Global Water Partnership Southern Africa

IWRM SURVEY AND STATUS REPORT:

Swaziland

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EXECUTIVE SUMMARY

Swaziland is still actively involved in preparing an integrated water resources master plan with support from the Global Water Partnership (GWP) and the Government of Swaziland. This process, now in its third year, has had some challenges that have resulted in delays in finalising the report. The major challenge was combining a duel process brought about by a requirement in the Water Act of 2003 to prepare a Water Resources Master Plan and a GWP obligation to prepare an Integrated Water Resources Management Plan. In 2008 Terms of Reference were issued to prepare an Integrated Water Resources Master Plan and consultants have been appointed.

An IWRM approach has been taken in preparing the Integrated Water Resources Master Plan and the Swaziland Water Partnership was given the responsibility of contributing towards this though defined activities that will feed into the final product. Consultants have been engaged to prepare the plan.

Water is featured as a main catalyst of national development in the country as confirmed by a number of projects, including the construction of Maguga dam, the Komati Downstream Development Project, the construction of Lubovana dam and the Lower Usutu Smallholder Irrigation Project. In addition industrial and domestic water demands require that a coherent integrated approach be taken to try and satisfy all demands using a finite resource.

All the five river basins in Swaziland are shared with neighbouring countries (Mozambique and South Africa), making all development on water resources subject to international agreements and protocols. The three countries, Swaziland, South Africa and Mozambique, have established commissions and committees to safeguard development of the international water bodies. They include the Joint Water Commission established by the Government of Swaziland and the Republic of South Africa, the Komati Basin Water Authority established by the Government of Swaziland and the Republic of South Africa, and the Tripartite Commission established by the Government of Swaziland, the Republic of Mozambique and the Republic of South Africa.

The Water Act of 2003 is the law governing the use and management of water resources. It seeks to integrate and decentralise water management and to consolidate its administration under one ministry. It established the National Water Authority (NWA) that is composed of representatives from key government ministries, from industry, from water users associations and individuals on Swazi Nation Land. The Department of Water Affairs is secretariat for the NWA. The act also establishes five river basin authorities through which basin specific water management processes will evolve. RBAs will empower basin stakeholders in the management of their water resources. The Act declares all water found in the country a national resource and requires all users to have permit for use of the water. It is however not necessary for any person or community to obtain a permit for use of water for primary (subsistence) purpose. The Water Apportionment Board is responsible for issuing of permits, and the five river basin authorities will take over this function once they are all established and operating. Water is allocated on volumetric basic, and in the case of irrigation it is allocated on the basis of crop water requirement.

Water related issues that have been raised by stakeholders include slow implementation of the Water Act and water management strategies, degradation of the resource through poor catchment management, agro-chemical run-off and other forms of pollution, impact of climate change on water

resources, transboundary issues and international water obligations, inadequate institutional capacities and training, poor information dissemination and inadequate sanitation issues that are often overlooked in water project planning.

The activities that are necessary in order to continue the process of IWRM in Swaziland include setting up all institutions that were called for under the Water Act of 2003, capacity building on IWRM, creation of secretariats for new institutions, training and retaining of staff of DWA, strengthening of institutions offering water related courses, improving metering and accounting for water, innovative mechanisms of fundraising, improved ways of disseminating information, and development and finalising of policies and regulations.

TABLE OF CONTENTS

CHAPTER 1: BACKGROUND AND CONTEXT

1.1 Project Background

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1.2 Geographic Context

The population of Swaziland is estimated to be 1,123,605 in 2002. The country is classified as middle-income country with per capita GDP of US$ 1,170. It is estimated that 10% of the population garner 40% of the country's resources, whilst 66% of the population live with disposal income of less than US$ 10 per month.

The country has one of the highest HIV/AIDS infection rates, with about 35% of the sexual active population believed to be HIV positive.

