the increase in the risk in the investor's portfolio,' explains Alexander and Irwin (1996). The study concluded that utilities under price-caps regulation have higher betas than utilities under rate-of-return regulation. What are the implications of this in context of the South African water services environment? Firstly, the above should not be understood to simply imply that the rate-of-return regulation is preferred to price-caps regulation. It may mean that regulators using rate-of-return regulation can set target rates lower than that earned by an average utility. This could then be passed on to tariffs in relatively low-income areas. On the other hand price-caps can be used in high-income areas which do not need relatively high capital investments in order to improve efficiency in the use of existing infrastructure.

4. Information systems in the business environment

In order to ensure that the NIS reflects best practice thinking, important lessons can be learned from examining how information is managed in the business sector. The following paragraphs offer a general overview of the different types and levels of information systems used in the business sector.

Information systems and organisations have a mutual influence on each other. On the one hand, information systems must be aligned with the organisation in order to provide information needed by user groups within the organisation. At the same time, the organisation needs to be aware of the impact of information systems on itself. In short, organisations affect the design of information systems and information systems affect organisation. This two way relationship is complex and is characterised by many mediating factors including the environment, culture, the structure of the organisation, procedures and processes, politics, management decisions, and chance (see figure below).

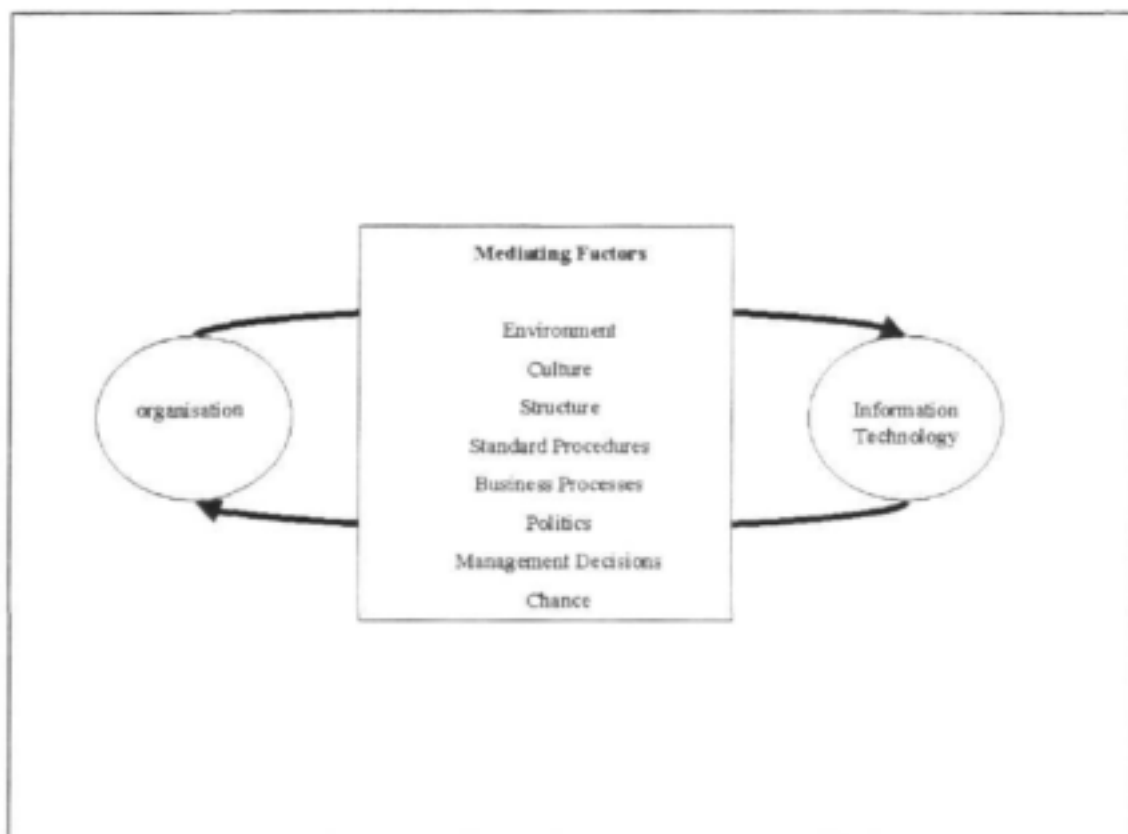


Figure 3 - Two way relationship between IT and the organisation

4.1 Levels of information and organisation

In general, different types of information systems serve different organisational levels. Organisations and information systems can be divided into strategic, management, knowledge and operational levels. These are each outlined below:

4.1.1 Operational level systems

Operational level systems support the organisation by keeping track of the day-to-day activities of the business. The main purpose of systems at this level is to keep track of the transactions as they pass through the different parts of the system. Examples of an operational information systems could include a system used to record volume of water passing through a treatment works, or a billing system.

4.1.2 Knowledge level systems

Systems at this level support knowledge workers and data workers. Two categories of knowledge systems exist – Knowledge Work Systems and Office Automation Systems. Knowledge Work Systems aid the firm in discovering, organising, and integrating new knowledge. An example of such a system could be a computer aided model used to plan and design new water schemes. Office Automation Systems handle and manage documents, scheduling and communications and include word processing, desktop publishing and document imaging.

4.1.3 Management Information Systems (MIS)

A MIS serves the management level of the organisation, providing middle managers with reports to assist in monitoring, controlling, decision making, and administration. MIS systems typically provide periodic reports rather than instant information on operational transactions. Generally these systems draw on the data found in operational level systems. Operational level data is a necessary but insufficient component of management information systems. Management level systems often aggregate transaction level data and combine this processed data with other internal or external data to provide key performance indicators (KPIs) to support the middle management strata of the organisation. Examples of management level system could be a cost analysis system, a water quality monitoring system, and a customer satisfaction system.

4.1.4 Executive Support Systems

Executive support systems serve the strategic level of the organisation and are designed to address unstructured decision making. These systems are developed to incorporate data about external events such as new legislation and competitors. Systems at this level focus on providing executives with the capability to make broad strategic decisions. These systems are aimed at supporting busy executives with the emphasis on simplicity and ease of use. The following figure illustrates the different levels served by different information systems.

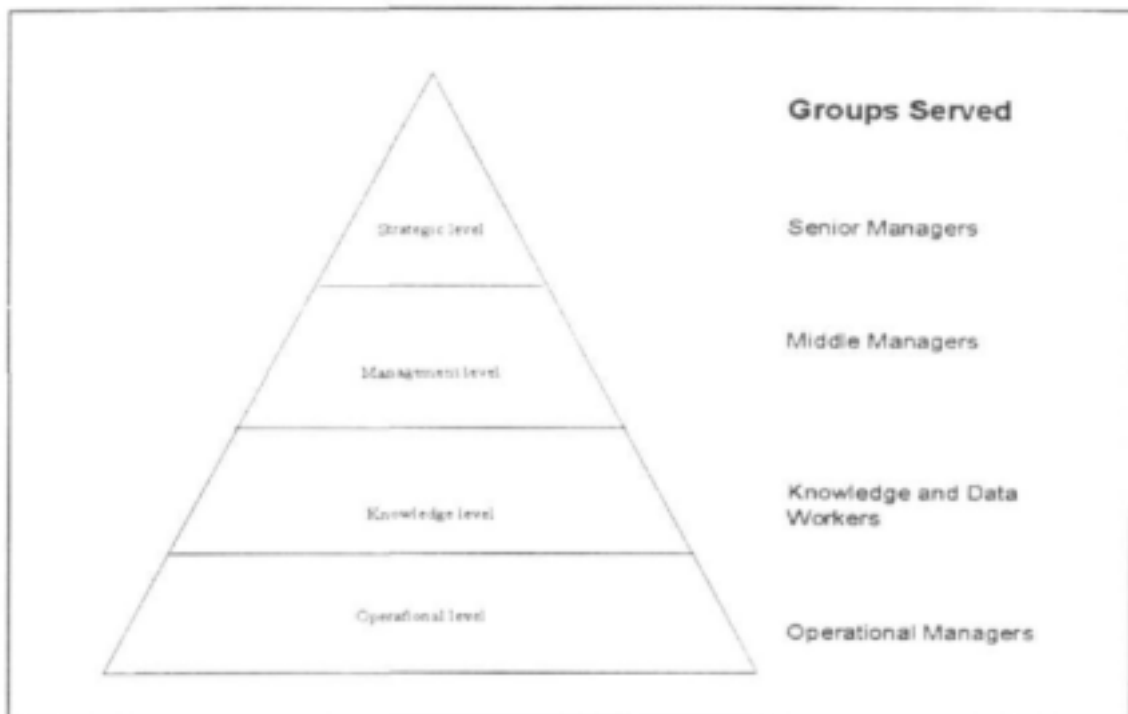


Figure 4 - Levels of information and groups served

4.1.5 Implication for the water sector

The water sector resembles the business environment in many ways and the different levels of organisation are equally applicable to the sector. Matching the different levels of information to the appropriate user groups is therefore equally important in the sector. Consequently, it is important to develop a firm grasp of the needs of the different user groups in order to determine the level of information most appropriate.

