



## IWRM SURVEY AND STATUS REPORT:

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### *Namibia*

Desert Research Foundation of Namibia

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## EXECUTIVE SUMMARY

- Namibia is the most arid country south of the Sahara with scarce and unpredictable rainfall and perennial rivers only on its borders. Increased temperature and shorter rainfall events predicted with climate change are expected to reduce water availability.
- Elements of Water Demand Management are developed, implemented and well accepted by decision makers, for example conjunctive use of water and use of unconventional sources. Other elements such as water banking in the unique Windhoek aquifer, while recognised as important, are bogged down in institutional negotiations. These efforts should be more widely publicised to raise overall water awareness and understanding and to facilitate implementation.
- The basic policy framework incorporating IWRM is well established but the associated legislation and regulations lag behind. Although originally accepted by decisionmakers, aspects of the policies are later queried thereby impeding implementation, e.g. cost recovery. This experience points to the need of providing a dynamic platform for broad information exchange and awareness and involving decision makers at all levels on an on-going basis.
- Sanitation was incorporated in the 1993 Water Supply and Sanitation Sector Policy but implementation was negligible. Its importance has been reinforced in the 2008 policy revision and an institutional solution identified. The importance of sanitation in terms of health and productivity has not been publicised, is little understood and requires concerted attention. An equivalent of natural resource accounting to address sanitation and its manifold implications is recommended
- Institutional arrangements for water supply are well established while those for regulation, tariffs and subsidies and other oversight and coordination elements are planned but not implemented. The relationship between cost recovery and infrastructure maintenance as a key element of WDM requires ongoing provision of information and awareness at all levels. It is recommended that these oversight and coordination elements are enacted to facilitate IWRM.
- Limited human resource capacity for water management is a key factor holding back implementation of the policies already in place. These limitations are observed at local, regional and national levels and have a major impact on water supply, water demand management and other elements of IWRM. Although these limitations will be addressed in the IWRM plan being formulated, they must be seriously adopted and a cohesive plan established to address this crucial deficiency. Alternatively, the shift of available capacity from government to the private sector capacity, where efficiency, effectiveness and other elements of IWRM are valued and acted upon, must be recognised and integrated into the water management fabric. DWAF has recognised that it should be overseeing and regulating water resources and their management while Basin Management Committees assume greater responsibility for implementation. This recognition is not widely accepted to date and capacity to implement this arrangement is not established.
- Monitoring of water resources is taking place but not integrated to provide an overall picture of water resources and their management. It has been recognised that this is essential but funds and capacity to do so are not prioritised. The private sector has entered the gap and is now working with selected urban areas; data and information may be obtained for a fee.
- Namibia is embarking upon the formulation of an IWRM plan with expected completion date of mid-2010. The key intention and recommendation is that decision makers at all levels are aware of and involved in the process as far as possible.

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## CHAPTER 1: BACKGROUND AND CONTEXT

### 1.1 Project Background

*Regional consultant and GWP to provide a common introductory paragraph*

### 1.2 Geographic Context

Namibia lies along the south-western coast of Africa bordered by the Atlantic Ocean to the west, Angola and Zambia to the north, Zimbabwe and Botswana to the east and South Africa to the south. It covers an area of about 823 680 square kilometres. Namibia is the most arid country south of the Sahara and two predominant features of its climate are scarcity and unpredictability of rainfall. The pattern of rainfall is highly seasonal with rain during the summer months (between October and April) in the north and winter rainfall in the south. The average annual rainfall is 250 millimetres per annum. Namibia is generally a hot country but temperatures vary a good deal. Furthermore, Namibia is generally not humid and the lack of moisture in the air has major impact by reducing cloud-cover and rainfall and increasing rates of evaporation. In the current rainy season (2008/9), Namibia experienced major floods in the southern, central northern and north-eastern parts of the country. While droughts were experienced in the early 1990's, disaster droughts as earlier in the century have not been recently experienced .

The predominant use of land in Namibia is agricultural, mainly livestock production, with crop production limited to the northern parts. The agricultural sector consumes around 75 % of all water. Commercial crop irrigation takes about 50% (~160 Mm<sup>3</sup>) of national demand, and the Green Scheme is likely to add about another 80% (~290 Mm<sup>3</sup>) above current irrigation abstraction. Major land use issues are overgrazing, erosion and poor management practices leading to bush encroachment, thus reducing land productivity, and increased water requirements for irrigation of crops and vegetables.

In terms of climate change, it is estimated that Namibia will experience increased temperatures in winter and summer. Climate change will mainly affect temperature and rainfall to a lesser extent. Rainfall seasons will be shorter with more intense rainfall. A reduction of 10-20% in rainfall by 2045-2065 over the catchments of the Zambezi, Kavango, Cuvelai and Kunene rivers is expected to lead to a reduction in runoff and drainage in these shared river systems by +/- 25%.

According to the vulnerability and adaptation study on climate change for Namibia, groundwater recharge may suffer a reduction of 30-70% across Namibia; a potential exception could be found in the recharge of alluvial aquifers that have their origins in central areas of Namibia, where more late summer convective rainfall can be expected by the middle of the 21<sup>st</sup> century (a trend that is already evident). It is predicted, even without the additional stresses of climate change on the water resources, that demand will have surpassed the installed abstraction capacity by 2015.

### 1.3 Social and Economic Context

Namibia has a human population size of approximately 1.83 million people, with a growth rate of about 2.6%. According to the 2001 Population Census the country has a relatively youthful population with 39% of the population under 15 years of age and only 7% over 60. Despite rapid urbanisation, Namibia is still a mainly rural society with only 33% of the population living in urban areas. The overall rate of urban growth for the whole country is about 6%/annum. If this rate of urbanisation continues 75-85% of Namibians will be living in urban areas by 2020. There are active movements of people over the Namibia/Angola border. A large portion of the Namibian population migrates between South Africa and Namibia for schooling and work; the opposite applies as well.

The mining sector is the traditional backbone of the economy, contributing about 13% to GDP and it still generates the biggest share of Namibia's foreign-exchange earnings. The agriculture sector continues to be one of the most important sectors, although only half the country is suitable for farming and is highly susceptible to drought. The sector contributes about 8.4% to GDP and it is a major source of income and employment for the bulk of the population. Other main contributors to the GDP are fishing, meat processing, beverages, metal and pre-cast concrete products.

