Global Water Partnership Southern Africa

# IWRM SURVEY AND STATUS REPORT:

## *BOTSWANA*

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## EXECUTIVE SUMMARY

Botswana suffers critical water shortages because of the low and variable rainfall that the country receives. In addition, almost all potential surface water sources have already been developed making it imperative that the country focuses on resource management instead of development. This situation calls for close attention to planning for the management of the available resources.

Although Botswana has not developed a classical IWRM /WE plan, the country has made commendable progress towards integrated development and management of its water resources. This has been made possible by the process that the country went through to produce a comprehensive National Water master Plan which to all intents and purposes incorporates all the elements of IWRM. The country has also had a functional GWP Country Water Partnership that has galvanized support for IWRM even before the development of such a plan was introduced through the UNDP GEF support.

Through the NWMP process and the work done by the CWP to date a number of critical issues have become important for Botswana. These are highlighted as lessons for the future in this report and are summarised as follows:

Water is becoming increasingly scarce. Traditional centralised (government) supply side practices that were the dominant means of managing the resource are therefore no longer sustainable. New approaches that include as broad a spectrum of stakeholders in the development and management of this resource are required if sustainable and integrated water resources management is to be realised.

Closely related to the point above, the need for resource management is becoming more relevant than resource development. Programmes for water demand management and water conservation are a critical requirement under these circumstances.

Water cannot continue to be regarded as a free good. All users have to realise that water has a value and should therefore be applied to best use. All users of the resource should be made to pay an ñappropriate priceò for this good. In reaching this conclusion, care should however be taken to ensure that the poor in each society are guaranteed access to adequate water for their needs. Innovative supply options/strategies are needed to allow for this. These include the provision of basic water, cross-subsidies and other methods that are equitable in the context of each country.

Water resources in southern Africa are generally shared across boundaries both in-country and across countries. This transboundary nature of the resources places the responsibility for collaboration in its management upon responsible authorities. It also makes it necessary for development and management entities to share their experiences with the development of the resource (knowledge management and sharing).

Water resources management (planning) should not be an end in itself. Stakeholder needs should be met through the planning processes that are inherent in IWRM. Most rural communities want to see the resource delivered to meet their needs. All initiatives conducted to date that have focussed on institutional development; capacity building etc will not remain relevant to these needs for long unless they are translated into programmes for water supply.

Transboundary water resources management should not be seen as a process that hinders development. All countries participating in these initiatives should not be denied the opportunity to use shared resources. In pursuance of this, Botswana encourages all the countries that it collaborates with in managing shared water resources to commit themselves fully to programmes that promote equity in the use of the resource.

Water resources do not occur in isolation. There is therefore need for the integration of water resource management with environmental management as the two are mutually dependent. Water sector managers need to reach out to their counterparts in the environment sector to ensure sustainability of their efforts.

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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*

Botswana is located in Southern Africa between latitudes 18o 30ô and 27o south of the equator and longitudes 20o and 29o E. The country covers an area of approximately 582 000 square kilometers.


Map of Botswana.

Botswanaôs climate is semi-arid; the rainfall is low and highly variable in both space and time. The mean annual rainfall varies from less than 250 mm in the south-western part of the country to over 650 mm in Kasane in the north. The eastern part of the country receives an average rainfall of 450-500 mm per annum. Most of the rainfall is received in the summer months between November and March. Very little, if any, is received in the winter from May to September.

There are four major drainage basins in the country:

- the Limpopo Basin in the east;
- the Orange-Senqu Basin in the south;
- the Zambezi basin in the north; and
- the Okavango-Makgadikadi Basin in the northwest and central parts of the country.

Because of the semi-arid climate, most of the rivers and streams are ephemeral. The only perennial rivers, Okavango and Chobe in the North, have their sources outside the country. The Okavango delta in the northwestern part of the country constitutes a major drainage system, and the Makgadikgadi Pans are an inland drainage basin with no outflow of water from the system. Together they account for about 95% of the total surface water in Botswana. There is no river run-off in the western part of Botswana. The only part of the country that experiences any major river run-off of internal origin is the eastern part of the country which drains into the Limpopo basin, and a small segment that drains into the Makgadikadi pans from the east especially through the Nata, Mosetse Moose and Lepashe Rivers.