4.2 The performance monitoring feedback cycle

A complete management system includes a performance monitoring feedback loop with successive cycles and goal setting, performance monitoring and regular reporting. These cycles can be of varying lengths, and can occur monthly, semi-annually, or less frequently, depending on the reporting demands and needs faced by managers and policy makers and the practicalities of collecting data. This cycle is illustrated in the figure below.

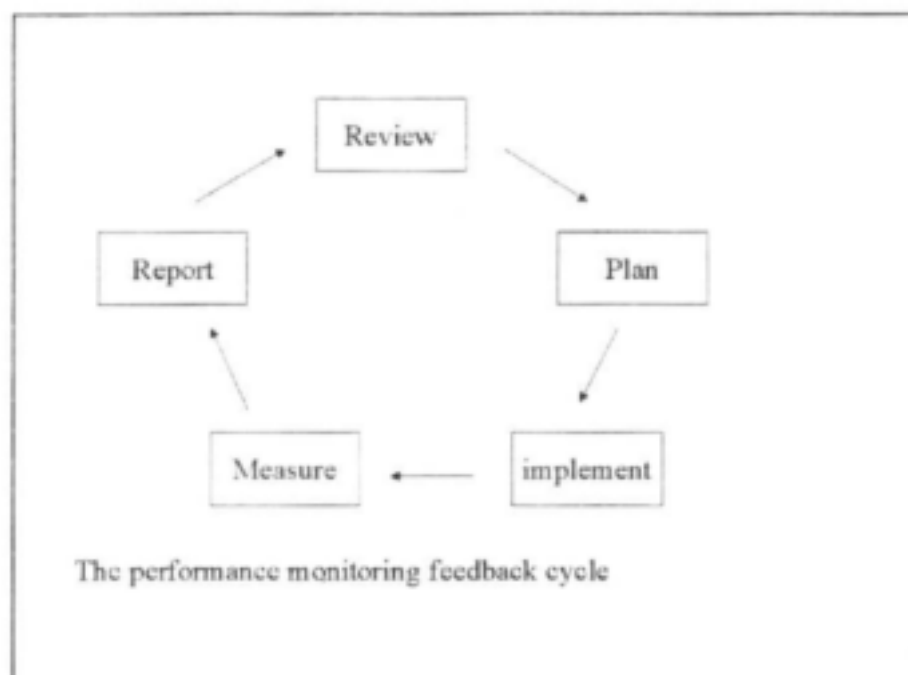


Figure 5 - The performance monitoring feedback cycle

4.2.1 Implications for the water sector

The plan, implement, measure, report, review cycle is equally applicable to the business and water sector environments. The requirements of the Water Services Act now formalises the planning process with all Water Service Authorities required to submit Water Service Development Plans (WSDPs).

4.3 Input/process/output/outcomes model

Numerous conceptual frameworks have been developed to describe the relations among the various resources, functions and results of business processes. One of the most used and familiar approaches is a simple input/process/output model.

Inputs include legislation, regulations, resources, admin arrangements, staff and target population demographics. Processes are the activities, or operations of the business. Outputs refer to the products produced by processing the inputs. Indicators can be developed for each of these stages.

This approach is well suited to the industrial production sector where output indicators would focus on the volumes, speed and quality of the product produced. In the water services sector, it may be necessary to extend the model to include outcomes. For example, an output indicator in the water sector context could be 'number of new water connections made'. An outcome indicator could be 'economic growth in an area as a result of the increased water connections made'. Another set of outcome indicators could centre around customer satisfaction.

4.3.1 Implications for the water sector

Outcome indicators are useful in the regulatory context as they tend to measure the extent to which goals and objectives are being met. Input and process indicators reflect the day-to-day operations of the enterprise. It is useful at this point to refer back to the discussion on levels of information and groups served. Clearly the executive decision making group would need access to highly aggregated input, process, and output indicators and would focus their attention on outcome indicators. Operational managers, on the other hand would tend to require detailed input, process and output indicators.

5. Institutional framework

5.1 Current regulatory institutions

The overall picture with regard to regulatory institutions is shown in the diagram below:

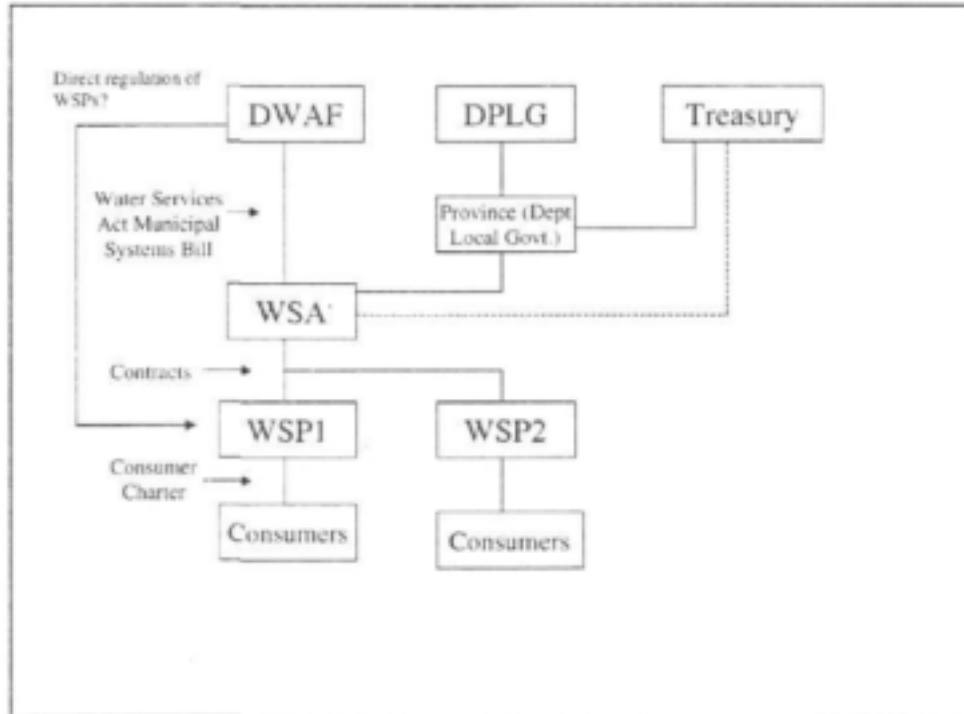


Figure 6 - Current institutional framework

Some key points with regard to the role of regulatory arrangements are:

- It is ultimately the relationship between consumers and WSP providers which is being regulated.
- WSAs have regulatory responsibilities and, in fact a sound way of viewing the role of regulator is that the national regulator works together with local regulator (WSAs) to achieve common regulatory goals.
- If the municipality is the WSP then it is important for its regulatory and services provide functions to be clearly separated.
- There is a lack of clarity with regard to the responsibilities of DWAF, provincial government and other national government departments.

5.2 Current support institutions

The term 'support' in this context is taken to refer to the information which is provided to water services institutions with the intention of assisting them improve the performance of their organisations.

DWAF has a role to play in providing support to WSIs which currently includes information management. In this context, in contrast to the regulatory context, this is essentially a service to WSIs.