The clean water supply coverage in the form of taps in houses, taps outside houses, community taps and boreholes stand at 33% for the rural population, and 84% for the urban population. Rivers and unprotected wells are the main source of household water for the rural population in the country with 45% of the rural population relying on them.

Two major systems of land tenure exist in Swaziland. Title Deed Land (TDL), covering 46% of the country, is privately owned land and it is used mainly for ranching, forestry or estate production of crops such as sugar cane, citrus and pineapples. Swazi Nation Land (SNL), covering 54% of the country, is land held in trust by the King for the Swazi people. Average farm holdings for cultivated land stands at 1.5 Ha per household in the SNL, with maize yield averaging 1.5t/Ha. An average household size is eight people. For administrative purposes the country is divided into four administrative districts. Hhohho in the north, Manzini in the centre, Shiselweni in the south and Lubombo in the east. A Regional Administrator administers each of the four regions. The headquarters for the regions are Mbabane, Manzini, Nhlangano and Siteki for Hhohho, Manzini, Shiselweni and Lubombo regions, respectively.

The country is divided into six agro-ecological zones, based on elevation, landforms, geology, soils and vegetation. The Highveld, the Middleveld, and Lowveld each occupy about one-third of the country whilst the Lubombo Plateau occupies less than one-tenth of the country. Some poor soils restrict the agriculture of the Highveld to mainly grazing activities, as only 3% of the area of the region constitutes good arable soils. Close to 15% of the Middleveld have arable soils of good to fair quality, whilst about 20% of the lowveld has good or fair soils. The Lubombo Plateau has about 12% arable soils of good to fair quality.

Swaziland has a subtropical climate with summer rains (75% in period of October till March). The climatic conditions range from sub-humid and temperate in the Highveld to semi-arid climate in the Lowveld. The long-term average rainfall figure for the Highveld, the Middleveld, the Lowveld, and the Lubombo Plateau are 950 mm, 700 mm, 475 mm, and 700 mm respectively.

1.3 Social and Economic Context

Swaziland has a strong export-oriented economy with limited domestic markets. The economy is diversified and dualistic, and production of agricultural commodities takes place on SNL and TDL,. The economy is closely tied to events taking place in much larger neighbours, Mozambique and South Africa. South Africa is by far Swaziland's most important external trading partner and is proportionately more important as a source of imports (80% of total imports) than as a destination for exports (50% of total exports). This is largely due to the fact that a substantial share of exports (about 15%) is governed by preferential trade agreements with developed countries.

Overall performance of the economy has declined from levels experienced in the last decade. Swaziland's economy, as measured by real gross domestic product (GDP) at factor cost, has been growing by 2.3% per annum on average since the beginning of the new millennium, which represents a decline compared to the average of 3.7% realised in the 1995-1999 period. The outlook indicates that the Swazi economy continues to be hampered by natural disasters specifically drought and other risks related to market access, the appreciation of the exchange rate, competition in the global market and declining prices of agricultural commodities. The economy grew by 2.6% in 2003, presenting a slowdown in growth from the 2.7% recorded the previous year. Preliminary estimates indicate that the economy increased by 3.5% in 2007, which was an improvement from the growth rate of 2.9% in 2006, however, recent economic upheavals will undoubtedly affect future growth negatively. The agricultural sector expanded by 2.9% in 2007 after contracting by 2% in 2004, largely propelled by a 24% increase in maize production and a marginal increase in sugarcane produced during the 2006/2007 cropping season. The contribution of the agricultural sector to GDP was 12.7% in 2007, compared to 12.8% in 2006. Agriculture remains one of the largest employers, contributing about 20% of the country's employment. The majority of people in the country derive their livelihood from the agricultural sector.