### *1.3 Social and Economic Context*

Botswana is classified as a middle-income country with an average per capita GDP of just under US$ 2000 (World Bank). According to the Central Statistics Office (2001) the countryôs population is estimated at 1.6 million (2001 Census) with an annual growth rate of 2.4%. The level of urbanization is of the order of 54% making the country one of the most urbanized in sub-Saharan Africa. There is a close correlation between availability of water and population distribution, with the western regions dominated by the Kalahari Desert being sparsely populated while the majority of the countryôs population lives in the northern and eastern regions on account of better climatic and soil conditions.

Despite the apparent economic success that Botswana has experienced during the past twenty years, the unemployment levels are high. Estimates for 2005 put the national unemployment level at around 25%. This level is predicated upon lack of diversification in the economy, which is still dominated by the mining industry. Attempts at diversifying the economy have so far yielded few results. Due to the high levels of unemployment, poverty levels and income inequalities are clearly defined in Botswana. It is estimated that up to 30% of the countryôs population lives below the official poverty line of less than US $2 per person per day. Poverty levels are higher in the remote areas of the country in the north and northwest districts. These areas are coincident with the countryôs major wetlands where rural communities rely on the exploitation of environmental goods and services provided by the wetlands. These include fish and environmental goods such as grazing for livestock, and reeds which are used for construction and in the making of artefacts such as baskets. Although these areas are important for the burgeoning tourism industry in Botswana, the community groups that are resident here are yet to realize any meaningful benefits from this growing sector of the national economy.

Average per capita disposable incomes were estimated at just under US$ 500.00 at national level, while in rural areas they were only just over US$ 100. This has implications on the

inequality between men and women, since income inequalities and poverty affect women more than men. The socio-economic indicators are being adversely affected by the high incidence of HIV/AIDS especially among the economically active sections of the population. The national average rates of infection are of the order of 18%. This is beginning to increasingly impact on development efforts as the young and able-bodied members of society succumb to the pandemic.

The economic development success enjoyed as a result of the discovery of diamonds immediately following independence has been successfully translated into effective service delivery, especially in the water sector. By 2001, 88% of the countryôs population had access to piped water, and only 3% met their primary water requirements from surface water sources such as rivers, streams, dams or pans.

## CHAPTER 2: WATER RESOURCES SITUATION

### *2.1 Water Availability and Infrastructure*

The geographic context section has highlighted the fact that Botswana is a dry country receiving on average 401 mm of rainfall per year. The rainfall is highly seasonal occurring over the period November to March. This period coincides with the incidents of high temperatures which result in high levels of evaporation. Most of the water resources received are therefore lost through this process. Rainfall is also highly variable resulting in recurrent droughts. Climate is therefore a major determinant of water availability in Botswana. The potential implications of climate change which indicates reduced rainfall over most of the southern African region are therefore of serious concern to the country.

Generally the north and eastern sections of the country receive more rain than the south and the west. Most of the countryôs rivers are ephemeral with the exception of the Okavango and the Zambezi, both of which have catchments outside the countryôs borders. The countryôs major dams are found in the north and eastern district where most of the potential sites have already been developed. The presence of this infrastructure in these regions has necessitated the construction of major water transfer projects to supply the population and economic hub in Gaborone. In addition, the country has developed a programme to harvest rain water to supplement the scarce water resources supplies described above.

Due to limited surface water resources, the country depends largely on groundwater reserves (80%).
These resources are however coming under increased threats of pollution from various people induced activities such as agriculture and industrial growth further worsening the water supply constraints.

The limited availability of sites for the development of new dams and other surface water harvesting schemes have placed Botswana in a position where the country now places more emphasis on water resources management (water demand management, conservation) than development.

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

The majority of water in Botswana is used in the agricultural sector followed by the domestic sector, and the mining sector in that order. **(More information awaited from water Affairs on this).**

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

Water resources management in Botswana is influenced and characterized by the following four major features:

1. Water is a scarce resource.
2. Limited number of sites to develop new dams.
3. Increased pollution which threatens the quality of water sources.
4. Weak coordination of water resources management in the country which threatens the sustainability of management systems.

Despite these limitations, the country has developed a comprehensive water development and supply framework that has resulted in more than ninety percent of the countryôs population having access to clean water. The hitherto centralised water resources management and governance system is under review with a view to promoting more visible civil society participation. This liberalisation of the water sector is the result of a National Water Master plan conducted in 2005.

