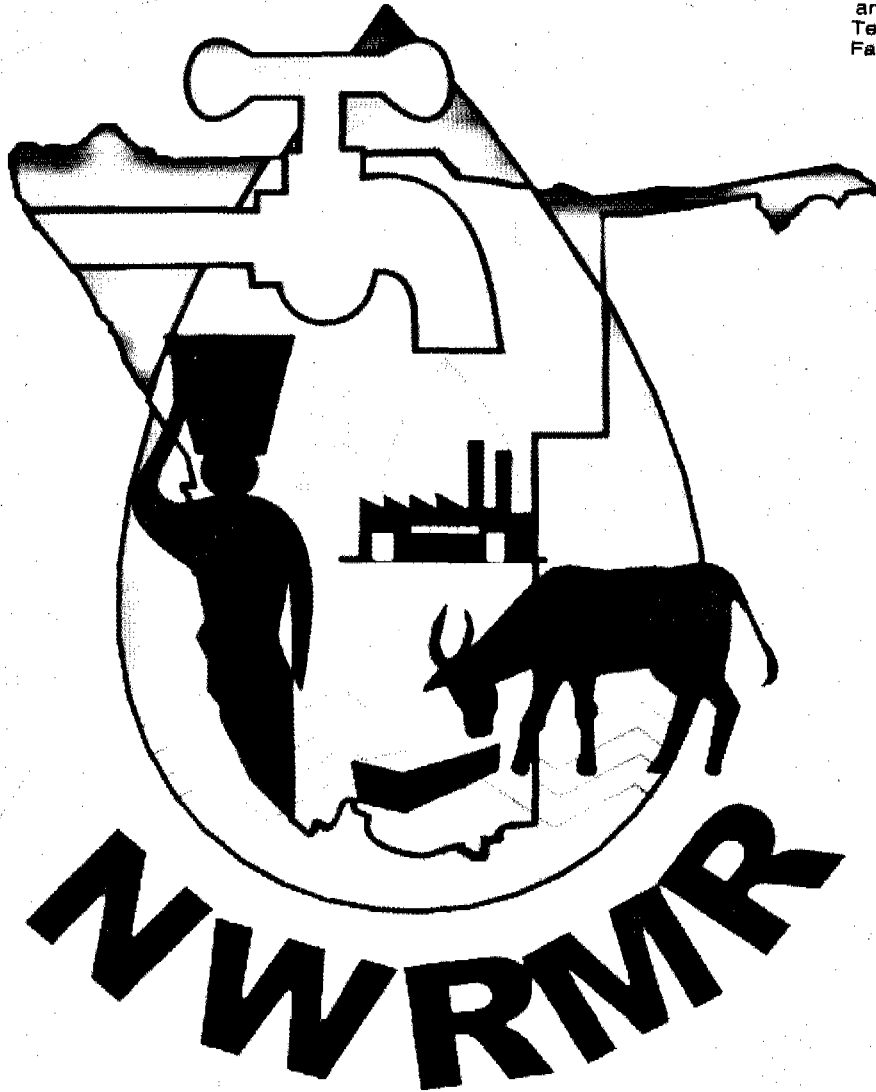


# Namibia water Resources Management Review

## KEY ISSUES PAPER

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### Contact information

Tel: +264 61 255637

Fax: + 264 61 255639

Email: [samuelg@iafrica.com.na](mailto:samuelg@iafrica.com.na)

**APRIL 1999**

Dear Reader,

The Key Issues Paper is a strategic document that has examined the overall water sector in Namibia. It has identified key gaps and constraints that inhibits integrated management in the water sector and has analysed and reviewed them in order to come up with proposals for new institutional, legislative and policy framework. Suggestions and preliminary thoughts on what to happen in the water sector are contained in this key Issue Paper including the core principle that water must no longer be perceived as a purely public good; it is a scarce commodity with dimensions of social equity, economic efficiency and environmental sustainability. This has been done in consultation with all the key stakeholders in the water sector.

Thus, the finalised draft key issue paper was broadly distributed to all the Task Force members for consultation. Consequently, a Task Force meeting of March 30, 1999 discussed and endorsed the draft key issue paper. After comments from TF members have been incorporated in the Key Issue paper, it has now to be submitted to the broad spectrum of key stakeholders and other interest groups in the water sector for their inputs, comments and suggestions. These comments and suggestions will form part of the Theme Report, which is the next stage of the Review.

In the Theme Report, the Review's Technical Team will come up with workable and implementable recommendations for policy and legislative framework that will guide the water sector into the next millennium. The recommendations should also suggest mechanisms to be put in place for ensuring the fair access of water to all Namibians.

The Review, therefore, request comments and suggestions from members of the public, governmental institutions, non-governmental organisations and other interest groups in the water sector on the key issue paper. The Review appreciates that there may be some factual errors and omissions in a study of this scale, and would therefore be grateful for all comments. The comments should reach the Review not later than June 10, 1999, and should be addressed to:

Technical Team Leader  
PO Box 2586  
Windhoek, Namibia

Tel (061) 255637/8  
E-mail: [nwrmr@iafrica.com.na](mailto:nwrmr@iafrica.com.na)

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## A. INTRODUCTION

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In 1996, the Right Honourable Prime Minister Hage Geingob requested support from the World Bank for the development of water resources in Namibia.

The Namibia Water Resources Management Review ("the Review") was launched by President Sam Nujoma on March 23 1998 and it is funded by the World Bank, GTZ and the United Nations Development Programme. In October 1997 Cabinet resolved as a matter of policy that:

- The review effort must cover cross-sectoral issues and be supported at the highest echelons of Government;
- A Water Resources Task Force be approved by Cabinet to guide the review, comprising all the stakeholders;
- The review be undertaken by a multi-disciplinary technical team comprising Namibian specialists assisted, where necessary, by international consultants; and
- The central focus of the review should be on capacity building and human resources development in order to guarantee future implementation and sustainability.

The long-term objectives of the Review are to promote and achieve equitable access to, and the sustainable management and development of, water resources by all sectors of the population.

The core strategy on which the work of the Review is to be based, is the principle that water must no longer be perceived as a purely public good; it is a scarce commodity with dimensions of social equity, economic efficiency and environmental sustainability.

The immediate objectives of the Review are to:

- examine current water resources management practices;
- define issues and evaluate the impact of water resource allocation, water use and waste water disposal practices;
- propose policies, institutional arrangements, planning, monitoring and enforcement processes which will :
  - provide for the equitable allocation of water resources,
  - ensure the environmental sustainability of water use and reuse,
  - support the long term social and economic development of Namibia, and
  - be based on the full participation of stakeholders; and
  - develop and strengthen the capacity of Namibia to manage its scarce water resource.

The following themes have been identified as key components of the water sector to be reviewed:

- Institutional arrangements;
- Human resources development;
- Legislation and regulation;
- Economics and financing;
- Strategic water assessment;
- Water conservation and reuse; and
- Shared watercourses.

The Review has conducted an analysis of the current situation and has identified key issues in each of the themes identified as outlined above. The aim of this work has been to determine the areas to be focussed on and the work required if the objectives of the Review are to be met. This report, which is a consolidation of the inputs of each of the theme groups within the Review, presents the key issues arising under each theme identified. The key issues papers contained in this report outline the issues identified, describe and analyse ongoing activities and identify the objectives and research agenda of the various theme reports that will be compiled in due course.

Further research will be conducted on the issues raised in these key issues papers with a view to compiling theme reports in respect of the various key component themes identified above. These theme reports, which are to be completed by June 1999, will present and analyse options to address the issues identified and contain proposals in respect of preferred policy and action.

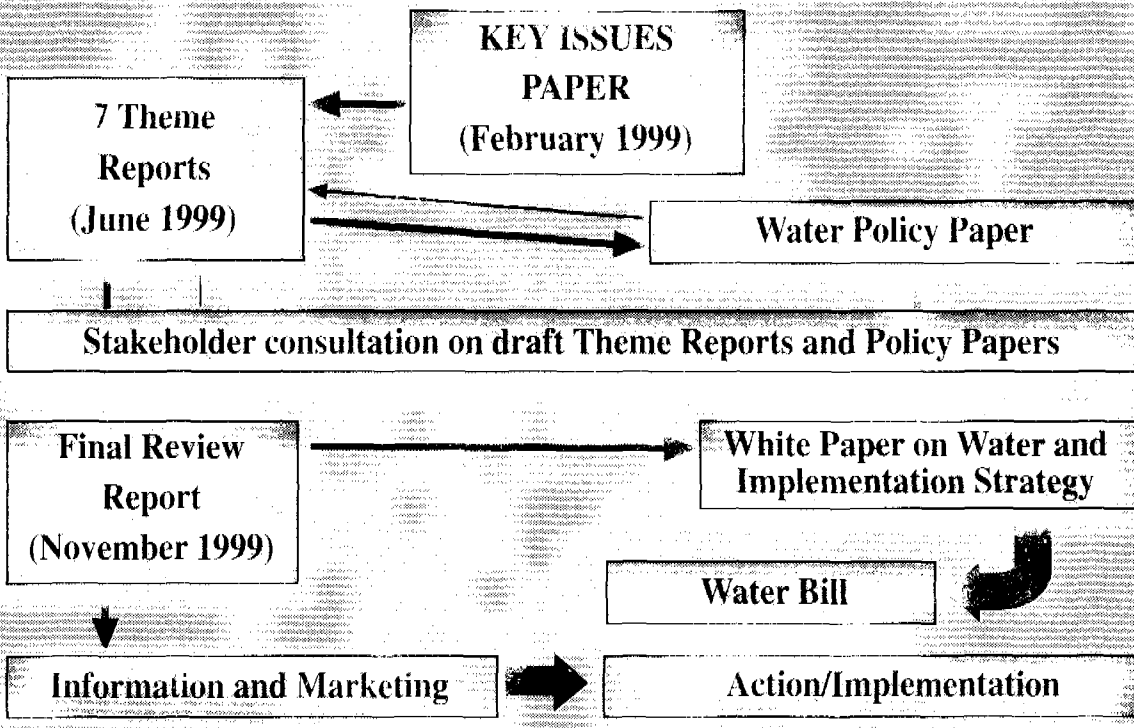
Thereafter the theme reports will be subject to broad consultation with all stakeholders and a final review report summarising the theme reports and consolidating the recommendations will be submitted to Cabinet for the final approval. On the basis of the final review report and input received during the course of this consultative process a White Paper on water and implementation strategy will be compiled, which will form the basis for the new Water Bill.

This process relating to the development of a White Paper on water and implementation strategy and a new Water Bill is summarised in the table below.



# NAMIBIA WATER RESOURCES MANAGEMENT REVIEW: OUTPUTS

## Progress Report and Implementation Plan



## B. INSTITUTIONAL ARRANGEMENTS

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### 1 INTRODUCTION

In considering water resources management institutions and community participation, two Government policies are especially pertinent.

First is the policy of decentralization, which seeks to promote efficiency and effectiveness in the delivery of public services, and to provide the vehicle for greater regional participation in these services. With public officials located where services are delivered, it is clearly much simpler to create institutions or structures of consultation so that community views are built into the decision-making processes. In this way, accountability will be heightened as complementary levels of delegation accompany these decentralized services. The decision-makers will become part of the community, known to all, and easily accessible for discussions. They will also be able to understand in a much more comprehensive and sensitive way, the aims and aspirations of their community.

Second is the clear intention of Government to embark upon public sector reform. Indeed, this is a feature of the first National Development Plan. Namibia inherited an administrative structure designed and attuned to a previous era of public administration, steeped in colonial tradition and remote from the majority of the people. Accordingly, the Review process is analysing, with the participation of all stakeholders, the existing institutions' responsibilities, accountabilities, and linkages. The Review will then propose ways in which these institutions can be reformed to meet the principles of modern integrated water resources management and the national goals of the Government of the Republic of Namibia.

The integrated water resources management principles are based on the fact that water is often poorly appreciated as a finite resource, vulnerable to degradation, and essential for life. At the 1992 United Nations Conference on Environment and Development held in Rio De Janeiro, one of the clearest sets of integrated water resources management principles was developed and adopted.

Agenda 21 describes these management principles as follows.

*"Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilisation. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perennality of the resource, in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately.*

*Integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin. Four principal objectives should be pursued, as follows:*

- (a) To promote a dynamic, interactive, iterative and multisectoral approach to water resources management, including the identification and protection of potential sources of freshwater supply, that integrates technological, socio-economic, environmental and human health considerations;*

- (b) *To plan for the sustainable and rational utilisation, protection, conservation and management of water resources based on community needs and priorities within the framework of national economic development policy;*
- (c) *To design, implement and evaluate projects and programs that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people and local communities in water management policy-making and decision-making;*
- (d) *To identify and strengthen or develop, as required, in particular in developing countries, the appropriate institutional, legal and financial mechanisms to ensure that water policy and its implementation are a catalyst for sustainable social progress and economic growth."*

Studies undertaken in several countries, both developing and developed, have shown that five common features stand out wherever successful integrated water resources management is achieved:

- 1) An institutional framework is developed which is both robust and flexible, and includes modern legislation and an integrated policy framework.
- 2) Planning and management is knowledge driven. Strategic assessment of water and related resources receives high priority, and does not stop at mere data management, but actively pursues the generation of strategically focussed information and knowledge.
- 3) Integration is built into institutions, resource management, and policy. There is recognition of the holistic nature of ecosystems, and all policies, decisions and projects are evaluated against this background.
- 4) Community participation is built into all processes. It recognizes also that the natural resources of a country belong to its people, and they have the right to participate in its management.
- 5) Recognition that water is an integral part of the ecosystem and that healthy, functioning surface waters or wetlands are essential to sustainable and healthy water supplies.

## **2 THE EXISTING WATER SECTOR: AN ANALYSIS**

The existing water sector consists of the following:

### **2.1 Ministry of Agriculture, water and Rural Development**

The Ministry of Agriculture, Water and Rural Development (MAWRD) is responsible for the nation water resources development. At a Strategic Planning Workshop, held in October 1996, the Ministry adopted the following mission:

*"To promote and facilitate the environmentally sustainable development, management and utilisation of water and agricultural resources to achieve sound socio-economic development together with all citizens"*

The same workshop formulated the objectives of the Ministry, as follows:

- ensure progressive improvement in household food security and nutrition;
- ensure access to a reliable water supply of an appropriate standard for household and economic uses;

- facilitate the empowerment of communities to manage their agriculture and water resources;
- assist and advise on the land reform process;
- continuously improve the capacity of the Ministry to best serve its customers, efficiently and cost effectively; and
- Improve agricultural income.

### 2.1.1 Water Resources Functions of MAWRD

Within the Ministry of Agriculture, Water and Rural Development (MAWRD), the Department of Water Affairs (DWA), is responsible for water resources management and rural water supply. The Department of Water Affairs, as shown in the above diagram has two directorates, namely the Directorate of Resource Management and the Directorate of Rural Water Supply.

The responsibility of Bulk Water Supply lies with the recently established Government owned, but commercially operated Namibia Water Corporation (NamWater).

At the moment, DWA maintains its organisational structure with two directorates. The Directorate of General Services within the MAWRD renders supports services.

#### *1. Directorate of Resource Management*

The directorate has the responsibility for water resources management, ranging from policy / strategy formulation and national planning to water resources monitoring and control, hydrological and geo-hydrological investigations, water related research, and representing the Government of the Republic of Namibia (GRN) in international water resource activities. The directorate is organized in five divisions, with the following functions:

##### □ **Division of Geo-hydrology**

- Conducting geo-hydrological investigations.
- Rendering geo-hydrological support services including monitoring, analyzing, processing, storage and dissemination of geo-hydrological data.
- Monitoring aquifer behaviour and the management of aquifer utilization.
- Drilling and test pumping services.
- Ensuring the optimal utilization of groundwater.

##### □ **Division of Hydrology**

- Carrying out hydrological investigations.
- Ensuring the optimal utilization of the surface water resources.
- Rendering a hydrological support service, including monitoring, analyzing, processing, storage and dissemination of hydrological data.

□ **Division of Water Environment**

- Research in water technology, ecology and other related fields.
- Rendering water quality support services, including laboratory services.
- Execution of water quality and pollution control.
- Environmental Impact Assessments.

□ **Division of Planning**

- Formulation of master water plans at national and regional levels.
- Co-ordination of water resources investigation programmes.
- Detailed planning of water projects.
- Rendering of planning support services.
- Obtaining capital funds for the Directorate of Resource Management.
- Representation of Namibia at regional and international levels on water resources related issues.

□ **Division of Law Administration**

- Obtain land, servitudes, and occupational rights.
- Seek permission to access private land for investigation purposes for the legal protection of departmental assets.
- Conclude agreements and mutual undertakings.
- Issue permits for the disposal of industrial effluents, water abstraction, irrigation, and transport of water over boundaries of private properties.
- Provide information and advice regarding the requirements and provisions of the Water Act and regulations.
- Render a legal administrative support service to the Department.
- Execute control over compliance with the conditions of all agreements and undertakings.

2. *Directorate of Rural Water Supply*

The directorate is responsible for planning, implementation and operation of rural water supply schemes, and is organised into three divisions with the following functions:

□ **Rural Water Supply Development Planning**

- Compilation of Rural Water Supply strategies, development priorities and programmes on a national and regional basis.
- Collection, evaluation, and processing of data on community needs.
- Advising on policy matters regarding standards, water tariff structures and community management aspects.
- Planning of Rural Water Supply Schemes, including feasibility studies and environmental assessments.
- Designing of civil, electrical and mechanical engineering works for new schemes and the upgrading of existing ones.

- Contract administration.
- Evaluation of project proposals from contractors' consultants and donors.
- Rendering of plant and equipment services.
- Preparation of annual budget for capital investments.

□ **Rural Water Supply North and Rural Water Supply South**

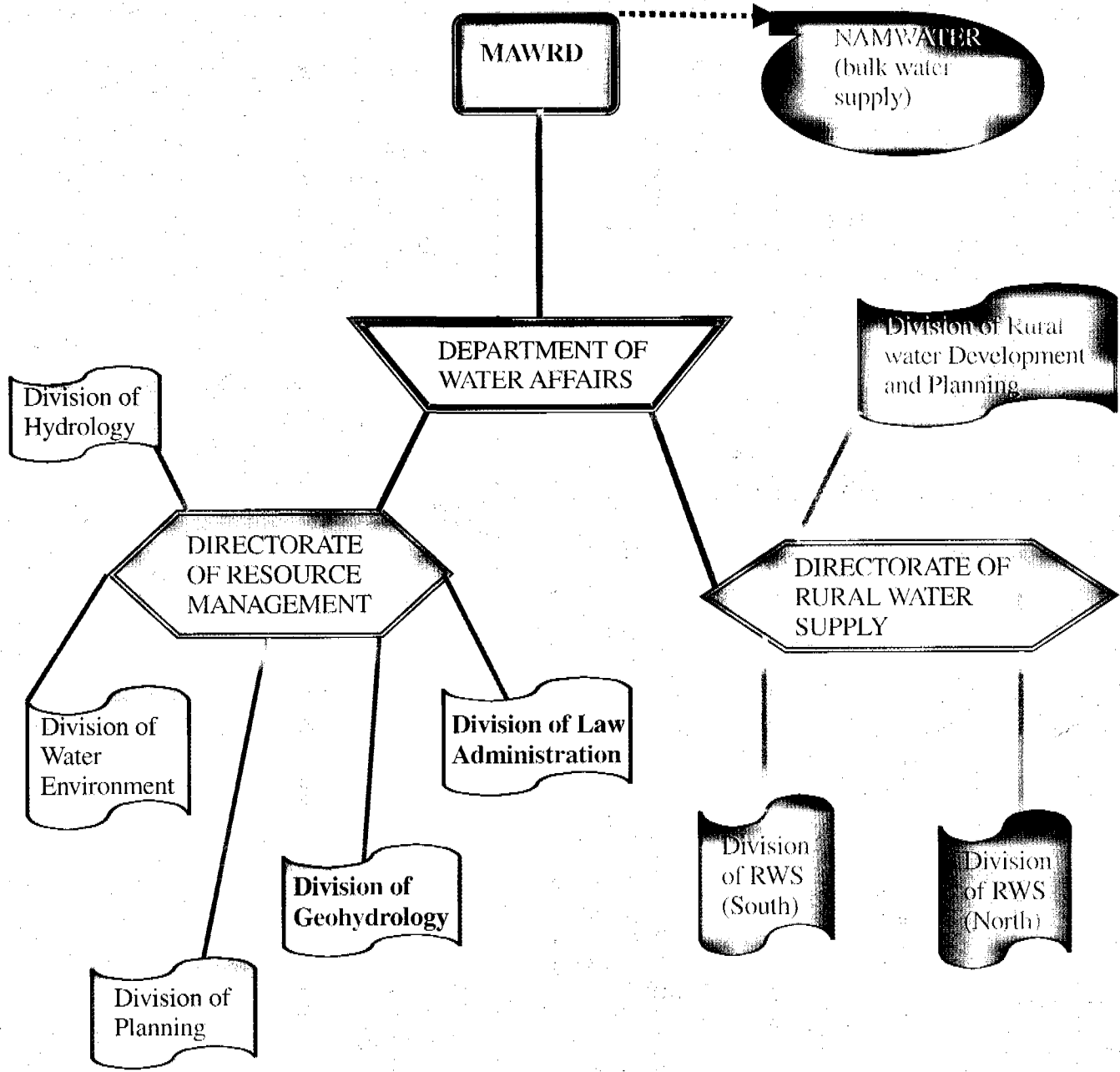
The two operational sub-directorates perform the same functions in different regions of Namibia. The following list of functions thus applies to both.

- Provision of engineering and technical advice to the regions.
- Identification and assessment of rural water supply needs.
- Co-ordination of regional operations.
- Fleet management.
- Management of a Rural Water Information System.
- Regular Scheme Inspections.
- Provision and maintenance of workshop facilities.
- Levying of water fees and collection of revenue.

**3. *Generic Functions***

The following functions are applicable to all divisions in the Department of Water Affairs:

- Financial Administration
- Human Resources Development
- General Administration
- Liaison with NGO's and other organizations



## **2.2 Namibia Water Corporation**

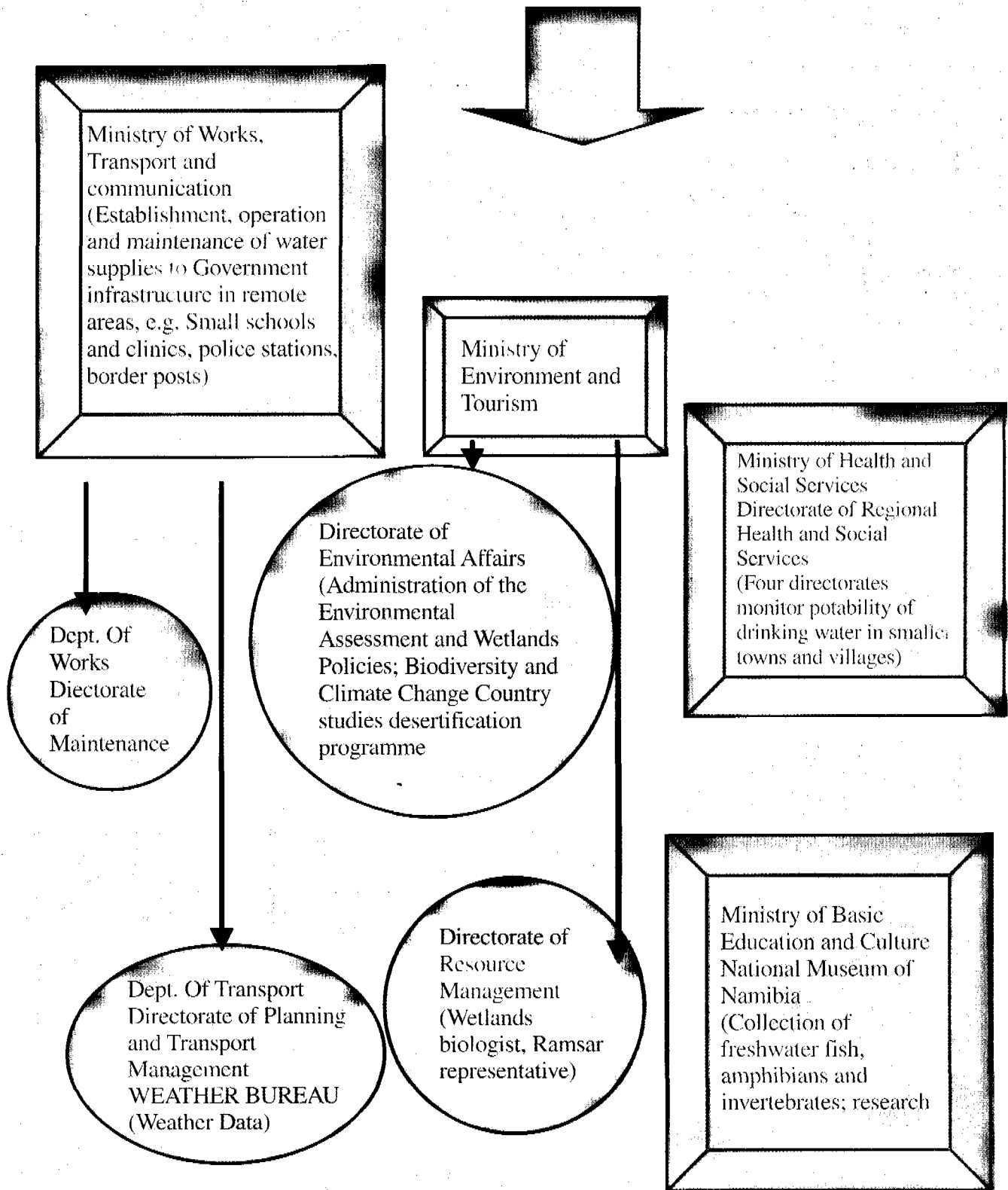
Namibia Water Corporation (NamWater) was established, as a Government owned corporation to develop sources of water and necessary transfer schemes, operates them and supplies water to rural water supply schemes, municipalities and the private sector in bulk. NamWater is to operate on a commercial basis, i.e. to finance its operations through revenues from the sale of bulk water. An analysis of its functions or how effectively they are performed does not fall within the scope of this paper.

## **2.3 Other Institutions with Water related Responsibilities**

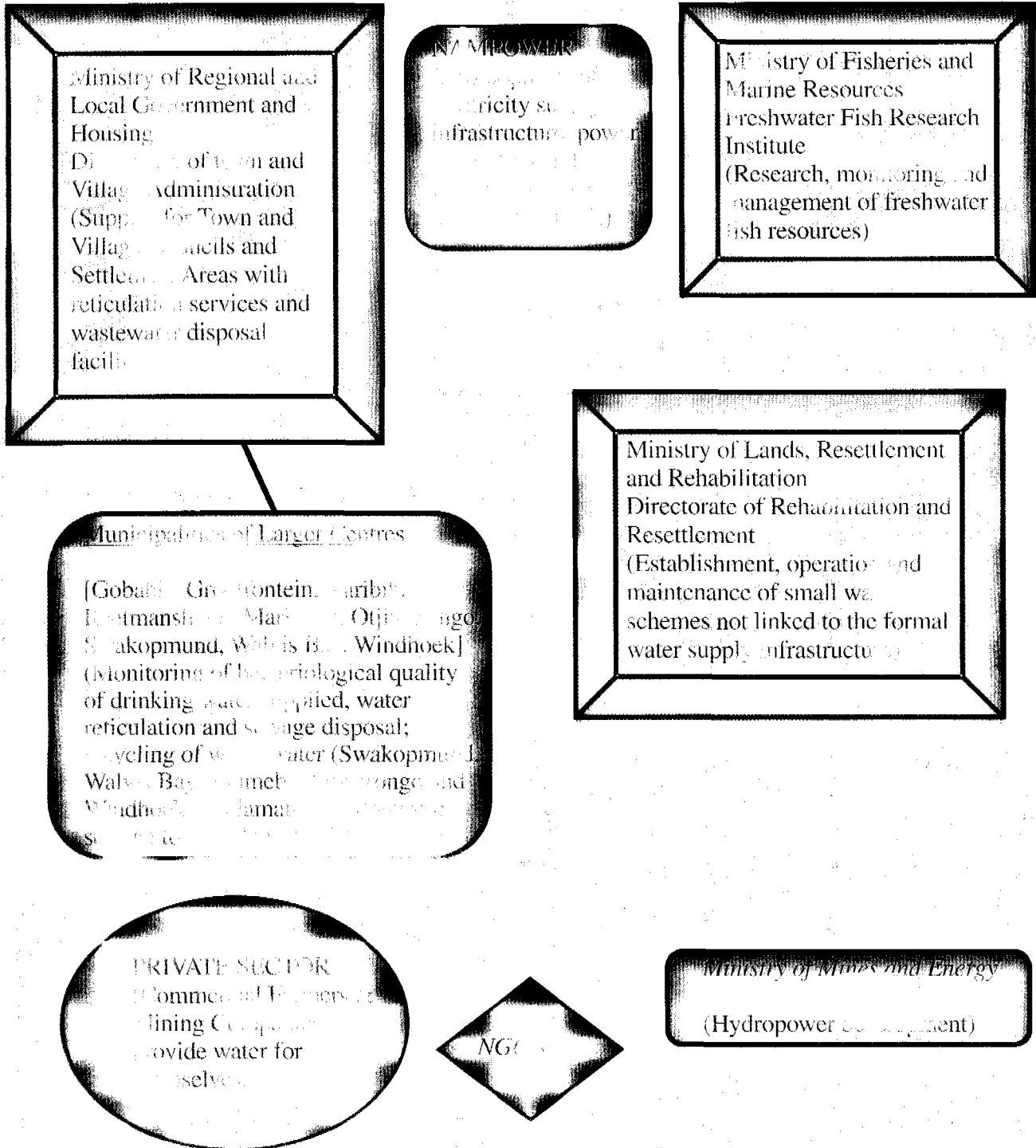
There are other Government bodies with responsibilities in the water sector. The Ministry of Regional and Local Government and Housing provides assistance to local authorities and municipalities in reticulation and wastewater disposal. The Ministry of Works and Transport and Communication is responsible for sewerage and property taxes on government institutions, while according to a cabinet decision of (April 1998) all ministries will be responsible to pay their water accounts directly to Namwater. These institutions are represented diagrammatically below:



2.3.1 Institutions with water related functions



2.3.1 Continue.....



### 3 SITUATION ANALYSIS

The Constitution provides for the Government to assume responsibility for the overall management of the water sector. Hence, Government's aim is to supply water, in sufficient quantities and of acceptable quality from the available sources on a sustainable basis, by utilizing affordable means to meet the reasonable demands of the customers. As a result of the establishment of NamWater as a supplier of bulk water and the concomitant reorganisation within the DWA, the Consultancy Services Group of the Directorate of Management Services (in the Office of the Prime Minister) was asked to help DWA review its policies, strategic issues, business needs, organizational structure and management processes.

The following are some of the problems identified in the current arrangements

- Lack of a properly integrated resource management system.
- Lack of a coherent institutional framework.
- Lack of comprehensive legal framework.
- Absence of a formal regulatory framework.
- Absence of clearly defined objectives and accountability mechanisms.
- Absence of strategies for delivering value for money.
- Absence of strategies for meeting devolution policies.
- Lack of community ownership.
- Poor performance of existing Government institutions.

In examining issues surrounding performance, it was found that the Business Profile which took place within the Ministry had already identified many of the reasons behind these problems. These were:

- Highly centralized, rigid and directive management structures and styles.
- Lack of cohesion between the centre and regions.
- Absence of strategic management.
- Focus on inputs, not outputs and outcomes.
- Lack of meaningful operational objectives.
- Poor accountability.
- Few useful management information systems.
- Little focus on performance.
- Poor understanding of and focus on customer and service issues.
- Lack of cohesive human resource management and development strategies.

The Office of the Prime Minister's Consultancy Services Group discussed the above shortcomings with DWA, which agreed in principle to address these shortcomings. It would appear however that, to date, DWA has not fully addressed these shortcomings.

#### 4 CURRENT INITIATIVES

As indicated above, it is the clear intention of Government to embark upon public sector reform, in order to promote the effective, efficient and economic delivery of public services, and to provide the vehicle for greater regional participation. To this end a number of initiatives have been embarked upon:

- The development of the Water and Sanitation Policy (WASP) guidelines and the establishment of Water and Sanitation Committee (WASCO) to oversee the implementation of WASP.
- The holding of a national consultation process from 1995 to 1997 for community based management of rural water supply.
- Participation in the 1996 Senior Government Officials' Study Tour to the United Kingdom to review the UK civil service and water sector and to evaluate its potential for application in Namibia.
- The commercialisation of bulk water supply through the establishment in 1997 of the Namibia Water Corporation (Namwater).
- The establishment of the Namibia Water Resources Management Review in 1997 "as a long-term strategy of Government to ensure availability and administration of water resources on a sustainable basis."<sup>1</sup>

#### 5 ISSUES ARISING

A review of activities in the water sector outlined above has identified the following four significant issues which will need to be thoroughly researched and addressed if Government's long-term strategy (sustainability of water resources – integrated water resources management) is to be achieved:

##### 5.1 Policy and Planning Issues

###### □ National Water Sector Policy

Namibia has an extremely arid climate and its water resources are limited. The efficient management of these limited water resources is of extreme importance for the country's economic development. Hence it is imperative that the country has a strong policy to guide the management of the country's precious water resources, which are not only finite, but also vulnerable.

The country's water sector policy is embedded in the Water and Sanitation Policy (WASP) recommendations approved by Cabinet in September 1993. In August 1994 Cabinet approved, in principle, that the bulk water supply function in Namibia be commercialized and be executed by a limited liability water utility company, owned by Government. Cabinet further approved, in February 1995, the guidelines and strategies for the establishment of the Namibia Water Corporation Limited (NamWater).

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<sup>1</sup> His Excellency, President Sam Nujoma's speech on the launching of NWRMR (22 March 1997)

In addition, a programme of national and regional workshops was launched in 1995 to sensitize stakeholders about the devolution of power and cost recovery for rural water supply.

During these workshops, guidelines were produced for the implementation of the policy, which were endorsed by WASCO and are now referred to as WASCO Statements. Furthermore, based on the deliberations during this workshop, the participants recommended that the Department of Water Affairs:

- Forward the revised WASCO Statements and Principles to WASCO for endorsement and thereafter to Cabinet for approval as policies for the rural water supply sector.
- Prepare and submit a Cabinet Proposal for implementation of a rural water supply programme based on the guidance provided by the WASCO Statements and Principles.