There are several other organisations which currently provide support which has, or could have an, information management component:

Organisation	Overall function	Current information management function
SALGA	Statutory body representing interests of local government	None currently as far as is known; no water sector info.
Association of Water Boards	Representing interests of water boards.	Currently setting up an information management system to serve their members; attributes identified.
Water Research Commission	Undertakes research with a national interest. Gets funded through levy on bulk water.	Distributes research; has co-ordinated a literature database.
Water Institute of Southern Africa	Organisation representing the interests of members, mainly individuals.	Has produced guidelines. But focus is more on individuals rather than WSIs.

Figure 7 - Information holdings of existing bodies

5.3 Future role of other organizations in managing support information

Each of the organisations mentioned in the previous section has a potential role to play in managing information. There is also the possibility that a new organisation could be established to look after the needs of all water services providers: government, parastatal and private.

The major issue is: which organisation would best run a user responsive support information service at national level? This is a relatively contentious issue as each of the organisations providing support to water institutions and to the water sector in general have different areas of focus. The question of whether an information system for supporting the sector ought to be located within one of these organisations, or whether a new body ought to be set up with specific purpose of providing information to the sector is an issue warranting investigation.

Indeed, a survey conducted as part of this project explored this issue. The survey, based on a questionnaire study of water boards and water services authorities, explored, inter alia, the interviewee's views on where this management information support function ought to be located institutionally. The full results of the survey are outlined in a latter section of the report but it was clear from the respondents that many of them felt that DWAF is not the best institution in which this function ought to be vested.

The most popular institution in which to locate this function was the Water Research Commission (WRC). However, other institutional options, including the possibility of established a new 'purpose built' body for this purpose also enjoyed some support.

There was also some support for the establishment of an independent body, outside of government to play this role.

6. The regulatory framework

6.1 Defining the regulatory framework

Identifying and describing what ought to constitute a regulatory framework for the water services sector is a challenging and complex task. A number of important regulatory mechanisms have begun to emerge, but these are not as yet codified in a single coherent policy document. The sector itself is extremely complex, characterised by many levels and a plethora of relationships that need to be monitored and regulated.

In order to begin to determine the types of management information that will be required to support a regulatory framework, it is important to identify and describe the elements that ought to constitute the framework. By examining the aims of objectives of these elements, it will be possible to begin to identify the nature of the information required in order to give them substance.

6.2 Principles guiding the regulatory framework

At the first Steering Committee meeting of this project, the following guiding principles were put forward and accepted:

- The regulatory framework should serve both the Water Services Act and the National Water Act;
- The framework should be simple and easy to implement; and
- The system should be integrated and not stand in isolation.

In addition to this, the principle of co-operative governance and developmental regulation is important to consider. This is fleshed out in the following paragraph.

6.2.1 Developmental regulation

Current legislation, including the Constitution and the Local Government Municipal Structures Act, emphasise the right and duty of local government to provide services while placing on other spheres of government the responsibility to set and monitor basic norms and standards, and to ensure that local government is adequately supported in the provision of these services. Regulation then aims to provide a framework within which those engaged in service provision will be assisted to achieve the common goals of government rather than subjected to control from the centre. This particular approach to regulation raises certain difficulties from an information and regulatory perspective.

6.2.2 Method of regulation

As described earlier in this report, four methods of regulation can be identified, based on the following:

- Outcomes
- Outputs
- Rate of return
- Inputs

Outcomes based regulation set the broadest objectives for services providers and measures only performance against these objectives. This could be done with relatively simple indicators.

Output based regulation is based on regulating the service the organisation provides and the price which is charged for this service. In the case of water services this could also include the resources which are used and the return of these 'used' resources to the environment.

Rate of return regulation is focused on regulating the amount of profit, or surplus, which an organisation can make. Thus the emphasis is on financial indicators.

Input based regulation is orientated towards regulating inputs used in delivering the service (staff, capital, water resources, chemicals etc).

Each of these options has specific information requirements, increasing progressively as one moves from outcomes based to input based regulation. Thus it is clear that the method used for regulation has to be determined before information systems can be addressed.

6.3 The components of a regulatory framework

The following broad areas all constitute aspects of a regulatory framework. Some of these areas have been relatively well defined and represent clear progress towards developing a regulatory regime. Others still need to be developed, including the key question around who the regulator ought to be. Importantly, these elements are currently not integrated into a single coherent regulatory policy.

- Legislative mechanisms (including legislation and regulations);
- Legal mechanisms (including licensing, agreements and contracts);
- Institutional mechanisms:
Dedicated regulatory structures;
- Administrative mechanisms:
Processes;
Procedures; and
- Communication and transparency.

6.4 Regulatory instruments

Given the notion of developmental regulation and the reality that many local authorities, who are presently the largest group of service providers, lack capacity in key areas, the following regulatory instruments are appropriate for the water services sector:

- Legislation:

- The nature of contracts between parties;
- Development plans; and
- The dissemination of information.

Each of these will be explored in following sections.

6.4.1 Legislation

This has been largely covered in an earlier section of this report. It is the legislation, particularly the Water Services Act and the National Water Act, that enables and necessitates the regulatory instruments outlined in the following sections. This legislation is supported by regulations gazetted by the Minister which are more specific in their requirements than the initial legislation.

6.4.2 Contracts between Parties

The water services authority is key to these contracts as it is the structure that is politically responsible for ensuring water services provision. The water service authority (WSA) is at the centre of a complex range of relationships with other entities and structures. Each of these relationships should be defined by some form of agreement or contract, and it is these agreements that need to be formalised in order to give substance to this regulatory instrument. The following relationships require contracts:

6.4.2.1 WSAs and Water Service Providers (WSPs)

Where the WSP is not the WSA a formal contract needs to be established. The nature of these contracts will be determined by Regulations issued by the Minister. Draft regulations in this regard have been published and are outlined earlier in this report. WSAs and residential users – this relationship is guided by law and articulated in Water Services Development Plans. No formal contract exists between the Authority and the user.

6.4.2.2 WSPs and consumers

Although the political responsibility for providing water services rests with the WSA, the formal supply agreement is between the consumer and the WSP.

6.4.2.3 Internal relationship

Where the WSA and the WSP are the same entity the relationship between the authority (council) and service provider (the department doing the work – preferably ring-fenced) may not be defined in a formal contract but will be guided by the WSDPs.

6.4.2.4 WSAs and Bulk service providers

A formal agreement must exist. This will focus more in the technical and financial aspects associated with supplying water of a certain quantity, quality and reliability.

6.4.2.5 WSAs and Catchment Management Agencies (CMAs)

One of the key responsibilities of the CMA will be to regulate and control the allocation of water resources through the issuing of authorisations and licenses. The

CMAs will make allocation decisions on the basis of a Catchment Management Strategy (CMS) which it will compile after taking the WSDPs of the WSA in the region into account. If the CMA is yet to be established, the DWAF regional office takes responsibility for these functions.

6.4.2.6 WSPs and large industries

For all larger industrial users a specific contract must exist between the user and the service provider which must provide recourse to the service authority.

6.4.2.7 Water Boards and DWAF national office

In terms of the Water Services Act, a water board must prepare and adopt a business plan relating to the following five financial years. Every business plan must be submitted to the Minister. In addition to this a report must be submitted to the Minister, any relevant Province or Parliament, and must be publicly accessible. The report must contain sufficient information to allow the Minister, the relevant Province, relevant water services institutions, and the public to assess the performance of the water board.

7. The objectives of the National Information System

The Directorate: Water Services in its NIS Prospectus lists the following as objectives of the NIS for water Services:

- Provide ongoing information management support to planning, management and monitoring and evaluation of water services in South Africa at both national and regional levels;
- Provide ongoing support to institutional development in the water services sector in South Africa through provision of reference information and a help system facility with respect to legislation, policy and standards;
- Create ongoing awareness about the status of water services provision in South Africa through publication and dissemination of periodic national and regional status reports; and
- Ensure the existence of standards and guides for data collection and management, indicator formulation and implementation of adequate quality control and quality assurance protocols.

8. The functions of an information system at national level

Following the discussion in earlier section of this document, information may be used to support the primary functions of regulation and to provide support to WSIs. It may also have a third function: assisting national planning and management. Each of these aspects is dealt with below.

8.1 Management and planning by government

The day-to-day management of the different components of the water services system requires access to comprehensive, adequately aggregated information. The sector is

characterised by a number of different Directorates, each with different but related information requirements. It is important to determine which user groups should be served by the information system and to carefully establish their needs. A common error that information system planners make is to rely on a data-driven process. Understanding who the users of the information are going to be and what their needs are is a crucial step in designing these systems. This information will usually be derived from the day-to-operations of the different functional areas.