Since independence the government's main policies have been aimed at achieving sustainable economic growth and a real increase in income per capita. The economic policy is expected to remain broadly unchanged, aimed at reducing poverty and income inequality, creating employment in the private sector, promoting black economic empowerment, achieving sustainable economic growth and diversification, and combating the spread of HIV/AIDS. Privatization was removed from the agenda in 2007-08, as the government prefers to improve the performance of state owned enterprises through better management and commercialization.

## CHAPTER 2: WATER RESOURCES SITUATION

### 2.1 *Water Availability and Infrastructure*

Namibia depends on the following water resources: ephemeral surface water, groundwater, unconventional water sources and perennial surface water. Water supply from boreholes contributes 73% of all water used. Groundwater recharge is from rainfall. The water balance model estimates recharge to be approximately 1% of the total rainfall received. The total assured yield of both surface and underground water resources, excluding the perennial rivers, is estimated at only 500 million cubic metres per annum. An important aspect of Namibia's water availability and water management is dictated by the fact that all perennial rivers are located on the borders of the country, whilst the entire interior is dependent on stored surface flow from ephemeral rivers, alluvial aquifers of ephemeral rivers or groundwater. Perennial rivers available to Namibia are: the Kunene (344 km of which 14 100km<sup>2</sup> lies within Namibian territory), Okavango (470 km), Kwando-Linyanti (340 km) and Zambezi-Chobe (340 km) on the northern border and the Orange (580 km) on the southern border.

There are many significant surface water storage dams in Namibia despite the high evaporation rates. These dams are generally for bulk water supply to municipalities and/or mines but also for supply to irrigation projects. Furthermore, there are also small dams used by smaller communities and farmers for human consumption and stock watering. Namibia has a total of ten major dams with storage capacity of about 665 million cubic meters per annum, but the 95% assured safe yield is only 87 million cubic meters per annum which indicates low efficiency of surface water storage facilities in the arid environment. Of these dams, three large dams, the Von Bach Dam, the Swakoppoort Dam and the Omatako Dam have been built in central Namibia to supply water to the capital city Windhoek, a number of smaller towns and two mines. The individual 95% assured safe yield of the three dams is about 12 million cubic metres per annum which is increased by conjunctive use.

In terms of groundwater, a total of more than 150 000 boreholes have been drilled in Namibia to find water and to understand the hydrogeological environment. Of the total, about 60 % are suitable for the purpose for which they were drilled. To date, 40 000 boreholes are in use. NamWater operates about 110 local water schemes, five major regional water schemes and the national water carrier. The Ministry of Agriculture, Water and Forestry constructed more than 3 000 kilometres of rural water supply pipelines and established more than 7 000 water points for rural communities since 1990.

Furthermore, there are desalination plants being constructed on the coast, a reclamation plant in Windhoek and small purification plants at some of the commercial farms.

In terms of planned infrastructure, desalination is seen as a solution for water supply to the booming uranium mines in the central Namib Desert. Other planned infrastructure include raising the wall of Hardap dam in the south for flood protection and not to supply more water.

### 2.2 *Water Use, Demands and Requirements*

In an arid country such as Namibia where water is scarce and water resources are costly to develop, it is important to prioritize the use of water. The prioritisation takes into consideration the economic outputs of each sector per m<sup>3</sup> of water consumed, basic needs of humans and stock and numerous socio-economic aspects. According to the Water Supply and Sanitation Sector Policy (WSASP) of 2008, the first priority is water for domestic use. Agriculture is the highest water user in Namibia: 75% of water use in 2001/02 was for agriculture with about 23% in the communal sector and 52% in commercial agriculture. The remaining percentages were consumed by other sectors such as mining (3.3%), households (12.2%) etc.

Water Master Plans are developed per water management area giving an overview of the water demands for the country. Information on water demands per sector and per catchment is available in the economic water accounts and the state of environmental report on water.

Environmental Water Requirements (EWRs) are established for the Lower Orange River; they are however not achieved. The process of establishing EWRs on the Okavango River has been initiated. To date no internationally accepted methods exist for assessing EWRs of ephemeral river systems. Nevertheless, there has been an attempt to determine adequate environmental water releases from the Oanob Dam. The idea was to maintain the Camel thorn (*Acacia erioloba*), woodland in the floodplain immediately below the dam. This was one of the first government initiatives in Namibia to assess EWRs. Other studies have been done on the Karst aquifer and Kuiseb River. For major abstraction, Environmental Impact Assessments (EIAs) are conducted.

The Division of Planning within DWAF is in the process of developing a Water Demand Management (WDM) Policy and a WDM country study was done for the IUCN in 1999. Unconventional water sources involve recycling of water in industrial processes, the reuse of water for industrial or irrigation purposes, the reclamation of domestic sewage effluent to potable water quality standards, the artificial recharge of groundwater resources with surface water, the banking of treated surface water in depleted aquifers and the desalination of brackish groundwater or sea water. Unconventional sources are used in selected locations in Namibia; Windhoek was the first city in the world to reclaim its domestic sewage water to potable water quality for use in the reticulation system. The banking of treated surface water is being planned for Windhoek.

Namibia uses inter-basin water transfers to increase the efficiency of surface water resources. This method of transferring water from a basin with less favourable to one with more favourable evaporation characteristics to reduce losses is used at the Omatako Dam in conjunction with the von Bach Dam. The infrastructure is available to include the Swakoppoort Dam in a three-dam system with Omatako and von Bach. This is called conjunctive use of surface waters. In Namibia, the conjunctive use of surface water from perennial and ephemeral rivers, groundwater and unconventional water sources, such as reclaimed effluent, is an important management tool to conserve water, to increase resource efficiency and to reduce water supply costs. Artificial aquifer recharge was established in the Omaruru River at Omdel Dam approximately 20 years ago.

Furthermore, WDM methods are developed, recognised and used through pricing. Towns such as Windhoek, Swakopmund and Okahandja use block tariffs. The only problem is that the water supply and use chain involves at least three parties on different levels (NamWater, Municipalities and then the users) and not all of them practice water conservation.