It was anticipated that this would form the basis for Namibia's National Water Policy. Unfortunately there has been no efforts to realise this plan. There is accordingly a need to further consult with the Ministry of Agriculture, Water and Rural Development in this regard.

## 5.2 Sectoral Issues

- Lack of sector co-ordination

WASP recommendations identified potential problems for coordinating the approach of all role players within the water sector and were instrumental in setting up WASCO to overcome such difficulties.

WASCO has not however practically overcome these difficulties because the need still exists to establish a singular body to achieve sustainability. At the moment there are a number of fragmented activities taking place in the water sector, and the Review process is aimed at taking the initiative to coordinate or integrate these efforts.

In addition, there have been no formal linkages with other ministries involved in the water sector such as the Ministry of Health and Social Services (MOHSS), the Ministry of Works, Transport and Communication (MWTC), and the Ministry of Basic Education and Culture (MBEC), and the Ministry of Environment and Tourism (MET). The success (sustainability) of the water sector will depend on the way it interacts with and coordinates activities amongst role players. The Review has taken cognizance of the current gaps and aims to promote integrated efforts in the water sector.

- Integrated Data Collection

According to MAWRD's Annual Report<sup>2</sup>, the Office of the Prime Minister approved 'the Master Computerization Plan containing information technology strategy.' This report states that "Data Systems has started to implement a Local and Wide Area Network with currently more than 200 workstations and variety of services, such as client/server data base systems, electronic mail, Internet access, software and hardware inventory, etc." The new computer network is expected to form the basis for a new and better information system, which will contribute to the efficiency and quality of the work produced by departmental employees.

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<sup>2</sup> ANNUAL REPORT 1 APRIL 1994 – 31 MARCH 1995

Despite the provisions of the Master Computerization Plan the DWA still only collects data on a fragmented basis. A holistic approach is lacking and there is no integration of surface water, groundwater, water quality and water environment data collection.

### **5.3 Community Participation**

Government's development objectives cannot be achieved without the co-operation and participation of the community it seeks to serve. Greater effort will be needed to align the ministry (MAWRD) to this participatory and consultative approach. There is a need to vest more responsibility in rural people and their organizations and to encourage other development agencies to work towards these goals. Whilst this is a daunting task, it is imperative that an environment be created that allows full participation and encourages the transfer of responsibility to the communities and other water sector role players. This new role will require a change of culture within the present institutional arrangements. It will involve changing attitudes and behavioral patterns at every level and will require careful management and monitoring. Closer links will need to be forged with those served and a better understanding of their needs must be gained by opening up channels that enhance two way communications.

Furthermore, it needs to be borne in mind that communities have the right to determine which solutions and service levels are acceptable to them. The Review therefore regards the maximum participation of the 'wider' community as the best way to achieve sustainable management of the nation's scarce water resources.

#### *5.3.1 Decentralization*

In 1992 Parliament enacted both the Regional Councils Act and the Local Authorities Act to provide for the establishment of second and third sub-levels of Government. Within this context, the Ministry of Regional and Local Government and Housing in 1997 embarked on a policy review process, to give effect to these laws, in particular the decentralisation of functions to the regional councils and local authorities which is provided for in the constitution of the Republic of Namibia. This process has culminated in the Decentralization Policy for Namibia, which was adopted by both Cabinet and the National Assembly. The aim of the policy is to provide the basis and a framework for Government to devolve functions, responsibilities, powers and resources to the lower levels of Government.

In terms of this policy, rural water supply is to become the responsibility of the Regional Councils, with appropriate assistance by responsible line ministries. The Water Supply and Sanitation Policy (WASP – 1993) went a step further and stipulated that rural water supply should become the responsibility of the communities themselves, with assistance from the Department of Water Affairs. In terms of the Cabinet-mandated decentralization policy, provision has been made for a hierarchy of committees, which are responsible for development activities in the regions. This regional structure is responsible for promoting and assisting the empowerment of local communities to handle their own affairs. The Department of Water Affairs initiated a decentralisation process of its own in 1991 by setting up a similar organizational structure consisting of a hierarchy of water committees. At present however there is no legal framework within which these committees can operate.

According to the Minister of Agriculture, Water and Rural Development, the concept of decentralisation does not imply an immediate devolution of power but anticipates a step-by-step process, involving three phases, i.e. deconcentration, delegation and devolution.

The draft Decentralization Action Plan for Rural Water Supply, which stipulates the decentralisation initiatives to be undertaken by the Ministry of Agriculture, Water and Rural Development, covers only the deconcentration and delegation phases. The ultimate goal of decentralisation can be only achieved if the following conditions are met:

- Legalization of water committees.
- Transfer of ownership of rural water infrastructure from Government to the water committees.
- Amending the State Finance Act.
- Capacity building.
- Decentralized planning and adequate resource allocation.
- Agreement or compromise reached that not all functions can be decentralised to all 13 regions, but rather to the four regional clusters.

The Review process will need to conduct research on how these conditions can best be met.

#### 5.4 Efficiency, Commercialization and Outsourcing

As part of Government's national goal of achieving greater efficiency and responsiveness, the National Development Plan (NDP 1) calls for the restructuring, decentralization and increased efficiency of central government, improved cost recovery and parastatal reform. There is accordingly a need to reassess the number, size and functions of Offices, Ministries, and Agencies (OMA), capacity building, the reduction in size of central government, improved planning, the cutting or re-deployment of unproductive and wrongly placed staff, and the introduction of computerized management information systems.

Commercialization and outsourcing has been utilised by government as means to achieve these aims. Commercialisation in this context is where an activity or function carried out by government is *"developed along business (commercial) lines, rather than as a pure government organisation, subjecting it to competition as far as possible – a long term arrangement. The aim is to sell products and services at a price higher than the cost of production, retaining the customers. A commercialised entity can also face bankruptcy; apply transactional funding, not vote funding; ensure accountability of managers by measuring economic and financial performance through management information systems; grant performance incentives to reflect improved performance; increase productivity levels, improve services, and reduce unit costs. Although self-financed, government retains ownership, sometimes providing independent legal status, called corporatisation. Corporatisation, in itself, should not be seen as an end result, but as the first step towards possible commercialization."*<sup>3</sup>

Similarly, outsourcing can be regarded as a *"development from the ad hoc approach to a strategic analytical approach to identify suitable functional areas to outsource, consistent with the interests of Government. It also recognises that structural adjustment of Government is a systematic process to ensure that human capacity develops in line with process and situational need."*<sup>4</sup>

<sup>3</sup>How to Outsource: Efficiency & Charter Unit - Office of the Prime Minister.

<sup>4</sup> ibid [3]

## 6 OPTIONS TO ADDRESS ISSUES

As part of the public reform process, Cabinet passed an action letter, 12<sup>th</sup> /20.05.97/002, which instructed the ministry (MAWRD) to use the reorganisation of the water sector in the United Kingdom as a model for its review of the water sector in Namibia and for the formulation of proposals for institutional improvements. In the United Kingdom, the reorganisation of the water sector entailed the following:

1. The transformation of civil service departments into agencies operated on commercial principles (independent agencies with CEOs reporting to a minister and work performed on a contract basis);
2. the establishment of private water and sewerage companies responsible for raising their own investment funds and recovering all costs through tariffs; and
3. the establishment of a regulatory agency to protect the consumer from exploitation by ensuring fair prices and by setting service delivery standards and ensuring that they are met.

By definition, Agency creation is *"when government delegates maximum authority and responsibility to the operational manager for the day-to-day running of a discrete management organization, including the financial and personnel functions."*<sup>5</sup> This option allows operational managers to be driven by performance in areas where they are skilled, thus leaving the development and provision of policy advice to those staff employed within the core activity function. The operational manager (Chief Executive Officer) remains accountable to Parliament, through Ministers, for the performance of the organisation and the management of public funds, which can either be voted directly to the organisation or through a parent Ministry, and probably as a lump sum at the start of a financial year. However, it is essential that agencies be run on commercial accounting systems.

In the United Kingdom such agencies are formalized by a Framework Document only as specific legislation is not necessary to create an agency in the United Kingdom. In Namibia however, it is not possible, in terms of the Public Service Act, 1995 (Act 13 of 1995), to create an agency along these lines. The establishment of such agencies in terms of the Companies Act 3 of 1989 or possibly under a future State Enterprise Act are currently being researched and negotiated.

Agencies of this nature would require robust management and financial systems including the following elements:

- strategic and business plans;
- identification of sources of income, heads of expenditure and capital expenditure over a period;
- budget and accounting procedures, providing for both an annual independent audit and the annual production of a balance sheet, income statement, cash flow statement and statement of utilization of funds within three months of the close of each financial year;
- key performance indicators;
- a management information system; and
- reporting procedures and policies.

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<sup>5</sup> Same Source as [3&4]

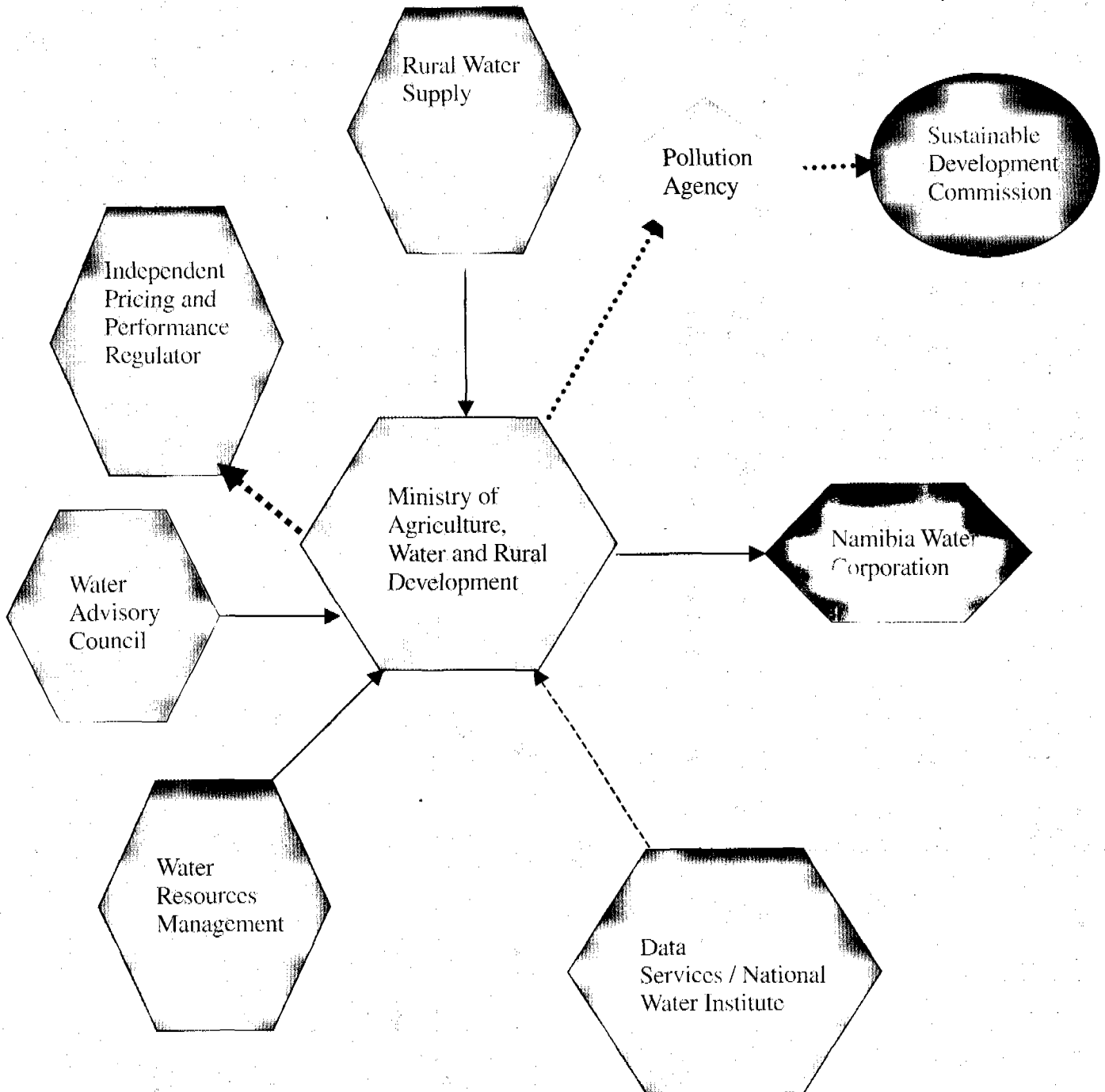


## 7 PROPOSED INSTITUTIONS

Consultations have been undertaken by the Review to consider the best institutional arrangement for the Namibia water sector. The primary objective of this consultation process is to recommend an integrated water resource management structure that will ensure maximum utilization of water resources on a sustainable basis. In this regard, the Technical Team has developed a set of principles (contained in Appendix 1) on which the following proposed institutional framework is based. Emphasis has been placed on efficient service delivery within an appropriate regulatory framework.

The optimal application of the British agency model in Namibia has not yet been determined and the number and form of agencies to be established has yet to be determined. Further consultations and discussions are being carried out by the Review in this regard. At present however it is suggested that all the institutions to be created will function at arm's length from the parent ministry.

7.1 Proposed Institutions: Rationale and Functions



### *7.1.1 Rural Water Supply and Sanitation (RWSS)*

#### *Rationale*

The government policy of decentralization, which seeks to promote efficiency and effectiveness in the delivery of public services, and to provide the vehicle for greater regional participation in these services, is regarded as the pivotal rationale for RWSS. The policy will make decision-makers part of the community, known to all, and easily accessible for discussions. Also, accountability will be heightened as complementary levels of delegation accompany these decentralized services. Furthermore, managers will be able to understand in a much more comprehensive and sensitive way, the aims and aspirations of their community.

#### *The Key Roles/Functions*

It is proposed that the Rural Water Supply and Sanitation function be redeveloped to concentrate on business-like delivery of services to regional clients through service agreements with Regional Councils. It would no longer carry the prime responsibility for policy in this function. This meets the well-accepted principle of separating policy making from service delivery, increases accountability, and will drive improvements in value for money.

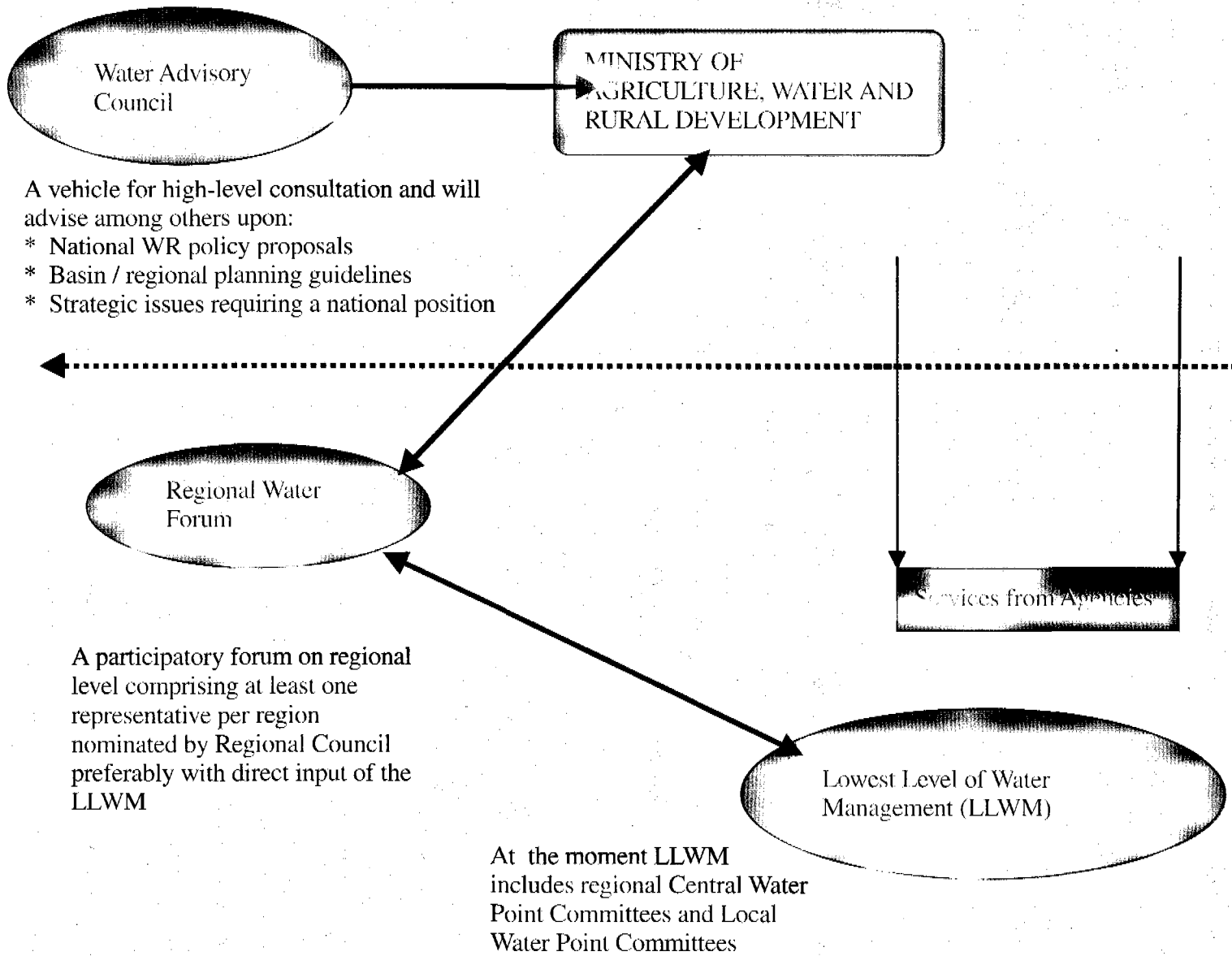
This will be a rapidly changing agency as functions and personnel devolve to the regions. Its functions will include, but not be limited to:

- Technical assistance with scheme planning
- Design and construction of rural water schemes
- Operations and maintenance as required
- Other technical assistance to Regional Councils as required
- Application of national standards and development of regional/local standards in water supply and sanitation

#### *Linkages and coordinating mechanisms*

The agency will report to the Minister of Agriculture, Water and Rural Development. Details on the linkages and/or coordinating mechanisms will be finalised after further consultation with stakeholders.

# PROPOSED WATER SECTOR: CONSULTING & PARTICIPATION



### 7.1.2 *Water Resources Management (WRM)*

#### *Rationale*

This institution will carry out the core-activities of government as a resource manager and will concentrate on effective policymaking and planning in consultation with service providers (NamWater and Rural Water Supply).

#### *The Key Roles/Functions*

This institution will exercise managerial functions on behalf of the Minister of Agriculture, Water and Rural Development. Its functions will include:

- Conduct strategic water resource assessments (this will require Service Level Agreements (SLAs) with Data Services for acquisition of primary data)
- Develop national and regional water plans (meeting environmental, social and economic goals)
- Develop modern legislation to give effect to the manager function and regulation of water services
- Develop and implement formal water allocations, and monitor compliance
- Develop and implement formal discharge permits, and monitor compliance
- Protect and manage water quality in cooperation with other Ministries, including development and implementation of water quality criteria, aquifer protection zones, and catchment management guidelines
- Provide a technical advisory service to Regional Councils and Local Authorities on all water matters, including water and wastewater treatment

Within this institution there will be a small (4-5) group of policy specialists (with project teams appointed by the Minister and drawn from Resource Management or other areas as needed) to:

- Develop national policies on all aspects of water – environmental, social and economic (including national pricing principles)
- Undertake strategic planning and corporate development in the Ministry
- Deal with shared river basins – develop strategic policy, promote liaison and possibly establish a secretariat for emerging basin organisations

#### *Linkages and co-ordinating mechanisms*

The institution will report to the Minister of Agriculture, Water and Rural Development. Details on the linkages and/or co-ordinating mechanisms will be finalised after further consultation with stakeholders.

### 7.1.3 *Water Advisory Council*

This will comprise key stakeholders affected by water policy appointed by the Minister of Agriculture, Water and Rural Development. It will be empowered to initiate policy proposals to comment on referred matters and to act as an advisory body and will focus on an integrated approach to water resource management.

The Council will be a vehicle for high-level consultation and will advise on:

- National water resources policy proposals
- Basin/regional planning guidelines
- Strategic issues requiring a national position

#### *7.1.4 Data Services (National Water Research Institute)*

##### *Rationale*

In addition to focussing on water knowledge, this institution will be responsible for the development of high-level professional water resources information functions and technology. Many of its activities will be capable of being contracted out if private sector capacity is well developed, but ownership and management of water resources data should remain with government.

##### *The Key Roles/Functions*

The data management function embraces all activities from measuring water to publishing water statistics. In essence, data management is a provider of intelligence services to policy makers, resource managers and water supply entities. This institution will create the opportunity for the Ministry to develop technology in the field of data management and will also act as a vehicle for the integration of data management activities.

Additional functions of this institution will be to:

- Build, own and operate a network of data acquisition facilities as determined and funded by client institutions
- Operate water quality laboratories
- Develop and operate a quality assurance system
- Archive data and act as a data custodian for the State
- Develop and manage a national natural resources data platform and information management system
- Extract, assemble and disseminate data as determined by client institutions, including publishing national water statistics

It is possible that this institution may ultimately become responsible for integrating and managing all of the Ministry's natural resources data. It also has the potential to perform a data management service for other Ministries and to become a centre of natural resources data excellence in Southern Africa.

##### *Linkages and co-ordinating mechanisms*

The institution will report to the Minister of Agriculture, Water and Rural Development. Details on the linkages and/or co-ordinating mechanisms will be finalised once consultations with stakeholders have been completed.

### *7.1.5 Independent Pricing and Performance Regulator (IPPR)*

#### *Rationale*

It is envisaged that this control body will be independent of government as far as the licensing of service providers and the application of policy and regulations are concerned.

The establishment of this institution is necessary for consumer protection and financial monitoring, which includes the task of examining and approving water tariffs and service charges. This institution will ensure that tariffs and service charges are fair and justified by production costs, which is particularly important given the fact that the service provider will have a monopoly over water supply within its area. Decentralisation and the increased participation of the private sector will lead to a differentiation of cost recovery methods in different parts of Namibia, and this institution will not only prevent the abuse of pricing powers by individual service providers, but also ensure that tariffs charged are sufficient to ensure the financial viability of the service.

#### *The Key Roles/Functions*

It is anticipated that this institution will establish sub-committees for each sector (water resources, energy, mining) which will be responsible for policies and standards as well as a price control unit for all "public utility" sectors (water, sewerage, telecommunications, electric energy). In respect of water, this institution will be responsible for proposing policies and monitoring their implementation, strategic planning, allocating resources, setting technical and service delivery standards, protecting consumer interests, promoting sector awareness, issuing pricing related regulations and approving tariffs.

In addition its functions will include:

- Ensuring that water is of acceptable quantity and quality for all water interests
- Ensuring optimum benefits from the use of water by all users
- Resolving conflict between water users through a formal allocation system
- Ensuring sustainability and protection of the resource base by closely working with the Ministry of Environment and Tourism's Community Based Natural Resource Management programmes in the regions
- Specific conflicts referred to it

#### *Linkages and co-ordinating mechanisms*

The institution is expected to report to Cabinet through the Minister of Agriculture, Water and Rural Development or directly to Cabinet. Details on the linkages and/or co-ordinating mechanisms will be finalised once consultations with stakeholders are completed.

## 8 CONCLUSION

As many of the issues addressed in this paper are still subject to consultation with stakeholders, suggestions made for the revision of institutional arrangements are subject to confirmation that they are indeed appropriate to meet the specific needs of Namibia.

At its core, the proposed approach is aimed at providing a comprehensive policy framework for the management of water on a sustainable basis, and at improving the efficiency of service delivery at an affordable cost to the consumer.

The comprehensive analysis that the Review Team is expected to conduct will yield more coherent policy guidelines which will promote investment in the sector as well as the conservation of water resources, and improve the efficiency of water allocation and the usage of water-saving technologies for domestic and agricultural use.

One of the important outcomes expected from this process is the restructuring of the government institutions currently dealing with water issues. Capacity building, environmental protection and restoration, low-cost and environmentally friendly methods of developing new water supplies for agriculture, rural drinking water and sanitation will also be fostered.

Institutional structures need to be developed which encourage the separation of policy, planning, and regulatory functions from operational functions at each level of government. This process, as indicated above, must at all times be guided by government policies on public sector reform, decentralization, poverty alleviation and capacity building.

The new strategy for Namibia's water resources management will, in the words of President Nujoma *"be a bold strategy, which will demand change from organisations in both the public and private sectors. The change must be driven by the needs of Namibia and her people - not by vested interests. And the strategy must be led by able people who embrace change not who resist it. People who want to see significant, not marginal, improvements for the benefit of the majority of our people."*



## 9 APPENDICES

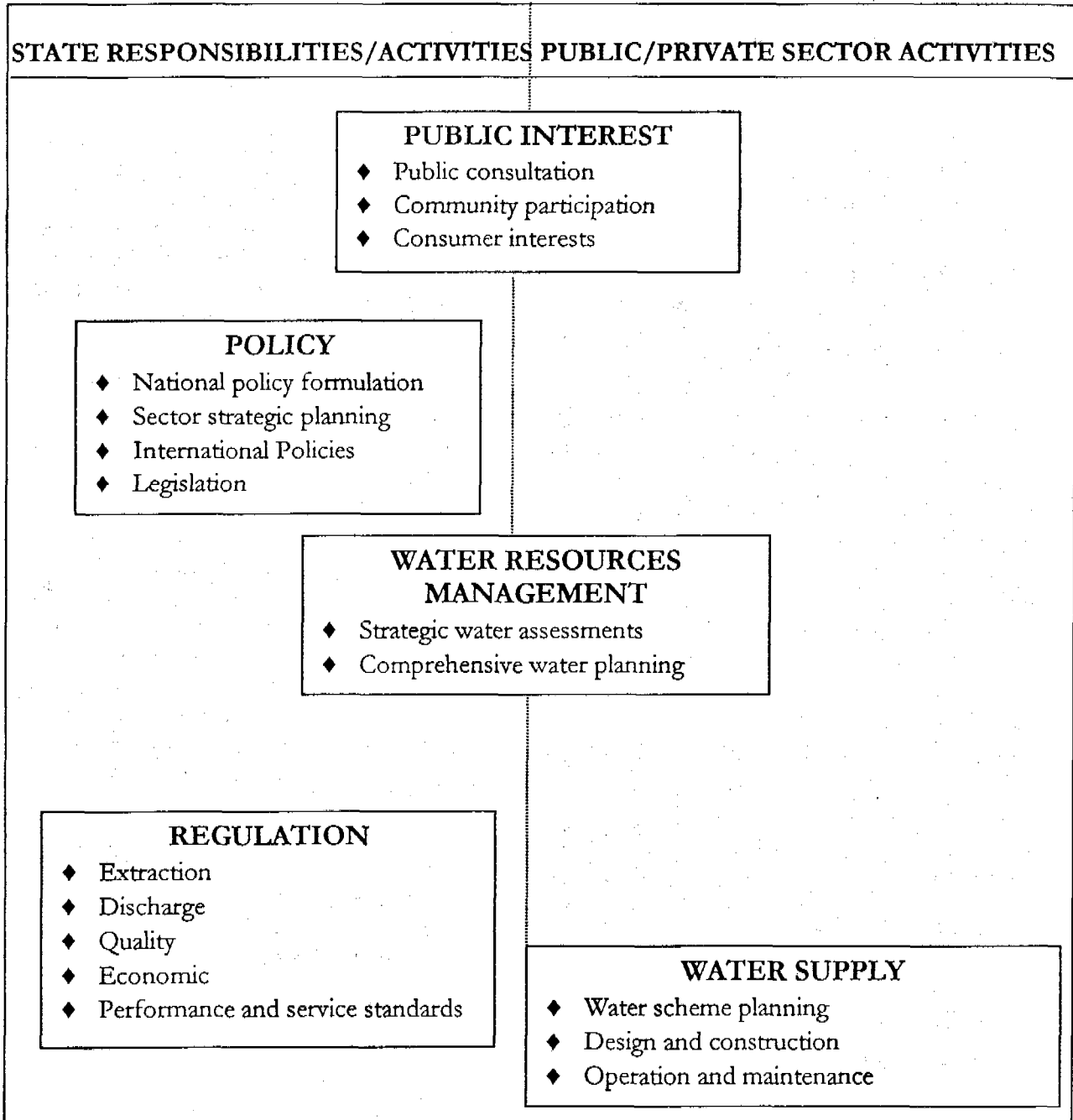
### 9.1 Principles for an Institutional Framework

The Technical Team established eight broad principles that need to be reflected in any new institutional arrangement. These principles take into account the requirements of integrated water resources framework, the Decentralization process, and the wider government policy on public service reform process.

PRINCIPLE	RATIONALE
<b>Accountability.</b> Ensure appropriate accountability mechanisms are accommodated.	As a state resource all role-players (political, public and private) should be accountable for their decisions, actions and activities within the water sector.
<b>Community Participation.</b> Maximize the opportunity for public/community participation.	Resources are "owned" by the people. Their participation is required to encourage trust, ownership and to break dependency on the state.
<b>Single custodian.</b> A single and accountable custodian for the sustainable allocation of water resources must be established.	Water is a scarce resource and requires a single institution to manage it in the best interest of Namibia.
<b>Separation</b> Separation of policy makers, regulators/resource managers from operators and source exploiters.	Removal of conflicts of objectives. Clarity of roles and responsibilities and greater focus on customers.
<b>Arms length service delivery.</b> Establish purchaser /supplier relationships.	Vehicle for "value for money". Brings focus to service delivery and enhances accountability. Allows purchaser to focus on policy and strategic issues.
<b>Decentralization</b> Appropriate delegation to regions to manage service delivery.	Devolution of power to the local authorities to manage the water resources at the regional level. Bringing government near to the people. This can result in improvement of efficiency and effectiveness at a service level.
<b>Institutional knowledge.</b> Focus on generation and acquisition of institutional knowledge.	Knowledge underpins all activity. It informs the processes of policy, planning, resource management, regulation, and service delivery.
<b>Synergy.</b> Adopt approaches that can be applied or integrated with other areas of government.	Opportunity to ensure overlap with other government services can be reduced.

## 9.2 Water Sector Roles and Responsibilities

The Technical Team also identified the broad responsibilities and activities that will need to be accommodated within future institutional arrangements. This was considered in view of where responsibility for delivering these activities could best be undertaken.



## C. HUMAN RESOURCES DEVELOPMENT

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### 1 INTRODUCTION

#### 1.1 Background

The water sector in Namibia is severely hampered by a lack of effective investment in human resources. Correcting this will be essential if Namibia is to alleviate poverty and develop the capacity to support the institutional, legal, regulatory and technical reforms that are the intended outcomes of the Review process.

The water sector comprises a wide range of organisations and players. These include the Ministry of Agriculture, Water and Rural Development (MAWRD), Regional Councils, Local Municipalities, NamWater, a wide range of private sector contractors ranging from drilling companies and consulting engineers to training companies and community analysts as well as the many local communities which are fundamental to community based management of water resources.

The sector is not only organisationally diverse, but also technologically diverse, with available technologies ranging from the most basic to the most highly sophisticated. In a national context characterised by a long history of discrimination and under-investment in human capacity the challenges and levels of need are accordingly great. The scale of the task too is significant. The number of people working directly within the water sector has never been fully surveyed across all types of organisations, but is likely to exceed 60,000.

Namibia's particular historical background has resulted in the great majority of the population in Namibia being deprived of capacity building. Neither a clear human resources strategy nor institutional human resource development (HRD) standards have been developed to overcome this legacy. If not adequately addressed, this will result in a lack of capacity to implement the recommendations of the Review and to carry out the functions required for improved integrated water resources management. In addition, an improved HRD plan that accommodates future demand and supply becomes a necessity to implement the recommendations of the Review.

Investment in human resource development in the water sector since Independence has however been inadequate. In particular, capacity building has been poor at the level of individuals. A great deal of the training, particularly for those in lower grades of employment or involved in communities, has lacked clarity of standards, evaluation or impact analysis, and has failed to provide even basic levels of qualification from which individuals can progress to higher levels.

In general, the water sector has not started to effectively utilise wider government reforms and developments. One such example is the Namibian Qualifications Authority, which could be central to a strategy of providing competence based training for community workers of all types as well as for lower technical grades and specialist occupations such as extension workers, but which is under-utilised. Such opportunities to integrate with wider developments and develop a clear and sustainable capacity building strategy have largely been missed.

The human resources strategy to be pursued goes far beyond addressing immediate short-term training needs. Namibia needs to develop policies, which provide realistic opportunities for the sustainable development of her human resources. These policies must encourage the development of organisational (corporate) competence and of individual competence through effective investment in human capital.

The establishment of human resources as a theme of review is therefore timely and welcomed. This review will seek to establish "demonstration projects" which will serve to sustain the overall policy principles and strategy, thereby providing an evidence base which should illustrate that the argument for capacity building and human resource reforms is a compelling one.

This paper seeks to explain each initiative, describe the Namibian policy context, outline what has been achieved to date by the Review and to highlight issues of implementation.

## **1.2 Objectives**

The objectives of the Human Resources Development Theme are to:

- ❑ identify existing skills and gaps in the water sector;
- ❑ design appropriate HRD strategies and policies for the sector and therefore strengthen the capacity of existing organisations in the water sector;
- ❑ develop a system of skills training which would maximise access for Namibians who have previously been effectively excluded from entering the traditional skills training institutions;
- ❑ to establish clear skills standards across the full range of water sector activities;
- ❑ to create nationally recognised qualifications for all water sector posts;
- ❑ to develop training delivery systems which are less dependent upon traditional education as well as a network of training institutions; and
- ❑ suggest recommendations emerging from the Review that can be implemented and sustained.

## **1.3 Scope of Work**

The Human Resources Development Theme is tasked with the following activities:

- ❑ Carry out a detailed survey of all staff employed in the water resources sector and analyse the present Human Resources situation in terms of number of employees in the water sector, age distribution, gender, skills and qualifications, experience and length of service;
- ❑ collect and analyse information on currently established authorised positions in the sector;
- ❑ estimate the number and quality of staff needed for proper management of water resources and analyse the training needs of water resources staff at all levels, including the staffing requirements as identified by the institutional development task group;
- ❑ design strategies for capacity building in preparation for reform implementation;
- ❑ identify training needs for the Technical Team and the broader water community and design strategies to address these needs;
- ❑ identify priority trades, design and pilot competence-based training and ensure recognition of these by the Namibian Qualifications Authority;
- ❑ develop and pilot organisational standards of human resource development; and
- ❑ drawing from the above research and the results of the pilot projects, develop policy principles and a strategy for human resource development in the water sector.