8.2 Support to the public and WSIs

Management information plays a key role in reporting at a variety of different levels. At the most basic level, the information system will enhance transparency by providing information in a form accessible to the public. The information system should also facilitate the flow of information between different categories of Water Services Institutions. The system should also facilitate the flow of information between government departments. The information system needs to be flexible enough to be suitably aggregated to facilitate reporting up the organisational hierarchy without overloading these decision makers with reams and reams of operational level data.

8.3 Regulation and monitoring

One of the key functions that the information system ought to play is in supporting the regulatory framework. This is an issue central to this particular project. The following section of this document outlines some of the elements that comprise a regulatory framework. It is important to recognise that the extent to which management information can support regulation is largely dependent on how well the objectives of the regulatory regime are defined.

9. Current MIS Initiatives

9.1 NIS

Refer to the local literature review in section 4.2.

9.2 Regulatory information

Currently DWAF has established information requirements as follows:

- 'Starter tables' related to water services development plans (WSDPs).
- Reporting template relating to water board business plans.
- Water audit requirements in draft regulations.

9.3 Benchmarking Project

The Benchmarking Project briefly profiled in the literature review is an important initiative as it has a practical application in that one of its intended outputs is a set of guidelines for the implementation of benchmarking practices in the provision of water services in South Africa.

The Water Research Commission initiated an investigation in 1998 to explore the potential usefulness of establishing guidelines on performance indicators and benchmarking for local authorities. Most local authorities polled indicated that they thought such a guideline would be useful. Recently a workshop was held with the aim of ensuring that water services providers fully understand the concept of benchmarking. The workshop was also used to develop the guidelines into a suitably useful document.

During the process of developing these guidelines, the WRC recognised "the need for a large database to contain the data on the key performance indicators that will be generated" and that "it may be necessary to use a specialised computer and user-friendly software. The Department of Water Affairs and Forestry, the Department of Provincial and Local Government, the Water Research Commission or the South African Local Government Association could possibly be responsible for hosting and maintaining the database."¹

One of the issues raised at the benchmarking workshop centred around the institutional home of the underlying database. Debate on the preferred benchmarking database service provider was, however deferred.

9.4 Information held by water boards

The Association of Water Boards, is currently setting up a database to manage key performance related data for its members.

9.5 Management guidelines for water service institutions

The management guidelines for water service institutions prepared by Palmer Development Group for the Water Research Commission sets out the information which needs to be provided for monitoring purposes. This is essentially output from the WSDP, complemented with additional information to be provided by water service providers on an annual basis. These tables cover the following broad categories for water supply:

- Existing bulk infrastructure;
- Operating expenditure;
- Consumption;
- Tariffs;
- Consumer units;

¹ Extracts from a booklet prepared by the WRC entitled 'Guidelines for the implementation of benchmarking practices in the provision of water services in South Africa'.

- Costs;
- Capital expenditure;
- Existing connector and internal reticulation infrastructure;
- Proposed new infrastructure; and
- Management arrangements.

Similar categories exist for sanitation services.

10. Financing national information management

It has not been possible at this stage of the project to calculate the amount of funding required. Neither has information been obtained from DWAF on their cost estimates.

However, certain options for financing the information management function have been provisionally identified. These are listed below, together with possible advantages and disadvantages:

Option	Advantages	Disadvantages
Funding from fiscus	• Provided for in WS Act. • Relatively simple to administer	• Subject to variation based on the annual priorities of government. • Creates a 'supply side' way of thinking.
Funding as a levy on bulk water supply	• Funding is essentially provided by the users of the service; therefore promotes user focused system. • Can be collected along with WRC levy; therefore requires no new administration.	• May be resistance from WSPs to a new levy, even though this will probably amount to less than 0.1c/kL.
Fee paid by WSPs based on sales or number of customers.	• Also promotes demand responsive system. • If funding requirements change, users can decide to increase amount based on perceived benefit.	• Requires new system for collection. • Possible WSP resistance.

Figure 8 - Financing options

It is possible to see the above options differently from a regulation and WSI support perspectives.

11. Information needs analysis

11.1 Regulatory information

The following key points with regard information requirements need to be noted:

- The starting point in this regard must be agreement on regulatory method.

- Secondly an assessment needs to be made of the capacity of WSPs to provide information.
- Then the important issue of communication needs to be addressed.

11.2 Support information

Support information is aimed primarily at assisting water services institutions with what they need. Therefore it is essential to find out what their needs are.

It was proposed that a start be made as part of this project and a small survey of water services providers has been conducted. The draft questionnaire used in the survey is given as Annexure A to this document. This has been formulated in discussion with the Association of Water Boards and SALGA representatives. The results of the survey investigation follow in the next section.

12. Survey of Water Boards and Water Service Authorities

12.1 Introduction

The objective of this part of the project is to support the other components of the study by canvassing views on regulation and related information issues from a sample of Water Boards and from a number of Water Services Authorities (WSAs).

12.2 Methodology

The survey instrument is a questionnaire which explores existing regulatory and related management information mechanisms. The questionnaire also explores the interviewees' views on possible future models of regulation and regulatory relationships as well as the information flows that would arise from these relationships. Apart from exploring various institutional and information related models for regulation, the survey instrument also seeks to understand information gathering mechanisms that could serve to support Water Services Institutions (WSIs). The survey also explores possible funding options for financing the information management functions arising out of the study. Finally the survey investigates WSI views on the amount of information that can reasonably be requested by a regulatory or support body. A copy of the survey questionnaire is appended to this report.

After discussion with the Steering Committee of the project, it was decided to interview four Water Boards and Six WSPs. The Water Boards interviewed include:

- Amatola Water Board,
- Bushbuck Ridge Water Board,
- Rand Water, and
- Umgeni Water.

The Water Services Authorities (all local authorities) interviewed were:

- Brits,
- Carletonville,

- Durban Metro,
- East London,
- King Williams Town, and
- Pretoria.

A list of the officials interviewed is appended to the report.

Each of the interviewee institutions was visited by a member of the study team who administered the questionnaire. The instrument comprised both qualitative and quantitative questions.

12.3 Findings

12.3.1 Management Information Systems (MIS)

All of the WSIs interviewed indicated that they either had, or were in the process of developing, an internal MIS. Generally speaking, these internal systems were geared towards managing the day to day operations of the institution. Seven of the respondents indicated this as the primary function of the MIS). Other MIS functions identified include; financial management, technical operations, planning and decision making and enhancing customer service.

12.3.2 Reporting Systems

All of the institutions indicated that management information was used in reporting to top management. 60% indicated that this reporting happened on an *ad hoc* basis, while the remaining 40% reported to executive managers on a monthly basis.

MIS was also seen as an important tool for reporting to Council. Thirty percent reported to Council on a Monthly basis, while twenty percent did so quarterly. The remaining 50% did so on an *ad hoc* on-request basis.

Generally speaking, the data behind the MIS was derived directly from the day-to-day operations of the institution. 9 out of the 10 respondents indicated that this was the case, while one, Bushbuck Ridge, indicated that they have a dedicated system for this function which costs approximately R100 000 to run.

Significantly, 85% of the sample felt that their MIS systems were inadequate in their current form. When asked to suggest areas where the MIS could be improved, the following changes were suggested:

- Increased functionality and simplicity of use,
- Adding Geographical Information System (GIS) functionality,
- Strengthening financial management functionality,
- Increasing technical management functionality,
- Providing adequate training for the system, and
- Integrating fragmented components of the system into a single, seamless system.