### *2.3 Key Water Resources Issues, Concerns and Priorities*

Clarity of existing policy and legislation is not a matter of serious concern. What is problematic is the lack of elaboration of policy into legislation and regulations. Another challenge is simply the awareness of existing policies and legislation, even amongst those who should administer them. During the 2008 revision of the 1993 WASP policy, many of the people responsible for its implementation did not know of its existence, did not have a copy or had heard of it but were unaware of its contents. Absence of regulations to implement the legislation, existing or being revised, are a hindrance. This leaves the policies as statements of intent upon which many developments are proceeding but not documents that can be enforced when required. This is said to be in progress and should be a priority.

Capacity of the water bureaucracy is limited. Many officials are inexperienced although they have some theoretical understanding of their responsibilities. Technical capacity and hands-on experience is limited and represents a major priority for attention. In terms of politicians, on one side they know

that Namibia is an arid country but on the other side they do not realize what it takes to manage resources and supply potable water to the population. It is still said by a few that 'water is from god' and therefore should not cost money. They expect the bulk water supplier to show a profit so it can pay dividends to the government but do not realize that this results in serious asset stripping and threatens capacity to sustainably supply water. In the informal settlements and rural areas, many politicians believe that water should be provided for free, but are not aware of the cost of making such provision. Rapid urbanization compounds this challenge. Although subsidization and particularly cross-subsidization have been discussed since at least 1993, no policy has been formulated to date.

Civil society in general has a modicum of empowerment in that they can attend meetings and contribute to workshops where policy is being formulated. In the rural areas, Water Point Associations and their Water Point Committees have major roles to play in water management including maintenance and cost recovery. They have been provided with training and necessary tools although further training is often requested. NGOs are playing a major role in establishing basin management committees, e.g. the Okavango, Omaruru, Kuiseb and Fish, although these efforts are all donor supported and their overall long-term sustainability is in question. Interest groups have been effective in their organisations but only in the more affluent capital and more focused on general environmental challenges including water but not directly focused thereon. The private sector is playing an increasing central role in water management through engineering and data management firms as they step in where government capacity is limited.

In an arid country such as Namibia, water should always be considered as scarce. Occasional good rainfall years tend to give the impression of water abundance, but these are the exception. Some water managers are of the opinion that Namibia has exceeded its water 'carrying capacity' when consideration is taken of rainfall variability combined with the high water demands of agriculture, particularly increasing numbers of livestock and irrigation farms, and enhancing life styles. Water quality in urban areas is maintained by local authorities but increased use of recycled and purified water may lead to inclusion of substances not fully monitored. Capacity to maintain the major water purification schemes is limited and increasing cause for concern and should be prioritized.

Water quality deterioration occurs on a large and a small scale. At the household level, deterioration of water quality after it is collected from communal standpipes is cause for concern. Deterioration of groundwater including alluvial aquifers is observed when recharge is limited or absent during dry years. Groundwater quality may also be affected by inappropriate placement of livestock kraals or pit latrines directly above recharge areas. Quality of water in the perennial rivers is variable. For some, e.g. the Okavango, there is little activity or use of water upstream of Namibia although farming along the river in Namibia contributes to deterioration. For other rivers, Namibia is at the downstream end and very poor quality water is delivered, e.g. the Orange. Plans for agriculture expansion on the Kunene upstream from Namibia gives cause for concern in terms of quantity as well as quality.

Major threats to water resources include overuse and mismanagement of groundwater based on lack of knowledge of the reserves, on poorly maintained infrastructure that leads to massive losses in some instances and to inadvertent pollution. To date, the focus has been on understanding the geology of the groundwater aquifers but their conservation, management and use has received much less attention.

Threats such as pollution, siltation and saline intrusion are recognized and are considered manageable threats but require the constant vigilance of technical staff with the capacity and understanding of the potential threats. Awareness of these potential threats by decision makers and all water users is also essential. These potential threats could escalate if appropriate monitoring and evaluation is not applied. Examples of these types of escalated threats include, for example, flooding

of the water supply infrastructure in irregularly flowing, ephemeral rivers and the consequent known impact on coastal water supply. Another example is the predictable flooding of the Cuvelai ephemeral wetlands which leads to contamination of surface water, used by some for domestic purposes, because of poorly designed sanitation infrastructure not to mention the necessity to house displaced families. The threat of water table decrease in dry years is also predictable and should be monitored, planned for and managed rather than being treated as an unexpected emergency.

The priorities for engagement at national level are three fold. First is the involvement of decision makers so that they have the required awareness and information to understand the issues involved in IWRM. For example, understanding of the relationship between cost recovery, maintenance of infrastructure and the ability to provide a sustainable water supply should be integrated into decision making on all levels. Secondly, the priority for engagement should focus on concerted capacity building as will be elaborated in the IWRM plan recently initiated. Technical skills and capacity as well as theoretical understanding are essential to ensure adequate and appropriate implementation of IWRM. Lastly, the focus on sanitation must be maintained and be appropriate to the social, economic and geographical realities of Namibia.

## CHAPTER 3: ACTUAL STATE OF THE IWRM PROCESS

### 3.1 Policy and Legislation

The Republic of Namibia initiated a process to review the water sector in the early 1990's, just after independence. At the initiation of the review the water sector was administered through the Water Act of 1956<sup>1</sup>. The Water Supply and Sanitation Sector Policy (WASP) was the first sectoral policy to be adopted in 1993 after independence. WASP had four overall goals; namely:

- To make essential water supply and sanitation services accessible to all
- To achieve equitable improvement of services through combined efforts of the government and the beneficiaries, based on community involvement, community participation and the acceptance of a mutual responsibility
- To provide opportunities for communities to participate in decisions regarding water supply and sanitation solutions and services and for communities to contribute to the cost for services
- To achieve the above goals in an environmentally sustainable manner

The WASP had a very strong focus on water supply and sanitation services and little to do with water resources management. For this reason, the formal Namibia Water Resources Management Review process was established leading to the National Water Policy that was adopted in 2000 with the aim of addressing water resources management. This policy was formulated at the time of global paradigm shift towards IWRM. The policy adopted the IWRM approach for water resources management in Namibia. Following this policy, the Water Resources Management Act no. 24 was promulgated in 2004 (even though it has not yet commenced). Unfortunately the Act as originally formulated could not be put into practice and therefore is currently being reviewed. Regulations for implementation are being formulated concurrent to the revision of the Act.