## 2 SECTOR ANALYSIS

The water sector in Namibia has been heavily reliant on the public sector with activities being concentrated in the Department of Water Affairs (DWA) within the Ministry of Agriculture, Water and Rural Development (MAWRD) and local authorities. With the creation of NamWater the number of people employed in the water sector is significant. However it is regrettable to note that there is currently no comprehensive HRD plan and no central human resources strategy for either the private or the public sector. A further vital issue is the lack of human resources records. This sector analysis is divided into four categories namely; DWA, Municipalities, Private Sector Organisation including other agencies and ongoing reform initiatives.

### 2.1 Department of Water Affairs (DWA)

The Department of Water Affairs is tasked with the responsibility of managing the water resources and rural water supply in Namibia. DWA has a well-designated structure. According to the Human Resources Study<sup>6</sup> the DWA has vacancies for 1,183 employees of which 926 are filled. DWA is accordingly a large department, which will require effective human resources standards and planning. Throughout the consultation process with senior staff members in DWA it was acknowledged that human resources standards and a clear human resources strategy is lacking. In terms of capacity building within DWA much remains to be done. Although training programmes have been established and a system of individual appraisals and performance reviews has been introduced, there is nothing to indicate that performance management is being effectively promoted. In addition, there is no strategic framework in place for the integration and co-ordination of all the government initiatives in this sector.

Many of the occupations within the water sector lack agreed standards. Training is accordingly mainly uncoordinated, often involving no assessment of individuals and mostly leading to no qualification. This is a recipe for wasting the scarce training resources that are available, and for failing to build capacity. In addition, comprehensive staff development for individual staff members is not catered for and there is thus little upward mobility even for those staff members with commitment and ability. Namibia currently suffers from a lack of integration of training and education, and from an elitist entry system into higher level training. Such a system may have served well during the apartheid era, but has no place in a strategy aimed at poverty alleviation or capacity building.

In parallel with the creation of proper training standards, the ultimate aim of the Review will include establishing progression routes throughout the sector, based on the 8 levels of skills development (from low level supervised workers up to senior professionals) recognised by the Ministry of Higher Education and Vocational Training.

Given the foregoing it is crucial for the Review to promote a change in human resources (HR) strategy as part of the overall strategy for the Namibia Water Resources Management Review (NWRMR). The most important aspects of the HR review are to develop training needs and development plans that are future oriented and promote HR standards within organisations.

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<sup>6</sup> NWRMR, *Human Resources Study*, by INTER-ED LTD (August 1998)

It is only through the application of such principles that greater efficiency; effectiveness and quality services can be achieved.

It is equally necessary to promote progression opportunities for those who enter employment at lower grades and for the previously disadvantaged groups. Given that Namibia is already committed to developing competence based accreditation (and has already achieved notable successes in this regard in the fisheries sector); the Review will seek to establish a competence-based framework for the entire sector, thereby matching the establishment of institutional standards with the creation of occupational standards.

## **2.2 The Municipalities**

The municipalities or local authorities play a major role in the water sector. Municipalities are currently responsible for water supply and reticulation within the local authority boundaries and employ more than two hundred employees in water-related activities.

The Review conducted a questionnaire survey among Namibian municipalities in order determine whether their training needs are met and whether they would support training based on competence based qualifications for all categories of workers. 67% of municipalities believe not enough is being done to meet current training needs and 95% support the development of work qualifications (HR Study, 1998).

## **2.3 Private Sector Organisation and Agencies**

A wide range of companies in the private sector is involved in the water sector. Many of these companies are under contract with the Department of Water Affairs to perform specific operational functions. There is little competition among these companies and accordingly little pressure to render services effectively and efficiently. In addition the private sector has not paid the necessary attention to establishing institutional standards.

The Review accordingly recommends the establishment of institutional standards for both the public and private sectors as a matter of priority.

## **2.4 Community Based Development**

The most challenging aspect of developing Human Resources strategy will be developing awareness and skills at the community level. Namibia has ten water regions and the structures involved in water management include water point committees, branch line management and regional management. The extension workers of the MAWRD assist these structures, and the Ministry through training supports them.

Although water is regarded as a technical issue, it is also part of poverty alleviation. The UNDP with its Poverty Alleviation Pilot Programme, has identified water as one of the key areas, and communities themselves have identified practical skills that they require in order to manage water effectively. These include skills such as repair water points, drilling of boreholes, laying and maintaining pipes, covering wells and constructing earth dams, and preventative maintenance.<sup>7</sup>

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<sup>7</sup> *Ohangwena Region Participatory Rural Appraisal*, UNDP and UNAM (1996)

The Directorate of Rural Water Supply within the Ministry of Agriculture has developed a five year training plan which highlights some of the training needs and indicates that approximately N\$ 47 million will be available for training purposes.<sup>8</sup> Outputs from such an investment in terms of capacity building are however not clear, due to a lack of clear training standards as well as a lack of a clear framework of qualifications. This is an indication that much work still needs to be done to create a coherent strategic framework for training which will both meet the needs of the sector and provide a platform for individual qualification and establishment of job and role standards.

The Review has identified several flaws in the current training strategy for community based management in the water sector. With the decentralisation process in the pipeline, functions are to be transferred to the communities to manage their water through water point committees. It is estimated that once all the water point committees are locally managed, more than 55 000 people will be working in the water sector. The current training strategy does not however adequately prepare the community for assuming these responsibilities. Unless this problem is addressed many tasks or functions will have to be contracted out rather than undertaken by the community themselves.

It has become apparent to the Review that the scale of demand for training and development within the water sector is greater than originally anticipated. It was thus agreed that with additional support from the United Nations Development Programme (UNDP) a pilot programme be set up to determine whether or not a new programme to facilitate human resources development could be launched. The new programme is to be based on the Fast- Trac system of vocational training developed in Scotland. Phase One of this pilot programme has been completed.<sup>9</sup>

## 2.5 Ongoing Reform Initiatives

Since Independence significant progress has been made in establishing a coherent framework for human resources development. The most important initiatives include the following:

- the creation of the Namibian Qualification Authority;
- the establishment of a requirement for competence based qualifications;
- the establishment of the University of Namibia and the Polytechnic of Namibia;
- the creation of labour market policies covering the main crafts;
- the creation of performance review requirements for the public sector by the Office of the Prime Minister (OPM);
- the adoption of equal opportunity and affirmative action policies;

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<sup>8</sup> 5 Year training plan for support of community based management of rural water supply, MAWRD, Directorate of Water Rural Supply (1997)

<sup>9</sup> NWRMR, *Community Capacity Building, FAST TRAC Namibia Supporting Communities* (4 November 1998)

- ❑ the development of the Training Policy of the Public Service of Namibia;
- ❑ the establishment within the Ministry of Fisheries and Marine Resources of a training programme for Fisheries Inspectors;
- ❑ the current exercise of transposing Vocational Qualification into competence-based mode by the Ministry of Higher Education; and
- ❑ The development by the National Planning Commission of the National Human Resource Plan 1998-2010.

The approach to be adopted by the Review will be to build on this process and to put programmes in place to raise standards. This will be achieved by, *inter alia*, establishing specialist development programmes and international scholarships.

The Review will also play a role in strengthening the capacity of existing organisations and in the development of policy principles and a strategy, which can be confidently supported by all major stakeholders. Establishing "demonstration projects" which will both contribute to the development of the sector and demonstrate the value of the strategy being pursued will be of assistance in this regard.

### **3 ISSUES ARISING**

#### **3.1 Human Resources Analysis**

Studies conducted in the water sector provided an indication of the type and number of people to be trained. There is however a need to collect and analyse more information on employee characteristics, including:

- ❑ age distribution;
- ❑ experience, skills and qualifications;
- ❑ length of service distributions;
- ❑ promotion opportunities; and
- ❑ leaving rates.

Based on an analysis of the above, a Human Resources Development plan could be revised to include the number and type of skills that are essential in managing water resources. The analysis will assist in the following:

- ❑ identification of young Namibians who need to be trained in order to acquire necessary skills in water resources development, water service provision and other disciplines needed to implement the recommendations of the Review; and
- ❑ influencing the development of HRD strategies, the revision of policies in respect of recruitment and promotion, training and development, the planning of redundancy and the planning of accommodation and physical requirements.



## 3.2 Training of the Technical Team

One of the main aims of the Review is capacity building. From its onset the recruitment of the Technical Team was done on the basis of individual commitment and ability to learn rather than professionalism and experience.

This is being so a team-building workshop was conducted where a wide range of development needs for all the Technical Team members were identified. On the basis of the needs identified, individual development plans will be prepared for each team member. To date a programme has been established for the development of all Technical Team members which includes:

- computer literacy skills;
- advanced presentation skills;
- management of change and project management skills; and
- human resources planning and management.

The general aim of this development programme is to fully develop individuals in their current roles within the Technical Team, provide opportunities for team members to upgrade their qualifications and address the gaps and needs within the team by equipping selected members with skills in new areas.

## 3.3 Human Resources Development Strategy

### 3.3.1 Competence Based Training

In much of the water sector existing training fails to provide those undertaking the training with qualifications and concentrates on imparting knowledge rather than skills.

This problem is not unique to the water sector, but it is particularly significant to it, given the large number of people to be trained to support community based management.

Furthermore, established organisations in the sector, such as the Department of Water Affairs, municipalities and NamWater employ many individuals in positions for which there is currently no appropriate qualification. Examples include positions such as extension workers, artisans and a wide range of technical support staff.

Most of these workers need effective skills based training accredited to appropriate standards. It is vital that they can do their jobs effectively (and not merely pass knowledge tests). Competence based training has been identified by a number of human resource studies commissioned by the Technical Team as particularly relevant.

Recent HRD reports have pointed out that current approaches to training are incompatible with effective development and affirmative action. The development of competence based training approaches will address such deficiencies.

Competence based training provides the opportunity to achieve qualifications on the basis of the skills a person can effectively apply in the workplace. Although there will be some knowledge assessment, the main focus is on assessing the competence of someone in actually doing the job.

Competence based qualifications are based upon units of competence broadly equating specific job roles. These are then broken down into elements which are the main tasks for a particular role and these in turn are broken down into performance criteria which effectively establish the standards being sought and the basis for worker assessment. Other details are also provided, such as range statements encompassing the range of contexts within which individuals must be able to deploy their skills and advice on the type of evidence required before competence can be inferred.

It should be noted that since the level of detail in units of competence is far greater than in a curriculum, the unit also acts as a detailed guide to the knowledge and skills content of training that is required. This is particularly helpful to both trainers and assessors.

Qualifications of this nature emphasise assessment of outcome performance and do not prescribe any entry standards. This being so, they are of particular relevance to the water sector where many people requiring training may not have enjoyed high levels of school attainment.

Namibia is in the early stages of developing competence based training and the NQA is currently establishing national policies in this regard.

### *3.3.2 Competence Based Training for Namibia*

The Ministry of Higher Education, Vocational Training and Science and Technology (MHEVTST) is committed to the development of competence based training. It has established by Act of Parliament<sup>10</sup> the Namibia Qualifications Authority to be a guardian of standards and accreditor of qualifications. The Technical Team has worked closely with MHEVTST in developing its competence based training strategy.

The MHEVTST has been giving extensive consideration to how it might adopt the Fast-Trac style of competence based delivery. This system creates the means to deliver competence based qualifications without resort to traditional educational institutions. The Hon. Nahas Angula, Minister for Higher Education, Vocational Training and Science and Technology has called this the creation of "schools without walls", carrying the potential to accelerate the quantity and quality of skills training in Namibia.

The Technical Team initiated a pilot programme in 1998, funded by UNDP and supported by GTZ and the Namibia Water Resources Management Review to test whether key features of the Fast-Trac system could be credibly developed and delivered in Namibia.

The Fast-Trac system is a system of vocational training developed in Scotland. Like in Fife, Scotland, based on the delivery of competence based qualification in the workplace whether via traditional employers or via the community. The training is focused on meeting the real needs of both the organisations facilitating the training and the individuals being trained. Individual training plans are constructed for each trainee and nationally recognised. Assessors provide a rigorous assessment of skills to meet national standards.

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<sup>10</sup> *Namibia Qualifications Authority Act 29 of 1996*

The key features of a Fast-Trac system are as follows:

- the establishment of a central organisation (FAST-TRAC to manage and assure the quality of the overall approach to training;
- key professional workers within FAST-TRAC are firstly Training Executives and secondly system administrators;
- training executives are responsible for drawing up training programmes for each individual, based on their needs, and on available units of competence. This system is based on individual training plans, not on class or group based programmes;
- individuals are trained on-the-job (in Namibia this will often be in-the-community), or if available in a training setting such as a workshop or college;
- individual progress and the quality of training provided is regularly monitored by training executives;
- trainers and assessors (such as extension officers, workshop trainers, work supervisors) are all trained in the appropriate skills for competence based training;
- assessments are undertaken by trained assessors and reviewed by FAST-TRAC before being presented to the Namibia Qualifications Authority for final evaluation; and
- Individuals are provided with nationally recognised qualifications, which detail the units of competence gained.

It is not the intention in Namibia to replicate all aspects of the system, but to attempt to tailor-make a Namibian version taking account of Namibia's needs and Namibian policy. In particular, strategically important components of the system have to be tested in the Namibian context.

The pilot programme seeks to test whether it will be possible to develop a Fast-Trac system for Namibia. A team of four specialists spent five weeks in Namibia working with key personnel in different areas of the water sector. The results of this pilot exercise exceeded expectations and indicate that this approach will be particularly useful in equipping the Namibian labour force with appropriate skills.

Staffs of the MHEVTST and UNDP working alongside consultants were able to design a management and administrative system for Fast-Trac Namibia during the consultancy period. Further training of assessors was conducted during February 1999 which brings the number of trained assessors to 46 in total. A follow-up assessment of 10 extension officers and 3 others in the field was done during February/March 1999.

The aim of the envisaged pilot is to have a minimum of 200 individuals trained in a wide variety of contexts and to a wide variety of competence based qualifications before the end of 1999. This will require the parallel development of a Fast-Trac Namibia organisation and significant further development of key staff and of competence based qualifications.

The following Fast-Trac issues need proper consideration for policy purposes:

- there would be no barriers to entry;
- training would not be time bound;
- all the training executives would be on probation until the required standard is met;

- organisations would be given temporary approval to provide such training and final approval to provide such training would be granted once certain basic organisational requirements are met; and
- Fast track systems would be organised in regional rather than in central structures.

This pilot project has been designed to comprise three phases. The aims of Phase One, which has now been completed, were the following:

- to work with key people in the water sector in order to design an appropriate version of the Fast-Trac system in Namibia;
- to design and pilot Namibian competence based qualification for work place assessors; and
- to work with a local authority and extension service via rural communities and test whether it is possible to develop high quality competence based qualification.

Phase Two will commence by June 1999 with full piloting organisation and will involve communities involved in poverty alleviation with the UNDP programme and the GTZ supported Communal Area Water Supply (CAWS). The third phase will concentrate on the launch of the system nation wide if phase two is successful.

In addition to the involvement of the MHEVTST, the NQA has been closely involved in the development of this strategy. In particular, the NQA has been involved in establishing the qualification requirements for the sector, and working with the Technical Team's HRD consultants in mapping out accreditation arrangements.

The Technical Team has also worked with a range of bodies to identify where competence based approaches will be most useful. These have included municipalities, the extension service and a range of government ministries.

In summary, the Technical Team has:

- worked with the MHEVTST and NQA to identify good practice and Namibian requirements in the development of competence based qualifications;
- engaged in an assessment of the training needs of the water sector;
- worked with key organisations in the water sector to identify where competence based approaches will be most appropriate; and
- piloted key features of the Fast-Trac system of delivery.

### *3.3.3 Water Management Advisory Committee*

A committee has been formed to advise the Review on issues pertaining to human resources development in the water sector. This committee consists of representatives from water-related institutions, training institutions and the MHEVTST. The committee's operation will be in line with the current vocational training initiatives and the committee will have the following terms of reference:

- assist in approving standards after planning, designing, evaluating and/or adapting water-related training standards for positions below artisan level;

- make recommendations for the development of qualifications for artisan level;
- advise the Review on:
  - identification of priority jobs in respect of which the standard of training needs to be developed;
  - issues relating to employer-based and community-based training as well as any other training conducted in the water sector; and
  - issues related to assessment, accreditation and certification.
- evaluate the piloted human resources development strategies i.e. institutional standards, implementation of the Fast-Trac system, including implementation of competence-based training and quality assurance programmes; and
- deal with any other matters relating to training in the water-related trades.

**Membership of the Committee will consist of:**

- the Secretariat of the Namibia Water Resources Management Review;
- representatives from Windhoek Municipality;
- NamWater;
- Department of Water Affairs; and
- DRFN.

Members representing other sectors will be co-opted if necessary.

*3.3.4 Human Resource Development Standards*

In Namibia there is a total lack of institutional standards in human resources. The Review has held extensive discussions with both the Office of the Prime Minister and the NQA and an agreement has been reached on the need to develop institutional standards for organisations within the water sector. The Review has accordingly developed institutional human resources standards following a wide range of consultations with all the stakeholders.

These standards have been developed after reviewing international human resources standards and considering the particular needs within the sector and government policies on matters such as affirmative action and equal opportunities. The standards are aimed at providing a framework for assessing whether or not an organisation has effective mechanisms in place for the development of all employees.

The most common types of institutional standards are quality standards seeking to regulate production or design processes. Examples would include the ISO 9000 standards, which seek to ensure quality of process within organisations.

Some Namibian organisations utilise standards of this nature. For example, the fisheries sector in Namibia has had to meet European Union standards for fish processing to allow it to continue exporting fish to European Union countries.

In the area of human resources, the trend has been towards creating outcome-based standards. South Africa, for example, has imported the UK's Investor In People standard, which has been designed to accredit organisations, which achieve high standards of development for their staff. This type of standard does not prescribe how the organisation should undertake tasks such as the identification of training needs and the evaluation of the impact of training but rather describes what outcomes must be achieved regardless of the organisation's preferred processes.

This style of quality assurance standard is similar to the competence-based model in terms of which the key feature is assessing the outcome.

In establishing human resource standards for Namibia, the benefits of adopting foreign standards are limited. Establishing appropriate human resource standards for Namibia is however crucial, particularly given the fact that the water sector needs to skill-up large numbers of personnel if it is to meet the growing expectations of its citizens.

Given that the water sector will be served by organisations that will have a virtual monopoly in some areas of activity, it is even more important that standards are adequately articulated. If there was no monopoly and a competitive market was in place, it might be optimistically argued that competition would force organisational effectiveness and therefore require effective staff skills development. This is however not the case in Namibia's water sector.

If corporate effectiveness is to be enhanced, some mechanism for attesting to and raising employee skill levels will be required. The most obvious mechanism is to establish outcome based institutional standards, which address human resource needs.

The Namibian HRD standards include 5 standards, 21 performance indicators, advice to institutions and assessors, typical documentary evidence and likely questions by the assessor. The standards are as follows:

□ **Standards 1 – Communication and Support**

The organisation makes a commitment to develop all employees to achieve its objectives. The commitments have to come from the top leadership and must apply to everybody in the organisation.

□ **Standards 2 – identifying needs**

The organisation has a systematic process for identifying the development needs of all its employees.

□ **Standards 3 – Resource and Planning**

The organisation identifies and mobilises the resources to be used to meet training and development needs. This needs to be done by way of a written plan on how the resources will be used.

□ **Standards 4 – Delivery and Support**

The organisation delivers and supports effective employees' development opportunity at all stages in an employee's career. This includes induction or training programme.

## □ Standards 5 – Evaluation

The organisation evaluates the effectiveness of training and development, and uses evaluation evidence to enhance future planning and delivery.

### *3.3.5 Pilot Organisations*

Six organisations have agreed to co-operate with the Technical Team in piloting the human resources institutional standards referred to above. Apart from the TT, other organisations are DWA, NamWater, Department of Women Affairs, City of Windhoek, Nampower and the Desert Research Foundation (DRFN). These organisations will be involved in the piloting until October 1999 and will thereafter be given an award upon successfully meeting the standards.

Most of the organisations with the exception of the Department of Women Affairs and Nampower, have started with the implementation and a trial assessment was done with the assistance of the external assessors. Consultations between such organisations and their assessors will continue until such time as the organisations meet the set standards.

The standards involve a range of performance indicators which organisations must meet. These performance indicators are outcome based, which means that organisations can choose the inputs and processes that are suitable to their circumstances.

These human resource standards will be helpful in facilitating the change process not only in the water sector but also in the whole public sector.

### *3.3.6 External Assessment*

An important feature of the standards is that they will be assessed by external assessors. For the first phase of the HRD project the Namibian Qualification Authority has agreed to act as independent assessor. However, in order to equip the sector with the necessary knowledge about assessment, an assessor-training workshop was organised for one week each during October 1998 and March 1999 respectively. About 46 assessors were trained, including the NQA staff, City of Windhoek's officials, two members from the Technical Team as well as Extension Officers from the Ministry of Agriculture, Water and Rural Development. To become qualified assessors, the people who were trained were assessed while carrying out assessment of individuals and institutions during February and March 1999 by a consultant from Scotland. In order to sustain these types of training, it is proposed that a training of trainers programme should be considered for the Namibians and that a group of internal verifiers should be trained in order to add quality to the system.

## 4 CONCLUSION

The HRD Theme of Review is aiming at articulating and suggesting an overall strategic framework. An action research approach will be used to enable the piloting of the key strategic components as described in this paper. The following elements are crucial to ensuring the success of further development:

- political support and approval by Cabinet

- equipping the senior managers in the water sector with the skills of project management.
- implementation of a 3 years HRD plan of action as from June 1999,<sup>11</sup> aimed at having the following outputs:
  - 200 individuals embarked on the study of a range of competence based units by December 1999.
  - 500 individuals embarked on the study of a range of competence based units of study, with a minimum of 200 having achieved at least 3 units of competence by December 2000.
  - 2000 individuals embarked on the study of a range of competence based units, with a minimum of 600 having achieved at least 3 units of competence by December 2001
  - 2000 individuals embarked on the study of a range of competence based units, with a minimum of 600 having achieved at least 3 units of competence by December 2001.
  - established a FAST-TRAC Namibia organisation by no later than end September 1999. Initially FAST-TRAC Namibia will be under the overall management of The Technical Team of the Namibia Water Resources Management Review.
  - a minimum of 6 Namibians trained as Training Executives by end September 1999.
  - a minimum of 15 Namibians trained as Training Executives by end September 2000.
  - a minimum of 30 Namibians trained as Training Executives by end September 2001.
  - a further 30 individuals trained as competence based trainers and assessors by end September 1999.
  - a further 60 individuals trained as competence based trainers and assessors by end September 2000.
  - a further 200 individuals trained as competence based trainers and assessors by end September 2001
  - developed 100 units of competence appropriate to the water sector by December 1999.
  - 200 units of competence appropriate to the water sector developed by December 2000.
  - 300 units of competence appropriate to the water sector developed by December 2001.
  - 2 Training Executives fully trained as FAST-TRAC managers by March 2000.
  - fully pilot the FAST-TRAC delivery system, and have completed an interim evaluation by December 2000.

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<sup>11</sup> NWRMR, FAST TRAC NAMIBIA, Project proposal, March 1999



## D SHARED RIVERS

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### 1 INTRODUCTION

Namibia has no perennial rivers within its territory. A large proportion of the nation's perennial water is found in the trans-boundary rivers that form the northern and southern borders, far from the centres of demand. As water sources in the interior of Namibia are virtually fully exploited, the country's future economic development is increasingly dependent on long distance water transfers from shared watercourses.

These shared watercourses are governed by various bilateral, regional and international instruments, which provide for integrated management and sustainable development of the shared resource. With the advent of these instruments of co-operation as well as other general framework international agreements and conventions, new concepts, guidelines, approaches and requirements have come into being. Namibia's international obligations under these instruments need to be taken into account in the management, development and regulation of the shared water resources.

Population growth, economic development, and urbanisation are placing increasing pressure on existing water resources and give rise to a need for further abstraction of water from transboundary rivers. In addition, growing demand for energy has precipitated a search for new sources of hydropower, again requiring development of international rivers. This theme of review will attempt to suggest ways and means of conflict prevention and dispute resolution and will propose a framework for the utilisation of shared water in compliance with Namibia's obligations in international law to other riparian states.

This theme has conducted research on shared watercourse issues with a view to formulating a policy for their management. Attention has been given to designing enabling legislation which will address and facilitate proper integrated management of the watercourses and enhance co-operation among riparian states, enabling Namibia to become an active and effective role player in this process.

Work has also been done on assessing methods and strategies for capacity building with a view to enabling the country to play an effective role in shared water course relations and to secure such share of water resources from shared water courses as it is entitled to in international law.

Current water legislation is outdated and does not adequately address the issue of transboundary rivers. Where an attempt is made to address international water issues in the Water Act, it is for the purpose of border delimitation and the establishment of a legal regime for ownership of the joint water facilities in the territories of different riparian states.

To assist in the determination of appropriate policy, the Review will conduct training workshops on the techniques of good policy formulation. The recommendations and findings of these workshops will be taken into account when advice on policy formulation is compiled for government consideration.

A broad consultative process will be put in place to facilitate maximum stakeholder input in the development of a white paper and framework legislation on shared water courses. Research will also be conducted as to how different instruments of international water law concerning shared

watercourses affect Namibia and recommendations made on how Namibia can give effect to her international obligations.

In order to achieve the aforementioned goals and objectives special attention will be paid to regional and local co-operation instruments, and to the manner in which Namibia can effectively exploit them whilst meeting its international legal obligations.

In order to facilitate proper research, the theme of shared river basins has been divided into two main components: the external or outside component and the internal or domestic component. Bearing in mind the objectives of the review in as far as shared watercourses are concerned, which include identifying key issues constraining water resource development and management, the following issues were identified as constraints:

- Inadequate inter-agency consultation and involvement.
- Absence of a proper and formal institutional home to address shared watercourse issues.
- Inadequately established and functioning riverbasin authorities.
- Weak or non-existent conventional international negotiation strategy.
- Absence of clear policy guidelines to guide country's business in shared waters.
- Lack of capacity.

## **2 CURRENT SITUATION: NATIONAL ISSUES AND INITIATIVES**

### **2.1 Environmental issues**

#### *2.1.1 Pollution*

Namibia is a downstream riparian state, with regard to all the shared rivers with the exception of the Zambezi, in respect of which it occupies an intermediary position. Environmental concerns accordingly include those such as water pollution and the maintenance of a balanced ecology. Particular attention thus needs to be afforded to pollution and other environmentally related issues. The Orange River is a particular case in point because of the major artificial manipulations and different uses it is subjected to before reaching Namibia.

It is interesting to note however that during negotiations with South Africa and in the various documents on the Orange that have been made available to the review, the issue of pollution does not feature as one of Namibia's concerns.

#### *2.1.2 Environment (pollution), integrated management and recent legislative initiatives*

The Ministry of Environment and Tourism and the Ministry of Health and Social Services have embarked upon separate legislative reform exercises aimed at regulating issues of water pollution and sanitation. It would appear however that there is little co-ordination between these initiatives. There is accordingly a risk that the end products will be scattered pieces of legislation that do not take account of each other and which may be difficult or too bureaucratic to implement.

Efforts should be made to ensure that legislative reform initiatives embarked upon by various Ministries are co-ordinated. The Review could be instrumental in co-ordinating these efforts through

its different themes, namely Legislative and Regulatory Framework, Water Use and Re-use, and Strategic Water Assessment.

### *2.1.3 Water Transfers and Associated Environmental Effects*

Of all the artificial manipulations of watercourses, water transfers have the greatest environmental impact.

The hydrological situation in southern Africa, with its variability in rainfall, limited runoff, with the greatest proportion of run off found on the eastern escarpment and coastal belt, creates difficulties for water supply, particularly as the large centres of population and industrialisation are situated in the dry central plateau. The solution seems obvious: to re-distribute the water so that it can be put to the service of people in areas where the supply is insufficient.

For both users and managers of water, transferring water between geographically distinct catchments or basins or from one reach of a river to another offers considerable advantages. In essence, a river system that is linked up with neighbouring catchments can provide more useable water than the combined yield of the individual components.

Furthermore, catchments can be manipulated to support each other, and the level of assurance of supply can be raised. In some instances water transfers are connected with pumped storage schemes, in which water is pumped back to higher elevations and released to generate electricity when there is peak power demand.

Water transfer is not however without its problems, which may only become apparent long after a scheme is in operation. It is therefore necessary to gain an in-depth picture of a river system in the early stages of planning. Fine details of water chemistry, flow dynamics, dependence of plants and animals on flooding, are some examples of the characteristics that are likely to be affected in inter-basin transfers which may result in a number of unknown consequences.

Environmental assessments of water transfers must consider the broad impacts to the system that donates the water, the system that receives it, and to the route between the two. Within each of these systems there are physical, chemical, biological and human components that must all be thoroughly assessed. Many changes that accompany a water transfer scheme may be inevitable, but analysing the possible impacts can at least alert decision-makers to try to reduce or avoid some of the more damaging effects. The draft Environmental Management Bill requires environmental impact assessments to be carried out at the strategic level of developing policy and planning.

In order to ameliorate negative consequences associated with inter- and intra- basin water transfers, it is imperative that integrated planning leading to integrated management precedes water transfers. It is equally important that environmentally assessed national water master plans are compiled, in the same manner as integrated watercourse master plans.

## **2.2 Proposed Namibia Water Legislation**

Namibia currently has no domestic legislative provisions to govern its utilisation of shared watercourses. A policy and legislative framework accordingly needs to be developed which should be informed by Namibia's foreign policy.

## **2.3 River Basin organisations (RBOs) and The Basin-Wide Integrated Water Resource Management**

Currently there are good water sharing arrangements in place between Namibia and other shared watercourse states. Among such arrangements are the Okacom and the Orange River Permanent Commission.

There is however both an external and an internal dimension to these arrangements. Whilst the outside or external part of these arrangements are fairly well developed, the internal aspects have been neglected. Attention should be given to putting mechanisms in place and creating a conducive environment necessary for the efficient and effective carrying out of the requirements and obligations arising from or leading to such international arrangements.

### *2.3.1 Inter-agency consultations*

As different government institutions have different mandates and are custodians of different information and data, information sharing is crucial. Lack of consultation and communication between different institutions involved in the water sector is rife. This obviously is problematic as it results in uncoordinated and fragmented development of the water sector.

There is little or no knowledge among stakeholders with regard to the existence of international water sharing arrangements. One of the contributing factors to this lack of information or awareness is little or no involvement of stakeholders in the whole process. The best remedy for this state of affairs is for stakeholders to be involved in consultation at the different stages of initiation, drafting, negotiation, signing, accession and implementation of water sharing agreements.

For integrated management of water resources to take place, it should be preceded by integrated planning. A platform/forum for soliciting views and securing comments of stakeholders should be created. In the absence of such a forum and approach, the obvious consequence will be isolated planning and fragmented management, decisions taken on the basis of incomplete information and insufficiently checked data. This compromises Namibia's ability to adequately negotiate water-sharing agreements.

### *2.3.2 Comprehensive cross-sectoral resource planning and management at basin level*

The concept of integrated watercourse management is not well grasped by the water sector and tends to be sector-specific. As long as this sector-centred approach is maintained other sectors and agencies that have not been brought along from the beginning will be expected to give their full cooperation and play a meaningful role in implementing a strategy in whose design they have not taken part. Involving them from the outset has the advantage of educating, sensitising and making

them fully appreciative of issues and strategies involved. In this way they will own the process and become conscious co-operating partners.

### *2.3.3 Leadership role of the water sector in issues of integrated watercourse management.*

Integrated watercourse management is a relatively new concept worldwide. For it to be properly understood and implemented a lot of education and co-ordinating work needs to take place. This work should start at the planning and project approval stage. Currently this is not properly done and the result is isolated management. For example the occupation of land adjacent to riverbanks has implications and importance not only for the Ministry of Lands, but also for Water Affairs, Health and Environment.

In order to move away from the culture and practice of fragmented management and bring about integrated resource management, it is recommended that the water sector transforms its role from that of expert-implementer to the one of educator, coordinator and leader of the activities impacting or impacted upon by integrated water management strategy. The purpose for so doing would be to bring these sectors along, secure their cooperation and input and sensitise them about their part of the obligations and requirements in terms of international watercourse agreements entered into by Namibia.

The sector could address the problem of integrated management, co-ordination and similar issues by instituting a liaison office that is properly placed in terms of authority. It could have focal points in the concerned agencies and ministries, who should equally be well placed in terms of seniority.

### *2.3.4 Participation of water institutions in the management and administration of shared watercourses*

The participation of Namibian water organisations in the management and administration of shared watercourses is too autonomous. There seems to be no appreciation for the fact that the business of sharing water internationally is a potentially dangerous area, out of which conflicts have historically arisen. As international water sharing has political implications and repercussions, it is desirable that it is carried out within a framework of regulations or guidelines clearly laid down by the political arm of government. In particular need of regulation is:

- a) The powers, functions and mandate of bodies participating in the management and administration of shared watercourses should be clearly defined and determined.
- b) The manner and process of consultation with other ministries, offices and stakeholders whose expertise or input might be required, or who might ultimately be affected by issues and positions to be adopted at international negotiations should be prescribed.
- c) Procedures and mechanisms of approaching cross-sectoral planning, integrated resource management and sustainable development issues on the Namibian side of the shared watercourse ought to be laid down and approved. Implementing and technical institutions can and should be involved in formulating proposals on mechanisms and procedures for approval or sanctioning by the corresponding authorities. Once approved the shared water institution will have to operate within the framework of such procedures.

In order to bring about efficient, effective and comprehensive integrated management of the resource, a trial forum consisting of the concerned directorates of ministries such as Regional, Local Government and Housing (directorate of regional and local govt.: town/village administration), National Planning Commission (directorate of planning), Lands, Resettlement and Rehabilitation (directorate of lands), Environment and Tourism (directorates of forestry and environment), Mines and Energy (directorate of energy) and Trade and Industry should be put in place. This exercise should have the aim of initiating discussions on how best integrated management can be achieved.

The forum should:

- serve as the appropriate platform to give feedback on the outcome of negotiations relating to and the signing and accession to international water sharing agreements;
- serve to inform participants of new or existing policy guidelines, principles and practices that should be observed or will affect the business of shared watercourses, from the side of affected sectors;
- allow discussions of methods and mechanisms aimed at bringing about or enhancing inter-sectoral cooperation which can lead to real and significant integrated water resources management in Namibia in general and on its side of the shared basin in particular; and
- help tackle accountability issues and provide an opportunity to look internally on how the obligations internationally contracted are going to be met domestically.