12.3.3 External Management Information and reporting systems

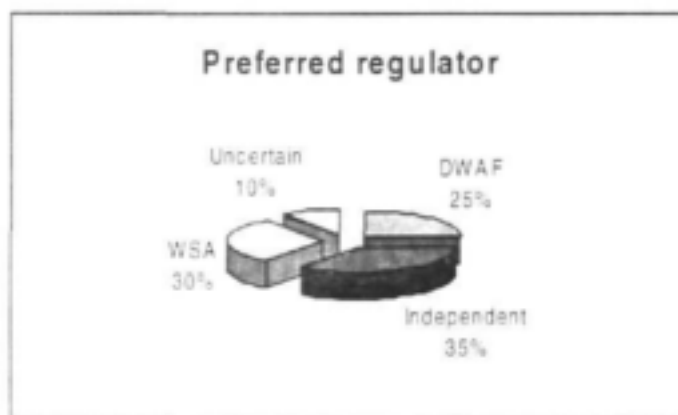
Most of those surveyed (7) indicated that they did not currently access external management information systems, although many saw the value of these systems. Four of the ten indicated that interfacing with an external system could facilitate benchmarking. Other functions of an MIS mentioned by respondents include; facilitating communication with other related organisations, assisting with financial management, and regulatory purposes.

When asked who they report to, 90% indicated that they report to DWAF. Four of the six WSAs report to the relevant Water Board. Two WSIs report to the Department of Finance, while one each reports to their customers and to province respectively². Seventy five percent felt that the external reporting was adequate in its current form, although the point was raised that the frequency of this reporting is a burden on their administrative structures.

12.3.4 Regulation

When probed on what ought to be regulated in the water services sector, half of the respondents indicated that the relationship between DWAF and water services authorities and providers needs to be regulated. Three indicated that the relationship between WSAs and WSPs ought to be regulated. Three felt that the proposed Catchment Management Authorities will need to be regulated. Significantly, 50% of the sample indicated that the interface between the WSP and customers need to be monitored and regulated.

When asked which body ought to play the role of regulator, the respondents were divided. 35 percent felt that this role ought to be filled by an independent regulator, with no links to DWAF. 25 percent saw DWAF as the body best placed to fulfill this function. Three of the ten felt that regulation ought to be a local function and that the WSA was best placed to do this. One of the respondents was unsure³.



² Note that respondents often report to more than one body.

³ Note – Fractions arise due to respondents favoring one body for central regulation and another for local regulation.

Figure 9 - Preferred regulator

Similarly, there was much diversity when respondents were asked what type of information ought to be collected by the regulator for regulation purposes. Responses include:

- Strategic level information,
- Operational data,
- Pricing information,
- Quality related information,
- Social and environmental information,
- Performance measured by Key Performance Indicators (KPIs),
- Water Service Development Plan data, and
- Contract compliance.

An observation arising clearly from this, is that there is currently no universally applied notion of what constitutes regulation, who the regulator ought to be, or what data ought to be collected to support regulation.

12.3.5 Quid pro quo

When asked what their institutions should expect in return for supplying data to the regulator, forty percent indicated that comparative benchmarking data ought to be provided by the regulator. Forty percent felt that the regulator ought to provide support based on the issues arising from reported data. Forty percent indicated that they would expect feedback from the regulator. One respondent hoped that by supplying this type of data, equitable treatment of WSPs would arise.

12.3.6 The Role of Regulator – Institutional options

Interviewees were asked to rate DWAF current regulatory position on a scaled from one to five with 1 being poor and 5 being excellent. Responses ranged from 1 to 4 with an average score of 2.1 indicating that respondents see DWAFs current performance as regulator as being “not good”. When asked to rate DWAFs ability to fill the role of regulator in the future, scores ranged from 1 to 4 with a mean score of 3 indicating an expectation that DWAF can play an ‘adequate’ role as regulator in the future.

A number of additional options for the regulator were also explored. The option of DWAF with a private information contractor also score an average of three, indicating the expectation that such a regulatory structure would perform the regulatory role satisfactorily. An independent body as regulator in the future was rated at 3.9, indicating that on average, respondents felt positive about such a body as regulator. An independent body with a private information contractor was rated at an average of 3.5, midway between ‘good’ and ‘adequate’.

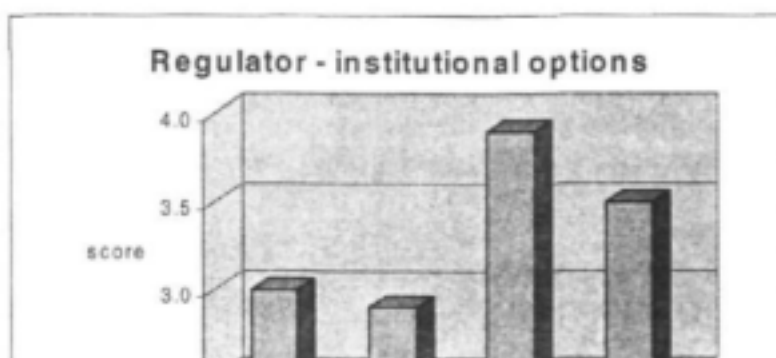


Figure 10 - The regulator - institutional options

12.3.7 Information for supporting WSIs – Institutional options

This section of the questionnaire was intended to deal with the second main function of a national MIS, namely that of providing information which supports water services authorities. When asked how they perceive DWAF's current role in this regard, interviewee responses varied from 1 to 4 with a mean score of 2.5, midway between 'not good' and 'adequate'. DWAF's ability to play this role in the future was rated an average of 3.3 indicating some confidence that DWAF's performance in this regard is likely to improve.

A number of alternative options for the information support role were explored. DWAF supported by a private information contractor scored an average of 3.2, indicating a perception that such an arrangement would simply be 'adequate'. An independent body scored a little better with an average score of 3.5, midway between adequate and good. A suggestion that SALGA play this role was not well received and scored an average 1.8 indicating little faith in this organisation playing an information support role. The Water Boards surveyed indicated that they felt that the Association of Water Boards could adequately play this role with a mean score of 3. A new association of WSP's also attracted a mean score of 3. The most favoured option for playing the information management role by some margin was the Water Research Commission which scored 4.2 (between 'good' and 'excellent').

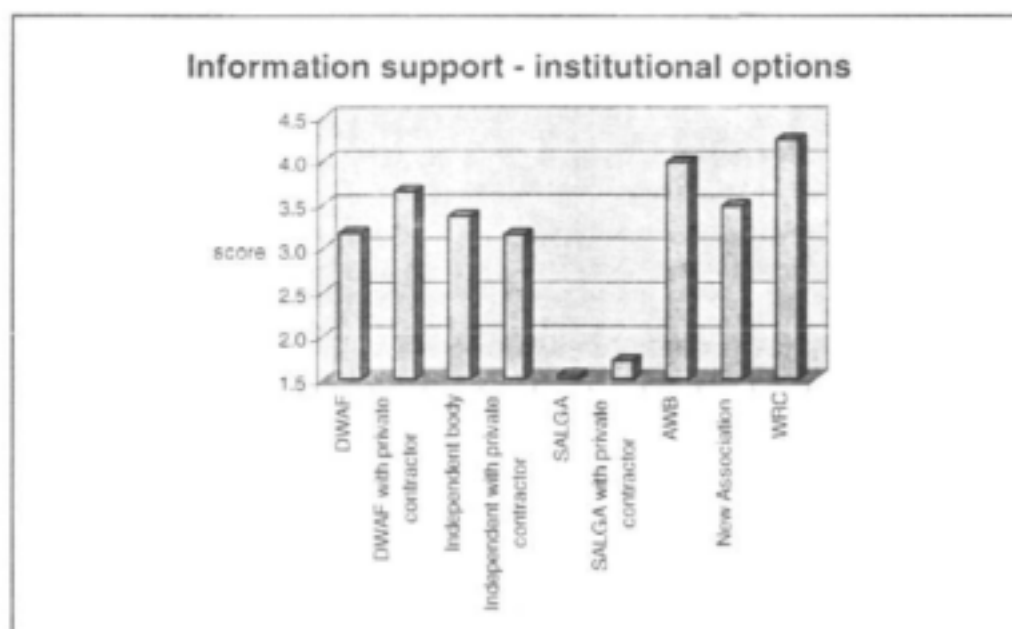


Figure 11 - Information management for WSI support – preferred options

12.3.8 Financing the national MIS

When asked how the MIS ought to be funded, three alternatives were presented including:

- Payment from the national fiscus,
- Payment as a levy on bulk water sold, and
- Payment by WSPs based on retail sales.

The favoured option was direct funding from the national fiscus scoring a 3.6, although there was considerable variation between the respondents. All of the options were rated 5 (excellent) by at least 1 of the respondents.