The Act provides legislative alignment between water supply/sanitation services and resource management. In agreement with and supporting the National Water Policy and Act, Namibia is a signatory and ratified the RAMSAR Convention on Wetlands, Convention on the law of the non-navigational uses of international water courses, SADC Protocol on shared water systems as well as the UN conventions to Combat Desertification, on Biological Diversity and the Framework Convention on Climate Change. Since the country shares all its perennial rivers with its neighbouring countries, transboundary cooperation is important and both the National Water Policy and Act address transboundary water management. Namibia is a member and a signatory to the Zambezi Commission (ZAMCOM), Permanent Okavango River Basin Commission (OKACOM), Permanent Orange-Senqu Commission (ORASECOM) and it is represented on the Permanent Joint Technical Commission (PJTC) for the Kunene River.

The Water Supply and Sanitation Sector Policy (WASP) of 1993 was recently reviewed, to incorporate new development in the water sector and to better address gaps particularly on sanitation. The Government recognised that it was doing well in terms of realising its water supply goals whereas the sanitation targets were lagging behind. The revised Water Supply and Sanitation Sector Policy (WSASP) was adopted in 2008 and it replaces the 1993 policy.

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<sup>1</sup> The Act of 1956 still holds to date because the Act of 2004 has not commenced.

In addition to the above, there are several other pieces of legislation and policies that support and have relevance to the water law and policies. These include:

- the Constitution of the Republic of Namibia,
- Namibia Water Corporation Act, 1997 (Act 12 of 1997)
- Environmental Assessment Policy, 1996;
- Environmental Management Act, 2007 (not yet commenced)
- Decentralisation Enabling Act, Policy and relevant implementation instruments
- The National Strategy for Rural Sanitation, 2004
- Green Scheme Irrigation Policy, 2005
- Local Authorities Act (No. 23 of 1992)
- Regional Councils Act, (Act No 22 of 1992)

### 3.2 Institutional Arrangements

The Department of Water Affairs and Forestry (DWAF) in the Ministry of Agriculture, Water and Forestry (MAWF) is overall responsible for water allocation and water resources management. Arising from the new Water Supply and Sanitation Sector Policy in 2008, DWAF also has the overall coordination responsibility for sanitation. The department is divided into three directorates, the Directorate of Resource Management, the Directorate of Rural Water Supply (DRWS) and Directorate of Forestry (DoF). The DoF has indirect influence on water resources. Also, within MAWF (part not DWAF) is the Department of Agriculture that has indirect influence in water resources management as it is mandated to advise on the development of farm dams, irrigation schemes and soil conservation practices.

*Even though, water supply and resource management institutions will be presented separately below, cognisance is given to the interlinkages and dependencies between the two functions.*

#### Water supply and sanitation institutions

The Water Supply and Sanitation Policy (WASP) of 1993 recommended several institutional changes to enhance supply of water throughout the country. It recommended the formation of a bulk water supplier and a directorate within DWAF to deal with water supply to communal rural areas. It also allocated responsibilities for other water supply and sanitation functions such as on private land, government institutions and towns.

The WASP led to the establishment of Namibia Water Corporation (NamWater) as a State Owned Enterprise based on the Namibia Water Corporation Act, 1997 (Act 12 of 1997). Since its establishment, NamWater provides bulk water to a variety of waterworks and water schemes throughout the country. The Directorate of Rural Water Supply was also formed as following from WASP. NamWater also supplies water to some of the rural water supply distribution network established by the DRWS, particularly in central northern Namibia. The DRWS further on supplies raw water from boreholes direct to consumers and their livestock.

The DRWS established regional offices in 12 of the 13 Namibian regions where communal areas occur. The directorate developed a Community Based Management (CBM) approach as a means to involve communities in water supply. Phase 1 and 2 of the 3 phases of the DRWS CBM strategy have been completed. DRWS has increased rural coverage of access to water to approximately 80% by 2000 (from about 43% in 1990). At the local level, Water Associations and Water Point Committees are established as platforms for communities to participate in decisions pertaining to water supply, maintenance of infrastructure and collection of water fees. Cost recovery from the rural consumers and capacity amongst these local community institutions remain key challenges.

The mandate for rural sanitation in communal areas was allocated to the Ministry of Health and

Social Services, a development which was reconfirmed by Cabinet in 1998. The revised WSASP policy of 2008 made a recommendation for the establishment of the Directorate of Water Supply and Sanitation Coordination (DWSSC). This new directorate will address the integration of water supply and sanitation within one sector to ensure coordination amongst all the role players. It is envisaged to encompass the national component of the Directorate of Rural Water Supply and to integrate a complementary sanitation component. It will serve to coordinate water supply and sanitation services in rural and urban areas through the existing institutional structures.

The mandate for urban water supply and sanitation falls under the Local Authorities and Regional Councils who, *inter alia*, distribute water to consumers supplied, in most instances, by NamWater. Water supply and sanitation on freehold tenure farms and mining companies are the responsibility of the individual farmers or companies at full supply cost recovery but under the coordination and control function of the DWSSC. The Ministry of Health and Social services provides hygiene and health awareness and education on water and sanitation.

#### Water resources management

The Directorate of Resource Management within DWAF is in charge of assessment of water resource potential, long term strategic planning and overall water resources management including elements of water demand management. The directorate is divided into 5 divisions; namely:

- Geohydrology carries out research and monitoring of groundwater resources and oversees management in controlled aquifers. It provides advice and guidance to the division of law administration that grants abstraction permits.
- Water Environment is responsible for water quality and pollution control. This division is tasked with the assessment, approval and administration of pollution permits for effluent discharge to water bodies. It also assumes responsibility for water awareness activities.
- Water Law and Administration administers and grants permits.
- Hydrology monitors water resources , flood management and oversees basin management institutional development
- Planning is responsible for long term strategic planning, transboundary agreements and resource accounting

All the above mentioned divisions are also responsible for capacity building.

NamWater is responsible for the management of all the large dams in the country as well as pipeline schemes that supply bulk water. There are a few cases where the local authorities operate and maintain water infrastructure such as in Windhoek.