This approach will assist in translating integrated water resources management from theory into reality.

The ministry may choose to develop the above process and implement it as a trial for the immediate future international negotiations. Attempts should be made to develop standards and monitor their implementation by the sector as far as shared watercourse issues are concerned, similar to the way it has been done with Human Resources Development currently being implemented by the Review.

### **3 CURRENT SITUATION: INTERNATIONAL ISSUES AND INITIATIVES**

#### **3.1 Introduction**

The international character of Namibia's perennial rivers derives from pre- and posts independence treaties and agreements. The uses and operational regimes of these rivers are conducted and regulated in terms of these agreements. The formation, existence and application of these agreements and treaties have their basis in the modern rules, practices and theories of international water law, which revolve around territorial integrity and national sovereignty. The Water Act (Act 54 of 1956) currently in force in this country does not adequately provide for the regulation of shared water. Other principles of international law that come into play are the principles of good neighbourliness and mutual respect between independent and sovereign states. As the modern international water sharing theories and international law principles were not issues when the present water act was promulgated, it cannot be expected to have adequately covered the theme of

internationally shared waters. For historical reasons the latter could not have been an issue, particularly as national sovereignty and territorial integrity, were not, with the exception of South Africa, enjoyed by riparian states with which Namibia shares the resource at the time when the act was drafted.

Policy proposals will have to be developed in respect of the way in which the country's business in shared watercourse is to be conducted, the retrospective recognition of pre-independence agreements if viable, regulations of national authorities dealing with riverbasin issues and the relation between them and international RBOs.

This theme will also make recommendations as to the extent to which the envisaged Namibia water act will cover shared watercourse issues.

## **3.2 Multilateral and Bilateral Agreements**

### *3.2.1 Post-independence instruments for co-operation*

The boundaries of the eleven SADC states lie across fifteen major perennial and ephemeral river basins, and straddle five major lakes. At present there are approximately 21 agreements between different SADC countries concerning joint co-operation in various fields, including water resources of mutual interest.

Below are listed the agreements and commissions between Namibia and its riparian neighbours that affect internationally shared water resources:

1. The Permanent Joint Technical Commission (PJTC) between Angola and Namibia on the Cunene River Basin was established at the same time as the agreement of co-operation between the two countries, signed in 1990. The major priority for the PJTC at present is the development of the Epupa Dam hydroelectric power scheme.
2. The Joint Operating Authority between Angola and Namibia was also reinstated in 1990 in Lubango. It deals specifically with the operation of the regulating dam on the Cunene River at Gove, in Angola, and with the infrastructure for the Ruacana hydropower station on the same river in Namibia.
3. The Joint Permanent Water Commission between Botswana and Namibia concerning the development and utilisation of water resources of common interest was established in November 1990 in Windhoek. It has been functional, specifically with regard to activities on the Okavango River and the Kwando-Linyanti-Chobe river system in the Zambezi River basin.
4. The Permanent Okavango River Basin Water Commission (OKACOM) between Angola, Botswana and Namibia was established in September 1994 in Windhoek. It has recently commenced with its activities overseeing development in the Okavango basin.
5. The Joint Permanent Technical Commission between Lesotho and South Africa on the Lesotho Highlands Water Project (LHWP) was established in October 1986 in Maseru, Lesotho. This Commission serves in an advisory and monitoring capacity for all the activities in the

construction of the LHWP, which transfers water from the headwaters of the Orange River to Gauteng. Two parastatal organisations were established at the same time to operate the LHWP. They are the Lesotho Highlands Development Authority which is responsible for the development activities concerning Lesotho, and the Trans-Caledon Tunnel Authority which is responsible for those concerning South Africa. Both Botswana and Namibia, who share the basin with South Africa, were not included.

6. The Permanent Water Commission between Namibia and South Africa was established in September 1992 at Noordoewer, Namibia, to deal with water matters of mutual concern. Since the re-integration of Walvis Bay with Namibia in 1994, the Commission has concentrated its activities on the Orange River Basin. However, preparation for the establishment of the Orange River Basin Commission is at an advance stage. This Commission will be composed of all riparian states.
7. The Treaty of the Vioolsdrift and Noordoewer Joint Irrigation Schemes between Namibia and South Africa was also signed in September 1992 at Noordoewer. This established a parastatal Joint Irrigation Authority to operate the irrigation project located on both sides of the Orange River at Vioolsdrift and Noordoewer.

There are also multinational agreements that have a bearing on water matters. One such agreement is the Southern African Regional Commission for the Conservation and Utilisation of the Soil (SARCCUS) which was established in 1948 and has Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa and Swaziland as actively participating members. One component of SARCCUS is the Standing Committee for Hydrology. This committee which is reportedly very active, deals with a wide spectrum of water related matters, including hydrology, hydrogeology, aquatic weed control, training and exchanging information on water resource development in the region. As part of new institutional arrangements, it was decided that four subcommittees, resorting under the Water Sector Technical Committee should be formed and that the SARCCUS structures should be amalgamated. Ways should be explored as to how SARCCUS structures and objectives could be adjusted and harmonised with those of the Protocol. Any changes or reform of SARCCUS should be informed by this reality.

### *3.2.2 Pre-Independence agreements affecting shared watercourses*

A number of pre-independence agreements exist. To our knowledge no formal compilation and study of these agreements have been carried out after independence and they are difficult to access.

A formal review of pre-independence agreements will have to be undertaken to assess whether any conflict exists between them and the legal order of present day Namibia.

It also is necessary to decide on the extent to which international and bilateral agreements shall be covered or referenced in the future Namibia Water Act. Guidelines of a general nature on what part of these agreements should be regulated by subsidiary legislation must be developed. Because of the more flexible nature of subsidiary legislation it is preferable that administrative and operational issues be regulated therein.



As regards future agreements it is necessary to lay down procedures, policy guidelines and principles to be observed in initiating, signing, accessing and administering international agreements. Since these agreements are of such national importance, procedures should be made for securing input from relevant stakeholders

### 3.3 International Framework Agreements

#### 3.3.1 *The Zambezi Action Plan*

The Zambezi River is the largest African river to flow into the Indian Ocean. Its basin, with an area of about 1300 000-sq. km covers the territories of eight different countries: Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. Floodplains, swamps, lakes, and dams are all features of the basin, making the river and its tributaries a great natural irrigation system in these countries.

Namibia's link to the Zambezi Riverbasin is through the Cuando River, which drains off from the Angolan highlands, enters Namibia as the Kwando, which in years of exceptionally high rainfall links up with the Chobe River in Botswana. The latter then joins the Zambezi. The area is so flat and depending on the relative height of the water in the Zambezi and the Kwando, the flow of the water may reverse and is pushed back into the Chobe Marsh and may finally spill into Lake Liambezi. The Cuando catchment therefore forms part of the Zambezi basin only in years of good rains. For these reasons these basins are treated as separate parts of two different watercourse systems, the Okavango and the Zambezi respectively.

The commendable but somewhat ambitious Zambezi Action Plan (ZACPLAN) initiative has been overtaken and overshadowed by activities related to and development of the SADC Protocol and the UN Convention on the Law of Non-Navigational Uses of International Watercourses. Hopefully ZACPLAN shall gain momentum again once the amendment process of the Protocol is finalised and the harmonisation thereof with the Convention is complete.

#### 3.3.2 *The U.N Convention on the Law of the Non-Navigational Uses of International Watercourses*

The Convention is a general framework agreement that consists of thirty-seven articles of which the following are the most outstanding:

##### 3.3.2.1 General principles underlying the Convention

###### 3.3.2.1.1 Equitable and reasonable utilization and participation

This principle implies that international watercourses should be utilized in an equitable and reasonable manner and that while watercourse states have the right to participate in the use and development of the watercourse they are required to protect it.

In the application of this principle, relevant factors and circumstances that should be taken into account include the following:

- Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
- The social and economic needs of the watercourse states concerned;
- The population dependent on the watercourse in each watercourse state;

- The effects of the use or uses of the watercourses in one watercourse state on other watercourse states;
- Existing and potential uses of the watercourse;
- Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect;
- The availability of alternatives, of comparable value, to a particular planned or existing use.

In the application of Equitable and Reasonable Utilization and the participation principle, watercourse states concerned shall, when the need arises, enter into consultations in a spirit of co-operation.

#### 3.3.2.1.2 Obligation not to cause significant harm

Watercourse states shall, in utilising an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse states. Where significant harm is caused to another watercourse state, the state whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, in consultation with the affected state, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

#### 3.3.2.1.3 General obligation to co-operate

Under this principle watercourse states shall be required to co-operate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilisation and adequate protection of an international watercourse. In determining the manner of such co-operation, watercourse states may consider the establishment of joint mechanisms or commissions, as deemed necessary by them; to facilitate co-operation on relevant measures and procedures in the light of experience gained through co-operation in existing joint mechanisms and commissions in various regions.

#### 3.3.2.1.4 Regular exchange of data and information

Watercourse States shall on a regular basis exchange readily available data and information on the condition of the watercourse, in particular that of hydrological, meteorological, hydrogeological and ecological nature and related to the water quality as well as related forecasts.

If a watercourse state is requested by another watercourse state to provide data or information that is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting state of the reasonable costs of collecting and, where appropriate, processing such data or information.

Watercourse states are obliged to employ their best efforts to collect and, where appropriate, to process data and information in a manner that facilitates its utilisation by the other watercourse states to which it is communicated.

#### 3.3.2.1.5 Relationship between different kinds of uses

According to this principle two considerations have to be made when determining the relationship and order of priority between the different uses. These considerations are:

- a) In the absence of agreement or custom to the contrary, no use of an international watercourse enjoys inherent priority over other uses.
- b) In the event of a conflict between uses of an international watercourse, it shall be resolved with special regard being given to the requirements of vital human needs.

#### 3.3.2.2 Planned Measures

The Convention sets out the procedures that should be followed in relation to a new activity in one state that may have significant adverse effect on other watercourse states. It also sets out the obligation of the state intending to carry out planned measures to notify other watercourse states that may be adversely affected by the planned activity.

##### 3.3.2.2.1 Implementation of Planned Measures

With regard to the implementation of planned measures, the watercourse state planning to implement such measures is required to exchange with or provide information concerning planned measures to other watercourse states.

Watercourse states shall be required further to exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse.

##### 3.3.2.2.2 Notification of planned measures with possible adverse effects

Before a watercourse state implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse states, it shall provide those states with timely notification thereof. Available technical data and information, including the results of any environmental impact assessment, in order to enable the notified states to evaluate the possible effects of the planned measures shall accompany such notification.

##### 3.3.2.2.3 Period for reply to notification

Unless otherwise agreed:

- (a) A watercourse state providing notification shall allow the notified states a period of six months within which to study and evaluate the possible effects of the planned measures and to communicate its findings;
- (b) This period shall, at the request of a notified state for which the evaluation of the planned measures poses special difficulty, be extended for a period of six months.

#### 3.3.2.2.4 Obligations of the Notifying State during the Period for Reply

During the period referred to above the notifying state:

- (a) Shall co-operate with the notified states by providing them, on request, with any additional data and information that is available and necessary for an accurate evaluation; and
- (b) Shall not implement or permit the implementation of the planned measures without the consent of the notified States.

#### 3.3.2.2.5 Reply to Notification

The notified states shall communicate their findings to the notifying state as early as possible within the period applicable. If a notified state finds that implementation of the planned measures would be inconsistent with the provisions of the Convention; it shall attach to its finding a documented explanation setting forth the reasons for the finding.

#### 3.3.2.2.6 Absence of reply to notification

If, within the period applicable, the notifying state receives no communication, it may, subject to its obligations stipulated by the Convention, proceed with the implementation of the planned measures, in accordance with the notification and any other data and information provided to the notified states.

Any claim to compensation by a notified state which has failed to reply within the period applicable, may be offset by the costs incurred by the notifying state for action undertaken after the expiration of the time for a reply which would not have been undertaken if the notified state had objected within that period.

#### 3.3.2.2.7 Consultations and negotiations concerning planned measures

If a communication is made that implementation of the planned measures would be inconsistent with the provisions of the Convention, the notifying state and the state making the communication shall enter into consultations and, if necessary, negotiations with a view to arriving at an equitable resolution of the situation.

The consultations and negotiations shall be conducted on the basis that each state must in good faith pay reasonable regard to the rights and legitimate interests of the other state.

During the course of the consultations and negotiations, the notifying state shall, if so requested by the notified state at the time it makes the communication, refrain from implementing or permitting the implementation of the planned measures for a period of six months unless otherwise agreed.

#### 3.3.2.2.8 Procedures in the absence of notification

If a watercourse state has reasonable grounds to believe that another watercourse state is planning measures that may have a significant adverse effect upon it, the former state may request the latter

to notify it with respect to such planned measures. The request shall be accompanied by a documented explanation setting forth its grounds.

In the event that the state planning the measures nevertheless finds that it is not under an obligation to provide a notification, it shall so inform the other state, providing a documented explanation setting forth the reasons for such finding. If this finding does not satisfy the other state, the two states shall, at the request of that other state, promptly enter into consultations and negotiations in the manner indicated to these effects by the Convention.

During the course of the consultations and negotiations, the state planning the measures shall, if so requested by the other state at the time it requests the initiation of consultations and negotiations, refrain from implementing or permitting the implementation of those measures for a period of six months unless otherwise agreed.

#### 3.3.2.2.9 Urgent implementation of planned measures

In the event that the implementation of planned measures is of the utmost urgency in order to protect public health, public safety or other equally important interests, the state planning the measures may, immediately proceed to implementation, notwithstanding the obligations and procedures stated earlier on.

In such case, a formal declaration of the urgency of the measures shall be communicated without delay to the other watercourse states that might be adversely affected together with the relevant data and information.

The state planning the measures shall, at the request of any of the states referred to above, promptly enter into consultations and negotiations in the manner prescribed by the Convention.

#### 3.3.2.2.10 Protection, preservation and management of the environment

The Convention contains certain environmental provisions. These provisions are potentially powerful in that they require watercourse states to preserve and protect the ecosystem of international watercourses.

#### 3.3.2.2.11 Protection and preservation of ecosystems and Prevention, reduction and Control of Pollution

Watercourse states shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses.

*"Pollution of an international watercourse" is defined in the Convention as any detrimental alteration in the composition or quality of the waters of an international watercourse, which results directly or indirectly from human conduct."*

Watercourse states are obliged, in terms of the Convention, individually and, where appropriate, jointly, prevent, reduce and control the pollution of an international watercourse that may cause

significant<sup>12</sup> harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse.

Watercourse states are further obliged to take steps to harmonise their policies in this connection. Watercourse states are further obliged, at the request of any of them, to consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse, such as:

- (a) Setting joint water quality objectives and criteria;
- (b) Establishing techniques and practices to address pollution from point and non-point sources;
- (c) Establishing lists of substances the introduction of which into the waters of an international watercourse is to be prohibited, limited, investigated or monitored.

#### 3.3.2.2.12 Introduction of alien or new species

Watercourse states are obliged, in terms of the Convention, to take all measures necessary to prevent the introduction of species, alien or new, into an international watercourse, which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse states.

#### 3.3.2.2.13 Protection and preservation of the marine environment

Watercourse states shall, individually and, where appropriate, in co-operation with other states, take all measures with respect to an international watercourse that are necessary to protect and preserve the marine environment, including estuaries, taking into account generally accepted international rules and standards.

#### 3.3.2.2.14 Management

Watercourse states shall, at the request of any of them, enter into consultations concerning the management of an international watercourse, which may include the establishment of a joint management mechanism.

For the purposes of the Convention "management" refers, in particular, to:

- (a) Planning the sustainable development of an international watercourse and providing for the implementation of any plans adopted; and
- (b) Otherwise promoting the rational and optimal utilisation, protection and control of the watercourse.

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<sup>12</sup> Significant harm is perhaps one of the most controversial terms of the convention as it is unclear whose discretion it is to determine whether a harm is or not significant at whose standard or judgement is it significant.

### 3.3.2.2.15 Prevention and mitigation of harmful conditions

Watercourse states shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse states, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion or drought.

### 3.3.2.2.16 Emergency situations

For the purposes of the Convention, "emergency" means a situation that causes, or poses an imminent threat of causing, serious harm to watercourse states or other states and that results suddenly from natural causes, such as floods, the breaking up of ice, landslides or earthquakes, or from human conduct, such as industrial accidents.

A watercourse state shall, without delay and by the most expeditious means available, notify other potentially affected states and competent international organisations of any emergency originating within its territory.

A watercourse state within whose territory an emergency originates shall, in co-operation with potentially affected states and, where appropriate, competent international organisations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency.

When necessary, watercourse states shall jointly develop contingency plans for responding to emergencies, in co-operation, where appropriate, with other potentially affected states and competent international organisations.

### 3.3.2.2.17 Miscellaneous Provisions

The Convention deals with issues like armed conflicts and sets rules of international law for the protection of international watercourses, related installations, facilities, etc. during times of hostilities.

It further prescribes methods and procedures for the settlement of disputes.



### 3.3.2.2.18 Namibia's position on the Convention

Namibia has signed but not yet ratified this Convention.

## 3.4 The SADC Protocol on Shared Watercourses

### 3.4.1 Background

The Declaration Treaty and Protocol on the establishment of the Southern African Development Community (SADC) was signed on 17 August 1992 in Windhoek, Namibia. The activities of SADC have been divided into ten different areas of co-operation, each of which was allocated to one of the member countries. Water is one such area and the SADC member country responsible is Lesotho.

The protocol on shared watercourses in the SADC region between the Republic of Angola, the Republic of Botswana, the Kingdom of Lesotho, the Republic of Malawi, the Republic of Mozambique, the Republic of Namibia, the Republic of South Africa, the Kingdom of Swaziland, the United Republic of Tanzania, the Republic of Zambia and the Republic of Zimbabwe was signed by the heads of state or government in Johannesburg on 28<sup>th</sup> August, 1995. After signature of the protocol, Angola and Mozambique in their capacity as stated parties, raised comments which needed to be addressed.

### 3.4.2 First Amendment Workshop

At its meeting in Windhoek, Namibia in 1997, Council issued a directive to the Secretariat and the Water Sector Co-ordination Unit (WSCU) to convene a Protocol Implementation Workshop with the primary purpose of reviewing the comments raised by Mozambique and Angola and elaborating a programme for the implementation of the Protocol. For this purpose a workshop was held in Manzini, Swaziland from 21<sup>st</sup> – 22<sup>nd</sup> April, 1997 and consensus was reached on the amendments proposed by the two member states, which, it was resolved, would be tabled before Council through the Water Sectoral Committee of Ministers for consideration and possible incorporation into the Protocol after its ratification. The workshop adopted a Protocol Implementation Programme which was to be submitted for further discussion and elaboration by the SADC Water Resources Technical Committee in May 1997.

At the time of the workshop, ten of the eleven original member states of SADC had signed the Protocol (with the exception of Angola), but only four had ratified it. Mauritius became a member of SADC in 1995 and acceded to the Protocol. Under Article 10, the Protocol enters into force thirty days after ratification by two thirds of the member states. In view of the need for more ratifications to bring the Protocol into operation, the workshop emphasised the urgency attached to further ratifications by member states.

Consequently a sufficient number of ratifications have been obtained to enable the Protocol to come into force. In the intervening period, however, two significant developments have occurred which have a direct bearing on the Protocol Implementation Programme. First, the United Nations has adopted the Convention on the Law of the Non-Navigational Uses of International Watercourses, which impacts directly on the Protocol as SADC member states parties thereto have also adopted the UN Convention. This development necessitates a clear definition of the

relationship between the UN Convention and the Protocol, to eliminate confusion as to the present obligations of member states under the two regimes. Second, more comments were raised by member states, pursuant to a Council directive that the Water Sector Co-ordinating Unit assisted by the Secretariat should continue with the process of soliciting amendments and present a consolidated report in September 1998.

### *3.4.3 Second Amendment Workshop*

The Second SADC Shared Watercourses Protocol Amendments Workshop was held in Ezulwini, Swaziland on 17-21 August 1998. The workshop objective was to review and reach consensus on comments raised by member States since the first workshop held on 21-22 April 1998 pursuant to a Council directive that the Water Sector Co-ordinating Unit should continue with the process of soliciting amendments and report at the meeting scheduled for September, 1998.

#### 3.4.4 *Third Amendment Workshop*

The objectives of the Third Amendment Workshop that took place in Mutare, Zimbabwe, from 19-22 April 1999 were:

- a) To resolve two outstanding issues on which consensus was not reached at the Ezulwini Workshop, namely: the use of the "riverbasin" and "watercourse" concepts;
- b) To consider Zambia's proposal which according to its Minister for Energy and Water Development did not have official blessing when it was tabled, but which it now has, and;
- c) To adopt a final Draft Amendment Protocol for submission to SADC policy organs for adoption in accordance with article 12 of the Protocol.

#### 3.4.5 *General Principles underlying the Protocol*

The protocol is informed by the following general principles:

- The utilisation of shared watercourses within the SADC region shall be open to each riparian state in accordance with principles contained in the protocol.
- States that are parties to the protocol undertake to respect and apply the existing rules of general or customary international law.
- They undertake to maintain a proper balance between resource development for achieving higher standards for their peoples and conservation and enhancement of the environment.
- They further undertake to pursue and establish close co-operation in the study and execution of all projects that are likely to have an impact on the watercourse system.
- They shall exchange available information and data about the watercourse system.
- State parties to the Protocol undertake to utilise the shared watercourse system in an equitable manner and:
  - to require any person intending to use water from shared watercourse within their respective territories for purposes other than domestic use or to discharge any type of waste with permission.
  - to notify, without delay, any potentially affected states as well as competent international organisations of any emergency situations originating from their territories; and
  - to utilise shared watercourses and related facilities and installations exclusively for peaceful purposes and in accordance with the SADC Treaty and the UN Charter.

A further important feature of the Protocol is the establishment of river basin management institutions, namely:

- a) River basin commissions between basin states; and

b) River Authorities or Boards.

According to the Protocol river basin organisations shall have the following functions:

(a) With regard to National Water Resources Policies and Legislation:

- i) Harmonisation of national water resources policies and legislation; and
- ii) Monitoring compliance with water resource legislation and legislation.

(b) With regard to Research, Information and Data Handling:

- i) Collecting, analysing, storing, retrieving, disseminating, exchanging and utilising data relevant to the integrated development of the resources within shared watercourse systems and assisting member states in the collection and analysis of data in their respective states,
- ii) Reviewing the provisions of National Development Plans relating to the water course systems,
- iii) Designing and conducting studies, research and surveys related to the environmentally sound development and management plans for shared watercourse,
- iv) Stimulating public awareness and participation in the sound management and development of the environment including human resources development,
- v) Promoting, in accordance with the national development plans of the Basin States, the formulation of integrated master plans for shared watercourse systems.

(c) With regard to Water Control and Utilisation in shared watercourse systems:

- i) Recommending regulation of the flow and drainage,
- ii) Promoting measures to control desertification, soil erosion and navigational purposes,
- iii) Recommending and promoting measures to control desertification, soil erosion and sedimentation,
- iv) Monitoring the utilisation of water for agriculture, domestic, industrial and navigational purposes,
- v) Monitoring the establishment of hydroelectric power installations; and
- vi) Monitoring the generation of hydroelectric power.

(d) With regard to Environmental Protection:

- i) Promoting measures for the protection of the environment and the prevention of all forms of environmental degradation arising from the utilisation of the resources of the shared watercourse systems,
  - ii) Assisting in the establishment of a list of substances whose introduction into the waters of a shared watercourse system is to be banned or controlled,
  - iii) Promoting environmental impact assessments of development projects within the shared water-course systems, and
  - iv) Monitoring the effects on the environment and on water quality arising from navigational activities,
- (e) With regard to Hydro-meteorological Monitoring Programme:
- i) Promoting a hydro-meteorological monitoring programme in consultation with other SADC sectors.

A new article on the objectives of the protocol, which draws heavily on the overall objectives of the SADC Treaty, has been added. Among these objectives are to facilitate the establishment of riverbasin organisations; to contribute to regional economic integration; poverty alleviation; sustainable development and integrated watercourse management. The Third Amendment Workshop held SADC workshop

### 3.5 NEGOTIATIONS ON SHARED WATERCOURSES

#### 3.5.1 *Current state of affairs*

Namibia does not currently have a proper national cross-sectoral strategy in place to enable it to participate in shared watercourse negotiations in an effective and efficient manner. Nor are these negotiations preceded by proper, methodical, scientific and professional preparations. They appear to be taken lightly, on ad hoc basis and without assessing in full magnitude the latent implications and outcome. Much reliance is placed solely on the technical expertise of the negotiators alone. Policy guidelines are not properly shared in advance. Formal and in-advance exchanges with own foreign missions on negotiations subjects do not form a crucial component of strategy, and negotiations are not informed by foreign relations policy between Namibia and the country in question.

#### 3.5.2 *Recommendations*

**a properly formulated national shared river negotiation strategy and mechanism must be put in place. This should provide for an appropriate multidisciplinary negotiating team that is up to speed and integrative in approach. The team should seeks to be informed of other relevant sector policies and the general and specific government foreign policy that also applies and the development of negotiating guidelines in a form of a negotiations manual.**

#### 4 SUMMARY

- 1) In view of the above, a proper, well-structured, formal, multi-disciplinary, institutional home for addressing international watercourse issues, agreements and other incidental matters should be created. The home must be properly placed for the authority that it must have and given the sensitivity and implications of issues that it takes care of.
- 2) the role and functions of this home/unit must be defined in such a way that this home will enable Namibia to meet its obligations with regard to international watercourses, especially those that are related to integrated resource management, the environment and sustainable development.
- 3) there is a need to establish an appropriate negotiating team whose members, apart from possessing professional expertise should themselves be widely familiar with prevailing government policies. (water ambassadors)
- 4) issues of capacity building and human resources development requires urgent attention
- 5) an education and awareness campaign directed towards stakeholders on water issues needs to be established which should include the state of affairs prevailing in shared river basins. The campaign should aim at maximizing input from stakeholders Since there is such a weak understanding of shared waters and integrated management of water resources, regionally and globally, it might be helpful, funds allowing, to extend this campaign to the regional level.

Adopting international principles that should govern Namibia's business in shared watercourses. good neighbourliness, principle of territorial integrity and national sovereignty, promotion of regional integration, promotion of equality and mutual respect among riparian neighbouring states, etc

Developing a manual for shared watercourse negotiations.

## E LEGAL AND REGULATORY ISSUES

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### 1 INTRODUCTION

Although Namibia is relatively richly endowed with many natural resources, water, one of the most strategic resources for the economic and social development of the country, is in short supply. To compound matters, access to water and water resources has in the past been the privilege of those with access to land and economic power. Furthermore, there is no integrated approach to water resources management.

Hitherto, the focus in Namibia has been on the development of water resources to meet the ever-increasing competing demands. Little or no emphasis has been placed on the management of water resources on a sustainable basis.

The legal and regulatory framework provided for by the current Water Act (Act 54 of 1956) is outdated. The Act applies the rules of the well-watered countries of Europe (notably, 17<sup>th</sup> century England and Holland) to the arid climatic conditions of Namibia, ignoring the country's hydrological reality. In addition, its provisions are inconsistent with post-independent Namibia's developmental goals and the constitutional requirements of equitable access to the nation's resources, and the protection of the ecosystems. Basing rights to so-called public water on the antiquated riparian principle of land ownership, the Act effectively excludes non-landowners from having adequate access to water and water resources. With most land being in the hands of white minority, the Act is in this respect overwhelmingly discriminatory in its effect on the Black majority.

In addition to the shortcomings of the current water legislation as outlined above, the following further shortcomings in the water sector which fall to be addressed by new water legislation include:

- lack of a holistic approach to water resources management, which takes into account the interactions among users and environmental impacts;
- inequitable access to water – there is disparity between the minority landed class and economically powerful on the one hand, and the majority landless and economically weak on the other;
- there is a disproportionate amount of water (especially, groundwater) tied up in private hands because of the present legislation; this frustrates government's efforts to manage the resource rationally;
- need to devolve or decentralise the management of the resource and create an environment for community participation in the management of the resource;
- need for the decentralization of water administration and possible privatisation or corporatisation of water works; and
- lack of, or inadequate regulation of this scarce resource due to fragmentation of government responsibilities and institutions.

## 2 EXISTING WATER SECTOR (SITUATION ANALYSIS)

### 2.1 The State of Water Legislation in Namibia

The Water Act, 54 of 1956 is the primary legislation relating to water resources management. There are however a number of other pieces of legislation which impact, directly or indirectly, on water resource management. These statutes are indicative of the current policies, practices as well as the institutional arrangements for water management in Namibia.

#### 2.1.1 *Water Act 54, of 1956*

This Act is the primary legislation with regard to the ownership, allocation, access to, use, and management of water resources in Namibia. Only certain sections of this Act have been made applicable to Namibia, namely sections 5-7, 9A, 9B, 21-23, 26 (excluding paragraph (a)), 27, 28(1), 30, 30A(a), 34-43, 44(2), 45-51, 54-56, 57(1), 59(2), 61, 66, 67, 69, 70 (excluding paragraphs (d), (f), (g) and (h)), 139-152, 164*bis*, 164*ter*, 165, 166, 170 (excluding paragraphs (5)(c)) and 171.

The stated objective of this Act is the control, conservation and use of water for domestic, agricultural, urban and industrial purposes. The Act was built originally on principles of water law from Roman and Roman-Dutch law. Subsequently the Cape Supreme Court superimposed principles of English and even American law upon the prevailing system governing water law. This superimposition resulted in the granting of exclusive rights to riparian landowners and the concomitant loss by the state of its original position of *dominus fluminis*. Henceforth, water law took on a distinctly private law orientation with emphasis on the rights of respective riparian landowners.<sup>13</sup>

The focus of the Act is largely anthropocentric as it does not consider the environment as a water user and does not expressly cater for the environment's water needs.<sup>14</sup>

Central to the operation of the Act is the distinction between private and public water. Private water is defined as "*all water which rises or falls naturally on any land or naturally drains or is led onto one or more pieces of land which are the subject of separate original grants, but is not capable of common use for irrigation purposes.*"<sup>15</sup> The owner of the land on which the private water is found does not have ownership of such water but does enjoy exclusive use and enjoyment of such water.<sup>16</sup>

The sale or disposal of private water for use by any other person on any other land or the conveyance of such water by the owner beyond the boundaries of the land on which the water is found for the own use of such owner is prohibited except under permit from the Minister.<sup>17</sup>

Public water is defined as "*any water flowing or found in or derived from the bed of a public stream, whether visible or not.*"<sup>18</sup> A public stream is defined as "*a natural stream of water which flows in a known and defined channel, whether or not such channel is dry during any period of the year and whether or not its conformation has been*

<sup>13</sup> Fuggle & Rabie, *Environmental Management in South Africa* (1992) at 653

<sup>14</sup> Kidd, *Environmental Law, A South African Guide* (1997) at 85

<sup>15</sup> Section 1

<sup>16</sup> Section 5(1)

<sup>17</sup> Section 5(2)

<sup>18</sup> Section 1



*changed by artificial means, if the water therein is capable of common use for irrigation on two or more pieces of land riparian thereto which are the subject of separate original grants or on one such piece of land and also on state land which is riparian to such stream, provided that a stream which fulfils the foregoing conditions in part only of its course shall be deemed to be a public stream as regards that part only.*<sup>19</sup>

The right to use of public water is divided into agricultural, urban and industrial purposes. In terms of section 7 of the Act any person may, while he is lawfully at any place where he has access to a public stream, take and use water from such stream for the immediate purpose of watering or dipping stock or drinking, washing or cooking, or for use in a vehicle at that place, or for purposes of waterborne sanitation or the watering of crops on land not exceeding one hectare in size. Such water may not however be used for irrigation purposes on land in excess of one hectare in size except under authority of a permit.<sup>20</sup>

Section 9B of the Act limits the quantity of public water that may be impounded or stored in a waterwork to 20 000 cubic metres. A waterwork is defined in the Act as

- “(a) a canal, channel, well, reservoir, protecting wall, embankment, weir, dam, borehole, pumping installation, pipeline, sluice gate, filter, sedimentation tank, road, telephone line or other work constructed, erected or used for or in connection with the impounding, storage, passage, drainage, control or abstraction of water, or the development of water power, including the generation, transmission and supply of electricity, or the filtration or purification of water sewage, effluent or waste, or the protection of public streams against erosion or siltation, or flood control, or the protection of any water work or irrigated land, other use of water for any purpose, or the conservation of rain water;*
- (b) land occupied for or in connection with the impounding, storage, passage, drainage, control, abstraction, filtration, purification, development of power (including generation of electricity), or any other use of water, and includes any area occupied or required or held for the purpose of being irrigated or for flood control purposes;*
- (c) gauge posts, measuring weirs and any other appliances erected or used by the department or an irrigation board or water board.”*

A person who wishes to construct, alter or enlarge a water work capable of impounding more than 20 000 cubic metres must accordingly obtain a permit from Cabinet. Although use of water for industrial purposes does not require a permit, a person using water for industrial purposes is obliged to purify or otherwise treat the water used and any effluent produced by such use in accordance with requirements which the Minister of Agriculture, Water and Rural Development may from time to time prescribe by notice in the Gazette.

After compliance with the requirements of purification the purified water and effluent must, in a manner and subject to any requirements, which may be prescribed by regulation, be discharged

- (a) if the water was derived from a public stream, into that public stream at the place where the water was abstracted or at such place as the Minister of Agriculture, Water and Rural Development may indicate; and*

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<sup>19</sup> *ibid.*

<sup>20</sup> Section 7 (a)A

- (b) *if the water was seawater, into the sea at the place where such water was abstracted from the sea or at such place as the Minister of Agriculture, Water and Rural Development may indicate (section 21(1)(b)).*

The user of water for industrial purposes must furnish the Department of Water Affairs in writing with those particulars regarding the use and disposal of purified or treated water as may be prescribed by regulation (section 21(1)(c)). The Minister of Agriculture, Water and Rural Development may either by notice in writing to a person, or by notice in the Gazette exempt a person or a class of persons on conditions which he or she may specify, from any or all of the aforesaid provisions (section 21(4)(a)). Any person prejudiced by such an exemption may apply to the Minister of Agriculture, Water and Rural Development and the person in whose favour the exemption was granted to object against the continuation of the exemption or any matter in connection with the exemption. The Water Court may confirm or withdraw the exemption or withdraw or amend any condition to which it may be subject (section 21(4)(c)). The Minister of Agriculture, Water and Rural Development may at any time withdraw an exemption or render the continued validity of the exemption subject to such conditions as he or she may determine (section 21(4)(e)).