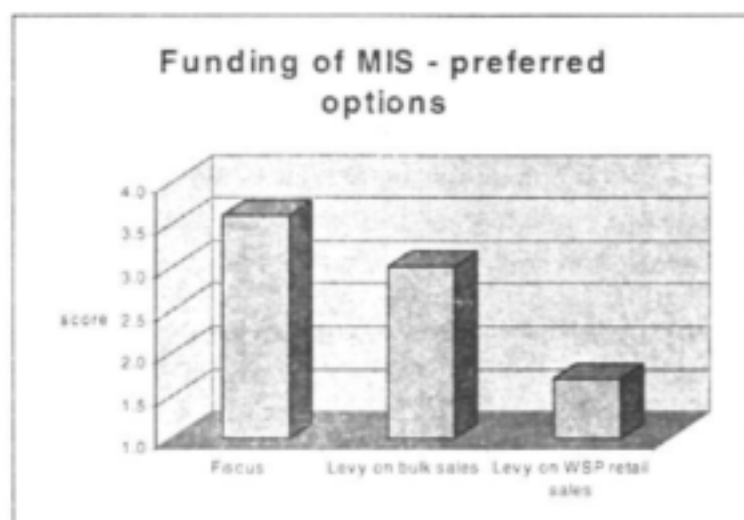


Figure 12 - Financing MIS - preferred options

12.3.9 Level of information

This section of the survey is intended to assess the amount of information which can reasonably be requested from WSIs. In doing this, the questionnaire explores the respondents knowledge of existing reporting channels and proposals and rating them with regard to the extent to which they would be willing or able to provide information. The following table summarises the responses by providing the average scores.

	Muniwater	WSDP starter requirements	Water Audit	WRC reporting guidelines for WSIs	Current proposals for a National Information
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					System
Knowledge of the following ⁴	1.3	2.7	2.5	2.3	2
Extend of ability to provide required information ⁵	2.3	4.2	4.3	4.1	3.3

Figure 13 - Knowledge of information initiatives and ability to provide the required data

From the above table, it is clear that most WSIs believe that supplying data related to the WSDP starter requirement, the Water Audit, and the WRC reporting guidelines is relatively easy. Most respondents did not know much about Muniwater, or the Current proposals for a National MIS.

12.3.10 Level of information – Water Boards

In addition to the previous section, Water Boards were asked whether they were familiar with the following:

- Reporting templates related to business plans.
- Association of Water Boards (AWB) requirements for their database, and
- American Water Works Association (AWWA) requirements.

They were also requested to rate each of these with regard to the extent to which they would be able to supply the current information. The following table summarises the responses.

	Business plan templates	AWB database requirements	AWWA requirements
Knowledge of the following ⁶	4	3	1
Extend of ability to provide required information ⁷	4	3.7	na

Figure 14 – Water Boards' knowledge of information initiatives and ability to provide required data

⁴ A 4 point scale was used for this question. 1=don't know at all, 2=have seen, 3=have assessed, 4=have used.

⁵ A 5 point scale was used for this question. 1=very difficult, 5=very easy.

⁶ A 4 point scale was used for this question. 1=don't know at all, 2=have seen, 3=have assessed, 4=have used.

⁷ A 5 point scale was used for this question. 1=very difficult, 5=very easy.

From the table above it is clear that there is a great deal of knowledge of the business plan templates with all the Water Board familiar with these and all indicating that they can meet the reporting with ease. Most were also familiar with the AWB database and felt comfortable meeting the associated information requirements. On the other hand none of the Water Boards surveyed had any knowledge of the AWWA requirements.

12.4 Summary of survey findings

12.4.1 Management information systems

- All WSIs interviewed either have or are developing an internal MIS
- All respondents use the MIS in reporting to top management and to Council
- 85% feel that their current MIS systems are inadequate
- 70% do not have access to an external MIS

12.4.2 Relationships to be regulated

- 50% feel that the relationship between DWAF and WSAs should be regulated
- 50% feel that the relationship between WSPs and consumers should be regulated
- 30% feel that the relationship between WSAs and WSPs should be regulated
- 30% feel that the proposed CMAs be regulated

12.4.3 The regulator

- 35% feel that an independent regulator is most appropriate
- 25% see DWAF playing the role as regulator
- 30% feel that regulation ought to be a local function of the WSA

12.4.4 Role of regulator – institutional options

- DWAFs current performance as regulator is perceived as 'not good'
- DWAF is seen as being in an 'adequate' position to play this role in the future
- An independent regulator is in a 'good' position to play this role in the future

12.4.5 Information for supporting WSIs – institutional options

- The WRC is seen as best placed to play the role of information manager in supporting WSIs
- DWAFs current performance of information manager is perceived as between 'not good' and 'adequate'
- DWAF is seen as being in a 'good' position to play this role in the future

12.4.6 Financing options

- The favoured option is funding directly from the fiscus
- Payment as a levy on bulk or retail sales also enjoys some support

13. Conclusion and recommendations

This report has identified and raised a number of key issues related to management information and regulation. As far as possible, the document goes further and begins

to flesh out and debate these issues. It is intended that this report act as a catalyst by mapping out the regulatory and MIS landscape and by raising the issues that need to be resolved in order to advance towards a coherent regulatory framework to address the unique specificity's of the South African water services sector.

Some of the key issues raised by the report and which require rigorous debate include:

13.1 Where should ownership of a Management Information System aimed at supporting the water sector be vested?

In terms of the legislation, including the requirements of the Water Services Act and the National Water Act, the Minister is responsible for ensuring that there is a National Information System on water services and in a range of water resource areas.

The report has also indicated that there are a number of associations and institutions which currently support the water services sector. These include SALGA, The Association of Water Boards, and the WRC.

The survey of water service authorities and water boards indicate that most respondents would favour either an independent body responsible for the management information system, or see the WRC as an appropriate institutional home for such a system. Respondents felt that DWAF's performance in this regard is currently not good, but that this could improve in the future.

Given that the establishment of a national information system (NIS) is legislated as a function forming part of the responsibilities of the Minister and given that a NIS has been established in the department, it is recommended that this function remain within DWAF. However, given the fact that certain institutions, including the WRC, have an interest in supporting the sector, and insofar as they have capacity to strengthen this function. It is recommended that the NIS, currently falling under the Macro Planning and Information Systems component of the Chief Directorate: Water Services, be encouraged to collaborate with and make its data holdings available to these institutions in order to increase their capacity to provide this support.

Given the findings of the study, it is recommended that the WRC take responsibility for developing and housing a broader management information capability aimed at providing support to the sector as a whole through, *inter alia*, benchmarking and providing data required for effective regulation (see 13.8).

13.2 Who should the regulator be and should the regulator be independent of DWAF?

Based on the findings of this study in general, and of the survey component of the project in particular, two preferred options emerged.

The first option is for an independent national body – whether the regulator would serve simply the water sector, or whether it ought to be a combined utilities regulator needs to be investigated further.

The second option is to locate the regulator in DWAF as a separate unit answerable directly to the Director General.

It is recommended that the regulatory function be integrated into a single regulatory system.

13.3 What method of regulation is required - outcomes, outputs, process, inputs?

The study team's preferred option in terms of regulatory type is an output based method. Outcomes are too vague and difficult to measure while process and input regulation is extremely complex to develop and manage, and often has very little bearing on the impacts on the customer which, after-all, is a key group who's interests ought to be protected by regulation.

13.4 What is the relationship between regulation and support?

While lack of capacity is a common feature of developing economies necessitating support at various levels, the study team recommends that the regulatory and support functions should be separated at the national level and ought to be serviced separately.

13.5 Should the regulator operate at the national or local level, or both?

The regulator must operate both at the national and local level, although it is strongly recommended that the regulatory functions at both levels, this should be integrated in a single system.

13.6 Should different regulators be responsible for regulating at different levels – e.g. DWAF at the national level and WSAs at the local level?

The study team recommends that a single regulatory body be established servicing both the national and local levels. The national office of the regulator will be responsible for ensuring that local capacity is properly developed through appropriate training and support.

13.7 Which relationships need to be regulated?

The key relationship that needs to be regulated is the contract between WSAs and WSPs. In the case of Water Boards, separate contracts will need to be in place with each WSA that is served.