As stated above, water is a scarce resource in Botswana. The country depends on ground water for up to 60% of its water needs on account of the variability of rainfall. Almost all potential sources of surface water have been developed. As a result, the countryôs focus is now on management of the resource and not on development of new supply sources. This situation is made imperative by the growing demands on the stocks of available water and increased pollution of current water supply sources due to a variety of anthropogenic activities principal among which are domestic and industrial waste water and increased sedimentation of rivers and dams.

## CHAPTER 3: ACTUAL STATE OF THE IWRM PROCESS

### *3.1 Policy and Legislation*

The need for ensuring that there are adequate supplies of water to all sectors of Botswanaôs economy is covered in most major policy statements. Both the Vision 2016 Policy document and NDP9/10 highlight the need for adequate planning for water delivery especially to marginalized rural communities.

The development of water resources in Botswana is governed by the National Water Master Plan (NWMP) which was recently reviewed (2005). The review of the current Plan was with a view to broadening the emphasis from a focus on meeting current and projected water demand through the development of surface and groundwater resources, to integrated planning for water resources management and development. The NWMP which covers the period 2005-2035 also addresses environmental aspects of water resources management and makes recommendations regarding the incorporation of requirements for Environmental

Impact Assessments (EIAôs) in proposals for water development. These recommendations have largely been fulfilled by the development of national EIA legislation of 2005. Specific guidelines for addressing IWRM will, however, still need to be developed.

Another policy instrument affecting water resources management that has been developed by GoB is the National Wetland Policy and Strategy (NWPS), which is presently in final draft form awaiting ratification by the Cabinet. The NWPS provides the contextual and institutional framework for the management of key wetlands such as the Okavango Delta. Although the NWPS was developed from a biodiversity conservation perspective, it is useful also in guiding the process of incorporating environmental management concerns into water resources management programmes.

Botswana has also formulated a draft Policy on Water Conservation and Strategy which, when adopted, will guide efforts towards enhanced protection and preservation of the nationôs water resources. Transboundary water resources management considerations also form part of this strategy. Botswana takes its international obligations to water resources management and has established an International Waters Unit within the structures of the Ministry of Minerals Energy and Water Resources (MMEWR) to guide the countryôs participation in water resources management within the context of the four river basins which the country is a party to.

Other policy instruments which influence processes in the water sector in Botswana include human resources development programmes, financing arrangements and the promotion of the development of new water resources management technologies such as rainwater harvesting. GoB pays particular attention to staff development, with staff in most government institutions receiving training at institutions in the region and further afield in a number of disciplines related to water resources management. DWA is adequately resourced by the central government and is able to institute new programmes in areas such as rainwater harvesting.

Botswana also has a comprehensive suite of policies for the guidance of water resources development and management. Water resources management is governed by the following principal laws:

- the Water Act (Chapter 34.01) of 1968;
- the Borehole Act (Chapter 34.02) of 1956;
- the Waterworks Act (Chapter 34.03) of 1962, as amended; and
- the Water Utilities Corporation Act (Chapter 74.02) of 1970, as amended.

The Water Act governs the overall administration of water resources in the country. This legislation has, however, been found to have the following shortcomings which both the NWMP of 1992 and the recent review have sought to address:

- lack of coordination in water resources planning;
- lack of provision for an institutional structure for water resources planning, policy formulation, management and delivery; and
- lack of control over drilling of boreholes.

Since 1991, various policy reviews have also suggested addressing the following principal issues:

- providing for public consultation and involvement in decision making;
- provide for integrated water resources planning;
- introduction of demand management, conservation and water reuse;
- recognition of environmental needs in water resources management; and
- International cooperation in management of shared water resources.

All these recommendations have been incorporated into the Water Bill (2005) which has been submitted to the national assembly for discussion before adoption. The Water Resources Council proposed in the Bill will oversee all water resources management in Botswana. Further, under the Bill, all water, including groundwater, is considered a national asset not amenable to private ownership. This will improve access to the resource by all. Local communities will be involved in water resources planning and management through the establishment of village water development committees. The Bill provides for formal national water planning through the formulation of a national water strategy, prevention of water pollution, regulation of water use through introduction of economic instruments, as well as the introduction of shared water resources management across international boundaries. Regulations will be introduced to address specific detailed problems related to water resources management.