Subterranean water can be abstracted and utilised by the owner of land under which such water is found for any purpose.<sup>21</sup> In terms of section 30A of the Water Act the Minister of Agriculture, Water and Rural Development may convey and supply any subterranean water abstracted or obtained by the state to any person for use on any land for any purpose. Water derived from such a source is considered public water.

The state does have the power, in certain circumstances, to restrict riparian owner's rights.<sup>22</sup> One of the main shortcomings of the Act is however the fact that the state's powers in this regard are considerably less than they are in countries with similarly scarce water resources.<sup>23</sup>

A further shortcoming of the Act is the fact that it does not recognise the environment as a user of water and does not provide for the maintenance of a basic amount of water for the needs of the environment.

### 2.1.2 *Public Health Act, 36 of 1919*

The stated objective of this Act is to deal with public health. In terms of section 111 of this Act it is the duty of every local authority to "*take all lawful, necessary and reasonably practical measures:*

- (a) *for preventing the pollution so as to endanger health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes (whether such supply is derived from within or beyond its district); and*
- (b) *for purifying any such supply which has become so polluted;*

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<sup>21</sup> Section 30(1)

<sup>22</sup> Chiefly through the declaration of a number of types of control areas such as subterranean government control areas and catchment control areas.

<sup>23</sup> M Kidd at 87. Compare Australia where the right to the use and flow of water is vested in the Crown in most states.

*and to take measures against any person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health."*

### 2.1.3 Local Authorities Act 23 of 1992

Local councils established in terms of this Act are, *inter alia*, empowered to supply water to the residents in their areas for domestic, business and industrial purposes (Section 30).

Extensive powers are conferred on the local authorities in connection with the construction of water works (s. 34) and the supply of water during drought or other calamities (s. 36).

More importantly, local authorities are charged with the responsibility to ensure that all natural channels and banks of all public watercourses situated in their areas of jurisdiction are clean and free from any artificial or natural obstruction (s 90).

Section 94 of the Act empowers local authorities to make regulations, after consultation with the Minister responsible for local government, with regard to the supply, distribution and use of water in their areas of jurisdiction.

### 2.1.4 Regional Councils Act 22 of 1992

In terms section 28, a regional council established in terms of this Act may undertake the planning and development of a region with regard to, *inter alia*, water.

### 2.1.5 Mineral (Prospecting and Mining) Act 33 of 1992

This Act which deals primarily with control over minerals and mining, contains a number of provisions relating to water and the environment. In terms of section 35, the Mining Commissioner is not permitted to approve an application for the registration of a mining claim unless he or she is satisfied on reasonable grounds that "*in the course of mining operations ... appropriate measures will be taken to minimize or prevent any pollution of the environment.*"<sup>24</sup> This obviously includes water pollution. Section 50 provides that it shall be a term and condition of any mineral licence that the holder of such a licence shall prepare for the approval of the Mining Commissioner:

- "(i) an environmental impact assessment indicating the extent of any pollution of the environment before any prospecting operations or mining operations are being carried out and an estimate of any pollution, if any, likely to be caused by such prospecting operations or mining operations; and*
- (ii) if any pollution is likely to be so caused, an environmental management plan indicating the proposed steps to be taken in order to minimize or prevent to the satisfaction of the Commissioner any pollution of the environment in consequence of any prospecting operations or mining operations carried out...*"<sup>25</sup>

The drilling of boreholes for prospecting and mining operations is also regulated by the Act, which prohibits same unless prior notice has been given to the Mining Commissioner.<sup>26</sup>

<sup>24</sup> Section 35(e)(iii)

<sup>25</sup> section 50(f)

<sup>26</sup> section 53(1)

### 2.1.6 Soil Conservation Act 76 of 1969

This Act provides for the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of water sources.

In terms of section 3 of the Act, the Minister of Agriculture, Water and Rural Development (“the Minister”) may either by written notice in the Gazette or by written notice to the owner or occupier of land issue directions in respect of, *inter alia*:

- (a) *the drainage of vleis, marshes, natural water sponges and water courses;*
- (b) *the protection and stabilising of barrier dunes on the coast, of other dunes where drift sand occurs or may occur and of the vegetation occurring thereon;*
- (c) *the prevention of erosion, the denudation, disturbance or drainage of land; and*
- (d) *any other disturbance of the soil which creates or may create conditions which cause or may cause any form of erosion or pollution of water by silt or drift sand.*

The Minister may, in addition, in terms of section 4 of the Act, order the owner of land to construct soil conservation works, in such manner and within such period as he may determine. Soil conservation works are defined in the act as “*any works constructed on land for the purpose of:*

- (a) *the prevention of soil erosion or the stabilising of land subject thereto; or*
- (b) *the prevention of drift sand or the stabilising of land subject thereto; or*
- (c) *the protection, conservation or improvement of the vegetation and the surface of the soil; or*
- (d) *the protection, conservation or stabilising of any natural water source; or*
- (e) *the prevention of the silting up of dams and the pollution of water by silt.”* (section 1)

### 2.1.7 Namibia Water Corporation Act, 12 of 1997

This Act, although providing primarily for the establishment of the Namwater provides, in addition, for a more efficient use and control of water resources.

In terms of section 5 of this Act, NamWater is established to “*carry out efficiently and in the best interest of the Republic of Namibia, inter alia, the primary business of bulk water supply to customers, in sufficient quantities, of a quality suitable for the customers’ purposes, and by cost effective environmentally sound and sustainable means...*”

Section 6 provides that notwithstanding any provisions of the Water Act to the contrary, it shall be a function of the NamWater to supply water to customers within and outside the borders of the Republic of Namibia.

In carrying out its objective and performing its functions under this Act, NamWater is required, in terms of section 11 to “*utilise the water resources available to it on a long-term sustainable basis.*” NamWater is further obliged in the performance of its functions, to take “*appropriate steps to conserve and protect the environment from damage, destruction or degradation, and in particular to protect -*

- (a) *the fauna and flora;*
- (b) *geological and physiographical features of special interest; and*
- (c) *buildings, structures and other objects of architectural, archeological or historic interest.”*

Accordingly, notwithstanding the lack of environmental protection provisions in the Water Act, NamWater will be obliged, in developing the water supply infrastructure to ensure that water is utilised on a long-term sustainable basis and further to take adequate steps to ensure that the supply of water does not result in damage, destruction or degradation of the environment.

From the foregoing outline of existing water or water-related legislation it is apparent that water and water related issues are governed by a number of different Ministries. Common to most of these enactments is the fact however that they ignore the concept of the environment as a legitimate water user.

## 2.2 Current water law in Namibia: Gaps and Constraints

The Water Act No 54 of 1956 is a legacy from the previous dispensation and does not meet modern Namibia's needs. In particular, the Act no longer adequately provides for the management of water resources as:

- it was adopted from the law of better-watered countries and is thus not appropriate for the management of water resources on a sustainable basis in an arid climate such as Namibia's;
- it has its roots in the needs of a predominantly agrarian society and is thus unable to deal with increasing demands on the scarce resource as a result of the growing competition – with its potential conflicts- among users, notably, domestic consumption, mining, industry, hydropower generation, wildlife resources, environment and recreation;
- it fails to recognise the hydrological cycle as an indivisible continuum and this is reflected in the legal rules that apply;
- it fails to acknowledge water resources as a national asset;
- it provides for the antiquated system of riparian rights, which links the right to use water to ownership of land adjacent to the river from which water is drawn, which in turn has the effect of having the right being issued in perpetuity;
- it provides for the notion of “private water” with resulting limited state control over ground water or water rising or originating on a person's private property;
- it fails to provide for equitable access to water; water in Namibia is mostly used by a dominant group which has privileged access to land due the injustices of racially based land dispossession and the consequential unequal distribution of land among the different racial groups;
- it lacks a well-structured pricing system, which reflects the economic value of water;
- it fails to provide for adequate regulation of exploitation of water resources;

- ❑ it has fails to adequately address the environmental impacts of schemes, use and disposal of water as there are no technical standards with regard to environmental protection;
- ❑ it has fails to provide for an independent body to protect the interests of consumers in respect of matters such as tariff setting, water quality and quantity as well as reliability of supply;
- ❑ it does not provide incentives for private operators to invest in a sustainable manner in the water sector; and
- ❑ it fails to deal adequately with the issue of water conservation and resource protection.

A revision of Namibia's water law must accordingly ensure that new water legislation is premised on principles of:

- ❑ equity;
- ❑ technical efficiency;
- ❑ environmental sustainability; and
- ❑ simple and easy administration.

To this end, several key questions need to be addressed:

- ❑ What will meet the Constitutional requirement?
- ❑ What makes most sense in terms of present understanding of the environment and the hydrological cycle? ;
- ❑ What will enable us to optimally manage a scarce resource to meet long-term developmental goals? and
- ❑ What will benefit the majority of Namibians?

## 2.3 Water Law and the Constitution

The doctrine of constitutional supremacy dictates that all law must be subject to and consistent with the Constitution. The Constitution, being the supreme law of the land, sets certain minimum standards against which existing and future laws will be measured. Thus there is a constitutional obligation on government to ensure that new water law conforms to the provisions of the Namibian Constitution. Article 95 (1) enjoins the State to actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future. It is accordingly imperative that new policy and legislation governing water resources provide for utilisation on a sustainable basis.

Ownership of natural resources is also specifically governed by the Constitution. In terms of Article 100 "land, water and natural resources below and above the surface of the land and in the continental shelf and within the territorial waters and the exclusive economic zone of Namibia shall belong to the State if they are not otherwise lawfully owned.

Chapter 3 of the Constitution, which provides for the protection of fundamental rights and freedoms, is also relevant in the development of new water policy and law:

- *Article 6: Right to Life: The right to life shall be respected and protected. Grinding poverty amongst the rural and urban poor communities, including poor water and sanitation related diseases, is responsible for many deaths, particularly amongst infants.*
- *Article 8(1): Respect for Human Dignity: The dignity of all persons shall be inviolable.*

It is impossible to maintain dignity in a situation where basic services such as water and sanitation are lacking

- *Article 10(2): Equality and Freedom from Discrimination: No persons may be discriminated against on the grounds of sex, race, colour, ethnic origin, religion, creed or social or economic status.*

Although the Water Act of 1956 is not racially based, its application has discriminatory effects with regards access to water and water resources by Blacks.

- *Article 16: Property: All persons shall have the right in any part of Namibia to acquire, own and dispose of immovable and moveable property...*

In the past the right to own land in most part of Namibia was reserved for the minority whites, and with the riparian system which links the right to use water to the ownership of the adjacent land, there is a *de facto* disparity with regard to access to water; and

- *Article 23: Apartheid and Affirmative Action:*

Recognising that mere neutrality of law is not enough to address past inequalities, the Constitution enjoins Government to be pro-active to ensure economic and social justice for all, particularly for those who were previously disadvantaged due past racially based discriminatory laws.

Current water legislation does not comply with the Constitutional provisions outlined above. Care must be taken in the development of new water law and policy that these provisions are given effect to.

### 3 CURRENT ISSUES

Government has been engaged for some time in efforts to reorganise the water sector in Namibia with a view to bringing the benefits of a sustainable and adequate water supply to all citizens of Namibia. In this regard certain activities can be highlighted:

- The Water Supply and Sanitation Sector Policy (WASP) approved in 1993, is aimed at cost recovery in the water sector (both rural and bulk supply) and to a certain degree addresses the issue community participation in respect of water supply;
- The National Consultation on Community Management of Rural Water Supply which produced national consensus among stakeholders on the future management of rural water supply and the subsequent Cabinet Agenda Memorandum on Rural Water Supply and Community Management of Rural Water Supply (1995-1997);
- The establishment of *NamWater*, a Government owned corporation, charged with the development water resources and managing the supply of water to rural water supply schemes, municipalities and the private sector in bulk.

The aforementioned reforms concentrate however on water services (water supply and sanitation) and cost recovery, rather than on the question of sustainable water resources management and development.

The Ministry of Environment and Tourism, through its *Environmental Legislation Project* has embarked on a project to review and revise Namibia's environmental legislation. Work is far advanced in this regard and a Draft *Environmental Management Bill* is currently awaiting submission to the Cabinet Legislation Committee, whilst a *Draft Pollution Control and Waste Management Bill* is nearing completion.

These developments will have significant implications for water resources management in Namibia as, by definition, environment includes water.

The draft *Environmental Management Bill* establishes a set of environmental management principles which must be applied by all persons and government in the planning and implementing of acts likely to have a significant effect of the environment. These principles include the principle of sustainable utilisation of natural resources, equitable access to sufficient water of acceptable quality and adequate sanitation and the promotion of the water needs of ecological systems (clause 6).

This draft Bill also gives legislative effect to the Cabinet Policy on Environmental Impact Assessments and contains comprehensive provisions on the implementation of an environmental impact assessment system in Namibia. In terms of this Bill the construction of canals and water transfer schemes, the drilling of boreholes, the construction of dams and the abstraction of ground or surface water will all be subject to environmental impact assessments.



The draft *Pollution Control and Waste Management Bill* introduces a system of integrated pollution control and makes specific provision for water pollution. The Bill establishes a Pollution Control and Waste Management Agency (Clause 1 (1)), which Agency shall be responsible for “*effective control and prevention of pollution in Namibia*”(Clause 3(2)(a)). The Agency shall further “*undertake and co-ordinate the monitoring of water quality in Namibia*” and the Minister of Environment and Tourism is empowered to make regulations relating to water quality after consultation with the Minister responsible for water affairs (Clauses 29 (1) and 30(1)).

These said regulations will establish standards, objectives or requirements in relation to water quality and activities that are likely to pollute water.

The Bill prohibits the discharge of effluent and solid waste into watercourses without a water discharge licence or in breach of the conditions of a licence. This licence will be issued by the Agency with the written agreement of the Minister responsible for water affairs who may add conditions to the licence (Clause 35).

The Bill proposes to repeal section 21 of the Water Act No 54 of 1956, which empowers the Minister of Agriculture, Water and Rural Development to deal with the purification and disposal of industrial water and effluent.

The Bill is a welcome step towards addressing the issue of water quality in particular and water resources protection in general. However, it must be harmonised with the general principles that will underpin Namibia's integrated water resources management, as they will emerge from the Review.

#### 4 KEY ISSUES

A number of key issues, which are central to the theme Legislation and Regulation have emerged from this analysis of the *status quo*. An attempt is made to single out certain broader issues that are necessary for understanding and appreciating the underpinning constraints that inhibit the sustainable management of water resources in Namibia.

##### 4.1 Ownership and Allocation

The concepts of water resources ownership on the one hand, and water allocation mechanisms and the rights to use water, on the other, are often confused and misunderstood. In most countries, including Namibia, the rights in water have been subject to the notion that the State retains the authority and responsibility to determine the nation's natural resources. Article 100 of the Constitution explicitly vests the ownership of all natural resources, including water, in the State unless such resources are otherwise lawfully owned. This was the situation under Roman-Dutch law prior to the introduction the 1956 Water Act which introduced the concepts of “public and private water” and the principle of riparian rights. The 1956 Act did not however change the law as far as the ownership of the resource is concerned. Water resources remain common property belonging to the nation as whole.

The bone of contention however is the method used to allocate the rights to the use of water. Riparian water rights form part of the title deeds of land and riparian landowners enjoy extensive rights to water in public streams adjacent to their land. These rights are however confined to rights

of use and enjoyment rather than of ownership. The method of allocation is however inherently exclusive as it gives preference to landowners. Key issues are thus how to reaffirm state ownership of natural resources including water and how to put in place a concomitant equitable allocation system. Other countries have used authorisation (in respect of certain uses such as domestic use with less significant impacts on a water resource) and a licensing system for major uses such as industrial or irrigation purposes.

The issue of allocation is very critical and must be addressed rationally and with the deserving sensitivity as some rights have been exercised for long period and are perceived as personal and private rights.

The issue of land ownership is also crucial, particularly in the context of community based water resource management. WASP formulated a long term policy which has as its basic tenets the fact that the equitable improvement of services should be as a result of the combined efforts of government and the beneficiaries, based on community involvement, participation and responsibility and the fact that communities should have the right to determine which service levels and solutions are acceptable to them.<sup>27</sup>

As full ownership of the rural water supply facilities is considered by the communities in Namibia to be one of the prerequisites for sustainable community-based management, the Department of Water Affairs has embarked on a process of considering methods to ensure that full ownership of water supply facilities is transferred to communities.<sup>28</sup> To this end a study was undertaken in March 1998, firstly to identify and analyse the legal options available to provide water point associations with formal legal status, and secondly, to identify and analyse the legal options available for the transfer of the ownership of water points from government to rural communities in communal areas.<sup>29</sup>

The primary concern identified by this study is the pressing need of rural communities for security of tenure over specific areas of communal land. This is particularly important if ownership of water point facilities in communal areas is to be passed to communities as envisaged in WASP, as without this communities' rights to land and to obtain secure tenure on land on which water point facilities are to be located will be wholly dependent on the whim of traditional authorities. This issue is particularly crucial when regard is had to the numerous instances of illegal fencing in communal areas that cut off access to water points and grazing.<sup>30</sup>

The study recommends that water point associations take the form of voluntary associations and that legislation be drafted to make provision for this. It would appear to be envisaged that water point associations would be constituted in a manner similar to that provided for in the Nature Conservation Ordinance Amendment Act, 1996 for the establishment and registration of communal conservancies. It is recommended in the study that a specialised Bill be drafted to provide for community water point management and the establishment of water point associations, local water committees and regional water committees.<sup>31</sup>

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<sup>27</sup> A Digest of the Water Supply and Sanitation Sector Policy of the Government of Namibia, MAWRD, November 1993, p. 12

<sup>28</sup> Legal Report of the Community Water Supply Management Support Programme; A W Corbett, March 1998, p iii

<sup>29</sup> *ibid.*

<sup>30</sup> *op cit.* 29-30

<sup>31</sup> *op cit.* 32

## **4.2 Management Priorities (allocation objectives)**

It is common cause that water in Namibia is a very scarce resource. Being able to use water for one purpose may mean that it is not going to be available for some other use. This is a situation of trade-off. Thus, as demand on water increases, the State must set priorities. As different competing water users increasingly demand their share of the scarce resource, government will be required to formulate policy guidelines on resource allocation. This should go beyond equitable access to water and poverty alleviation and water uses other than for basic human and environmental needs (reserve water) need to be prioritized. In short, the issue is to decide on allocation objectives to be followed by suitable allocation mechanisms. The allocation objectives have to be all-inclusive, yet priority driven.

## **4.3 Resource Conservation and Protection**

The question of sustainable socio-economic development in Namibia depends largely on the sustainable management and development of the nation's water resources. The current Act does not address the question of conservation adequately. Nor is conservation considered as a long-term strategy to be employed for sustainable water resources management and development. The issues of efficient and effective use of water, including demand management are not addressed by the Act and the practice has been to develop the sources to meet the demands of the ever-growing users.

Linked to the question of conservation is the issue of the water environment quality management. Currently there are no standards guiding water resources protection. This is despite the fact that the Act empowers the Minister to regulate water resources quality, particularly with reference to pollution control and waste disposal. These issues might be addressed to some degree by the passage of the *Pollution Control and Waste Management Bill*, to be introduced by the Ministry of Environment and Tourism. However, there is need to develop principles and objectives which recognise that it is the healthy functioning of the ecosystem that enables water resources to recover from disturbing natural and human impacts.

In summary, there is need to move away from placing emphasis on quantitative water allocation to focusing on quality management (protection) and conservation of the resource and its environs. Water resources are likely to better protected by classifying activities according to their impacts (detrimental or otherwise) on specific water resources.

## **4.4 Institutions and Participation**

Hitherto, the Department of Water Affairs in the Ministry of Agriculture, Water and Rural Development has been responsible for the management, development, conservation and allocation of the nations water resources. It was also, until recently with the corporatisation of the bulk water supply, responsible for both bulk and rural water supplies. This state of affairs is contrary to principles of modern water resource management in the sense that there is no separation of roles and functions. The Department is the resource manager, the operator and the regulator at the same time. With the corporatisation of bulk water supply through the establishment of NamWater no concomitant regulatory framework has been put in place. A monopoly such as NamWater needs to be regulated in terms of resource utilisation (development), pricing, quality and quantity as well as reliability of supply. It must be pointed that NamWater does not pay abstraction fees at all.

With regard to participation, consideration should be given to ensuring that the management of water resources takes place, as far as possible, at catchment level. This will ensure that small or weak (economically and knowledge-wise) stakeholders are not marginalised.

#### **4.5 Water Services and Pricing**

Water and sanitation services are basic services and should be treated as such. Access to these services has hitherto been distorted by the practice of the ideology of apartheid, which used race and colour as the only criteria. The legacies of this practice continue. Water and sanitation services are skewed in favour of the economically powerful and former white residential areas in urban centres, at the expense of communal rural areas where the majority of Blacks live. This situation must be rectified.

In an effort to rectify this situation, a number of options have to be considered:

- ❑ Water at an affordable cost for primary use such as human consumption must be classified as a basic right, not a privilege;
- ❑ Because of poverty among the majority, consideration must be given to subsidisation and cross-subsidisation ;
- ❑ Effective incremental water use tariffs must be considered as a strategy to address the issues of wastage (efficient use of water) on the one hand and cross-subsidisation on the other; and
- ❑ The creation of tradable rights in water will address the issue of efficiency in water use.

#### **4.6 Shared Waters**

Namibia has obligations under international environmental law to abide by international environmental law principles on the use of shared watercourse. Of particular importance in this regard is the issue of ensuring that Namibia has access to her fair share of the shared resource following a realistic needs assessment, capacity building (in terms human and other resources), the creation of collaborative institutions and the putting in place of dispute resolution mechanisms and a common database. One paramount issue with regard to shared watercourses, is to shift emphasis from merely demanding the riparian fair share of the resource to insisting on joint integrated management of the resource.

The current water legislation does not adequately address the issue of shared watercourses, nor does it provide an institutional framework for it.

## 5 POLICY OPTIONS

(Basic principles and objectives for new legislation and administration in the water sector)

New legislation in the water sector must be underpinned by the following basic principles and objectives:

1. **Compliance with the Constitution:** Any legislative and regulatory framework in Namibia must be subject to, and consistent with, the letter and spirit of the Namibian Constitution which is the supreme law of the land.
2. **Water resources are a national asset:** Water resources are an indivisible national asset for which government has the ultimate responsibility and authority with regard to management, allocation and usage.
3. **The unity of the water cycle:** The unity of the water cycle and the interdependence of its elements, where evaporation, clouds and rainfall are linked to underground water, rivers, lakes, wetlands, estuaries and the sea, and where human activities and different land uses impact on the water cycle must be acknowledged.
4. **All water is a resource common to all:** All water, wherever it occurs in the water cycle, is a resource common to all, the use of which should be subject to national control.
5. **No ownership, but only a right to use:** Arising from principle 4 above is the principle that there should be no ownership of water but only a right to its use and that the location of the water resource in relation to land should not, in itself, confer right to usage. All water should have a consistent status in law, irrespective of where it occurs. No right to use water should be issued in perpetuity.

*The current legislation does not embrace the consistent legal status of water, with the result that there are very limited controls on ground water or water originating on a person's property – this is where the mistaken notion of "private water" crept into the water law.*

6. **Co-ordination of the use of ground water and surface water resources:** While underground water needs special attention, it is also important to co-ordinate the use of surface water resources, as this is necessary for ensuring that in the long term, our water resources are well managed and sustainably utilised.
7. **Managing quantity, quality and reliability:** The objective of managing quality, quantity and reliability of the nation's water resources must be to achieve optimum and equitable long term social and economic benefits from their sustainable use, while recognising that water allocations may have to change over time.

*Social and economic priorities can, and will change over time. We cannot lock our water resources into irreversible allocations based on the current reality. The right to use water must be defined in a flexible manner that allows for the changes down the line.*

8. **Reserved water:** The Constitution of Namibia guarantees the right to life. Without water, there can be no life. Without a minimum daily amount of water, health cannot be guaranteed. It must accordingly be ensured that everyone has access to enough water for basic needs. In addition to this, is the need for sufficient water for the maintenance of the ecosystems on which we depend for our survival? The amount of water required for these two factors, namely, basic human needs and the ecosystem protection might be described as **reserved water** and should enjoy priority of use.
9. **Respect for shared waters:** There is an international obligation to respect the needs of the countries with which we share watercourses and to recognise their downstream allocations of water.
10. **Criteria for the development, apportionment and management of water-resources:** Underlying all the above principles, is the principle that the development, apportionment and management of water resources should be carried out using the criteria of public interest, sustainability, equity and efficiency of use in a manner which reflects the value of water to society while ensuring that the basic domestic needs, requirements of the environment and international obligations are met.
11. **Institutional framework and participation:** The responsibility for the **development, apportionment and management** of available water resources should, where possible, be delegated to the lowest possible level, for example catchment or regional level. In order to make this work in practice; the institutional framework for water management must be simple, pragmatic and understandable. This in turn will call for a system of representation that ensures that catchment or regional based institutions are fully representative of all interested parties.
12. **Capacity building:** Simple representation, without capacity building and without effort to counteract the historical disadvantages experienced by certain groups with respect to education and socio-economic conditions, ends up as democratic smokescreen that masks the continuation of the old order. Structures must be established to level the playing field.
13. **Quantification and registration all water rights:** There is a need to quantify and properly register all water rights, including existing rights, particularly in those areas of the country where water rights are most contested. Existing water "rights" have substantial deficiencies – often they express, at best, the right to use water when there is some available. New hydrological information might compel us to review existing rights.

*There are cases where water rights were obtained on the basis of the riparian right principle, yet years later these rights are not exercised and the water is not utilised while other potential users are restricted in their access to water.*

Thus, there may be a good argument for placing restrictions on the time within which a right may be exercised. Rights should not be issued in perpetuity although cognisance must be taken of the fact that there is need for security, clarity and predictability particularly in the context of investment by potential users

14. **Interdependence of water quality and quantity:** *Water* quality and quantity are interdependent and should be managed in an integrated manner, which is consistent with broader environmental management approaches;
15. **Cost of water:** The price of water must reflect that it is a very scarce resource. Being able to use water for one purpose means that it is not available for some other use. A situation of trade-off accordingly exists. The price of water must reflect trade-off and economic efficiency balanced by considerations of social equity such as the needs of the poor. In addition to running costs, the following should be considered when determining water tariffs:
- Cost of future refurbishing and replacement of State assets;

The full catchment management costs such as pollution control and the protection of the ecosystems.

In the final analysis a more realistic cost of water should encourage greater conservation, as this is crucial to the sustainable management of water resources.

At the same time, however, it must be ensured that everyone has access to minimum domestic water requirements at an affordable cost. It is here that the concept of **lifeline water** at affordable cost must be considered.

16. **Licensing Fees:** Raw water must be paid for because it is a public good and must be maintained and protected. The following criteria can be used to determine the user-fee:
- Volume extracted;
  - Level of pollution on the "polluter-pays-principle";
  - Purpose of use;
  - Percentage of turnover of commercial users; and
  - Development levy.

These principles and objectives need to be refined and harmonised with preferred options as they emerge from the other themes of the Review and must be subjected to an intensive process of consultation before they become part of the National Water Policy Paper.

## 6 ISSUES OF IMPLEMENTATION

The primary objective of the work on the Legislation and Regulation theme is to develop policy and a new Water Act for Namibia after extensive consultations with stakeholders. It is expected that the final report and recommendations of the Review will not only include a layman draft Bill for the new Act, but also a costed and time bound implementation programme.

## 7 SUMMARY AND CONCLUSION

The fundamentals of the existing legal and regulatory framework with regard to ownership, allocation, access to, use and management of water and water resources are flawed because they are not based on:

- The concept of water and resources as national asset;
- Equitable access to water and water resources by all Namibians;
- Sustainable management and development of water resources; and
- Technical efficiency, for it is too complex and cumbersome.

These deficiencies – and there are many others as it might be gathered from the other building blocks of the Review - are too critical to be dealt with by way of amending the current Water Act. Save for these fundamental omissions in the legislative and regulatory framework, other critical issues are at best not adequately addressed, and at worst not addressed at all. Thus, the only logical option is to use these windows of opportunity provided by the Review and redraft the Act, informed, of course by the Constitution, principles of integrated water resources management and development, sound *knowledge of the hydrological conditions* and national development goals.

What is needed most is the replacement of systems of water abstraction and use based on rules of custom – most notably, riparianism – administered by the courts through litigation among water users, with systems based on a para-governmental body administered licences and permits. This will entail the extent to which the existing water use rights can be subject to change and what guarantees should be considered.



## F. STRATEGIC WATER RESOURCES ASSESSMENT

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### 1 INTRODUCTION

An understanding of Namibia's water resource base and an assessment of its status is crucial to enable us to address socio-economic imperatives and to ensure equitable access to and sustainable development of the water resource base. In the case of Namibia, where raw water is being sought at the margin of the natural resource base, strategic water resource assessments have to be concerned with:

- matching the patterns of demand with the status of the resource base and anticipating trends;
- protecting the resource base where threatened;
- developing the resource base where opportunities exist;
- providing a basis for allocation among competing demands; and
- valuing the resource base prior to making investment decisions.

In terms of the water resource base, what actually is at issue in Namibia today? Clearly the issue is not one of lack of information as there is plenty of water resource data. Rather the primary concern is how water resource information has been structured by the demands of development and how it is conditioned by the physical realities and vulnerabilities of the hydro-environmental systems that furnish raw water for human and biological use and consumption. Is the right sort of information collected and made accessible to plan, develop and manage the water resource base and protect the hydro-environmental systems? Close attention has to be paid to the demand for information and assessment - for whom and by whom - and how this pattern of demand for water resource information is changing. Further - is the spatial and temporal resolution of the data adequate, in Namibia's special hydro-environmental context, to serve these changing patterns of demand?

It is evident that water resource information is fragmented and very rarely integrated with other natural resource information, such as land and soil and even less with socio-economic data - the patterns of demand. The integration of all key information in useable and updateable physiographic and socio-economic frameworks is fundamental when seeking to develop and protect the water resource base at the margin of its capacity. This integrated planning tool has to be comprehensive and open, not only to serve all of Namibia's population in an equitable fashion, but also to ensure that all options and impacts are taken into account before investment decisions are made.

There is evidence to show that the flow of the right sort of water resource information is impeded or non-existent. If water resource information is to be collected, analysed and disseminated it is vital that this flow is:

- feeding the policy process - being realistic about access to and engagement with the resource base across all of Namibia's landscapes;
- feeding the planning process - the need for integrated information analysis;
- feeding the development process with technically and environmentally sound development options; and
- feeding the management process - the need for management tools across basins and administrative jurisdictions.

The direct links between assessments of water resource information and equitable and sustainable development therefore need to be emphasised when the resource base is extremely limited and variable. This is as much a challenge for the NWRMR themes in the short term as it is for national development in the long term.

Improved water resources assessments and active feeding of policy, planning, development and management processes have practical implications for:

- ❑ applied research;
- ❑ the structure of water policy and associated legislation and regulation;
- ❑ institutions and human resource development; and
- ❑ capital and recurrent budgetary commitments.

## 2 SITUATION ANALYSIS

### 2.1 Policy Context

#### 2.1.1 *The Evolution of Policy, Legislation and Institutions*

After Independence in 1990 there was no clear policy on the provision of water supplies to the communal or former 'homeland' areas, where over 70% of the Namibian population reside. The primary objective of the Department of Water Affairs was to supply bulk water to towns and cities. The formation of the Directorate of Rural Water Supply (within the Department of Water Affairs) and the launching of the Water and Sanitation Policy in 1993 (WASP) were therefore the first formal moves to address this issue.

Despite this, the legal basis for water management is still the Water Act No 54 of 1956, which empowers the Minister responsible for Water Affairs to investigate, plan, develop, allocate, conserve, control and manage water resources in Namibia. As already noted, the present Water Act is inappropriate and in urgent need of review. Legislation which takes into account the new (1993) Water and Sanitation Policy as well as changing institutional responsibilities and which specifically addresses the issues of pollution control and environmental protection needs to be developed. The scope for encouraging the use of progressive regulatory tools such as economic instruments and demand management also needs to be realised.

The Water and Sanitation Sector Policy (WASP) of 1993 emphasises the cost recovery aspects in the water sector both for bulk water supply and rural water supply and places emphasis on community participation. This has given rise to a shift towards community based management of rural water supplies and raises critical questions about continuing subsidies of raw water to commercial farmers using flood irrigation. Not only is this an extravagant waste of a limited resource, but the economic output is generally low and compromised by low soil fertilities and salinisation. In response to this, WASP, in determining access to water resources in the face of competing demands, gives first priority to domestic use and livestock watering and ranks irrigation as a second priority. WASP states in respect of irrigation that "*being water intensive, no irrigation scheme should be embarked upon without a comprehensive study confirming its overall viability, including socio-economic benefits and an appropriate environmental assessment.*" There is however little evidences to show that this provision has been enforced.

In 1997 the Legal Assistance Centre prepared a Legal Report for the Directorate of Rural Water Supply which was designed to consider the legal parameters of community ownership of rural water supply infrastructure. As the report notes (1997:1), "*It is anticipated that legal status will allow communities to define the rules and regulations of a particular waterpoint and give water committees the legal authority to manage the waterpoints and to enforce discipline on the users, make rules for outsiders using the waterpoint and provide for the resolution of disputes.*" In the meantime committee structures have been created within the context of existing legal uncertainty. The legal status of waterpoint committees is currently complicated by the lack of tenure rights in communal areas. Pending the passing into law of the Communal Land Bill, an interim solution would be to issue Permission to Occupy permits to waterpoint committees in respect of water points, coupled with the adoption by water point committees of a constitution in terms of which they would constitute themselves as a legal entity. Since the establishment of NAMWATER in 1997 as supplier of bulk water, Department of Water Affairs (DWA) was left with

the responsibility of supplying water to rural areas and a continued mandate to investigate, plan, develop, allocate, conserve, control and manage water resources.

Namibia's Environmental Assessment Policy, approved by Cabinet in 1994, supports sustainable development in the use of water in Namibia. It calls for integrated planning and enjoins developers to ensure that benefits from water use are maximised while the negative impacts are minimised.

The draft Environmental Management Act (1998), which gives legislative effect to the Environmental Impact Assessment Policy as aforementioned, establishes general principles for the management of the environment and natural resources, promotes the co-ordinated and integrated management of the environment and sets out responsibilities in this regard. (No specifics except the activities that require environmental assessment) Furthermore, it stipulates that environmental impact assessments will be required in respect of all plans, policies or programmes that may have a significant effect on the environment (dam constructions, ground- and surface water abstractions etc.).