### 3.3 *Water Strategy and Instruments*

The broad objectives of the Namibian water sector are to achieve the efficient supply and allocation of water to ensure equitable access to water and sanitation considering the social, economic, environmental and conservation/ sustainability requirements/ demands on the resources. Currently, MAWF, with the support of the Namibian Water Partnership (NWP), is facilitating the process for formulation of an Integrated Water Resource Management (IWRM) Plan. The plan will recommend strategies for the country to achieve its water sector objectives. This will be based on the optimisation of water supply and allocation and reduction of water demand to realistic levels and efficiency improvement throughout the water sector taking sustainable development into account.

Below are highlights on expected outcomes of the Plan

- The existing information reviewed, documented and adopted
- The resources potential, use and allocation established
- Water demand management strategies and programme formulated,
- A comprehensive, strategy and action plan optimizing water supply and demand for economic development and social welfare and environmental use prepared as an input to the overall IWRM plan.
- A mechanism for sustained information and knowledge management prepared.
- A framework for long-term Monitoring & Evaluation for integrated water and land resources use and management including attainment of the Water Supply and Sanitation (WSS) targets.
- A strategy for securing financing implementation for the IWRM plan prepared.
- An integrated framework to enhance institutional capacity and human resources development established, and adopted for implementation.
- An awareness campaign on integrated water and land resource management launched.

Stakeholder participation is considered important throughout the process of formulating the plan. Public workshops and focus-group consultations will play a prominent role in the development of the IWRM Plan. Workshops and consultations, with awareness raising components, will be held in each of the 13 regions of Namibia during the course of development of the IWRM Plan. A press release was placed in national newspapers to announce the commencement of the formulation of the Plan and to invite Interested and Affected Parties (IAAP) to register so that they receive reports and information as they become available and have the opportunity to comment.

### *3.4 Practice (Implementation) of IWRM*

Although several efforts have been implemented to raise awareness on IWRM, no formal studies have been done to determine the level of awareness. During the formulation of the IWRM Plan ongoing awareness creation activities and their suitability will be reviewed.

There was a major review of the water sector between 1994 and 2000; the review process involved awareness raising and capacity building at the various levels. At about the same time of the review, the Desert Research Foundation of Namibia had a project that produced Environmental Updates, a one page document, on pertinent issues including IWRM and distributed to parliamentarians for a six year period. These were supplemented by presentations to parliamentarians e.g. through the Parliamentary Standing Committee on Natural Resources.

For the professionals, the NWP hosts information sharing seminars on IWRM and in the past distributed a newsletter on IWRM activities. Several people in the water (and related sector such as agriculture) participate in regional (mainly through WaterNet and GWP-SA) and international events related to IWRM such as the World Water Forum and World Water Week in Sweden. Since the early 1990's there have been several IWRM projects and programmes that were implemented; these have contributed to hands-on capacity building. The government (DWAF) has a programme in place that supports its staff to receive professional training in fields related to IWRM.

At regional (administrative) and basin level, awareness creation and capacity building on IWRM is mainly done through the basin management initiatives. IWRM is introduced at the local level through the CBM approach.

UN days, such as the World Water Days, are used for raising awareness on water related issues for the general public .

Comprehensive consultations are conducted during the formulation of water policies and legislation. Such consultations raised awareness on IWRM at national and regional levels.

Transboundary cooperation is important because Namibia shares all its perennial rivers with neighbouring countries. Namibia is involved in joint agreements on all transboundary rivers with the aim to manage and share the water resources in an integrated manner.

Water needs and requirements per sector are fairly well quantified; however they are not always met. There are cases where the DWAF does not approve applications for groundwater abstraction permits because of limited water resources. The Division of Planning within the Directorate of Water Affairs and Forestry (DWAF) carries out resource accounting.

Water use regulatory instruments such as issuing of abstraction and discharge permits are recognised in the Water Resource Management Act for 2004 and the Water Policy for 2000 and they are being supported by the still-in-force Water Act of 1956. The Division of Water Environment within DWAF is tasked with the assessment, approval and administration of pollution permits for effluent discharge to water bodies. The Division of Geohydrology also within DWAF carries out monitoring of groundwater resources and provides advice and guidance to the division of law administration that grants abstraction permits. DWAF further monitors compliance according to the policy and legislation and there are fines with regards to non-compliance.

Namibia is divided into 11 river basins. Two Basin Management Committees have been established; efforts towards establishment are ongoing in four others. Due to limited financial and human capacity and to a lesser extent the commencement of the Act; the basin management committees are not yet able to fully carry out their mandates. Nevertheless, the draft Act indicates that a Basin Management Committee will be expected to protect, develop, conserve, manage and control water resources and water resource quality within its water management area; supervise formulation of IWRM Plans for the respective basins; to make recommendations to the Minister to issue or cancel licences under this Act; to collect, manage and share such data as are necessary to properly manage the water management area in coordination with the Ministry; to determine abstraction charges based on approved abstraction licence volumes with the approved policy in concurrence with the Minister for data collection, resource monitoring and other approved purposes; refer serious water or pollution problems to the minister.

The Water Supply and Sanitation Sector Policy of 1993 introduced cost recovery in rural settings and gave it stronger emphasis in urban areas. As a result of this policy water charges/tariffs are collected by local authorities in urban areas and by water point committees in rural areas. In an assessment on the implementation of the WASP done in 2008, it was reported that cost recovery for water in communal rural areas and in informal urban settlements has been marginally successful. There is limited acceptance of the approach by high level and local authority decision makers which has a negative effect on cost recovery. There is also a prevailing attitude of entitlement to services by the population which hampers cost recovery. The estimated total debt owed to NamWater, mainly by local authorities, amounts to approximately N\$ 278 million. The total outstanding service debt (water, sanitation, property tax and other services) owed to Local Authorities by consumers amounts to approximately N\$ 540 million.

The current situation of non-payment of accounts is exacerbated by the absence of equitable tariffs and transparent cross-subsidies and subsidies as well as inappropriate government 'bail-outs' of Local Authorities and rural communities. Non collection of debt leads to a reduction or cessation of maintenance and expansion of water supply and sanitation services. The reduction in capital spending results in lower levels of service with health implications, lower economic growth, more unemployment and social problems. Moreover, service providers are not using recovered costs for

operation, maintenance and expansion of water supply and sanitation services but apply them to other expenses thus contributing to deterioration of coverage and infrastructure. In practice this results in asset stripping including deterioration of infrastructure and overall coverage.