### *3.2 Institutional Arrangements*

One to two page narrative of:

- existing and planned water institutional arrangements for (roles, responsibilities, relations)
    - water resources management at transboundary, national , catchment and scheme levels distinguishing functions of water management and infrastructure operations
    - water supply/sanitation at a national, provincial and/or local government level and links to water resources management
- process of implementing the institutional arrangements, including
    - approach to establishing/supporting these institutions
    - progress with their establishment nationally
- assessment of the capacity of these institutions to do the required functions
    - human, financial and infrastructural resources
- water pricing and financing arrangements
    - fiscal support and possible scale of donor support
    - charges for water resources management, infrastructure and/or pollution
    - water supply and sanitation tariffs
- stakeholder engagement at different levels
    - considering differences between awareness, consultation and involvement
    - gender mainstreaming and involvement of women
    - capacity building and empowerment of groups to participate

- mechanisms for cooperation/collaboration with other sectors (and private sector)

The Ministry of Minerals, Energy and Water Resources (MMEWR) has overall responsibility for policy formulation, planning, development and management of the countryôs water resources. The Department of Water Affairs (DWA) of the Ministry has traditionally led the process of planning for surface water development and management in the country, while the Department of Geological Survey is responsible for exploring and assessing groundwater resources, and for monitoring major groundwater development programmes. DWA has primary responsibility for the implementation of water development infrastructure including dams and boreholes. The Water Apportionment Board of the DWA reviews and approves applications for water abstraction; while the Hydrology and Water Resources division is responsible for the coordination of national water resources planning, as well as investigations, studies and development of surface water including dams; and the Water Conservation and Quality division is responsible for conservation, protection and water quality testing of water resources in the country. Between 1989 and 1992, DWA led the process of developing the National Water Master Plan covering the period 1990-2020, which considered future water supply schemes, water conservation, legislation and institutional arrangements for sustainable management of the water resources. This plan was reviewed and updated in 2005.

In conducting its primary responsibilities, the Department of Water Affairs works in close collaboration with other institutions. These include the Water Utilities Corporation; the Department of Geological Survey; the Water Development Division under the Ministry of Agriculture; the Ministry of Local Government through the District Councils; and the Ministry of Environment, Wildlife and Tourism. The mining and livestock sectors secure their own water supplies subject to approval of Land Boards for access to land in the Tribal Lands, and the Water Apportionment Board which grants water rights.

The Water Utilities Corporation is a statutory body mandated to supply water to the countryôs major urban areas. The Corporation works closely with the Department of Water Affairs to whom they provide bulk water supplies. As GoB moves towards cost recovery in the sector, the Corporation might also in the future assume greater responsibility for water supply to the villages that are currently serviced by DWA. In addition to operating the countryôs major dams the corporation also operates the North South Carrier, a major pipeline transferring water from the north of the country to the southern districts. This is a major infrastructure development project that was developed to augment the meagre water supplies in the heavily populated and more developed southern districts of the country. There is a proposal to duplicate this pipeline in response to increasing water demand.

The Water Development Division in the Ministry of Agriculture is responsible for supply of water for irrigation use. The Ministry of Local Government, through the District Councils, is responsible for water supply and delivery to medium and small villages around the country. The department contracts with the Department of Water Affairs and with private consulting companies to develop the necessary infrastructure as it does not have the necessary skills in-

house. The Ministry of Environment, Wildlife and Tourism is responsible for the supply of water within the nationôs parks and wildlife estates. The Department of Sanitation is also an important stakeholder in water resources management in Botswana especially given the plans for water reuse that they are advocating through the National Sanitation Master Plan. The reclamation of water will have a direct implication on water use.

The mining sector is an important user of water in Botswana. Most mines develop their own water sources with permission from the Water Apportionment Board. As the country strives to diversify its economic base beyond mining and the livestock sectors it is imperative that this sector is involved in the planning and management of the resources at national level.

As a consequence of this multiplicity of institutions active in water resources management in Botswana, planning for water development and management has traditionally been done on a sectoral basis, and coordination between sectors has been poor. The NWMP Review recommends extensive re-evaluation of the countryôs institutional and legal arrangements for water resources management with a view to including and involving the lowest tiers of governance in water resources management. Botswana has a two-tier government system. The central government is responsible for developing and overseeing implementation of national level policy and legislation. Local (or District) government through the District Council is responsible for local-level policy administration and service provision (including water) in the nine districts under the Ministry of Local Government with support from line ministries that have District or Regional offices. The Local governance is also administered through Tribal Administration which is responsible for administration of customary law, and functions through the kgotla, a forum for village level discussion and participation. These local level institutions are assuming greater roles and responsibilities as water resources management is devolved to the local level.