## 2.2 Water Resources Availability and Limits

It is estimated that 83% of all rain in Namibia evaporates soon after it falls, leaving just 17% available for surface runoff. Of this runoff, 1% recharges groundwater sources, and 14% is lost through evapotranspiration. Only 2% of the total rainfall can be captured by surface-water storage<sup>32</sup>.

Perennial rivers are found at Namibia's borders: the Orange in the south; the Kunene in the northwest; the Okavango, Kwando-Chobe-Linyanti, and the Zambezi in the northeast. Namibia currently has access to an agreed 180 Mm<sup>3</sup>/a from the Kunene River and provisional allocation of 200 Mm<sup>3</sup>/a has been agreed upon at from the Orange River. No formal agreements have yet been reached on abstracting water from the Okavango River. However, the completion of the last stage of the Eastern National Water Carrier, the largest state water project in Namibia, will lead to the importation of possibly 100 Mm<sup>3</sup>/a from the Okavango River to augment supplies to the central, eastern, and western areas of the country.

The estimated average flows from the perennial rivers bordering Namibia are as follows:

Zambezi River (at Katima Mulilo):	36 000 mm <sup>3</sup> /a
Kwando River (at Kongola):	1 100 mm <sup>3</sup> /a
Okavango River (at Mukwe):	10 000 mm <sup>3</sup> /a
Okavango River (at Rundu):	5 500 mm <sup>3</sup> /a
Kunene River (at Ruacana):	5 000 mm <sup>3</sup> /a
Orange River (at Noordoewer):	11 000 mm <sup>3</sup> /a <sup>33</sup>

The flow in the ephemeral rivers in the interior is irregular and unreliable, limiting both the potential for utilizing surface-water sources and the indirect recharge of aquifers from watercourses. The estimated safe yield of the surface-water works that could be developed on the ephemeral rivers is at least 200 Mm<sup>3</sup>/a or 40% of the total surface-water resources available in the interior. Ten large dams have been constructed on these ephemeral rivers, with a combined safe yield of 87.3 Mm<sup>3</sup>/a<sup>34</sup>.

Groundwater plays a major role in water supply in Namibia. The safe annual yield from groundwater sources is estimated at 300 Mm<sup>3</sup>/a<sup>35</sup>. Overabstraction of groundwater is however already a serious problem in some areas.

### 2.2.1 Surface Water Sources

#### 2.2.1.1 Rainfall

The distribution of rainfall throughout a water year in Namibia ranges from less than 50 mm/a south west up to 700 mm/a in the north eastern region of the country. The average for the whole country is 300 mm/a. Most rain occurs during the summer months between October and April<sup>36</sup>.

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<sup>32</sup> Heyns et al., DWA

<sup>33</sup> DWA, Hydrology Division

<sup>34</sup> DWA, Hydrology Division

<sup>35</sup> DWA, 1998

<sup>36</sup> DWA, Hydrology Division

Rainfall events show extreme temporal and spatial variability across Namibia. The rapid evolution of small scale convective events in the more arid south of the country and the slower development of larger, more organised systems result in a variety of runoff events and recharge styles across Namibia's landscapes. Typically rainfall events occur over periods of minutes and hours so that monthly means rather disguise the intensities of the events and the surface water processes they initiate<sup>37</sup>.

The State of the Environment Report on Water (1999) emphasises the point that the network of rain gauges in the north of the country has broken down and is in urgent need of replacement. Ensuring that data is collected in areas for which there is known demand should be made a priority.

Under the circumstances outlined above, the design of surface water storage schemes becomes an exercise in risk management rather than a confident assessment of probabilities. It is imperative to monitor rainfall accurately and to make projections on rainfall events in near real-time to indicate the onset of periods of drought. The use of satellite data is starting to be of assistance in this regard but there is no substitute for a carefully designed network of high quality autographic rain gauges. Fortunately the technology and maintenance for these types of hydrometeorological observations is becoming cheaper and more reliable.

#### 2.2.1.2 Ephemeral surface water sources

Namibia's hydrology reflects the extreme temporal and spatial rainfall variability. Drought periods are to be considered as endemic and good rainy years as the exception. As a result of the prevailing climatological and physical conditions, all interior rivers in the country are ephemeral and the few floods that do occur during the rainy season are too short and erratic to make direct abstraction of surface water runoff a feasible solution for the supply of water either for drinking water or for irrigation. Most of the technically feasible ephemeral surface water sources have been developed with large-scale dams, but these pose considerable operational challenges (juggling dam safety with maximising live storage and minimising evaporative losses).

This remains however an important area for future investigation. With open water storage, evaporation is a significant problem. Evaporation levels are high for most of the country. There is a general conjunctive use policy to first supply water from the dams, because of the high evaporation rates, and to reserve the aquifer water for periods of drought. Options to extend such conjunctive use approaches and to minimise evaporation losses through the storage and recovery of dam water in available aquifers have only just begun to be examined although the reticulation infrastructure to extend such schemes is already in place.

It is not possible to effectively plan and manage these types of resources on an annual 'safe yield' basis. The resource assessment has to be adjusted on the basis of the runoff season and new drawdown plans adjusted on a monthly, if not weekly basis. This being so, firm operational rules become difficult to apply.

#### 2.2.1.3 Perennial surface water sources

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<sup>37</sup> DWA, Hydrology Division

The only perennial water sources available to Namibia are the Okavango, Kunene, Zambezi and the Kwando-Linyanti-Chobe Rivers on the northern border and the Orange River on the southern border. The equitable and reasonable share of Namibia in the water from the border rivers is difficult to quantify. The important fact is that those sources must be considered as being of critical importance for Namibia, not only to supplement the available ephemeral water sources within the country in times of drought, but also to sustain future socio-economic development. It is important for the Government to negotiate agreements between riparian countries on the utilisation of the water resources of the perennial border rivers.

## 2.2.2 Groundwater sources

The nature of Namibia's groundwater resources remains poorly defined and understood.

Estimated 'safe' yield of groundwater sources:	300 mm <sup>3</sup> /a
Groundwater sources:	about 60% of total potential yield
Boreholes:	~32 00, of which 85% are private (mainly commercial farms), yielding 0.5-120 m <sup>3</sup> /h <sup>38</sup>

Due to the arid environment, the groundwater sources are sensitive to over-exploitation and are exhaustible. They are replenished by natural recharge and can be utilised on a continuous basis, provided that abstraction does not exceed the long-term recharge potential. Efficient management and the protection of these renewable sources are therefore of vital importance to Namibia. This can be achieved through water level monitoring, resource conservation and effective aquifer management that could be supplemented and facilitated by groundwater modelling techniques. These activities require adequate measuring equipment, computer facilities and competent hydrogeological staff.

### 2.2.2.1 Groundwater Control Areas

Major groundwater sources are detailed in Table 3 below.

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<sup>38</sup> JVC, 1994

TABLE 3. MAJOR GROUNDWATER SOURCES

Windhoek Aquifer
Tsumeb Aquifers
Platveld Aquifer Kalahari Basin Aquifer
Grootfontein Karst Aquifer
Otiwarongo Marble Aquifer
Omaruru Town Aquifers
Braunfels Dolomitic Aquifers
Nei-Neis Aquifers
Omdel Aquifer
Karibib Spes Bona Aquifer
Usakos Aquifers
Rossing Khan Aquifer
Swartbank and Rooibank Aquifers
Osona Aquifer
Rehoboth Aquifer

The following have been identified as priority zones:

- Tsumeb region aquifers: There are substantial groundwater resources in the dolomitic rocks in the Tsumeb region. Large quantities of water have been pumped from the underground mine workings and water is abstracted for irrigation purposes in the areas north and west of Tsumeb. Recent, investigations by DWA have confirmed the presence of strong groundwater in an artesian aquifer in adjacent Kalahari sediments in the vicinity of Oshivelo as well as in an unconfined aquifer in Kalahari sediments in the area to the east of the Oshivelo.
- Omaruru basin: These are alluvial aquifers and are mainly recharged by floods in the Omaruru River.
- Maltahohe basin: This unexploited artesian aquifer is located in solution cavities in limestone in the Nama Group of rocks near Maltahohe.
- Stampriet Artesian basin: This is the most significant primary aquifer in the Karoo Sequence in Namibia: This confined sandstone aquifer is already losing significant artesian pressures due to abstraction for irrigated agriculture<sup>39</sup>.

The current groundwater control areas should be evaluated in relation to present and predicted patterns of consumption. This can be done through existing literature. Proposals have however been made to embark on detailed research by means of new technology methods on these aquifers.

#### 2.2.2.2 Aquifer depletion and degradation

A more serious problem is the depletion of the aquifer itself. There are various examples that illustrate this issue:

<sup>39</sup> JVC, 1993



- The Kuseb alluvial aquifer in the central Namib has already been overused and the water table has dropped significantly. The aquifer can no longer meet the needs of the coastal towns of Swakopmund and Walvis Bay or the Rossing uranium mine, and the lower water table has seriously undermined the dependence of the local Topnaar people on hand-dug water.
- In the Kuseb and Omaruru catchments, the combination of farming practices and periodic droughts has reduced the vegetation cover, leading to considerable topsoil removal during rainstorms and the subsequent sedimentation of the Kuseb and Omaruru Rivers. This soil forms a thin layer of fine material on the riverbed, which seals the surface of the sand and prevents groundwater recharge.
- The fossil water from the aquifer under the Koichab River is being mined to support the Luderitz and the mining industry at Elizabeth Bay. The aquifer will probably never be recharged in present climatic conditions.
- In some parts of the Stampriet artesian aquifer, saline water overlies the freshwater and is a contamination threat to the freshwater. Farmers in this area are now required to use a specially designed borehole that seals off the overlying salty water. There is also evidence that artesian pressures are declining as abstraction exceeds current rates of recharge<sup>40</sup>.

Thus, in many areas, the abstraction of groundwater and the impoundment of surface water have upset the delicate balance sustaining the configuration of piezometric heads and in some cases associated aquatic ecosystems linked to high water tables, groundwater seepage and springs.

## 2.3 Unconventional Water Sources

### 2.3.1 Rainwater harvesting

Large-scale rainwater harvesting, weather modifications and fog-harvesting systems have been investigated but not taken to scale. Rainwater harvesting at household level can prove feasible and is often practised in areas where groundwater has a high salt content and where precipitation is sufficiently distributed throughout the water year. The main problem is ensuring adequate volumes of tank or underground storage to give enough storage between rain events. The reliability and security of these systems cannot compete with piped supplies.

### 2.3.2 Desalination

A pilot desalination plant using seawater is being established on the coast of Namibia, the cost of which will be roughly N\$ 6.5/m<sup>3</sup> (in 1996, 4.34 N\$ = 1 USD), including the capital cost, if water is used locally. Pumping desalinated water inland to Windhoek is not economically feasible at present because of prohibitive pumping costs. The use solar energy for such pumping can however potentially curb this problem<sup>41</sup>.

Most of the groundwater in the far north is saline. Desalination schemes for groundwater have been tested, but major investment in desalination schemes is unlikely because the groundwater is a limited resource.

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<sup>40</sup> DWA

<sup>41</sup> GKW, Parkman, Bicon

### 2.3.3 Reclaimed water

In municipalities and industrial installations where sewage systems and effluent disposal systems exist, there is potential for reclaiming wastewater. Windhoek recycles about 12% of its water, and the Rousing uranium mine recycles about 76%. It is widely acknowledged that recycling could be greatly improved in other municipal centres and wet industries. If this is to be encouraged regulations on the drinking water guidelines should be enforced to avoid sub-standard drinking water from reticulated sources.

## 2.4 Water Quality Constraints

These are linked principally to groundwater where mineralisation or mixing with juvenile (hydrothermal) waters has resulted in high salinity's or harmful concentrations of major ions. Evidence of groundwater quality degradation from sources of surface pollution, injection of industrial effluent, and leachate from landfills has grown in the past two decades. Where aquifers exploited for water supply are involved, the public health risks and costs of treatment are rising. Permanent waters are also under threat of pollution from non-point sources, primarily in the form of run off of agricultural chemicals.

## 2.5 Vulnerability of the Resource Base

Surface and groundwater resource systems in semi-arid climates are highly sensitive to minor changes in flow regimes and piezometric heads. This applies particularly to wetlands where small changes in heads or head duration can alter ecological balances and the integrity of the system.

The ability to dilute pollutants is clearly limited when throughflows are limited and the near surface accumulation of faecal bacteria poses a constant health risk in peri-urban areas and densely populated rural areas. Even where transmissivities are high, there is a downgrading accumulation of groundwater pollutants. As industrial products proliferate, so to do the range of pollutants.

## 2.6 Water Use and Society

### 2.6.1 Changing Patterns of Water Use and Consumption

There are five main groups of water users in Namibia, each with different demands on the available surface and groundwater sources:

TABLE 1: PRESENT WATER USE AND CONSUMPTION

Consumer Group	Total Consumption (Mm <sup>3</sup> /a)	Average Consumption (l/d)
Domestic (urban)	42.13	330
Domestic (rural)	28.44	85
Livestock, Large	63.23	45
Small		9
Mining	7.7	
Tourism	0.8	
Irrigation	106.6	15 000 m <sup>3</sup> /ha/a
TOTAL	248.9	

Source: DWA

At present, about 43% of water consumed in Namibia is supplied from surface water sources (ephemeral and perennial rivers), whereas 57% is supplied from groundwater sources. Settlements in the far north are aggregating along the network of pipelines and canals that connect the major rural villages with the Kunene River and supply water to about 30% of the northern population<sup>42</sup>. Livestock are believed to account for 80% of all water demand in northern Namibia and much of this demand is being met by the pipeline. Moreover, livestock that were previously moved from one water point to another are now settled in fixed areas, leading to overgrazing and overstocking. Fixed human settlement is also denuding vegetation as trees and bushes are being used for fuel and buildings.

Because Namibia relies heavily on major interbasin water-transfer schemes, demand statistics expressed in terms of surface-water catchment are not particularly useful. Furthermore, aquifers are seldom contiguous with catchment boundaries and can even be subject to interregional transfer, as in the case of the Karstveld area around Grootfontein, where groundwater is exported southward to Windhoek. Therefore, sectoral demand is best compared with water availability on the basis of existing abstraction patterns, as shown in Table 2, which shows current demands projected to 2005.

<sup>42</sup> FG Consult, 1998

TABLE 2. CURRENT AND PROJECTED WATER DEMAND IN NAMIBIA BY SECTOR

Sector	Demand (Mm <sup>3</sup> )					
	Perennial Rivers		Ephemeral Rivers		Groundwater	
	1990	2005	1990	2005	1990	2005
Urban <sup>a</sup>	12.6	40.0	13.4	45.0	41.0	45.0
Irrigation	39.7	95.0	34.8	30.0	31.5	30.0
Stock	3.7	10.0	0.0	65.0	60.3	65.0
Mining	2.0	10.0	2.5	10.0	7.5	10.0
Tourism and environment	0.0	2.0	0.3	2.0	0.7	2.0

<sup>a</sup> Includes domestic and industrial demand

Source: DWA

Only 49% of total estimated ephemeral surface and ground water sources will be used by the year 2005, but the demand on perennial rivers is expected to increase by 270%. Irrigation demand is unlikely to increase dramatically because of the generally poor soil quality. Any additional irrigation demand will probably be met from the perennial border rivers<sup>43</sup>.

The estimated future water demand of Namibia during the next 10 years will depend largely on the socio-economic, industrial and agricultural development policy of the Government. Substantial growth in water demand may result in various sectors such as agriculture, mining and industry or as a result of projects for the social improvement of the population. Irrigation may have the largest impact on future water demand, depending on the development of new, viable irrigation projects, whereas domestic water demand is anticipated to increase on the average by 3% per annum<sup>44</sup>.

The spatial patterns of water consumption and use will however change. Demand management in the central area has already reduced demand significantly in the past decade. Continuing development in the Walvis Bay area will require the utilisation of seawater, after desalination, to augment fresh water supplies in the coastal area. But perhaps the most significant change will occur in the north of the country where burgeoning demands from a dense rural population for water to serve household, stock and small scale irrigation are already in evidence.

Future water supply and demand are also affected by demographic shifts. The 1991 Population and Housing Census placed Namibia's population at 1 432 920. It provided actual population structures; i.e. the population was broken down into categories to reflect the number of women and men, at both the national and regional levels, the number of rural and urban dwellers, age differentiation and the number of economically active people. Namibia's population is increasing at a rate of 3.5% per annum. Current estimates of 1 700 00 are based on the 1991 census. The population increase is clearly observable in urban areas such as Windhoek, Walvis Bay, Swakopmund, Oshakati, Ondangwa, Rundu and Katima Mulilo due to urban migration. Based on the number of registered voters, it would appear that populations in most of the northern regions have however remained constant, despite the outflow of people to central and southern towns.

<sup>43</sup> DWA

<sup>44</sup> JVC, 1994

Regions with a high population density include the Oscine Region with 25.3 persons per km<sup>2</sup>, the Ohangwena Region with 17 persons per km<sup>2</sup> and the Omusati Region with 13 persons per km<sup>2</sup>. The population density of the remaining regions is 4 persons per km<sup>2</sup> or less<sup>45</sup>. An uneven distribution of the population also occurs within the regions themselves. These trends are important as they result in changed accessibility to basic services such as health care and water supply. They will best be determined by a second national census.

### *2.6.2 Planning: reconciling future supply and demand*

Past approaches to water resource planning in Namibia have been characterised by a management of supply. It has only been in the last decade that management of demand has been promoted – but only in the city of Windhoek and then largely in response to the 1991/2 and 1995/6 droughts (policy initiatives in this regard were developed in 1994). Major planning initiatives have also focussed on guaranteeing supplies to the central area of Namibia (CAWMP<sup>46</sup>, 1995) and have been predicated on unrestricted demand and demand forecasts. In addition, this planning process has been largely opaque. It involved limited public consultation and no economic analysis. This style of planning has continued even with the more recent preliminary feasibility study into the extension of the Eastern National Water Carrier to Rundu (Water Transfer Consultants, 1997). This legacy may prove hard to shake, but clearly there is scope for more equitable approaches to water resource planning that takes into account the physical and socio-economic realities and responds to the particular needs and priorities of each region.

## **2.7 The Role of Integrated Water Resource Development and Management**

At the most basic level, integrated water resource development and management involves an appreciation of three effective levels of integration, being integration within the hydrologic cycle (the physical processes), integration across river basins and aquifers (spatial integration) and integration across the overall social and economic fabric at regional and national levels. Specific sets of knowledge-based tools are required to undertake this very broad analysis but it is the links between the various components of the hydrological cycle and the range of users seeking to exploit the natural resource base that have to be firmly established and understood prior to making informed technical and investment decisions. The potential for missing specific development opportunities or damaging vulnerable resources is high without such an integrated approach. There is evidence that such opportunities, notably in the area of groundwater development, have been missed or abused through a fundamental lack of this understanding.

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<sup>45</sup> Regional Border Delimitation Report

<sup>46</sup> Central Area Water Master Plan

### **3 CURRENT INITIATIVES**

The following initiatives have been taken into account during this assessment:

#### **3.1 State of Environment Reporting**

The State of the Environment Report on Water (1999) is the first in a series of State of the Environment Reports that have been commissioned by the Ministry of Environment and Tourism, addressing all-important sectors related to the environment. The aim of these reports is to identify appropriate key indicators for long term monitoring of the health and trends of Namibia's environment. There will be updates to provide for continuous monitoring of all sectors of Namibia's environment. These reports will provide an important source of background information in respect of the present state of the resources with regard to the environment. Much of the information contained in this report has been derived from the State of the Environment Report on Water.

#### **3.2 Water Demand Management Study**

This is a joint study between the Department of Water Affairs and the City of Windhoek. Water Demand Management, in this study, is defined as a holistic and integrated approach towards sustainable development and optimal use and supply of water resources, involving the implementation of policies for the efficient use of water, for equity, economic efficiency and environmental sustainability<sup>47</sup>. The main aim of this study is to establish and assess the level at which Water Demand Management is practised in Namibia. The study has concentrated mainly on the Namibian urban water supply sector that includes residential, commercial and industrial water supply, the agricultural (commercial) sectors, mining and tourism sectors.

#### **3.3 Hydrogeological Mapping**

This BGR (Bundesanstalt für Geowissenschaften und Rohstoffe), funded project is tasked with the production of a hydrogeological map covering the whole country. This constitutes an ideal opportunity to develop a hydrogeological framework for Namibia and as a planning tool will be extremely beneficial. This project is expected to be finalised in two years.

### **4 ISSUES ARISING:**

#### **4.1 Matching Information with Actual Needs: Evidence of A Critical Imbalance**

There is an abundance of hydrological/hydrogeological data and volumes of interpretative and feasibility reports related to individual water supply projects. However, significant gaps remain, particularly in respect of the more ubiquitous groundwater resources, in compiling a national picture of the water resource base and relating this to patterns of consumption and use. The largest of these omissions is the consistent failure to address the development of the resource base (and principally groundwater) in rural areas – the so-called “communal areas”. It is in these areas that 70% of Namibia's population live and an estimated 57% of water usage occurs (Lange, 1997). Many boreholes and water points have been constructed in these areas, but the limits of the exploited groundwater resource, the constraints in its use (inherent quality) and the vulnerability of the

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<sup>47</sup> WDM, Report

aquifers to over-abstraction and pollution have not been properly addressed. Prior to independence in March 1990 those areas referred to as "communal" were administered by so called second tier authorities. The communal areas are home to the vast majority of Namibians and, under the previous authority, development was suppressed. Consequently poor, and in many cases, non-existent records regarding water resources were kept. Consequently, in the very areas where socio-economic development is vital, little or no information is available to guide decision-makers in regard to water resources sustainability.

It should be noted that major aquifers that underlie the areas of the country designated as communal are either dry or have saline water. Although regions such as the Kunene, Kavango, Caprivi and Karas border international perennial rivers, the development of these sources is controlled, they are substantially developed, and are subject to the demands of neighbouring States. With the exception of the Orange River bordering the Karas Region the sustainable yield of these border rivers is not known. Similarly for the country as a whole, although many studies have been conducted with respect to water schemes based on the major aquifers existing within the commercial farming areas, little emphasis has been placed on the evaluation of recharge criteria. Thus, in broader terms, national level sustainability is not well understood. As far as groundwater is concerned, no national hydrogeological map has been compiled nor has a national picture of the distribution of demand been compiled.

To make sound decisions about water management, a considerable amount of information is required. This means that the operation of the different networks for hydrology, geohydrology and the subsequent processing and dissemination of the data must be considered as high priority activities for the country, even if the economic return is not immediate. The analysis of the data and, as far as possible, a clear understanding of the hydrological processes, such as quantification of statistical risks for surface flows, and the comprehension and quantification of the mechanisms of water table recharge are unavoidable prerequisites for the implementation and up-dating of the water resource strategy for the country. Improved information systems are a key input for comprehensive water management. Systems that effectively use the data to monitor current changes in water supply and demand must be developed to improve decision making. A suitable database must be established and managed by a responsible institution where linkages between users and providers are made. Emphasis should be put on scientific research in respect of all water sources, e.g. Recharge processes, and understanding of aquifer potential.

#### **4.2 Data Collection Networks: Partial Coverage And Under-Resources**

For surface water, data on rainfall, evaporation, dam levels, river flow, and the silt load in floodwater is collected through a gauging station network throughout the country. The DWA is responsible for monitoring the available surface water resources and operates a countrywide hydrometric network. This network needs however to be strengthened and improved by, for example, replacing the out-dated chart recorders with digital data loggers. Another problem is lack of specialised field staff to undertake the routine operation of the network. The Weather Bureau is involved mainly with collection of rainfall data. Community participation can be used in some of these data collection functions. School children may, for example, be required to collect rainfall or water level data as part of their curriculum.

The groundwater-monitoring network needs to be extended to provide data for determination of the national and regional ground water potential as well as the range of water level and quality variations that may occur. More data needs to be collected on ground water abstraction, water levels and water quality, especially at places that have been neglected in the past. Much groundwater abstraction occurs on private commercial farms. Abstraction on these farms is not subject to licensing, nor to measuring or reporting requirements. Most of the rural boreholes have no meters. It is imperative that water meters be installed at all abstraction points to account for national water consumption.

Operational management of water resources in arid and semi-arid environments requires near-real time data. This applies as much to the operation of hydraulic structures as it does to the calculation of transmission losses and recharge. The current hydrometeorological monitoring network for Namibia is in urgent need of review to adjust its coverage to neglected areas with high population densities (particularly the north) and to focus on strategic basins and aquifers, where understanding of processes needs to be refined and abstraction monitored closely. For both surface and groundwater, the current split in responsibility for data collection (and planning) between DWA and NAMWATER is not clear and needs to be addressed.

#### **4.3 Fragmented Information and Inhibited Information Flows**

Many detailed hydrological and hydrogeological studies; maps and figures have been compiled for Namibia. Although national databases for surface water, groundwater and water quality exist, they are not integrated and are difficult to overlay in time and space due to a general lack of compatibility. This renders them difficult to use for integrated water resources management or for planning purposes. There is accordingly no central and authoritative (i.e. quality assured) product which displays, updates and disseminates information on the status of the national water resource base. Similarly, there is no useable and accessible framework linked to associated archives for either hydrological or hydrogeological data. In the absence of such a framework it is difficult to adequately explain the hydrological response of the catchment and to account for the distribution of the available surface and ground water resources.

Promoting the flow of data of this nature to both consumers and managers is vital, not only to facilitate sustainable development of the resource base at regional levels, but also to promote awareness.

The superimposition of socio-economic data is essential in order to plan resource development and management. No comprehensive overlay of population and demand characteristics has however been compiled.

#### **4.4 Gaps in the Understanding of Key Processes**

Key hydrological and hydrogeological processes remain under-researched at a national level. Rainfall/runoff relationships have not been systematically updated and developed since the 1992 compilation of a unit runoff map. Assessments of transmission losses and trends in catchment yields as a result of climatic variability and land use/management changes are important to track in key catchments and basins. Groundwater processes remain partially understood and there exists no authoritative compilation or account of the country's groundwater occurrences and the related processes – particularly an assessment of the styles of recharge across Namibia's range of exploited and potential aquifers. While attempts have been made to quantify the volume of groundwater reserves in the aquifers that are known, this exercise is hardly useful.



Pollution, declines in water level and water quality frequently affect the sustainability of groundwater dependent uses, regardless of whether the resource base itself is threatened with physical exhaustion or severe degradation. It matters little if an aquifer contains hundreds of metres of sediments saturated with high quality groundwater if groundwater levels have declined to the point where extraction is uneconomic, the shallow wells of villagers and subsistence farmers run dry and dry-season base flows decline.

For many processes there is both a lack of precision and integration together with a lack of understanding of the all-important spatial and temporal variability. This makes the identification of hydro-environmental limits and assessments of vulnerability impossible.

#### **4.5 Lack of Knowledge of the Impact of Sanitation and Waste Disposal on the Resource Base**

Water use and consumption produces effluent in direct proportion. The ultimate sinks for this effluent in Namibia, with the exception of seweraged coastal municipalities, are the open water bodies (principally reservoirs) and underlying aquifers. Good sanitation practices and sewage treatment plays an important role in reducing levels of pollution and degradation of the resource base. Since pollution sources are not registered or enumerated, the aggregate impact can be hard to quantify. What is clear, however, is that sources of raw water are becoming progressively more polluted.

#### **4.6 No Link between Water Use Data and Water Resource Data**

At present there is no obvious link between water use data and water resource data. This is true for institutional arrangements as well as for communication and information flows. The bulk water suppliers, NamWater, collects bulk water supply data. The Rural Water Supply Divisions in the Department of Water Affairs should collect rural water supply data, but for most part this data is not available (rural water points are not equipped with water metres). The Directorate of Resource Management (DRM) in the Department of Water Affairs is theoretically responsible, as the ultimate manager of national water resources, for investigating, assessing, strategic planning and monitoring of water resources, as well as for managing and updating water resource data. There is however no provision at present for this Directorate to reduce abstraction of groundwater. The water use data does not appear to reach those who are responsible for water resource data collection, namely: the Hydrology Division, the Geohydrology Division or the Water Environment Division.

#### **4.7 Weak Applied Research**

Commitment to and budgetary allocation for progressive water resources and related research is currently limited. Testing and taking innovative water resource management to scale requires continual commitment and is essential when the costs of supplying further increments of raw water are high. This is particularly the case for irrigation, water reclamation, water treatment and enhanced recharge. All institutional water users, municipalities and large "consumer" ministries such as agriculture, fisheries, industry, mines and energy have a stake in and stand to benefit from research of this nature. External assistance can only be used for highly specialised expertise, but Namibian professionals and technicians, including UNAM departments can carry out the bulk of applied research programmes.

## 5 OPTIONS TO ADDRESS ISSUES

### 5.1 Developing Hydrological/Hydrogeological Frameworks and 'Pushing' Data

Hydrological and hydrogeological frameworks are basic tools to facilitate planning and regulation of water resources and to explain and quantify the water resources occurrence. Such framework needs are frequently based on geomorphological and geological characteristics upon which temporal data can be super-imposed and ultimately modelled. All basin geological, geomorphological and hydraulic characteristics need to be well defined for their contribution to the catchment hydrological response, to provide a framework in which to discuss water resource planning.

The DWA/BGR hydrogeological mapping exercise referred to below is an opportunity to develop such a framework. This is an area where the technical exercise needs to be informed by socio-economic needs.

Under the current policy of decentralisation, water supply will be a responsibility of each region. Regional administrative boundaries do not coincide with catchment boundaries and aquifer margins. This non-coincidence can pose problems when analysing the resource potential and relating this to patterns of demand. It may also create conflicts over the resources of basins and aquifers that happen to be shared by regions. Therefore, reliable information that is suitably desegregated for regional planning will become essential and Geographic Information Systems (GIS) techniques can be of considerable assistance in this regard. If water resource planning and management is to be effective, it is necessary to actively provide consumers, decision-makers and managers with reliable data. At this stage in Namibia's development, trying to recover costs on data transmission for data that has to be collected anyway, may prove a false economy and inhibit its use.

#### 5.1.1 *Hydrogeological Mapping*

At present there are no hydrogeological maps of Namibia. Plans are in place for the production of 1:1 000,000 sheets to cover the whole country with assistance from the German Government. It is estimated that this will take approximately two years to complete. This is a significant opportunity to establish a definitive hydrogeological picture of Namibia and to furnish accessible data to national and regional authorities for planning purposes. Attention therefore has to be given to the legend, scale and parameters so that these maps can be utilised as a practical planning tool.

#### 5.1.2 *Identification of groundwater flow systems and resource potential*

The current state of knowledge in respect of groundwater flow systems and resource potential is only partial. Many major aquifers are under-researched and monitored. The CAWMP (Central Area Water Master Plan) report on groundwater contains a description of most of the aquifers serving the central area, as well as their sustainable and potential yields. More work needs to be done however on the following:

- Monitoring of abstractions at sentinel boreholes;
- Compilation of piezometric contour maps;
- Modelling of the dynamic behaviour of systems to determine the exploitable sustainable yields.

## **5.2 Developing the Technical Tools**

### *5.2.1 Data collection and analysis tools*

The current network consists of outdated chart recorders, which are often blamed for the occurrence of substantial gaps in hydrological time series. These recorders are currently being replaced gradually by digital data loggers and sensors to improve the situation. Capacity needs to be built and continuously improved in this field. With the growing technology, new hydrological analysis software should be monitored and its performance assessed to establish suitability for Namibian needs. The use of GIS, Satellite imagery, telemetry and modelling programmes should also be promoted. Regional programmes such as HYCOS (Hydrological Observation System) represent a step in the right direction in this regard.

### *5.2.2 Integrated water resources database and the use of GIS*

Integrating physical and socio-economic data (i.e. resource base and water use data) can now be carried out using relatively inexpensive Geographic Information Systems (GIS). The existing and proposed databases (e.g. HYDSIS and GROWAS) can all export data to allow convergence in a common GIS to improve spatial planning for water resource management. In many senses, this has been a lost opportunity to date. To regain an effective water resources information system will require commitment from and agreement by the relevant agencies to share data.

### *5.2.3 Modelling tools (surface, ground, quality)*

The modelling of water resource systems is becoming cheaper, more transparent and adaptable. Types of models have to be selected with care but when correctly calibrated and validated, can provide very cost effective means of testing demand scenarios and resource constraints to both present choices to decision makers and find optimal solutions.

### *5.2.4 Remote sensing and telemetry*

Remote sensing techniques in data analyses of hydrological variables have developed rapidly in recent years. Namibia possesses high quality Thematic Mapper imagery for the whole country, currently on open access with the Geological Survey. Use of satellite telemetry for data collection will allow for the real time dissemination of information and easy access to areas that are hard to access. The use of conventional and satellite telemetry, for hydrological and environmental monitoring, surveys and data collection, especially with the HYCOS and other programmes is being expanded by the DWA and other institutions, Geological Survey, Agriculture, etc.

## **5.3 Themes for Strategic Water Resource Assessments**

The need to target specific areas for detailed assessment will arise – these should be demand driven if involving specific basins or aquifers. While surface water is generally well covered from the perspective of engineering hydrology, there remain significant gaps in the understanding of critical processes that determine the local accessibility of the resource and the integrity of the water related ecosystems.

### *5.3.1 Water balances, recharge processes and natural storage*

The potential for exploiting recharge processes needs careful understanding of the processes and the nature of aquifer storage. This will include rainfall and runoff processes, discharge and recharge, transmission losses and evaporative losses.

Planning at regional, catchment and aquifer levels will require a much more precise grasp of water resource balances and anticipated changes in response to recharge and runoff.

### *5.3.2 Trends in water quality and related hydrochemistry*

The rate at which surface and groundwater quality are changing through degradation from abstraction and surface pollution will have to be assessed at local levels. This has important implications for public health.

There are also hydrochemical effects that need to be understood and managed. For instance in the Karst (limestone) areas, excessive pumping from boreholes can result in the deeper lime rich water being exposed to oxygen thereby causing the lime to precipitate and block the borehole.

### *5.3.3 Hydro-environmental limits and resource vulnerability*

Determination of the limits, in terms of abstraction volumes, groundwater tables and quality changes that can be tolerated before the integrity of the natural systems is compromised is vital.

## 6 NEXT STEPS AND LONGER TERM IMPLICATIONS

### 6.1 The development of strategic water resource policy directions

An assessment of the status of water resource understanding, opportunities to develop the resource base and proposed solutions indicates that six broad areas will have to be addressed at a policy level:

- Addressing the integration of water resource information and guaranteeing information flows to consumers, decision makers and managers
- A thrust in groundwater development and management: both understanding and regulation of abstraction
- Establishment of hydro-environmental limits and assessments of surface and groundwater vulnerability
- A commitment to take current demand management initiatives to scale and establish good demand data
- Supplementing water production through expanded water reclamation
- The public health interests that are related to sanitation, pollution and related hydrochemistry

Harmonisation of environmental policy and related agricultural and industrial policy will be essential.