As the bulk water supplier, NamWater is responsible for the management of all the large dams in the country as well as pipeline schemes that supply bulk water, e.g. to municipalities. Since before 1990 no new dams have been developed even though some studies on potential dam sites have been done. There are no official policies or guidelines for operating dams. NamWater which operates the dams have internal flood management procedures which include releases, allocation and safely issues.

There are platforms for stakeholder engagement. At national level, the NWP serves as a platform for information exchange, awareness raising on issues that are of national concern as well as participation in trainings. At basin level, their basin management committees and forums serve as platforms to discuss basin issues and other issues that require cross sectoral coordination and implementation. Local water committees and water point committees create platforms where communities can also raise and discuss issues related to IWRM. Most municipalities host information sharing meetings for residents, e.g. Windhoek. Environmental Impact Assessment studies for new developments often include public meetings for interested and affected parties.

### *3.5 Monitoring and Evaluation*

There are several systems in place for monitoring of implementation of development plans, e.g. national population census, done at ten years intervals, and the National Housing, Income and Expenditure Survey, which provide valuable information about the status of implementing development plans. The national population census contains information on access to basic services such as water and sanitation. The National Development Plans (NDP), done in five years intervals, have ongoing evaluation processes in place. For example, the current NDP 3 contains targets that the water sector wish to achieve in the period 2007/08 to 2011//12. These targets will be reviewed before formulation of NDP 4.

A monitoring and evaluation framework for the implementation of the IWRM Plan will be developed during the formulation of the plan. The process will identify monitoring and evaluation needs through consultations with institutions presently monitoring the sector, e.g. the DWAF. Central to this activity will be to define which indicators should be used for monitoring of the water and sanitation sector and the IWRM plan in particular. Indicators already in use will be identified and assessed. New indicators will be defined for different sectors (e.g. urban, irrigation, mining), based on the suggestions and approaches presented in the IWRM plan, and will be developed together with indicators that answer to the monitoring needs identified during the stakeholders' consultations. The monitoring system has to be in compliance with the Water Resources Management Act, the WSASP and other relevant policy and legislation. The monitoring and evaluation framework will include methods and mechanisms to meet national objectives and will therefore be developed in close cooperation with the institutions that will be responsible for the monitoring of water resources in Namibia.

## CHAPTER 4: ACTUAL STATE OF WATER ACCOUNTING

### 4.1 *Reliability of the Water Use Information*

Information on water use per sector is available in the economic water accounts report and state of the environment report for water in Namibia. Furthermore, there are estimates on water use per catchment in the economic water accounts. The available water use information is based on administrative records from DWAF, NamWater, Ae Gams Data (Company involved in costing systems for local authorities) and some Municipalities with the majority of water use records based on water meter readings. Comprehensive research and data collection is important for any major field of resource management, including water. At DWAF, separate databases on water exist, namely on: Surface water at the Division of Hydrology, Groundwater Database (GROWAS) at the Division of Geohydrology and water quality at the Division of Water Environment. To enable economic water accounts, NamWater provides information on water volume, distribution route, cost of supply and User-Charged Levied.

Data collected for hydrological, geohydrological and water quality purposes are kept separately in different databases. This is undesirable because it does not serve the purpose of facilitating and supporting decisions concerning water resources management by offering one 'piece' of information at a time. In terms of accessibility, water use information is provided upon request though it takes a long period.

NamWater and DWAF have data on raw and bulk water, while Local authorities have data on retail water. In some cases, the data is reliable, consistent and accessible and in some cases accessibility is a problem. Data on current water demand, supply and projections are available from NamWater, DWAF and in the economic water accounts.

Information on waste discharge is available but to a limited extent because there is lack of complete monitoring of the whole country due to limited capacity and personnel.

### 4.2 *Allocation of Water*

Water allocation is recognised in the WSASP for 2008, the Water Resource Management Act for 2004 and the Water Policy for 2000 and they are being used. The first step in water allocation is to determine the sustainable yield of water sources in order to avoid overexploitation. Water allocation is done by DWAF through a permit allocation system. In order to abstract water from a river and/or aquifer, a permit is required. Applications for abstraction permits are submitted first to DWAF. In cases, where Water Management Bodies (WMB) exists, DWAF consults with these bodies to get advice on water allocation. DWAF then processes the applications and gives recommendations (to reject or accept). These recommendations are based on volume of water to be abstracted. In cases where permit applications are for irrigation, the Department of Agriculture is consulted on suitability of soils to be irrigated and types of crops to be cultivated. When DWAF has finished processing the applications they are submitted to the WMB for the specific area who then also give recommendations (accept or reject) based on volumes of water allocated by DWAF for abstraction in a specific area.

In terms of groundwater, each area is allowed a certain volume of groundwater dependent on hydro-geological parameters and, when this volume is reached, no further permits are granted. The WMB also considers whether the volume of water applied for will then exceed the optimal amount given above or not. However, it should be noted that according to the Water Resource Management Act of 2004 it states that a person who abstracts water from a water resource for domestic use is exempted from the requirement for a licence to abstract and use water. A person may abstract and use water

for domestic use, subject only to such public health limitations and environmental limitations, and limitations imposed from time to time for the purposes of efficient water management practices.

Furthermore, economic water accounts are being used to provide information on water demands and DWAF allocates according to these demands and value addition of water for that specific use.

Namibia does not practice water trading.

To date, the permit allocation system for water abstraction is effective and consistent. In areas where there are active WMBs, water monitoring (quantity of water abstracted) is incorporated into the system and that gives room for evaluation of whether permit holders are complying with the permit conditions or not.

### 4.3 Water Pricing and Tariffs

NamWater (bulk water supplier) is obliged to cost recover the full operations, maintenance and capital costs of water supply under the NamWater Act of 1997. NamWater proposes tariff adjustments annually and submits to MAWF who then reviews the proposed tariffs. A working group is established to ensure that all relevant information required for decision making is made available. The information includes: costs per scheme, costs of operation and maintenance and capital costs. As the next step, the Minister of MAWF submits the proposed tariffs to cabinet for approval. Once the tariffs are approved by cabinet they are then gazetted and become effective/are implemented in that financial year. NamWater then communicates to its customers such as local authorities regarding the new approved tariffs.