From the perspective of institutionalising IWRM, Botswana already has a structure in place in the form of a functional CWP which incorporates a broad spectrum of stakeholders, including government. The Botswana CWP was launched in October 2003 with the mandate to facilitate and promote Integrated Water Resource Management/Water Efficiency (IWRM-WE) planning nationally, as well as to support government initiatives, linking and aligning national water initiatives with regional initiatives such as the GWP Regional Framework for Action, the SADC Water Strategy and the RSAP. The partnership also provides a platform for networking with different specialists and interest groups on water issues. It is run through a Committee currently representing:

- the Department of Water Affairs under MMEWR, being the lead Government Ministry;
- the Kalahari Conservation Society (KCS) which is an environmental Non-Governmental Organization (NGO) and which hosts the Secretariat of the CWP; and
- the University of Botswana, Dept. of Environmental Science, which is the Chair of the Committee.

Other Committee members are drawn from:

- Water Utilities Corporation (WUC);
- Ministry of Agriculture, Department of Crop Production;
- Rural Industries Innovation Centre (RIIC);
- Ministry of Health;
- Department of Environmental Affairs (DEA);
- Department of Meteorological Services;
- Department of Sanitation and Pollution Control;
- Groundwater Association of Botswana;
- Department of Womenôs Affairs;
- Botswana Youth Water Action Team; and
- The Private Sector

It is clear from the representation shown above that the CWP is broad-based enough to be used as the vehicle for promoting IWRM in Botswana, and that it should be able to address the range of global environmental concerns as they relate to integrated water resources management. Although some concern has been expressed about the leadership of the CWP being outside government, the advantage of this arrangement is that it brings all stakeholders together as equal partners in the promotion of IWRM in the country. In line with the provisions of the NWMP the CWP will also engage with broader NGO and community based organizations and interest groups.

The Water Bill (2005) recommends the setting up of a Water Resources Council (WRC) which will be made up of representatives of government, the private sector and members of the public. The functions of the council will include the coordination and direction of the preparation of a National Water Resources Strategy.

### *3.3 Water Strategy and Instruments*

One to two page narrative of:

- Existence and nature of national IWRM plan/strategy (or other national plan/planning)
  - Noting the status of an implementation plan/resources/etc
- Past and planned process of developing the strategy, and progress
  - Including information/analysis that supported the process
- Linkage with other sector planning processes
  - reflecting these development priorities in the IWRM strategies
  - promoting IWRM priorities in these other strategies
- progress and content of instruments developed to give effect to policy, legislation & strategy

It has been mentioned in previous sections of this report that Botswana has developed a comprehensive National Water Master Plan (Reviewed in 2005). This document is presented in twelve volumes covering the following aspects of water resources management:
Sociology and demography;
Surface water resources;
Groundwater resources;
Rural water supply;
Sanitation and Wastewater Reuse;
Agriculture;

Environment;
Institutional and Legislative reform;
Water development modelling;
Economics of urban water use;
Water resources modelling.

The Planôs coverage of the water resources management related issues is therefore comprehensive. The GoB considers this NWMP to be their overall framework for IWRM as it provides a framework within which resourcing of water resources development and management are coordinated at national level. In addition, the country has benefitted from support from the International Waters Division of UNDP-GEF for the development of an IWRM/WE plan. Through this support, Botswana has developed an IWRM/WE programme which is modelled along the lines of the NWMP for purposes of consistency. The implementation of this plan will begin as soon as recruitment of requisite personnel is concluded. These two plans/documents combine to constitute Botswanaôs IWRM strategy which is now ready for implementation.