While the experiences of other countries and the business sector are useful in identifying good and best practice when it comes to developing management information and defining key performance indicators, only after the issues raised above are thoroughly debated and resolved, can the specification of a management information system to support regulation be finalised.

13.8 Which organisation ought to be responsible for developing and housing the framework and data required for effective regulation?

It is recommended that an organisation take responsibility for providing the framework and accompanying data required for the effective regulation of the sector. This body would, *inter alia*, develop a benchmarking methodology for measuring the performance of various aspects of the sector. Our survey of water service authorities and water boards suggest that the WRC is the best placed organisation within which to locate this function. The WRC would then form an important link between the various source of information on the sector (including the NIS) and the regulator.

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14. ANNEXURE 1: INTERVIEW QUESTIONNAIRES

A: MUNICIPALITIES

A INSTITUTIONAL FRAMEWORK

Introduction to be given on institutional framework, based on information given in this document.

B CURRENT ARRANGEMENTS

This section to deal with the arrangements currently applied by municipalities:

B1: What internal systems do they have at present for reporting to:

- Top management
- Council

Response is expected to be qualitative but it is hoped that actual reports can be provided in some cases.

B2: What do they currently report externally:

- Name of organisation
- Purpose of report (regulatory? Info sharing?)
- Level of information (No of fields)
- Quality of feedback received: How long does it take to get analysed information back and how good is the quality of the information returned.

C FUTURE: INFORMATION FOR REGULATION

This section is intended to deal with the views of the municipality on regulatory relationships and of the flow of information related to regulation

C1: DWAF as the regulator

After an introduction to put DWAF's regulatory position into context, the following questions as proposed:

- Do you think DWAF is doing a good job from an information point of view (Communicate adequately; clear about parameters; collect information effectively and return analysed results effectively)
- Do you have confidence that they will be able to do a good job in the future:

Excellent	
Good	
Adequate	
Not good	
Poor	

Confident that they will be:	
Excellent	
Good	
Adequate	
Not good	
Poor	

C2: Other options for regulator

Based on the institutional framework described:

- How do you think that other organisations will perform if given the responsibility to deal with information related to regulation.

Rate 1 to 5 (1=poor; 5=excellent)	
DWAF with a private info contractor	
An independent regulator	
An independent regulator with a private info contractor	

D FUTURE: INFORMATION FOR SUPPORTING WSIs

This section is intended to deal with the second main function of a national information system: that of providing information which supports water services institutions which include water services authorities (WSAs) and water services providers (WSPs).

D1: DWAF as the information manager

As an introduction to this question the difference between regulatory and support information roles will be emphasised.

- Do you think DWAF is doing a good job from an information point of view (Communicate adequately; clear about parameters; collect information effectively and return analysed results effectively)

Excellent	
Good	
Adequate	
Not good	
Poor	

- Do you have confidence that they will be able to do a good job in the future:

Confident that they will be:	
Excellent	
Good	
Adequate	
Not good	
Poor	

D2: Other options for information manager

- How would you rate the probability of other organisations performing in the role of support information manager:

Rate 1 to 5 (1=poor; 5=excellent)	
DWAF with a private info contractor	
An independent regulator	
An independent regulator with a private info contractor	
SALGA (in the case of municipalities)	
SALGA with an info contractor	
Assn of water boards (in case of water boards)	
New association of all WSPs	
Water Research Commission	

E FINANCING THE NATIONAL INFO FUNCTION

A number of options for financing the information management function have been identified in the report. This section will deal with the view of the WSP on this issue.

- Which of the following options would you support to finance the national information management activity.

Rate 1 to 5 (1=poor; 5=excellent)	
Payment from (fiscus) national budget	
Payment as a levy on bulk water sold (less than 0.1c)	
Payment by WSPs based on retail sales	

F LEVEL OF INFORMATION

This section is intended to assess the amount of information which can reasonably be requested.

F1: Information for regulation from municipal WSPs

- Do you know of the following:

1=don't know at all; 2=have seen 3=have assessed; 4=have used	
Muniwater	
WSDP starter requirements required by DWAF	
Water audit in draft regulations from DWAF	
Reporting requirements in WRC management guidelines for WSIs	
Current DWAF proposals for NIS	

- If you know about them How would you rate the following with regard to the extent to which you would be able to provide information:

Rate 1 to 5 with 1=very easy to provide and 5=very difficult	
Muniwater	
WSDP starter requirements	
Water audit	
Reporting requirements in WRC guidelines for WSIs	
Current proposals for NIS	

F2: Information required from water boards:

- Do you know of the following:

1=don't know at all; 2=have seen 3=have assessed; 4=have used	
Reporting template related to business plans	
Assn of WBs requirements for their database	
AWWA requirements	

- If you know about them How would you rate the following with regard to the extent to which you would be able to provide information:

Rate 1 to 5 with 1=very easy to provide and 5=very difficult	
Reporting template related to business plans	
Assn of WBs requirements for their database	
AWWA requirements	

15. ANNEXURE 2: INTERVIEWS

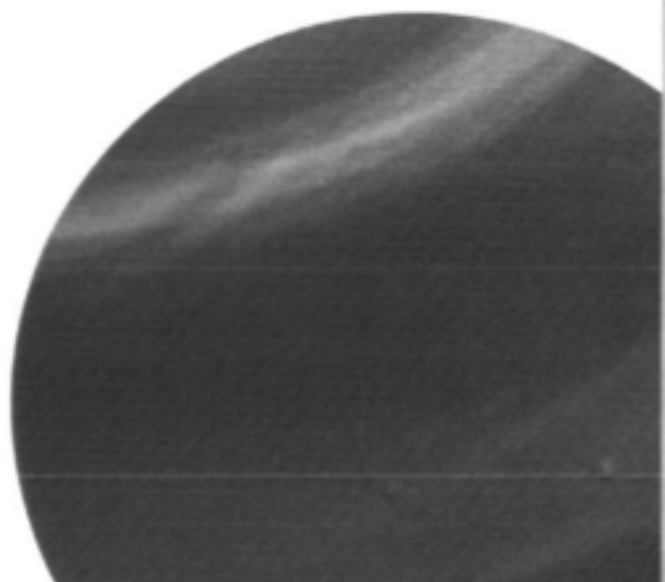
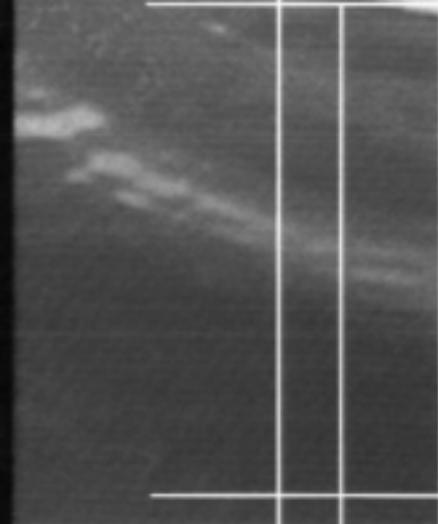
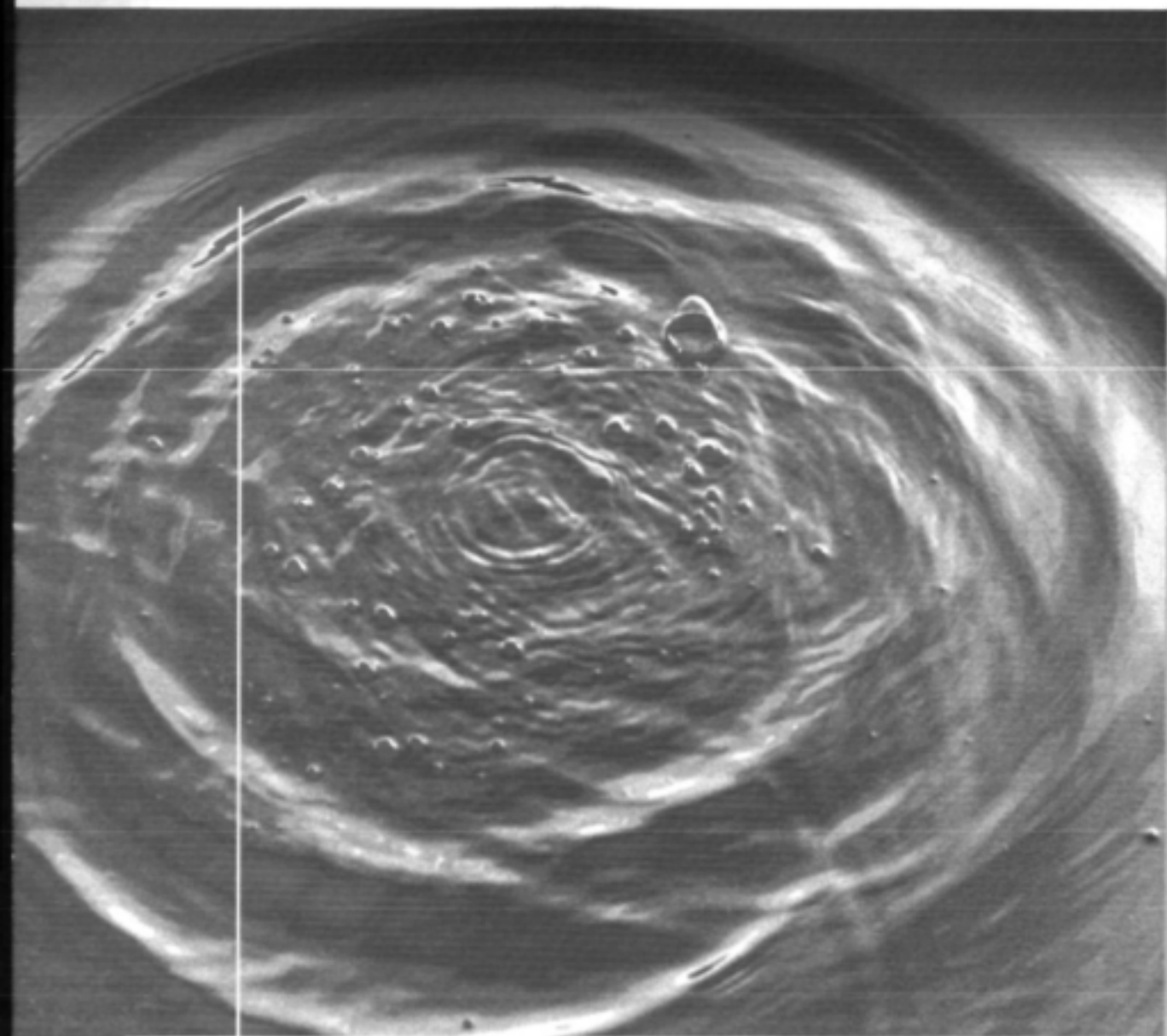
Amatola Water Board – 19 Oct 2000	Johan Killian
Bushbuck Ridge – 17 Oct 2000	Gibson Nkuna
Rand Water – 20 Oct 2000	Pat Ward
Umgeni Water – 16 Oct 2000	Yogan Reddy
Brits – 12 Oct 2000	Pieter Buys
Carletonville – 12 Oct 2000	Terence Kent
Durban Metro – 16 Oct 2000	Neil MacLeod
East London – 19 Oct 2000	Mr James' stand in
King Williams Town – 18 Oct 2000	Mr C. Hitem
Pretoria – 13 Oct 2000	Mr FE Mouton