### 6.2 The role of theme discussion groups

In water resource matters, it is essential that some professional consensus be achieved on strategic themes to establish a national perspective on the processes and their potential for development. The Review proposes achieving this through a series of expert group meetings and discussions to arrive at technical consensus that can be used to form policy initiatives and specify a programme of pilot research and development in priority areas. In Namibia, a mixture of professional meetings/discussion groups and email conferences will suffice and a discussion leader can be appointed to facilitate this process. The recommended clusters and range of proposed themes are:

- Frameworks and Information:
  - Physiographic, hydro-environmental and socio-economic frameworks for regional assessment and planning and the role of GIS
  - Mapping and satellite imagery
  - Databases and data fragmentation
  - Water resource monitoring and data access
- Process understanding
  - Rainfall and runoff (e.g. modelling/forecasting/updating)
  - Surface water processes and environmental service provision (e.g. transmission losses, evaporative losses)
  - Groundwater processes and environmental service provision (e.g. discharge and recharge styles)
- Resource Development and Management Techniques/Options

- Awareness raising on resource issues
- Conjunctive use and planning models (WEAP, STELLA etc.)
- Enhanced recharge
- Aquifer Storage Recovery (ASR)
- Groundwater protection and source vulnerability
- Salinity and other hydrochemical and hydrobiological risks/threats
- Extreme event analysis and hydrological risk management
- Definition of hydro-environmental limits for resource protection

It is suggested that these themes and topics be presented to an invited but inclusive set of water resource professionals to provide opportunity for input and comment and to solicit a consensus on priority areas. This feedback can be used to form a limited set of discussion groups.

### **6.3 The development of a theme paper**

The issues raised in this paper lay the foundation for the development of a detailed theme paper in water resource evaluation and conservation. A suggested outline for this paper is set out in Annex 1.

### **6.4 Implications for water policy, legislation and regulation**

Water policy, legislation and regulations need to reflect the physical nature of Namibia's water resource base, its particular distribution and variability. For instance, access to safe water, provisions for sanitation, willingness to pay for water services and adoption of standards of service will show as much variation as the physical availability of the resource itself. These realities have to be reflected in appropriate policy and legislation. Legislation and regulation need only be punitive where and when the resource base is threatened and the function of appropriate legislation should be to facilitate sustainable engagement with the resource, subject to tests for beneficial use.

One area requiring special attention is reporting requirements of bulk water users, principally commercial farmers and Namwater. The current divided responsibility for data collection between the Department and Water Affairs and Namwater should not inhibit timely compilation of water resource data in one authoritative agency and the statutory requirement for this could be linked to the provision of licences to abstract.

Given the inherently limited nature of Namibia's water resource base, some difficult policy decisions will have to be made. A policy of food self-sufficiency may, for example, make sense in subsistence areas where food alternatives cannot be guaranteed. On the other hand, however, the promotion or subsidy of commercial irrigation bears economic and environmental examination.

### **6.5 Implications for institutions and human resource development**

#### *6.5.1 Institutional Development*

The Authority/Agency approach developed in the Institutions Issues Paper (NWRMR, 1999) may provide a suitable structure for more efficient gathering and compilation of data if the requisite tools, budgets and personnel are made available. However, the "owner/manager" function invested in the Authority will need to be more clearly spelt out in terms of its overall responsibility for data and planning. It must also be recognised that there are institutional transitions in place that will have to be accommodated.

#### *6.5.2 Human Resources Development*

Undertaking more targeted and strategic water resource assessments and translating them into water development opportunities will require an upgrading of skills, both in the public and private sector at technical, professional and management levels. Human resource development programmes developed under the auspices of the review need to consider this as well as the fact that it is important to concentrate on developing human resource in both the public and private sectors.

At a technician level there will, for instance, be a growing need for borehole maintenance technicians. If expansion in the field of reclamation of water is to take place then more treatment plant operators will be required.

At a professional level, efforts should be made together with the University of Namibia and other tertiary training institutions to establish appropriate academic training in water resource management. The training of hydrogeologists and water chemists should be given urgent attention.

Gender balance should be one of the considerations in the training and participation of staff in water resources management. This should be the case at national, regional and community management level.

## 6.6 Implications for financing and budgets

It is estimated that the implementation of the recommended policy in the area of strategic water resource assessment will require some increments over current budgetary allocations indicated under NDP1. In most cases it is expected that these increments will be marginal since the scope for information gathering, research and analysis and more detailed resource investigation and development is already established.

The major increased budgetary allocation is expected to be in the provision of new capital equipment (e.g. data loggers, portable computers, meteosat data collection platforms and receiving station, GIS servers and workstations), operation and maintenance of network and training of technical and professional staff.

It is expected that the use of external assistance to support some of the resource evaluation work will reduce the reliance upon central and regional government resources. Links to the following existing water resource external assistance projects can be improved to maximise the national benefit of the support:

- Netherlands Government Groundwater Recharge and Evaluation Studies: Kalahari Aquifers
- BGR funded Hydrogeological Mapping
- IAEA isotope studies (Caprivi, Stampriet)

In addition, many rural groundwater investigations can be bilaterally or multilaterally funded.

## 7 CONCLUSION

Water resources assessment (WRA) which is the determination of the quantity, extent, dependability and quality of the water resources, upon which is based and evaluation of the possibilities for their utilisation, control and long-term development is of critical importance for the sustainable development, management and planning of water resources in Namibia. Only with reliable and systematically collected data concerning the status and trends of water resources, including its quantity and quality, as well as statistics on major hydrological events and water use, can there be sustainable and rational planning of water resources.



### PART ONE

#### 1 INTRODUCTION

The overview of the current situation in the water sector in Namibia, current water usage, current pricing and cost recovery policies is essential for the Review. Appraisal of the current initiatives and the issues arising is also essential while the isolation of the key issues will be emphasised.

Limited water resources can be seen as one of the main constraints to economic growth in Namibia in the sense that water is subsidised substantially, utilising funds that could have been spent profitably elsewhere. The efficient management of water is accordingly essential.

Welfare to society is maximised when water is priced at its marginal cost and water is used until the marginal cost is equal to the marginal benefit. This is reflected in NDP1, which states that government's aim should be to ensure that water consumption reflects the relative contribution of industries to sustainable economic development. To this end, welfare maximisation conforms to the current wisdom in the field of water management as an economic good.

The current world trend is to view water as an economic good for which a price must be paid. Since the cost of water to consumers is largely governed by its price, pricing and the factors that influence the price of water must be taken into account. There are three main inter-linking reasons for approaching the allocation of water from the pricing perspective. These are as follows:

**Economic Sustainability:** this implies that water should be managed in such a way as to ensure economic growth, leading to poverty alleviation through employment provision.

**Environmental Sustainability:** The management and maintenance of aquifers for supply augmentation is envisaged while pollution control is taken care of.

**Financial Sustainability:** The expectation is that utilities should be able to finance themselves and encourage economic growth. The value of water also incorporates opportunity costs: i.e. when water is allocated for one use, there is less water for allocation to another use.

It is also worth reflecting on the role of subsidies in the water sector. The role of subsidies could be twofold: On the one hand, it may be essential for the purpose of equity. On the other hand, it utilises funds that could have been spent elsewhere in the economy to enhance economic growth. Subsidy also distorts prices and leads to wastage.

The essence of integrated water resources management is to contribute to the socio-economic development of Namibia today, without jeopardising development in the future. Given Namibia's scarcity of water resources, allocation and use of those scarce resources is a major determinant of the country's future economic progress.

## 2 EXISTING SITUATION ANALYSIS

Rainfall and groundwater in Namibia is extremely limited. There are very few sources of perennial surface water other than the border rivers. Namibia's water resources fall in the following categories:

- It is estimated that 56 % of water for consumption is derived from groundwater.
- Perennial border rivers provide 24 %.
- Ephemeral rivers provide the remaining 20 %.

Because of the high temperatures (average 25-degree Celsius), it is estimated that 83 % of the total rainfall evaporates, only 1% contributes to groundwater recharge and 2 % can be harnessed in surface storage facilities.<sup>48</sup>

Rainfall varies between 50mm per annum in the western regions (Coastal and desert area) to 700mm per annum in the Northeast. The combination of low rainfall and the high evaporation results in an irregular and unreliable supply of water from ephemeral rivers. Whilst the perennial rivers on the borders of Namibia provides a reliable sources of water, this water is shared with the neighbouring countries.

Most water is derived from boreholes of which there were 32000 in 1993. However, because of hydrological conditions, the risk of not finding water or the water being unfit for consumption is high. Water stored in dams is obviously dependent on rainfall and as at April 1998 the capacity of four of the dams supplying water to the central area was as follows:

Dam	Volume (cubic meter)	Percentage
S Von Bach	30.1 million	61.9 % (50.7 %)
Omatako	5.8 million	13.3 % (92.9 %)
Swakoppoort	36.9 million	58.1 % (77.1 %)
Goreangab	1.3 million	35.5 % (97.7 %)

<sup>49</sup>

The figures in brackets show the comparative percentages during April 1997. The volume is equivalent to 46.65% of the capacity of the four dams, which is 27.2 % lower than the storage in 1997. Without additional supply from the Windhoek boreholes and the Karst Area in the north, the expected run dry date of, for example, the Von Bach dam is expected to be October 1999 without any further inflow. During the current season the inflow into dams supplying water to the central area was inadequate.

It is clear that Namibia's general climatic, geological and topographical features make water one of its scarcest resources. This scarcity has the potential to constrain the development of virtually all sectors, ranging from major developments in the industry such as mines and energy, to the

<sup>48</sup> First National Development Plan

<sup>49</sup> Windhoek Municipality: Dr Ben van der Merwe

development in the health sector relating to the provision of potable water for domestic consumption.

What can be learnt from the availability of water resources in Namibia? In economics, scarcity is determined by supply and demand and as such, an overview of the water use patterns will be informative about the future utilization of water in Namibia.

## 2.1 Existing water use patterns

The existing water use patterns refers to the demand side of water, i.e. who is using water in Namibia and to what extent.

### Water use by Sector:

<b>WATER CONSUMPTION BY SECTOR</b>			
<b>SECTOR</b>	<b>Water consumption per annum per Millions of Cubic meter</b>	<b>% of Total</b>	
Urban (All Inclusion)	67.9	24.2	
Rural Domestic	13.1	4.7	
Wildlife and Tourism	0.7	0.25	
Mines	20	7.1	
Livestock	42.2	15	
Irrigation	137.0	48.75	
<b>Total</b>	<b>280.9</b>	<b>100</b>	
<b>Source: State of the Environment Report: Water (draft) (1999)</b>			

### 2.1.1 Urban

One of the concerns of the Review, vis a vis urban areas is to look at improved delivery cost of water in the form of improved management, decreased unaccounted for water and private sector participation in water related investments, i.e. desalination projects. It is also concerned with estimated cost/benefits of possible supply augmentation schemes. However, there can be no compromise as far as the supply of water to human beings in urban areas concerned.

### 2.1.2 Rural

Another concern of the Review is with water usage in rural areas. In this case, there can be no compromise as far as the provision of water to human beings and livestock is concerned; i.e. water

use for meeting basic needs (social). However, Community Based Management (CBM) is tasked with identifying ways and means that will lead to cost recovery for the usage of water in rural areas.

### *2.1.3 Mining*

The mining sector is one of the major contributors to the GDP, yet some of the practices of mining operators as far as the use of water is concerned leave much to be desired. Namdeb provides water to the citizens of Oranjemund free of charge. Water is supplied from boreholes and in 1997 the consumption was 6, 846 000. The daily average at Oranjemund is equivalent to 16 cubic meters per household per day. In comparison, the consumption level in Windhoek is on average 200 liters per household per day the average consumption is estimated to be 1,2 cubic meters per person per day. Thus, there is a huge consumption gap between the consumption levels of Oranjemund and Windhoek. (Source: Draft Water Demand Management Study).

It has been noted in the introduction, that welfare to society is inter alia maximised when water is priced at its marginal cost and water is used until the marginal cost is equal to the marginal benefit. Clearly, in the case of the Oranjemund example, this is not reflected.

In addition, justice is not done to the aim of the government to ensure that water consumption reflects the relative contribution of industries to sustainable economic development.

### *2.1.4 Agriculture*

Economists have often said that Namibia is country that produces what it does not consume (i.e. mining products) and consume what it doesn't produce (Agricultural products). In the face of this statement, one is tempted to pose the question as to why so much water is used on the irrigation schemes in Namibia. Perhaps the answer lies in the fact that the government is striving towards food self-sufficiency, and therefore there is some justification to use the highest amount of water in the agricultural sector.

Maybe there are no other options for water usage, e.g. along the Orange and Okavango rivers etc. What other development options are there? Certainly the government has had influence in promoting irrigated agriculture.

It must be borne in mind that, as much as Namibia is striving for food self-sufficiency, SADC Protocols emphasise the policy shift in the Region from food self-sufficiency to food security.

### *2.1.5 Unaccounted for water:*

Unaccounted for water is the wastage of water that occurs in the system before it reaches the end user. It takes the following forms:

- Pipe breaks
- Leaks
- Inaccurate water meters
- Un-metered connections
- Illegal water connections

□ Administrative errors

Unaccounted for water in urban distribution system amounts to 8-15 % of the bulk water supplied, if the distribution is well managed and maintained. The weighted average of unaccounted for water in the urban distribution centres shown in the Table below is approximately 20%. The amount of unaccounted for water compares well with other modern cities such as Paris and Singapore, which have recorded losses of 8 %. But in Khorixas losses may be as high as 58%. In other towns in communal areas accurate statistics are not available but the figures may be higher than 30% in those areas.<sup>50</sup>

**Unaccounted for water in urban centres in 1997/8**

Local Authority Area.	Total Water Production (m <sup>3</sup> 1996/97)	Unaccounted for water %
Arandis	561345	35.0+
Gobabis	480933	7.7
Grootfontein	2 887 587	20.9
Henties Bay	358 669	9.0
Karasburg	228 197	18.0
Karibib	246 624	n/a
Katima Mulilo	2 224 980	35.0+
Keetmanshoop	1 653 419	17.0
Khorixas	1 102 985	58.0
Luderitz	834 009	22.0
Mariental	627 498	9.4
Okahandja	1 124 861	16.0
Omaruru	656 251	7.0
Ondangwa	870 147	35.0+
Ongwediva	1 125 878	35.0+
Opuwo	640 363	47
Oshakati	1 773 799	35.0+
Otjiwarongo	1 551 167	7.5
Outjo	639 012	7.7
Rehoboth	1 904 374	35.0+
Rundu	1 516 622	38.0
Swakopmund	2 793 197	12.0
Tsumeb	1 041 603	15.0
Usakos	123 925	31.1
Walvis Bay	4 515 087	14.5
Windhoek	13 741 731	10.0

\*35+ represents a rough estimate of the situation based on information from Namibia's Water Demand Management Country Study. (Source: Water Demand Management Study)

<sup>50</sup> Namibia's Water: A Decision Makers Guide

## 2.2 Current Water Supply by Source

A water supply and sanitation policy (WASP) for Namibia was approved in 1993. In terms of this policy, affordable water supply and sanitation services should be made available to all Namibians in order to improve public health and hygiene, reduce the burden of collecting water, promote community based social development, support basic needs for subsistence and promote economic development. Beneficiaries should contribute towards the cost of services at increasing rates for standards of living exceeding the levels required for providing basic needs.

Thus by water supply is meant the provision of water in sufficient quantity and of an appropriate quality to meet the requirements of people, their livestock and their associated activities. According to the WASP:

- all Namibians should have access to water at a cost the country can afford
- water supply should be managed on good business principles
- private sector and support organisations should be encouraged to participate in the water sector
- there should be community involvement and acceptance of mutual responsibility in decision making
- use of the country's water resources should follow the principles of environmentally, economically, and socially sustainable development.

In Namibia, water supply is separated into:

- a) bulk water supply, which is undertaken by the government owned company, NamWater;
- b) rural water supply which is undertaken by the Ministry of Agriculture, Water and Rural Development, Directorate of Rural Water Supply (DRWS) in conjunction with rural communities and community institutions; and
- c) local government: municipalities, town councils, village councils etc.
- d) private water development which is undertaken by private concerns such as mines and tourist lodges and commercial farmers (irrigation and livestock).

Namibia has reached the limits of easily accessible water sources and improved management of water supply is becoming a first priority.

In recognition of the water resources in Namibia being scarce, the Water and Sanitation Policy (WASP, 1993) stipulates the following priority ranking to the allocation of water where there are competing demands:

**First priority:** Water for domestic purposes, including livestock watering for both subsistence and commercial farming

**Second priority:** Water for economic activities such as mining, industries and irrigation. Priorities for these activities will in each individual case have to be determined by their respective value in relation to the overall development objectives and plans for the country. (source:WDM-Study)

### 2.2.1 Groundwater

It is estimated that, depending on the rainfall in a given year, approximately 60% of water for consumption is derived from groundwater. This means that Namibians rely chiefly on boreholes for their water supply because of unreliable rainfall and surface run-off. Unlike dams, boreholes supply water throughout the year.

Approximately 130 000 boreholes have been drilled in Namibia. Of these, only 32000 boreholes are estimated to be in use. This indicates that only about 20 % of all boreholes drilled in Namibia are successful. However, successful boreholes are not always reliable in the long run, as they can eventually dry out. This may be attributed to an imbalance between the rate at which water is pumped out and the rate of natural recharge of the aquifer from rainwater. Even when successful, in many cases boreholes produce water too salty to drink.<sup>51</sup>

The economic potential of groundwater management as an existing source of water is that it can sustain an assured yield (500-Million cubic meters) and thus lead to increase on the supply-side of the source of water.

Of the 32 000 boreholes which are in use in Namibia, more than 25 000 are situated on privately owned commercial farm land, and water supplied from these boreholes is defined in terms of current legislation as "private water" which is not regulated by the state. A revision of current legislation is clearly necessary if groundwater is to be adequately managed.<sup>52</sup>

Groundwater is also abstracted from different types of aquifer . The stored reserves and abstraction from these aquifers are given in Table below:

Stored reserves and abstraction from major aquifers

AQUIFER	STORED RESERVE Mm <sup>3</sup>	ABSTRACTIO N Mm <sup>3</sup> /a	CONSUMER
Grootfontein (karst)	1 162	n/a <sup>3</sup>	Grootfontein, ENWC
Otiwarongo (marble)	13.0	1.55	Otiwarongo
Omaruru delta (alluvial)	53.74	11.2 <sup>2</sup>	Central west coast
Kuiseb (alluvial)	39.34	11.2 <sup>2</sup>	Central west coast
Windhoek wellfield	n/a	0.5 – 5.0 <sup>1</sup>	Windhoek
Koichab pan (alluvial)	150	0.08	Luderitz
Tsumeb aquifer (Karst)	1 400	2.0	Tsumeb
Platveld	99.0	0	Still to be developed
Stampriet artesian basin (sandstone)	n/a	9.44	Irrigation

<sup>51</sup> DWA

<sup>52</sup> DRFN

<sup>1</sup>Depending upon status of dams supplying Windhoek

<sup>2</sup>Combined abstraction from Omaruru and Kuiseb delta aquifers

<sup>3</sup>n/a = not available



### 2.2.2 Surface Water

Rainfall and surface water in Namibia are extremely limited. It is estimated that 20% of all water is derived from ephemeral rivers.

The combination of low rainfall and the high evaporation results in irregular and unreliable supply of water from ephemeral rivers. Luckily, there are other storage facilities or dams on which to rely, depending on the rainfall during a specific season. Below is a list of dams with their capacities, mean annual run off, and 95% assured yield (i.e. the yield can be assured with a probability of 95%):

Dams constructed on ephemeral rivers (Source: Water Demand Management Study)

DAM	CAPACITY Mm <sup>3</sup>	MEAN ANNUAL RUN-OFF Mm <sup>3</sup> /a	95% ASSURED <sup>1</sup> YIELD Mm <sup>3</sup> /a
Von Bach	47.5	18.27	8.26
Swakoppoort	67.1	22.14 <sup>2</sup>	7.42
Omatako	40.7	35.06	4.70
Hardap	300.2	188.36	50.00
Oanob	34.1	10.13	4.88
Naute	83.6	74.01	12.00
Otjivero	17.4	8.45	1.24
Omdel	42.0		5.20
Friedenau	6.3	1.55	0.82
Dreihuk	15.5		0
Goreangab	4.2		1.05
Viljoen Dams	1.6	1.43	0.26

<sup>1</sup> Single reservoir analysis

<sup>2</sup> Intermediate catchments downstream of von Bach

### 2.2.3 *Perennial Surface Water*

The perennial rivers on the borders of Namibia provide reliable sources of water. The only rivers available to Namibia are the Kunene, the Okavango, the Kwando-Linyanti-Chobe and the Zambezi river on the northern border and the Orange river on the southern border. However, as this water is shared with the neighbouring countries, the use of water from these rivers must be based on agreements, which have not been signed for all the rivers to date.

## 2.3 **Current Water Supply Institutions**

The Water Supply and Sanitation Policy (WASP) which was approved in 1993 clearly states the activities of the Water Supply Institutions as follows:

- All Namibians should have access to water at a cost the country can afford.
- Water supply should be managed on good business principles.
- Private sector and support organisations should be encouraged to participate in the water sector.
- There should be community involvement and the acceptance of mutual responsibility in decision-making.
- The use of the country's water resources should follow the principle of environmentally, economically and financially sustainable development.

### 2.3.1 *NamWater*

NamWater was established by the government to provide water to the urban areas at a cost recovery price. NamWater supplies bulk water and has over 200 bulk water supply schemes which supply water to Local Authorities, Mines, Rural Water Supply (DWA) and occasionally to private connections.

To achieve full cost recovery it is important to charge, as a minimum, operating as well as capital and the interest recovery costs. NamWater is phasing this in over a period of five years from 1995 to 2000 for all bulk water schemes.

### 2.3.2 *Local Authorities*

The Local Authorities consist of Municipalities, Village and Town Councils, most of which buy water from the National supplier, i.e. NamWater. Some Municipalities supply water from their own supply (boreholes). This is the case in Tsumeb, Outjo, Grootfontein and Oranjemund.

As the national water operator in Namibia is forced to turn to more distant and difficult sources of water to satisfy local demand, the price of water will increase. The price will also increase in order to satisfy recovery objectives in the water sector. At the same time, price increases serves as an important tool to manage demand.

### 2.3.3 *Rural Water Supply*

The Directorate of Rural Water Supply (DRWS) is charged with the task of ensuring a sustainable supply of safe water to people and livestock in rural communities in communal areas. This will be achieved

through the implementation of Community Based Management (CBM) of rural water resources in terms of which the water users are ultimately responsible for the integrity and upkeep of their water resources. This will be a gradual process involving a period of partnership between government and communities in managing the water resource until the year 2007 when it is hoped that all water points will be managed and owned by the users. In this way cost recovery for water infrastructure will be attained, management of water will fall on the users and there will be associated improvements in the efficiency of water use. The movement towards CBM has already begun with Water Point Committees (WPC's) being established countrywide under the recommendations of the Water and Sanitation Policy of 1993.

Furthermore, in line with the targets set out in the National Development Plan (NDP1), by the year 2007 RWS hopes to have 80% rural access to potable water, where access is defined as being within 2.5kms of the home and users should not have to wait longer than 30 minutes for water.<sup>53</sup>

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<sup>53</sup> State of the Environment Report: Water (draft)(1999)

### 2.3.4 *Private Boreholes*

It is worth pointing out that, of the 32 000 boreholes which are in use in Namibia, more than 25 000 are situated on privately owned land (commercial farms), whose owners are protected by the stipulations of the Water Act which deals with the water rights. Clearly, a change in the Water Act is a prerequisite if water supply from boreholes on private commercial farmland is to be managed in accordance with the principles of WASP.

It is essential that relevant control be exercised whenever any activity of national importance is undertaken. This implies, for example, that boreholes cannot just be drilled at random and that there should be some measure of control by relevant authorities. A system of Permits and Licenses involving fees is vital to maintain control over the quality and quantity of water.

Permits and licenses are currently handled by the Division of Law Administration in the Department of Water Affairs. Abstraction permits and permits for borehole drilling are only mandatory where such activities take place in relation to a Water Control Area as proclaimed under the existing Water Act (Act 54 of 1956). There is a need to bring the Water Act in line with the present day activities of providing water in line with economic principles, including those activities which may affect the quantity and quality of water. Permits or license requirements will be crucial.

It must be understood clearly that, for the economist, the interest lies in the revenue that can be accrued by the provision of water in quantity and quality.

## 2.4 **Economics of Water Supply**

In an arid country like Namibia, water is a precious commodity whose availability is a critical factor in contributing to the health and general welfare of the population as well as the economic development of the country. The economics of water supply dictates that the cost of current water supply be taken into account and that cost recovery principles be applied. This is necessary for the long-term sustainability of the water resources in Namibia.

### 2.4.1 *The Cost of Current Water Supply*

Cost is generally defined as the expenses involved in the supply of water. The cost items for water supplied are listed below:

- **PERSONNEL EXPENDITURE:**
  - Remuneration
  - Staff Welfare (Social fund)
- **CURRENT EXPENDITURE**
  - Transport
  - Materials and Supply
  - Maintenance and Expenses
  - Property rental and related charges
  - Goods and services

## CAPITAL EXPENDITURE

- Furniture and Office Equipment
- Vehicles
- Operational Equipment, Machinery and Plants
- Acquisition of Capital Assets

## OPERATIONAL EXPENDITURE

- Feasibility Studies, Design and Supervision
- Purchase of Land and Intangible Assets
- Construction, Renovation and Improvement

### 2.4.1.1 NamWater

The cost to the Government in terms of subsidies was N\$ 37.3 million as can be seen from the table below:

**Water Subsidy by Sector as a Percentage of Capital and Operating Cost in 1993 is Reproduce for Information.**

<i>Sector</i>	<i>SUBSIDY AS PERCENTAGE OF COSTS</i>		
	<i>% of Operating costs only</i>	<i>% of Total costs (Capital plus Operating)</i>	<i>Percentage of total Water Use</i>
<b>Agriculture</b>			
Commercial livestock (own supply)	-	-	11
Commercial Crops from bulk water supply	79	95	14
Commercial Crops from own supply	-	-	19
Commercial Livestock from bulk water supply	6	64	4
Commercial Livestock from rural supply	100	100	5
	100	100	9
Commercial Crops (rural water supply)			
<b>Mining</b>			
Diamonds (own supply)	-	-	7
Other mining from bulk water supply	19	71	2
Other mining from own supply	-	-	2

<b>Manufacturing</b> (from bulk water supply)			
Fish Processing	-13	69	-
Other Manufacturing	0	59	2
<b>Other Services</b> (from bulk water supply) (Hotels/Restaurants/Tourism)			
From bulk water supply	-12	21	1
Own supply	0	0	-
Transportation	20	64	-
Other Services	0	59	2
<b>Households</b>			
Rural (rural water supply)	100	100	5
Urban (bulk water supply)	14	67	17
<b>Subsidy by Source</b>			
Bulk water supply	17	71	42
Rural water supply	100	100	19
Own supply	-	-	39
<b>Cost of Subsidy</b> (million of Namibia dollars)			
<b>Bulk water supply</b>	<b>N\$37.3</b>		
<b>Rural water supply</b>	<b>N\$30.0</b>		
<b>Total</b>	<b>N\$ 67.3</b>		
A Blank indicates no subsidy because user, not government, supplies water. Percentage may not sum to 100 because of rounding.			

It is clear that the water price will increase substantially during the next few years to ensure security of supply and to increase the NamWater price to a full cost recovery level. For full cost recovery, it is important to charge, as the minimum, operating and maintenance costs capital costs as well as the interest recovery cost. The goal of full cost recovery, in the case of NamWater, is being phased in over a period of five years from 1995 to 2000 and that includes all bulk water supply schemes.<sup>54</sup>

#### 2.4.1.2 Local Authorities

The Local Authorities (La's) buy water from NamWater and sell it directly to the end user. This implies that any increase in the price of water by NamWater will bring upward adjustment in the price of Municipality water supply, meaning that the end user will have to bear the price of making use of the scarce commodity.

<sup>54</sup> DRFN/DWA 1988

The reality is often somewhat different however. Tariff setting in the Local Authorities is often arbitrary, e.g. a 10% margin on the NamWater Tariff. Sometimes the Local Authority tariff is less than the NamWater tariff. The arbitrary nature of the tariff setting process often means that the LA will make losses on the water sold since the reticulation costs (operations, maintenance and capital) are not covered. At present there is very little information on the costs of reticulation and the extent of the losses incurred by the La's.

In addition to this, many LA's have difficulty collecting the revenues from the water consumers. Non-payment is a big problem. Many LA's (e.g. Rehoboth, Oshakati) are indebted to NamWater. NamWater has responded by cutting the water supply to some towns. Intervention by the Ministry of Regional and Local Government has often occurred in the form of paying of debts to NamWater that have arisen. This is only a short-term solution to the problem and it is clear that Local Authorities will have to improve their management of water supplies to avoid this situation again.

The larger municipalities do not appear to have this problem.

#### 2.4.1.3 Rural Water Supply

For rural water supply, a five-year operations and maintenance program followed by a four-year full supply cost recovery program started in August 1997. The cost of rural water supply is more than often heavily subsidised in order to reflect equity towards the members of society who cannot afford to pay for the use of water. This has been the assumption, but the latest cost recovery strategy assumes that they have the ability to pay and the success of CBM really rides on this assumption.

#### 2.4.1.4 Environmental Cost

Action must be taken to determine the cost of all-important resources: vegetation, soil and wildlife. This will be achieved only through will co-ordinated effort or integrated water resources management by all the stakeholders in Namibia. Focus should be placed on natural climatic variability.

#### 2.4.2 *Cost Recovery Pricing and Subsidies*

Water is increasingly becoming a scarce commodity and the notion of water being regarded as a free gift of nature and therefore a free commodity no longer holds. As can be seen in the section, which deals with the cost of current water supply, there are costs involved in the supply of water. As a result of the burden upon government finances, and questions about the sustainability of adequate water supply whilst water is under control of the government, movement is being made towards full cost recovery in the water sector.

The traditional behaviour of having free or heavily subsidised water for livestock, irrigation and domestic use has created the attitude that water is plentiful and of low value.

Water does however have value and the value of water to the user is the maximum amount the user would be willing to pay for the use of the water resource. This aspect of willingness to pay for an economic good is fundamental to water resource management in Namibia because there is a growing realisation of the cost involved in supplying the scarce resource.

#### 2.4.2.1 NamWater

The setting of prices and lifeline rates are fundamental management considerations if the objective of treating the scarce water resources as an economic good for which a price must be paid for its provision is to be obtained. Pricing is one of the most important economic tools for ensuring the efficient use of water and usually ensures that water is used in the most efficient way. NamWater has been created to look the most efficient and effective way to manage the bulk water supply. The Water and Sanitation Policy echoes the necessity of pricing, stating that the water sector must become financially self-sufficient, and that water must be provided at a cost which is affordable to the country as a whole. A comparative study of pricing is illustrated in the following table:

Summary of cost from different sources		
Sector/Region	Price/kl	Base line year
Kavango water	N\$7.10 (a)	1996
Namwater recovery tariff	cost N\$3.17	1998
Namwater tariff	N\$2.40	1998
Goreangab tariff	N\$2.35	1997/98
Goreangab (Extended)	N\$2.50	1998
Artificial recharged borehole water	N\$0.65 (N\$4.40) (b)	1996/97
Purified affluent	N\$1.57	1998

(a) Based on 50 % concessionary loan and 50 % market related loan

(b) Price with low production rate of 500 000 kiloliter (kl) per annum

#### 2.4.2.2 The Extent of Subsidization

In the 1998/99 financial year alone, the deficit of government was recorded at N\$ 745166 000. This amount is set to continue, since the foreign contributions to Namibia's Budget have decreased considerably during the 1999/2000 budget.

In the light of this adverse financial situation, it is clear that government cannot afford to supply a productive good at subsidized rates for uses that are not economically or socially justified. Subsidization is not seen as sustainable.

A case in point is that of Namdeb Oranjemund where water for workers is 100% subsidized. Government has essentially given free water to Oranjemund and allowed the town of Oranjemund to use the water as it pleases. Given that Oranjemund does not have the right to sell the water to other potential users along the Orange River, the private opportunity cost of this water to Oranjemund is zero. Therefore all the incentives are in place for Oranjemund to use water as it chooses. By not charging for water in Oranjemund, private individuals use large amounts of water in



potentially low value uses; there is no opportunity cost for the residents of the town. There is potential for the government to obtain rent from this resource and perhaps increase revenues. Furthermore, given that Namibia is only allowed 50Mm<sup>3</sup>/a from the Orange River, pricing the water may cause a reduction in consumption at Oranjemund, and allow water to be used elsewhere.

Subsidization has a further unwelcome effect. When income statements are submitted, this subsidy might be recorded as expenditure which might reduce the amount of tax payable to government while dividends payable to government as a shareholder/owner are also reduced. In turn, due to reduced revenue caused by indirect subsidy, the deficit in the National Budget is rising. This is against the norms of financial prudence and illustrates the necessity of reviewing the award of subsidies for water.

Government is spending more than N\$67.3 million to subsidize the water sector. This amount or part of it could go a long way in reducing government deficits. Thus, a future objective should be to make communities pay for the costs of water in order to reduce subsidies.

#### 2.4.3 The Economic Value of Water (Value Added in each sector)

Table 3.1 Value Added per Cubic Metre of water Consumed by Sector 1996

Economic Sector	Value added 1996 (millions of N\$)	Water use 199 (Mm <sup>3</sup> )	Value added per cubic metre of water 1996 (N\$)
<b>Agriculture: 2.4.3.1</b>	1,029	142,9	7,20
Commercial	650	92,9	7,00
Subsistence	379	50,0	7,60
<b>Mining : 2.4.3.2</b>	<b>1,654</b>	<b>25,2</b>	<b>65,60</b>
Diamond mining	1,169	13,6	86,00
Other mining	485	11,6	41,80
<b>Manufacturing:</b>	<b>1,552</b>	<b>5,3</b>	<b>292,80</b>
2.4.3.3	354	0,5	708,00
Fish processing	1,198	4,8	249,60
Other manufacturing	<b>3,215</b>	<b>5,5</b>	<b>574,50</b>
<b>Services: 2.4.3.4</b>	226	1,2	188,30
Hotels and restaurants	252	0,8	315,00
Transportation	2737	3,5	782,00
Other services			
<b>Whole economy (GDP)</b>	<b>11,796</b>	<b>231,2<sup>1</sup></b>	<b>51,00</b>

Source: SOER (draft) 1999

### 3 CURRENT INITIATIVES IN THE WATER SECTOR

#### 3.1 Cost Recovery Initiatives

Some measures are already in place to recover cost such as the creation of NamWater. Other measures, such as those of the Directorate of the Rural Water Supply, are being implemented gradually. Possible effects of the implementation of cost recovery initiatives could give rise to the following effects:

- More efficient water use
- Reduced wastage of water due to effective repairs
- Reduced grazing pressure near boreholes
- Piped water supply to enhance and ensure accessibility.