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

Botswana has recently completed planning for IWRM implementation and might therefore not have comprehensive experience with the implementation of the process. However, the Country water Partnership has conducted numerous awareness raising campaigns on the subject of IWRM. Botswana has also been participating in various transboundary water resources management initiatives for a considerable length of time now. The most notable initiative has been the involvement of Botswana in the management of the waters and resources of the Okavango Basin together with Angola and Namibia. The Permanent Okavango River Basin Organisation (OKACOM) was first River Basin Organisation (RBO) in Southern Africa. The experience with this process has guided the formation of other basins in other parts of the region. In addition to its involvement in the Okavango basin, Botswana is also involved with processes in the Orange Senqu, Zambezi, and Limpopo river basins. A special feature of Botswanaôs participation in these initiatives is the countryôs focus on the participation o as broad a spectrum of stakeholders as possible. The experience with the Every River Has its people initiative in the Okavango is a flagship of this focus.

Integrated water resources development includes the development of infrastructure such as dams and associated water transmission systems which could result in serious and adverse impacts on communities if they are not planned properly. Botswana has developed comprehensive planning guidelines for the development of such infrastructure including EIA legislation which is adhered to. The recommendations from international initiatives such as the World Commission on Dams are taken on board in the implementation of these planning guidelines.

A major constraint that Botswana has faced in the implementation of the initiatives discussed above has been that of institutional and human resources capacity limitations. This constraint has resulted in the country seeking external support with training and capacity building for water resources management.

### *3.5 Monitoring and Evaluation*

Botswana has not developed a Monitoring and Evaluation system specifically for the implementation of IWRM. Instead, the systems that are used by the institutions responsible for water resources development and management are the ones that are deployed to inform progress with IWRM implementation. It is expected however that as the IWRM plan is rolled out, an effective M&E system will be instituted to inform water resources management processes in the country.

## CHAPTER 4: ACTUAL STATE OF WATER ACCOUNTING

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

One page evaluation of the availability, reliability, consistency and accessibility of water use information, by:

- By sector (including efficiencies)
- In different areas / catchments
- Elements of the water supply and sanitation value chain
  - raw water, bulk and retail
- Current and projections

Information on water use is not readily available in Botswana. The water resources accounts for Botswana provide a good source of information on water use in the country but these also need t be updated. The figures given in this section are for the period 1993 to 1998 and will need updating. They however provide an indication of the status of water use in Botswana.

As is the case with almost all the countries in Southern Africa, the Agricultural sector is the major user of water in Botswana. Up to 50% of the total water use in 1993 was for agriculture (35% for the livestock industry, and the other 15% in commercial agriculture which is mostly irrigated crop farming).

Following agriculture, ðhouseholdsô constitute the second largest user of water, and one that is rising faster than most sectors of the economy. Household water use stood at 33% in 1998.

**Agriculture**, using 50% of all water in 1993, contributed only 4% of national income (value added) and 2% of formal sector employment, if full-time farmers were considered part of the workforce, agriculture's share of employment increases to 32%. Within agriculture, the traditional sector makes a greater economic contribution, relative to the share of water it uses, than the commercial sector, mainly because commercial sector water use is dominated by irrigation, which requires much higher amounts of water for the income generated than does livestock.

**Mining** makes a strong economic contribution in terms of income (35%), but not employment (under 4%), relative to its water use (10%). **Manufacturing** shows considerable variationð the water-intensive food and beverage sectors generate less income and employment relative to the water they require compared to other manufacturing sectors. The Service sectors also show variation in water intensity and economic contribution.

The economy is producing higher levels of GDP for a given amount of water used.

GDP per cubic meter of water used rose from nearly P 77 to P 96, an increase of 26%. This increase may have been achieved in two ways: 1)-water conservation measures or, 2) through a change in the structure of the economy. Because water efficiency is an important goal, more work should be undertaken to determine the reason for increasing macroeconomic water efficiency.

In Agriculture, the economic contribution of water per cubic meter of water use declined between 1993 and 1998, from P 6.75 to P 6.52. This change resulted mainly from the decline in livestock, a more valuable use of water than irrigation.

The economic efficiency of water use in Mining increased by an impressive 25%, from P 244 per cubic meter of water use in 1993 to P 302 in 1998, largely due to water conservation measures in diamond mining. The economic efficiency of water use in the Service sectors also roseð in this instance by 51% from P 927 in 1993 to P 1404 in 1998.