16. ANNEXURE 3: SUMMARY OF INTERNATIONAL CASE STUDY INDICATOR CATEGORIES

Case Study	Indicators
Melbourne, Australia	Customer numbers and system lengths • Number of water customers – domestic and non-domestic; • Number of sewerage customers – domestic and non-domestic; • Length of water main; • Length of sewerage main; • Volume of water delivered; and • Volume of sewage delivered. Water Quality • Number of water quality samples tested (for coliforms); • Percentage of water quality samples meeting guideline – total and faecal; • Water quality complaints per 1000 customers; • Overall sewage treatment plant compliance (%); and • % of effluent and biosolids reused. Reliability of service • Water supply interruptions per 100km of water main; • Average frequency of water supply customer interruptions – planned and unplanned; • Water supply interruptions restored within 5hrs (% of interruptions) – planned and unplanned; • Average duration of water customer interruptions (minutes) – planned and unplanned; • Unaccounted water; • Average water customer minutes off supply – planned and unplanned; • Average response time to priority one interruptions; • Sewer blockages per 100km of sewer main; • Sewer spills from reticulation and branch sewers fully contained within 5 hours • % of sewage split; and • Calls to emergency phone line (answered in 30 seconds). Affordability • Utility relief grants scheme – applications approved per 100 000 domestic consumers; • Utility relief grants scheme – average amount granted; • Restrictions for non-payment of bills – per 1000 customers; • % of domestic and non-domestic customers with instalment plans; • Legal actions per 1000 customers; and • Average domestic consumption. Customer Service • Complaints per 1000 customers.
England and Wales	Level of service indicators • Companies must report their achieved performance on: The availability of water resources, restriction on water use, low pressure, interruptions, flooding from sewers, responses to billing queries and written complaints, the answering of telephone calls and the frequency of meter reading. Company performance under the Guaranteed Standards Scheme • Customers are entitled to certain guaranteed standards laid down by the government. These standards cover interruptions to the water supply, flooding from sewers, written account queries, making and keeping appointments, responding to account queries and complaints, and installing a meter. Where these standards are not met, compensation is payable. Non-financial measures • population supplied; • number of households and non-households receiving measured and unmeasured supplies of water and sewerage services; • new connections; • meter installations; • supply to non-households in consumption bands; • volumes of water affected by various undertakings and relaxations; • the components of water delivered including leakage; • volumes of sewage and effluent collected, treated and disposed; • lengths of water mains and sewers inspected, repaired and renewed; • types of water source; • treatment needs; and • types of water and sewage treatment works. Regulatory accounts • profit and loss accounts and balance sheets;

	• cash flow statement; • operating costs analysed by types of direct cost; • maintenance and other expenditure for water and sewerage services; • revenue from measured and unmeasured supplies of water and sewerage services and other sources; • values and types of assets; • movement in working capital; and • transactions with associated companies. Financial measures • asset additions; • maintenance and depreciation by type and asset life; • expenditure by purpose for water and sewerage services (base service, quality enhancements, enhanced service levels and improvements to the supply/demand balance); and • proceeds from land disposals.
Jamaica	OVERALL STANDARDS Drinking water quality • Testing samples for impurities Water Pressure • Minimum water pressure Reliability of supply • Restoration after planned work GUARANTEED STANDARDS Access • Connection to supply • Issue of first bill Inquiries • Keeping appointments • Responses to complaints not related to billing Bill inquiries • Bill accuracy • Final bill Reliability of supply • Restoration after emergency lock-off Water meters • Meter installation • Repair or replacement of faulty meters • Changing meters • Meter reading Reconnection • Reconnection after payment of overdue amounts Sewerage • Correction of sewerage problems Compensation Payment • Payment of Compensation
Chile	Solid, timely and accurate general management information
Argentina	Process indicators including: • Increase in production capacity • Water pipes rehabilitated • Sewers drained • Decline in clogged drains • Staff reduction • Residents with new water connections • Residents with new sewer connections
AWWA	General information • Water production and sales; • Population served and services provided; • Financial overview; • Total capital expenditure; • General surface water – source, average day production, pretreatments; and • Groundwater – number of wells, average day production. Revenue data • Water charges; • Active connections – metered and unmetered; • Revenue from water sales; • Meter reading and billing; • Payment methods; and • Customer inquiries.

	Financial data • Capital expenditure; • Operation and maintenance expenses; and • Operation and maintenance outsourcing. Water Quality • Surface water quality; • Distribution system water quality; • Groundwater quality; and • Distribution system laboratory analysis. Treatment Practices • Surface water treatment; • Surface water residual treatment and disposal; • Groundwater treatment; and • Groundwater residual treatment and disposal. Distribution • Miles of pipe; • Main breaks; • Storage facilities; and • Type of pipe materials.
World Bank	Core indicator categories: • Coverage; • Water consumption and production; • Unaccounted for water; • Metering practices; • Pipe network performance; • Cost and staffing; • Quality of service; • Billing and collections; • Financial performance; and • Capital investment.



Water Research Commission

PO Box 824, Pretoria, 0001, South Africa

Tel: +27 12 330 0340, Fax: +27 12 331 2565

Web: <http://www.wrc.org.za>



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