All cost recovery initiatives should be based on consistent and reliable service that justifies payment. (Source: Final Mission Report-Arcadis Euroconsult, Arnhem, The Netherlands).

##### 3.1.1 *Community Based Management Details*

The Communal Areas Water Supply Project (CAWS) which was undertaken with the support of GTZ I rural areas, forms an important basis for community participation in and community based management of cost recovery initiatives. (The Kunene Region (Okombahe and Omatjete) and the Omusati regions feature prominently in this regard).

Some communities in rural areas as indicated above have been convinced to take into account the real cost of the supply of water in an arid country like Namibia which is the driest country south of the Sahara desert. For example, communities in Okombahe contribute NS 5-00 per month (flat rate) while those in Omatjete makes a quarterly contribution of NS 2-00 per head per cattle.

The Okombahe and Omatjete experiments served as pilot projects in which two technologies were involved, i.e. windmill and diesel installation. These projects demonstrated that where communities are involved from the outset and community based management is regarded as important, there is willingness on the part of communities to make a contribution towards cost recovery.

The Directorate of Rural Water Supply should allocate the greater proportion of their budget towards ensuring that their CBM approach is fully functional. Successful CBM will be positive for environmental sustainability and will enhance health conditions. (Source: Final Mission Report).

##### 3.1.2 *Decentralization*

Decentralization is essentially an institutional arrangement and is dealt with fully by the institutional framework theme.

##### 3.1.3 *Block Tariffs (Windhoek)*

It is often felt that the pricing of water based on economic principles may achieve efficiency at the expense of equity. Since water demands and hence willingness to pay for water are influenced heavily by incomes, basing the price of water on demand and supply principles may leave some people unable to afford water. In many developing countries, this issue has been addressed by the use of increasing block tariffs i.e. progressively higher tariffs for progressively higher consumption. Currently Windhoek operates an increasing block tariff system. This is shown in Table 1 below. The bulk tariff in Windhoek is N\$ 3.17 per cubic meter at full cost recovery and from the table it is clear that only the initial block is subsidized. The high consumption tariffs are much higher than the bulk water tariff, which represents the marginal cost to the Municipality.

**Table 1. Block Tariff Schedule in Windhoek**

Monthly consumption per cubic meter	Tariff
0-6	2.65
6-15	3.70
15-36	4.75
36-45	6.25
45+	8.15

This type of system allows for cross-subsidization to occur between high income and low-income users, as it is generally high-income users with gardens and swimming pools who pay punitive tariffs for high consumption. Those who use relatively small amounts of water are able to pay less in the form of the initial block tariffs, which is uniformly set for all families.

### 3.2 Water Demand Management

Water demand management is a current initiative to achieve the efficient use of water and maintain the services water provides. The purpose of Water Demand Management (WDM) is to ensure that water can be used in the most efficient way. In the light of the growing demands due to population pressure, environmental constraints and distinct constraints in the previously favoured supply augmentation, the emphasis is firmly on WDM to achieve these ends.

WDM can be implemented in a variety of ways with different practices and combinations of practices being successful in a variety of different contexts. These include non-market mechanisms such as the application of standards and quotas on water use, market mechanisms such as price changes, direct interventions such as repairs to leaks, reduction of unaccounted for water and promotion of water efficient technologies.

#### 3.2.1 Water Demand and Supply in Namibia

The assured yield of water in Namibia is estimated to be close to 500m-Cubic meters per annum, excluding perennial border rivers. Water demand in Namibia is currently approximately 250m-cubic meters per annum. The growth rate of water demand in Namibia is driven by the combined factors of population growth and changes in the structure of the population. Namibia's population growth has been estimated as being somewhere between 3% and 6% per annum, depending on the

assumptions used. This implies that the demand for water will double in the next 10-20 years at which time the entire assured yield will be accounted for by domestic demand. More recently, the potential effects of climate change and the El Nino phenomenon have raised doubts about the level of the assured yield in the future.

Supply augmentation will have to be addressed. Future potential sources include desalination and extraction of water from border rivers. Only the desalination option implies self sufficiency in water supply since extraction from border rivers will depend on international cooperation. Each potential source is fraught with its own particular problems, be they cost or politically oriented constraints, making the notion of WDM a pertinent and potentially effective alternative approach to alleviating the constraints of water supply.

### 3.3 Unconventional Sources of Water

Conventional sources of water include surface water collected in dams, groundwater and water abstracted from the perennial border rivers. **Unconventional water sources** refer to water supplied through means other than the traditional supply augmentation and includes re-use and reclamation of water, artificial groundwater recharge, fog harvesting and rain harvesting. (**Unconventional water sources:** Aquifer Recharge-Windhoek, Desalination-Coast, Recycling –Windhoek and Rossing Uranium Ltd., Fog)

The increasing expense of conventional bulk water supply investments has made unconventional sources a more practical and economic alternative source of additional water. Technological advancements have also been very important in making these investments practically more appealing. This is particularly the case when considering reclamation of water. Furthermore the environmental and political costs associated with conventional water sources, e.g. the Okavango River, have also pushed to the forefront the need for alternative sources of water.

The inexorable move towards more realistic full financial cost pricing of water will make recycling and re-use of water more viable for private agents such as domestic consumers, manufacturing and agriculture.

### Unconventional Supply Sources<sup>55</sup>.

Existing Supply Sources	Potential Volume of water Assumed per Year (Mm <sup>3</sup> /a)	Unit Cost, N\$/m <sup>3</sup> at Windhoek	Comments
Existing Supply	15	3.17	
Goreangab ext	3.65 (7.5 in future)	2.50	Environmental costs are low
<b>Desalination</b>	50	19.65	Expensive
<b>Artificial Recharge</b>	4-8	1.25	Testing still occurring. Supply from reduction in Evaporation.
Boreholes	2.3	1.15	Subject to recharge
<b>Purified Effluent</b>	1.14	1.57	Environmental costs are low

## 4 ISSUES ARISING

The major problem facing government, as the main stakeholder in the water sector is inadequate funding for all the water related projects. This weak financial position seems to be aggravated by a failure in cost recovery and pricing. It is difficult to deliver efficient and effective services under such conditions and government cannot continue to bear the increasing capital and maintenance cost for the projected growth of water requirements.

This problem will only be alleviated by the promotion of the most efficient use of water, which will require an overhaul of the institutional, legal and economic framework within which water is supplied and used. This will entail institutional and legal reforms, utility reforms, privatization, and the adoption of macro-economic and sectoral policies to encourage private investment in the water sector.

The following issues have been isolated as key issues which will be elaborated on in the theme report.

<sup>55</sup> The tariffs shown here differ from the conventional tariffs in Table 5.27. They have been supplied by Ben van der Merwe City of Windhoek Case Study of the Namibia WDM study.

## 4.1 Equity

The government realizes that the provision of water in Namibia on the basis of the market forces of demand and supply will cause the poor to suffer. Therefore, equity is viewed as an important means by which the government can intervene in an economy to correct the shortcomings that may be created by the market forces.

### 4.1.2 Rural

Community Based Management Water Point Committees are seen as important means by which the communities can have a say in how the resources in their areas are to be managed. They can be used to correct inequalities in wealth distribution and to protect the members of the communities who are unable to compete as well as to promote rural development.

### 4.1.3 Urban

Cross subsidization can be used to address the issue of equity in urban centres. This means that the higher income groups must pay higher prices for water, assuming that they will use more water i.e. the more you use the more you pay.

## 4.2 Efficiency and Cost Recovery

### 4.2.1 *The Link between NamWater and the Local Government.*

The link between NamWater and the Local Government is the revenue base they both share i.e. the customers which are made up of the urban and rural population of Namibia. This is a very crucial link because without revenue, the water infrastructure will collapse and it will be difficult, if not impossible, to supply water to the communities in need. Another link is the scarcity of the Namibian water resources that can be seen as the main constraint to economic growth.

### 4.2.2 *Transfer of Price Increases from NamWater to Local Authority and Revenue Sufficiency in Local Authorities*

The Market based tools for economic management of water resources such as water pricing cannot be overstated. The purpose of integrated water resources management is to, inter alia, scrutinize and sensitize price increases in the water sector so as to minimize the effect thereof on all the stakeholders in Namibia.

### 4.2.3 *The Effect of WDM*

Businesses, industrial enterprises, institutions, public offices and residential consumers all share available water. In Walvis Bay 51% of water supplied is used for residential purposes while for Windhoek and Otjiwarongo the figures are 65% and 77% respectively. Surprisingly, less than 1% of water supplied to a town with full water reticulation and water borne sewage is used for drinking and cooking. About half of the water goes to gardens, food processing such as beer, soft drinks, meat and fish, manufacturing products and to the building and construction industries.

The effect of water demand management is that the resource will increase on the supply side for redistribution to customers.

#### *4.2.4 Long-Run Marginal Cost Pricing*

The assumption is that long-run marginal cost pricing would be efficient in the water sector in Namibia and could have desirable effects. The question is whether this will not lead to profit-making (monopoly- profit making) by NamWater and the Local Authorities. If this is indeed the case, perhaps the use of block tariffs could be an effective counter strategy.

#### 4.2.5 *Externalities: The Role for Government in ensuring that Externalities are taken into account by NamWater and Local Authorities*

Externalities occur when the actions of an individual or a private sector firm (Namwater), confer benefits or costs on individuals or firms not directly involved in those actions. How much pollution should be there in the water sector (or in the economy)? Not only must society, i.e. all households taken together, decide on the optimal levels of water pollution, but must also decide who, in society, should pay for achieving these levels. Resources used in stopping pollution mean fewer resources for all other goods and services.

In the light of the foregoing, it is in national interest for the government to step in and fill the gap left by the private sector

### 4.3 **Future Supply Augmentation**

#### 4.3.1 *Perennial Rivers*

Through perennial rivers, Namibia will have a secure source for future supply augmentation. However, water sharing allocation agreements must be in place to allow the countries involved to benefit from perennial rivers.

#### 4.3.2 *Groundwater*

Namibians mostly rely on boreholes for their water supply because of unreliable rainfall and dam levels. Boreholes supply water throughout the year. Water levels in boreholes may fluctuate and some may dry up. But more and more are drilled whenever the pressure on the groundwater supply increases. Clearly, these factors isolate ground water as a key issue.

It should be realized that Namibia as a country does not float atop an inexhaustible sea of underground water which can be tapped forever. Such a state of affairs dictates that management of groundwater be regarded as a Key Issue and as an important step towards sustainability.

#### 4.3.3 *WDM*

Water demand is the quantity of water required to meet the needs of a WDC or other consumer. In economics water demand is considered strictly a price quantity relationship. If either the yield from a Water Resource, or the supply capacity of Water Infrastructure cannot meet the Water Demand, water consumption will be less than the demand.

In an arid country such as Namibia where water is scarce and water resources costly to develop, it is important to prioritize the use of water by the various sectors of the economy.

This prioritization cannot only consider the economic outputs of each sector per m<sup>3</sup> of water consumed, but also has to consider the basic needs of humans and stock as well as take into account numerous socio-economic aspects and priorities.



Priorities for these activities will in each individual case have to be determined by their respective value in relation to the overall development objectives and plans for the country.

#### 4.3.4 Unconventional Sources

Conventional sources of water include surface water collected in dams, groundwater and water abstracted from the perennial border rivers. Unconventional water sources refer to water supplied through means other than the traditional supply augmentation and includes re-use and reclamation of water, artificial groundwater recharge, fog harvesting and rain harvesting.

The increasing expense of conventional bulk water supply investments has made unconventional sources a more practical and economic alternative source of additional water. Technological advancements have also been very important in making these investments practically more appealing. This is particularly the case when considering reclamation of water. Furthermore the environmental and political costs associated with conventional water sources, e.g. the Okavango River, have also pushed to the forefront the need for alternative sources of water.

The inexorable move towards more realistic full financial cost pricing of water will make recycling and re-use of water more viable for private agents such as domestic consumers, manufacturing and agriculture.

## 5 CONCLUSION

The following conclusion can be made vis a vis sustainability in the water sector :

- **Economic Sustainability:** This can be achieved and maintained in the water sector if all water related activities can contribute to government macro-economic policies such as poverty alleviation and income distribution.
- **Environmental Sustainability:** This can be achieved and maintained in the water sector if environmental cost can be controlled.
- **Financial Sustainability:** This can be guaranteed by launching massive awareness campaigns involving all the stakeholders about the need for cost recovery and the importance of paying for water. Utilities should be able to finance themselves and encourage economic growth.

In the final analysis, since water is such an important resource and affects all communities in Namibia, it goes without saying that only coordinated action i.e. integrated water resources management involving all decision-makers in the water-sector will go a long way in realizing the goal of sustainable provision of water at affordable rates to all communities.

## **PART TWO: FINANCIAL SUSTAINABILITY OF THE WATER SECTOR**

### **1 INTRODUCTION**

To effectively meet a growing host of challenges in the water sector including resource limitations, complex international water agreements, including shared river basins and environmental issues, competing sectoral and regional demands as well as social imperatives, Namibia needs to have an extremely effective water resources management policy framework and a highly trained, capable and diverse multidisciplinary cadre of water sector experts. Integrated water resources management will play a key role in ensuring financial sustainability in the water sector.

Water must be regarded as an economic good for which a price must be paid so as to ensure sustainability, poverty alleviation and cost recovery must be effected as without provision of water to the needy communities in an efficient and effective way will be impossible.

### **2 CURRENT SITUATION ANALYSIS**

There has been a realization by Cabinet that the developments in the water sector and management thereof cannot continue in the present fashion as the state bears the majority of costs for the provision of water.

The water-infrastructure, which is already in place in Namibia, is commendable but it is clear that it will not guarantee the supply of water to the ever-increasing population of Namibia. Increasing population will put upward pressure on the cost of the existing infrastructure. There will be increases in operating costs, sewerage system operating costs and the costs of Municipality reclamation works. All these factors bear testimony to the fact that water is scarce commodity, which should be paid for by the users, at cost recovery prices.

However, water is not seen as an economic good for which a price is to be paid on a universal basis in Namibia and therefore there is a tendency to waste water. In addition, there is a lack of integrated management in the water sector and a lack of consumer-education about the scarcity and value of water. This problem is compounded by out-dated water legislation, which does not make adequate provision for revenue generating Permits, Licenses, and Abstraction-fees system.

### **3 CURRENT INITIATIVES**

#### **3.1 Public Sector Reform**

Creating an enabling environment is crucial if the required changes in the water sector are to take place. Such an environment must not lose sight of financial viability if future activities in the water sector are to be successful. Clearly institutional reform is necessary in the water sector and this reform is the subject of attention of one of the other themes of this Review.

The financial impact of such institutional reform requires attention. What savings will accrue? Will such reform lead to efficiency in terms of the application of functions that are neglected today? Will it lead to financial savings and therefore to financial prudence and financial sustainability?

The Development Budget: MAWRD-RWS (See Attached Annexure A) for the 1997/98 Financial Year indicates an expenditure of N\$ 91 872. It also records a Total Estimated Cost of N\$ 590 212 between 1993 and 1998.

Moreover, the Estimate of Revenue and Expenditure for the Financial Year Ending 31 March 1997 for MAWRD-RWS (See Attached Annexure-B), records the following financial outlay:

Personnel Expenditure	:	N\$ 16 528 000
Goods & Other Services	:	N\$ 29 039 000
Total Capital Expenditure	:	N\$ 9 968 000
Acquisition of Capital Assets	:	N\$ 29 550 000

The issue to be addressed is whether integrated water resources management and the proposed Institutional Framework will push the cost up or down given the fact that it will entail down-sizing, outsourcing, Decentralization, stakeholder and community participation, commercialization and private sector participation, efficient services (i.e. doing much with less), effective services (i.e. cutting unnecessary spending) and transparent decision-making. The cost will clearly not come down under the present highly centralized structure. Therefore, integrated water resources management under a new institutional framework has the best chance of keeping the cost down and registering increased revenue by employing cost recovery principles.

For the purpose of financial sustainability, it is important to put the issue of water supply to the Namibian population in a public economic context. As is apparent from the table below government is running a large deficit and cannot afford to supply a productive good (water) at subsidized rates for uses that are not economically or socially justified.

<b>ESTIMATE OF THE FINANCIAL POSITION OF NAMIBIA AS AT 31 MARCH 1999</b>			
	<b>N\$ 000</b>	<b>N\$ 000</b>	<b>N\$ 000</b>
AMOUNT TO BE VOTED 1998/99	6, 342 412		
Plus: Additional amount to be voted	<u>301 872</u>	6 644 284	
Minus: Suspension in terms of section 16 (1)(b) of the State Finance Act (Act 31 of 1991)		203 325	6440 959
Statutory			<u>483 844</u>
Total amount to be financed 1998/98			6 924 803
Estimated available for appropriation 1998/98		<u>6 179 637</u>	
Own Revenue		6 115 079	
Foreign contributions		64 557	
Net loans to be raised		745 166	
		<u>6 924 803</u>	<u>6 924 803</u>

As can be seen from the above Estimate, the Namibian Government experiences deficit on an annual basis. It is important not to see the net loans to be raised for 1998/98 Financial Year to finance the N\$745 166 million in isolation, but as a part of necessary step for the last few years to balance the budget. At the time of writing this paper, the national debt reportedly rose to N\$ 3,4 billion.

The main budget for the 1998/99 Financial Year was based on the rather ambitious economic growth of four per cent by the Government Economic Policy makers. In contrast, economists widely believe that the growth will be below two per cent. The only good thing is that government has thus far succeeded in financing the deficit from local sources, including Government Bonds.

In the light of this adverse financial situation, it is clear that government cannot afford to supply a productive good at subsidized rates for uses that are not economically or socially justified.

A case in point is that of Namdeb Oranjemund where water for workers is 100 % subsidized. Accordingly, when income statements are submitted, this subsidy might be recorded as expenditure which might reduce the amount of tax payable to government while dividends payable to government as a shareholder/owner are also reduced. In turn, due to reduced revenue caused by indirect subsidy, the deficit in the National Budget is rising. This is against the norms of financial prudence and illustrates the necessity of reviewing the award of subsidies for water.

The government deficit is N\$745 166 000. Approximately N\$ 80 000 000 of this amount is, according to Financial Analysts, to be financed from foreign loans. The balance of the deficit will be financed through Government Bonds. Namibia is accordingly still well off considering that the large amount of money raised to finance the deficit comes from local sources, keeping circulation of funds at home and reducing capital flight.

Government is however spending N\$67.3 million to subsidize the water sector. This amount or part of it could go a long way in reducing foreign loans and therefore Government deficits. Thus, a future objective should be to make communities pay for the costs of water in order to reduce subsidies.

### **3.2 The Principles of Effectiveness and Efficiency**

The current institutional framework in the water sector boasts many institutions. It is also evident that integrated water management has been largely absent. It is therefore conceivable that there will be delays in the water sector in recognizing concepts such as Demand Management, Integrated Water Resource Management, the principle of cost recovery as well as the introduction of pricing reform.

Effectiveness and efficiency will be given prominence in a reformed public sector. The justification for effectiveness in a reformed public sector is that it will be customer focussed and the resource will be brought closer to the needy communities. The justification for efficiency in a reformed public sector is that the available funds will be invested in water related projects to make cost recovery possible e.g. Goreangab Reclamation Works.

### **3.3 The Creation of NamWater**

As part of an effort to improve water resource management, government has established NamWater to develop and provide bulk water on a commercial basis. NamWater will recover water supply costs from the beneficiaries through tariffs and fees.

NamWater is tasked with enhancing effectiveness and efficiency in the water sector by developing sources of water without involving government bureaucracy and it should finance its operations through revenues from the sale of bulk water. This is one of the first steps taken by government in the reforming the water sector.

## **4 PREFERRED OPTION AND RATIONALE**

Only 62% (SIAPAC) of the estimated rural population has proper access to a reliable source of safe drinking water.

Clearly, the current situation analysis reveals that water is an economic good in Namibia as opposed to a free good. Furthermore, the provision for payment for water on a universal basis and the creation of a revenue basis for all the stakeholders in the water sector is essential if a reduction in subsidies and therefore a reduction in budget deficit is to materialize.

Since there is a lack of integrated management in the water sector, the reform of the institutional framework in the water sector will be a watershed in the management of the water sector as far as efficiency and effectiveness is concerned.

## **5 PROPOSED INSTITUTIONAL REFORM**

If it will also be useful to pinpoint what benefits the introduction of a new Institutional Framework will bring to the water sector. Will it lead to more efficiency in terms of convincing all communities to pay for the usage of water? Will it introduce policies that will improve management of water metering, billing, and collection of funds? Will it bring efficiency in operations and maintenance to minimise leakage's and unaccounted for water and stopping illegal connection?

## **6 ISSUES FOR IMPLEMENTATION**

Highly decentralized financial management through public sector reform has the advantage of increasing awareness at the operational level and effectiveness in the water sector is likely to improve. An additional advantage of highly decentralised financial management is that it will monitor subsidies closely in order to safeguard new parastatals and other decentralised institutions from making unnecessary loses.

The importance of cost recovery as a critical policy objective for the purpose of financial sustainability in the water sector should be viewed as an urgent issue for implementation

**NAMIBIA WATER RESOURCES MANAGEMENT REVIEW**

**WATER CONSERVATION**

**OUTLINE OF THE THEME REPORT**

**MARCH 1999**

#### DEFINITION

**Water conservation is any beneficial strategy designed to manage water resources with a view to preserving or protecting them by preventing exploitation, destruction or neglect and ensuring the wise and sustainable utilization of water resources so as to prevent waste and guarding future use of water resources that have been depleted, carried out through care and supervision by a governmental authority or by a private association or business.**

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*Water Conservation and Reuse (Namibia Water Resources Management Review, 1998)*

- Appropriate water harvesting and conservation techniques (maintenance of distribution systems, rainfall harvesting, reduced evaporation, tree planting, range management, livestock management, soil conservation);
- Appropriate wastewater treatment and reuse focusing on conventional methods where adequate, and non conventional alternatives in other areas (lagoons, wetlands, animal feed production, small plots/gardens, aquaculture);
- Related income-generating activities;
- Traditional water saving techniques;
- Appropriate watershed (including sub-watersheds and source areas) protection and management programs, institutions and financing;
- Demand management techniques and strategies for urban, industrial and agricultural water use.

The following aspects should be addressed:

- Capacity building;
- Research and information flows;
- Traditional practices;
- Environmental sustainability.

## *Water Conservation and Reuse (Implementation Plan, 1998)*

### **Statement of problem**

Namibia is a dry country with very high evaporation rates, open water storage leads to high evaporation losses. Water conservation techniques such as water reclamation for gardens and other use are not exploited fully. Current use of water does not provide the best economic outcome. Cost of water to consumers has little or no incentives for water saving. There is not enough emphasis on Water Conservation and Reuse (WCR), and a very limited community awareness/participation in solutions.

### **Objective of the theme**

To identify and recommend cost-effective strategies to increase WCR through:

- Improved/new technologies
- Financial incentives
- Improved community awareness, etc. where water efficiency becomes part of every Namibian's goals.

### **Scope of work**

- Overview of the existing water practices and its efficiency
- Research new technologies (artificial recharge and water reclamation) and evaluate their applicability to Namibia
- Develop principles and policies looking at the existing policies like WASP (Water and Sanitation Policy)
- Evaluate the scope and quantify possibility for improvement and cost
- Investigate practices, by region/aquifer/catchment
- Recommend strategies for:
  - capacity building
  - public awareness
  - water pricing and other financial incentives.

### **Dated output**

- Data collection (Jan - Jun 99)

- Data analysis (constraints and gaps) (Feb - Mar 99)
- Compile a memorandum of appropriate water harvesting and conservation techniques for Namibia, with recommendations (Mar 99)
- Collect and disseminate information to the public on the ways to conserve and use water wisely (public awareness campaign) (May 99)
- Suggest and compile changes to be made on the existing water policies (Jun 99)
- Compare the existing pricing system with the researched better one (Jul 99)
- Final report (Aug - Sep 99)

# WATER NEWS

Quarterly Newsletter of the Namibia Water Resources Management Review May 1999

## WATER SECTOR UNDER REVIEW

**The water sector in Namibia is being overhauled. New institutions that will manage the sector in an effective way are being proposed.**

The Technical Team Leader of the Namibia Water Resources Management Review (NWRMR), Mr. Samuel Goagoseb said that new legislation as well as policy are in the proposal stages.

He said that one of the main objectives of the Review is to ensure fair access and sustainable development of scarce water resources in the country.

"To achieve this objective, issues constraining water resources management in Namibia have to be reviewed and analysed," he stated. Mr. Goagoseb noted that the Review has to come up with policy recommendations to improve the management of water resources.

According to him, the Review currently supports and strengthens institutions dealing with water. It complements the ongoing activities in the sector by identifying gaps and proposing mechanisms to stakeholders and government for greater integration and coordination of effort.

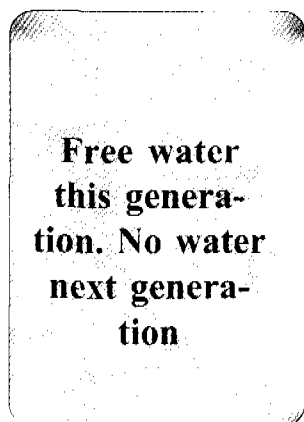
Last year, the Review produced standards for human resources development in the water sector. These standards are being piloted by the Department of Water Affairs, Windhoek Municipality, NamWater, the Department of Women's Affairs and



*Members of the Technical Team: Standing from left: Ida Besser, Elijah Ngurare, Marysia Avis, Maria Amakali, Martha Mbombo, Samuel Goagoseb, Dr. Helmut Woehl (GTZ), Vero Mbahuurua, Aleksandra Puz. Seated from left: Thomas Frederik, Loise Shixwameni, Kaitira Kandjii and Seth Boois.*

the Desert Research Foundation of Namibia.

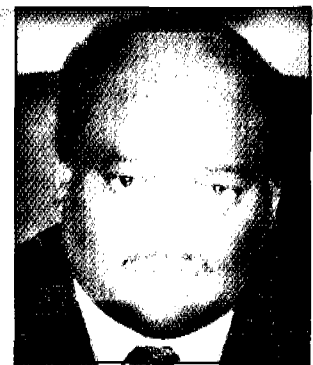
Modules for competency-based training programs that could provide certification for trainees in the water sector have also been produced. In October last year, staff from the above-mentioned institutions were trained as assessors.



**Free water  
this generation.  
No water  
next generation**

### Foreword by Minister Angula

**I must begin by reiterating the importance of water, a precious but scarce resource, in the lives of humankind.** Some countries are God blessed with more than enough water resources, while others experience frequent water shortages. Namibia is among the latter. We must bear in mind that this resource is finite and better management and usage are key to ensuring the availability of water for today's and future generations. The Namibian Government is committed to ensuring that water is used wisely and that better man-



*Mr Helmut Angula*

agement practices are followed. As you all know our water sources can't meet the constantly growing demand - be it for household, industrial or agricultural use. It is for this reason that Cabinet instituted the Namibia Water Resources Management Review (NWRMR) in March 1998. Its aim is to review the water sector in Namibia as

continue on page 2



President Sam Nujoma received the book titled "Namibia's Water: A Decision Makers' Guide", from Samuel Goagoseb, Technical Team Leader of Namibia Water Resources Management Review while the Director of the Desert Research Foundation of Namibia. Dr. Mary Seely looks on.

## NOTICE BOARD

\* A professional training Seminar for managers in the water sector will be offered by the University of Dundee in May 19-29. The seminar is titled: Options for Achieving Equitable Access to, and Sustainable Development of the Water Resources in Namibia. The seminar will focus primarily on the law and policy issues of the water resources management and development in the international and national context, as relevant to Namibia.

\* The Review will produce a periodic newsletter and flyers to disseminate its work to the public.

\* Workshops throughout the country are planned after June to comment on draft reports on the proposed reform in the water sector. However, consultations with the Task Force are scheduled to take place on a regular basis. The stakeholder Task Force consists of 37 organisations.

## Book a tool for decision making

**President Sam Nujoma launched the book: Namibia's Water, a Decision Makers' Guide in March this year.**

At the occasion, the president urged Namibians, to make the conservation of water a top priority.

He said this would ensure that all Namibians have access to clean, portable water in future. President Nujoma also urged decision makers to take the "fragile and vulnerable water resources into consideration when planning activities. Decisions about development need to be made with

sustainable use of water at the forefront of our minds." Decision makers carry the important responsibility of developing and protecting the limited water resources available to humans as well as animals.

According to President Nujoma water availability can be increased to the benefit of Namibians through careful conservation and utilisation of existing water resources. He said every man, woman and child in Namibia is a water manager. And as such, decision makers have the responsibility of providing them with

a solid foundation of valuable information and knowledge on which they can manage their day to day use of this rare and valuable resource. President Nujoma thanked the Swedish International Development Agency (SIDA) and the Director General International Cooperation, The Netherlands (DGIS), for providing the funds and the Desert Research Foundation of Namibia and the Ministry of Water, Agriculture and Rural Development for producing the book.

### Facts about the Review

THE Review was launched on March 23, 1998 by President Sam Nujoma. It is guided by a Task Force chaired by Dr. Vaino Shivute and headed by Technical Team Leader, Mr Samuel Goagoseb. The following themes have been identified as key components to be reviewed within the water sector.

- Institution and Participation
- Legislation and Regulation
- Shared Water Courses
- Strategic Water Assessment
- Conservation and Re-use
- Economics and Finance
- Human Resources Development.

Funding for the Review comes from the World Bank, GTZ and the Namibian Government.

**Water News welcomes any comments and suggestions you may have on the water sector in the country. Please address your comments to:**

**Water News  
P.O.Box 2586  
Windhoek**

or

**E-mail us at  
nwrnr@iafrica.com.na**

# UPDATE

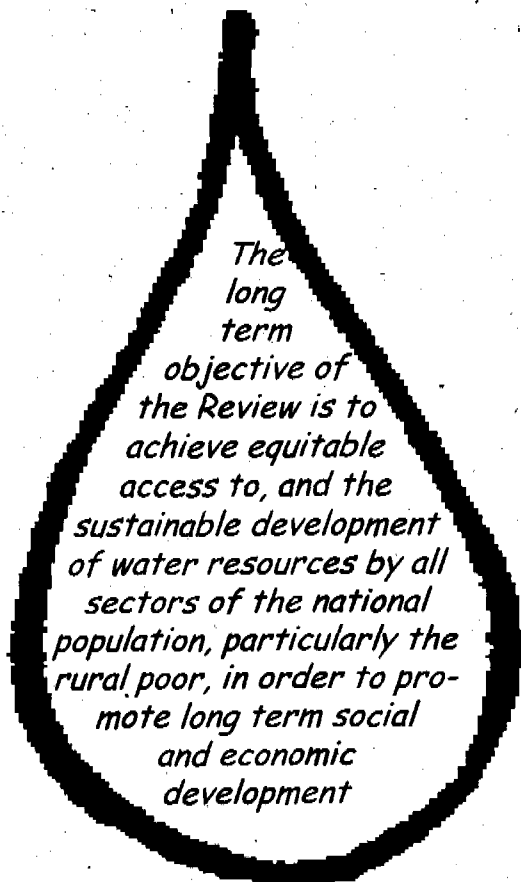
A REGULAR BRIEFING ON ASPECTS OF SUSTAINABLE DEVELOPMENT IN NAMIBIA,

Edition 4, No. 1

PUBLISHED BY THE DRFN

February 1999

## THE NAMIBIA WATER RESOURCES MANAGEMENT REVIEW



The **Technical Team** covers:

- ◆ Institutional and Participation Issues
- ◆ Human Resources Development
- ◆ Shared River Basins
- ◆ Legal and Regulatory Issues
- ◆ Water Conservation and Re-use
- ◆ Strategic Water Assessments and
- ◆ Social Economic and Financial Issues.

Namibia is a very arid country with limited water resources

Water is:

- ◆ essential for much of Namibia's productive activity
- ◆ a finite resource
- ◆ vulnerable to degradation and
- ◆ essential for life

Lack of water is also the main constraint to further development in Namibia

For Namibia to meet its growing host of challenges in the water sector it needs:

- ◆ an effective water resources management policy framework,
- ◆ full participation of its citizens in water management and
- ◆ a highly trained, capable, multidisciplinary team of water resources management specialists.

### For these reasons

The Review was established by the Namibian Government in November 1997. It is guided by a multi-disciplinary task force, is managed by the Minister of Agriculture Water and Rural Development and is headed by a Technical Team, the Leader of which was appointed by Cabinet.

The **Task Force** plays an advisory and monitoring role. Its members are from:

- ◆ Ministries and Public Institutions
- ◆ Regional and Local Government Structures
- ◆ Academic and research institutions
- ◆ Non-governmental organisations
- ◆ Trade Unions
- ◆ Professional associates
- ◆ Donors of water projects (as observers)
- ◆ Leaders of the Faith



# Activities of the Water Resources Management Review

*The Water Resources Management Review aims to:*



Review and analyse:

- ◆ key issues limiting water resource development;
- ◆ international shared rivers;
- ◆ issues of financial sustainability and
- ◆ cost recovery.



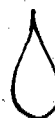
Develop capacity building training in the public and private sector to:

- ◆ effectively and efficiently manage water resources in Namibia;
- ◆ in the short, medium and long term.



Propose a legal framework for the management of Namibia's water resources including:

- ◆ Updated legislation;
- ◆ Develop a programme of implementation;
- ◆ Make recommendations for a regulatory mechanism to ensure the smooth operation of the sector.



Ensure continuous participation of civil society as stakeholders in water resources management, based on a customer focused approach.



Build awareness across society of the challenges and opportunities in the management of water resources.



Identify appropriate and acceptable institutional structures for the Sector and the Ministry to:

- ◆ ensure the most efficient management of water resources;
- ◆ build on ongoing institutional reforms in government, such as:
  - the Public Service Reform Process and decentralisation.

***Water Resources Management needs to be driven by prevailing socio-economic realities. Without addressing human resource requirements the reform process would be unsustainable.***