### *4.2 Allocation of Water*

Half page description of how water is allocated and by which institutions, including approaches for planning, authorisation and/or trading, and evaluation of how effective and consistent this is applied

The Department of Water Affairs is responsible for water development, supply and delivery functions to all rural consumers in Botswana. In performing this function the department works together with other institutions. These include the Water Utilities Corporation; the Department of Geological Survey; the Water Development Division under the Ministry of Agriculture; the Ministry of Local Government through the District Councils; and the Ministry of Environment, Wildlife and Tourism. The mining and livestock sectors secure their own water supplies subject to approval of Land Boards for access to land in the Tribal Lands, and the Water Apportionment Board which grants water rights.

The Water Utilities Corporation is a statutory body mandated to supply water to the countryôs major urban areas. The Corporation works closely with the Department of Water Affairs to whom they provide bulk water supplies. As GoB moves towards cost recovery in the sector, the Corporation might also in the future assume greater responsibility for water supply to the villages that are currently serviced by DWA.

The Water Development Division in the Ministry of Agriculture is responsible for supply of water for irrigation use. The Ministry of Local Government, through the District Councils, is responsible for water supply and delivery to medium and small villages around the country. The department contracts with the Department of Water Affairs and with private consulting companies to develop the necessary infrastructure as it does not have the necessary skills in-house. The Ministry of Environment, Wildlife and Tourism is responsible for the supply of water within the nationôs parks and wildlife estates.

The Department of Sanitation is also an important stakeholder in IWRM planning in Botswana especially given the plans for water reuse that they are advocating through the National Sanitation Master Plan. The reclamation of water will have a direct implication on

water use.

The mining sector is an important user of water in Botswana. Most mines develop their own water sources with permission from the Water Apportionment Board. As the country strives to diversify its economic base beyond mining and the livestock sectors it is imperative that this sector is involved in the planning and management of the resources at national level.

It is clear from the above account that there is a multiplicity of institutions active in water resources management in Botswana. Because of this, planning for water development and management has traditionally been done on a sectoral basis, resulting in poor coordination among the various sectors. It was this realisation that prompted the government of Botswana to conduct the National Water Master plan Review which recommends extensive re-evaluation of the countryôs institutional and legal arrangements for water resources management to ensure that there is improvement in cross-sectoral coordination and enhanced stakeholder participation in national water resources management policy, strategy, planning and implementation.

### *4.3 Water Pricing and Tariffs*

As described above, responsibility for water supply and management is spread among a number of institutions. These institutions are also responsible for pricing and setting water tariffs in conjunction with the Ministry of Finance and Economic Development. The Department of Water Affairs is responsible for establishing tariffs for ñrural consumersò. As water is considered a primary requirement for improvement of rural livelihoods, the Department subsidises the water tariffs on the water they supply to their consumers.

The Water Utilities Corporation on the other hand operates on the basis of full cost recovery for the supply of water to the consumers in the countryôs urban areas. This corporation is however set to take over water supplies to all consumers in the country and is expected to apply the same principle all over the country. The implications of this development on access to water in Botswana will need to be assessed.

Water tariff information is available upon request from the supply authorities and is displayed for public information at their offices. The Central Statistics Office is an additional source of this information.

### *4.4 Economic Data*

Economic data for Botswana is readily available at national level. The Bank of Botswana in association with the Ministry of finance and Development Planning publishes a monthly bulletin that covers the various aspects of the Botswana economy.

### *4.5 Economic Water Accounts*

A first set of Economic Water Accounts for Botswana was produced in 1998 and updated to cover the period 1998 to 2003. The accounts were produced under the Natural Resource

Accounting project for Southern Africa that was aimed at aassisting and enhancing the in-country capacity of
Botswana, Namibia and South Africa to prepare and utilize natural resource accounts in decision-making processes aimed at achieving sustainable natural resources development.

Water accounts have been constructed for each of the known major categories of water supply:
Water Utilities Corporation (WUC), Department of Water Affairs (DWA), District Councils (DC), and other users who are mainly self-providers, as well as for different water sources: groundwater, dams, and rivers for the years 1993-1998. The accounts provide an overview of water use for different economic activities; the economic contribution of water use from each sector as well as the costs of providing water and revenues received by each.

The result of this exercise is a comprehensive set of water accounts for the country which is used in decision making processes relating to water allocation and use.

Chapter 5: Future Perspectives

This chapter provides an opportunity to give guidance to the region on the issues that should be considered around IWRM planning, so may be as broad-ranging as you like

## *5.1 Key Lessons from the Country Experience*

Key lessons:

Water is becoming increasingly scarce. Traditional centralised (government) supply side practices that were the dominant means of managing the resource are therefore no longer sustainable. New approaches that include as broad a spectrum of stakeholders in the development and management of this resource are required if sustainable and integrated water resources management is to be realised.