The local authorities in turn review their own tariffs under the guidance of the Local Authorities Act of 1992 and submit retail tariff adjustments to Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD). The Minister of MRLGHRD submits the proposed tariffs of local authorities to cabinet for approval. Once approved, they are also gazetted and then the local authorities inform their customers about the new approved tariffs and thereafter are effected.

There is no link between the two different tariff setting process, namely, the one by NamWater through the Minister of MAWF up to cabinet and the other one by local authorities, through the Minister of MRLGHRD up to cabinet for approval. The institutions involved are not coordinated, resulting in inefficient use of time and resources. The process of tariff setting can be improved through establishing a water regulator.

In most cases, information on tariffs is available and usually the challenge is access to the information and sometimes this is due to the format in which the information is stored as well as lack of technical know how in using the system. The Ae Gams Data provides information on specific municipalities at a cost. Furthermore, upon request, local authorities usually provide information on their tariffs.

### 4.4 Economic Data

Reliable and well presented information on economic gross domestic product (GDP) at national level is available and that indicates that the information required for determining GDP is available. Information on GDP is available by sector and not by area. The average annual per capita for Namibia is US\$1,992, but it should be noted that the country has one of the highest Gini coefficients (0,67) in the world, reflecting large differences between the rich and the poor.

#### 4.5 *Economic Water Accounts*

Development of water resource accounts for Namibia started in 1995 under the Namibian Resource Accounting Programme. The programme was initiated by the Ministry of Environment and Tourism (MET) in cooperation with DWAF. The first set of water accounts were compiled in 1993 and included stocks and flows of water, but the information was limited and much of the data had to be estimated. There have been a number of developments since the initial water accounts were compiled. In 2001, DWAF specifically Division of Planning took over the responsibility of compiling NRA for water. In 2002, the Swedish International Development Cooperation Agency funded the compilation of NRA for water by DWAF and the plan was/is to compile these NRA for water on an annual basis. Some of the outcomes of the NRA for water for 2001/02 are information on: total water availability in various water sources, estimates of sustainable safe yield of aquifers in Namibia, trends in water supply and use, water use by sector and catchments etc.

To help guide the compilation of NRA for water, a steering committee was formed and it meets twice per year. The committee is comprised of representatives from Directorate of Rural Water Supply (DRWS), Water Resource Management, Division of Agricultural Engineering all within MAWF, NamWater, City of Windhoek, MET, Desert Research Foundation of Namibia (DRFN), Namibian Economic Policy Research Unit (NEPRU) and some Namibia water sector consultants.

The methods that are used in compiling NRA for water are: desktop studies (collection of data from reports and other relevant materials), regional consultations/workshops with service providers and stakeholders, as well as face-to-face interviews. The NRA for water are partly compiled based on records from NamWater, Ae Gams Data and local authorities. Data collection is supposed to be carried out annually and analysis should be every five years in line with national development plans (NDPs), but due to insufficient capacity within DWAF the NRA for water were last done in 2002. Currently, the Division of Planning is working on collecting data that covers the period 2007 – to date and this data will be used to draw up NRA for water for the period of NDP 3 (2009 – 2012).

## CHAPTER 5: FUTURE PERSPECTIVES

### 5.1 Key Lessons from the Country Experience

A number of key lessons were identified through this review and through the process of initiating an IWRM Plan for Namibia. For the past twenty years or more, a number of international developments, e.g., *inter alia*, the Dublin Principles, the Ramsar Convention, the Global Water Partnership, have provided a foundation for IWRM. The Namibian government, particularly through the WRMR and cooperating with the NGO and private sectors, has done its best to keep abreast of these occurrences and ensure that they are integrated into evolving development plans, policies and legislation. A key lesson is that cognisance should be taken of international and regional developments, by all concerned, while integrating them appropriately into evolving national processes.

A linked key lesson is that ongoing formal and informal capacity building, for young as well as experienced managers, is a key basis for IWRM implementation. The importance of wide participation and ongoing capacity building and awareness raising on all levels is a lesson not to be underestimated. By involving water users, managers and policy makers on all levels in development of plans, policies and legislation, awareness is raised and acceptance is generated, albeit slowly.

Implementation of components of IWRM often requires unanticipated changes not always readily accepted, e.g. treating water as an economic good or participation of users in decision making, thus ongoing provision of information and explanations of the implications are essential. This can be facilitated by establishment of the appropriate communication and awareness-raising platforms, covering aspects as widely diverse as implications of natural resource accounting, community based management or outsourcing to the private sector, within and between levels, of users, managers and decisionmakers.

In a very arid country such as Namibia, it is imperative to seek innovative mechanisms to conserve water. At the same time, adequate technical capacity is required to maintain existing systems, effectively apply WDM strategies and practices across all sectors, and investigate and implement new and innovative approaches. The importance of adequate technical capacity, within government and the private sector, in addition to theoretical understanding of IWRM including WDM, can not be over emphasised.

Provision of an adequate, effective and integrated institutional framework is an important part of IWRM. So long as central government, municipal and local government, parastatals and the private sector are not moving in the same direction, IWRM can not be implemented effectively. Tariff setting, subsidies and cross subsidies and similar issues should, for example, all be subject to the same water regulator.

An adequate institutional framework should be based on an effective and operational framework of policy, legislation with supporting regulations. Absence of legislation and associated regulations constrains implementation of the good intentions embodied in the best of policies.

Water supply and sanitation should be closely linked in terms of policy and legislation as well as institutional arrangements and implementation. This does not exclude specialised contributions from, *inter alia*, health, groundwater quality monitoring or other related agencies and activities.

## 5.2 Future Perspectives and the Need to Continue the Process

The formulation of the IWRM Plan for Namibia will create further opportunities for IWRM implementation. The revised WSASP has sections which, if implemented, should improve access, *inter alia*, not only to water supply but also to sanitation services. The policy makes provision for investigations into alternative sanitation technologies which have not been systematically investigated to date. It also recommends the creation of a Directorate of Water Supply and Sanitation Coordination which will allow for coordinated implementation of water supply and sanitation initiatives. The commencement of the Act will allow for the creation of the suggested water resource management institutions.

The formulation of the IWRM plan addresses some of the main obstacles identified. Sensitising the decision-makers is addressed at various steps where workshops will be held, reports will be circulated for comment and special documentation will be made available. This is an essential element for successful implementation.