Closely related to the point above, the need for resource management is becoming more relevant than resource development. Programmes for water demand management and water conservation are a critical requirement under these circumstances.

Water cannot continue to be regarded as a free good. All users have to realise that water has a value and should therefore be applied to best use. All users of the resource should be made to pay an ñappropriate priceò for this good. In reaching this conclusion, care should however be taken to ensure that the poor in each society are guaranteed access to adequate water for their needs. Innovative supply options/strategies are needed to allow for this. These include the provision of basic water, cross-subsidies and other methods that are equitable in the context of each country.

Water resources in southern Africa are generally shared across boundaries both in-country and across countries. This transboundary nature of the resources places the responsibility for collaboration in its management upon responsible authorities. It also makes it necessary for development and management entities to share their experiences with the development of the resource (knowledge management and sharing).

Water resources management (planning) should not be an end in itself. Stakeholder needs should be met through the planning processes that are inherent in IWRM. Most rural communities want to see the resource delivered to meet their needs. All initiatives conducted to date that have focussed on institutional development; capacity building etc will not remain relevant to these needs for long unless they are translated into programmes for water supply.

Transboundary water resources management should not be seen as a process that hinders development. All countries participating in these initiatives should not be denied the opportunity to use shared resources. In pursuance of this, Botswana encourages all the countries that it collaborates with in managing shared water resources to commit themselves fully to programmes that promote equity in the use of the resource.

Water resources do not occur in isolation. There is therefore need for the integration of water resource management with environmental management as the two are mutually dependent. Water sector managers need to reach out to their counterparts in the environment sector to ensure sustainability of their efforts.

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

The National Water Master Plan (2005-2020) clearly articulates Botswanaôs future plans for the water sector. As stated earlier the focus of the water sector going forward will be resource management instead of resource development as most of the potential water sources have been developed already and ground water resources are under increasing threats from pollution. The focus of the Master Plan has been described as comprehensive as it covers a wide range of areas including institutional and legislative reform, environmental sustainability. An important recommendation of the Plan is the need for the inclusion of a broader range of stakeholders in the decision making processes that will influence water development and development into the future. This approach will result in increased sensitisation of all stakeholders including government leaders to the need for sustainable development and management of water resources in the country. In addition, the country is in the process of developing an IWRM/WE plan with support from UNDP-GEF. These two initiatives will be directed at addressing the major feature of water supply in the country-the fact that most of the water sources are shared with other countries. (Example: The Zambezi River provides opportunities for Botswana to develop potential agricultural potential in the northern regions of the country but these waters can only be sourced with the concurrence of all riparian states to the Zambezi).

IWRM/WE planning incorporates elements of knowledge management and sharing of experiences with other countries in the region. Botswanaôs IWRM strategy already incorporates these elements and will therefore be an important component of the countryôs water resources management strategy. IWRM/WE planning has been promoted through the GWP/CWP formation in Botswana. This institution has been important in galvanizing support for water resources management across sectoral boundaries. As a result of the efforts of the CWP, water resources management is no longer the domain of government and MMEWR

alone but includes all sectors of the Botswana society. This collective responsibility facilitates the spread of information on water resources management and conservation across the country more effectively than would have happened before. It is important to note here that GWP/SA is committing resources to the UNDP/GEF sponsored IWRM/WE planning process thereby further leveraging national efforts at promoting IWRM.

### *5.3 Constraints, Opportunities and Perspectives*

IWRM has brought about increased realisation of the need to take into account various factors in the process of planning water resources management. Primary among these is the need to work with other sectors such as agriculture which in the majority of cases are the major users of water in the region. What can be considered a weakness in the process is lack of practical action on the ground. There is need therefore for the IWRM planning process to address practical problems of continued limited access to water for the majority of the regionôs population. Botswana has achieved almost 100% access to clean water by its population but the country still lags behind in the area of sanitation and use of water for economic development initiatives such as irrigation. As Botswana, begins the process of developing a comprehensive IWRM/WE plan, it will be imperative that they be provided with guidance on how to address this issue. The lessons section (5.1) of this report has highlighted a number of concerns that need to be addressed in this process.