The institutional framework will be reemphasised based on the existing policy and act. The IWRM implications of the framework will be reviewed and recommendations made for enhanced implementation. To date many good ideas in the policy have not been taken further.

Financial support for implementation of IWRM will be reviewed and recommendations made for this key element of the IWRM plan to be formulated during the next 18 months.

Technical support for implementation of the IWRM plan will be provided by several sections of the plan, e.g. WDM, a long-term monitoring and evaluation framework, an information and knowledge system and human resource capacity building.

Nevertheless, the key obstacles expected to remain in place are a combination of limited human resource capacity and limited understanding by decision makers.

The GWP: The NWP creates a platform where professionals in the water sector can share information. It also provides opportunities to attend the annual regional symposium where scientific papers are presented. The NWP is also providing representation from NGOs and the private sector on the Steering Committee for Namibia's IWRM plan. Nevertheless, the NWP has not yet been accepted as replacing membership in international professional water organisations which has slowed the integration and cooperation of government, NGO and private sector institutions involved in the water sector. It is considered to be addressing the soft or theoretical elements of IWRM while not addressing the technical support for, for example, WDM which is proving to be a key and growing element preventing successful application of IWRM strategies.

## 5.3 Constraints, Opportunities and Perspectives

Constraints and opportunities: Areas to be improved (things that have not worked out so well)

- The WASP of 1993 was aimed at improving access to both safe water and sanitation services. Targets for access to water supply have been achieved but little to no progress has been made on sanitation. This is attributed to fragmentation of the sanitation function combined with limited in-house capacity in the Ministry of Health and Social Services. With this realisation, a directorate to coordinate the water supply and sanitation sector, rural and urban, has been recommended in the revised WSASP of 2008.
- There is limited technical capacity to implement IWRM (at all levels, i.e. national, regional, basin and local levels). For example NRA is considered as a good and useful tool; however there is

limited capacity within MAWF to implement it. Similarly, there is also limited capacity for water resources monitoring and mobilisation of community-based monitoring is limited. The Government is continuously losing staff to the private sector, many of the technical qualified staff are retiring and capacity building and training for Namibian staff is a slow, *ad hoc*, drawn-out process.

- Although some progress has been made in terms of cost recovery, there are still many challenges to be overcome. Many of the local authorities are experiencing ageing infrastructure and infrastructure that is not maintained which causes major losses in the water supply system. This state of infrastructure is largely the result of lack of cost recovery for water supply services creating budget deficits for local authorities combined with limited capacity.
- Cost recovery for water in communal rural areas and in informal urban settlements, has been marginally successful. In addition there is limited acceptance of this approach by high level and local authority decision makers which has a negative effect on cost recovery. The prevailing attitude of entitlement to services by the entire population also hampers cost recovery.
- Although the water sector has limited capacity, amongst technical staff there is also antipathy toward out-sourcing when capacity is inadequate. This is most common amongst government and local authority officials. They often consider outsourcing to be expensive and do not compare this to the amount of water that is being lost and the cost of the lost water which needs to be paid. The example was identified of a government institution in Windhoek paying N\$1.2 million per year for several years to the City of Windhoek for water that was lost from the system while the cost of repair, when finally undertaken by a private contractor, was only N\$300,000-. The cost of outsourcing compared to the cost of doing nothing is frequently not calculated or comprehended.
- As previously stated Namibia is exploring mechanisms to conserve and use water sustainably. This includes WDM approaches. During the review of the WSASP in 2008, many examples of the results of ignoring WDM were uncovered. Many suppliers are not aware of their leakage losses and do not know how to measure them or have limited capacity for repair. Various local authorities believe they need additional bulk water when the majority (up to 91% was noted in a recent assessment in Aminuis) of their water supply is lost to leakage. It is estimated that by taking a strategic view, that is, measuring and understanding all the wastage caused by poor infrastructure maintenance and management, water supply coverage could be improved without exploiting new resources.
- The National Water Policy and Water Resources Management Act propose the creation of several institutions to support IWRM implementation. The commencement of the Act to a large extent caused a delay in the establishment of most of these institutions.

Perspectives: Namibia has an enabling policy framework, which supports IWRM implementation. IWRM is well incorporated in developmental processes such as in the 3<sup>rd</sup> NDP. Implementation on the ground has started though slow. Areas where progress has been made include:

- Overall access to safe water particularly to rural communal areas. In 1991, the rural population that had access to clean water within a reasonable distance (2.5km) was 43%. This increased to 80% in 2001. This success is mainly attributed to the formation of DRWS which was established in 1993, following from the WASP.
- CBM. The approach creates a partnership between Government and communities in rural areas to share responsibilities concerning management of rural water supply infrastructure and cost sharing. A strategy for the implementation of CBM was launched in 1997. The strategy set clear milestones with timeframes. Even though implementation is slower than initially planned e.g. total hand over of water points to Water Point Associations for lease and full ownership was supposed to have happened by 2007 and this has now been changed to 2010, there are positive achievements.

- Cost recovery for water in communal rural areas and in informal urban settlements, has been marginally successful. In rural communal areas, water users were not paying for water services before the WASP, now people are paying even though there is room for improvement.
- NRA was introduced, it is accepted as a valuable tool which provides information concerning value added by use of water. It is a powerful tool to help decision makers in a variety of ways.
- Basin management approach was introduced as another means to decentralise management of water resources and to allow involvement of a broad array of stakeholders in water resources management. Even though the Water Act has not commenced, two basin management committees have been established and efforts are underway in four other river basins.
- Namibia continues to seek innovative mechanisms to conserve water. Unconventional water sources are regarded important and are being applied and further explored. These include: reuse of grey water for landscaping, recycling of water for industrial or mining use, water reclamation as practiced in Windhoek since 1968, artificial recharge of aquifers including ongoing negotiations for water banking in Windhoek, and construction of a desalination plant to support uranium mining on the west coast and plans for a second plant.
- The Government with support from the NWP secured funding from the African Development Bank to formulate the IWRM Plan. Formulation of the plan will involve awareness raising and capacity building on IWRM.
- The NWP creates a platform where professionals in the water sector can share information.
- Several professionals (particularly young professionals) have taken up short and full time studies related to IWRM.