The manufacturing sector is dominated by four export industries specialising in processing agricultural and forestry products, including woodpulp, soft drink concentrate, fruit canning and sugar processing. Sugar and woodpulp are the main contributors from the agriculture and forestry sectors to export earnings. Sugar is the largest single foreign exchange earner in Swaziland and contributes about 60% of agriculture's contribution to GDP. It is exported via the port at Maputo to the EU and US, and regionally to Mozambique and South Africa. The irrigated sugarcane plantations at Simunye, Mhlume and Big Bend are major employers, second only to the government. The sector is managed by the Swaziland Sugar Association, which oversees the marketing of sugar into preferential and world markets. Mills at the three main estates process sugar from both the estates and hundreds of smallholders, and in recent years output has increased considerably. In addition to exports, sugar is also sold domestically, particularly to soft drinks, confectionery and jam-making industries.

Livestock rearing is predominant on SNL under rangelands conditions. About 80% of the national cattle herd is found on SNL under the care of smallholder farmers. The Government through the Ministry of Agriculture is vigorously pursuing commercialisation and diversification of livestock production and positive results are being realized in increase in cattle feedlots, dairy farming and poultry businesses, and other livestock enterprises. The development faces challenges in overgrazing and land degradation, malfunctioning marketing systems and availability of markets. Cattle

population declined by 2.8% in 2007, and the decline was attributed to poor weather conditions and poor management of rangelands. The total number of cattle slaughtered declined by 8% in 2007. Despite the notable decline in slaughters, beef production grew by 2% to 8116 MT. Unemployment stood at 29% in 2008, whilst the labour force was characterised by excess supply as the economic activities failed to generate job opportunities. The national budget for 2008/2009 showed a deficit of E330 million or 1.4% of GDP, compared to a deficit of 0.5% of GDP in 2007/2008.

CHAPTER 2: WATER RESOURCES SITUATION

2.1 Water Availability and Infrastructure

The surface water resources of the country are estimated at 4.5 km^3/year with 42% originating from South Africa. The five main river systems in the country are the Komati, the Lomati, the Mbuluzi, the Usutu and the Ngwavuma. The Komati and the Lomati river systems are found in the north of the country and both originate in South Africa and flow out of Swaziland back into South Africa before entering Mozambique. The Mbuluzi River rises in Swaziland and flows into Mozambique. The Usutu River, together with a number of major tributaries originate in South Africa, and flows out into Mozambique, forming the border between Mozambique and South Africa. The Ngwavuma River lies in the south of the country. It rises in Swaziland and flows into South Africa before entering Mozambique. The sixth river system contributing to surface water is Swaziland is the Pongola River, which is found on the South African side south of Swaziland. The Jozini dam built on the South African side, floods some land on the Swaziland side and its water is available for use in Swaziland. The major drainage basins and their corresponding hydrologic variables are shown in Table 1.

Table 1: Major drainage basins of Swaziland and their corresponding hydrologic variables

River System	Area (km^2)	Rainfall (mm)	Inflow (naturalised) {x 10^6 m^3/a}	Outflow (naturalised) {x 10^6 m^3/a}
Pongola	-	400 -600	Nil	59
Ngwavuma	1305	600 – 900	Nil	156
Usutu	12903	600 - 1000	896 (386)	2357 (1358)
Mbuluzi	3065	700 – 1200	Nil	460 (208)
Lomati[1]	931	900 – 1400	74 (40)	249 (118)
Komati[1]	7423	800 – 1400	688 (515)	1239 (520)
Lubombo	-	800 – 900	Nil	31
Total	-	Mean = 850	1809	4551 (2448)

A total of 11 major dams store water for irrigation, domestic and industrial purposes exist in the country, with combined storage capacity of 743.2 x 10^6 m^3 (Table 2).

Table 2: Main dams that store water in Swaziland

Name	Capacity (10^6 m^3)	Surface area (Ha)	Date established	River System	Source of funding
Hendrick Van Eck	10.4	124.0	1969	Usutu	Private
Lavumisa dam	0.35	27.22	1996	Pongola	Republic of South Africa
Luphohlo dam	23.6	120.0	1984	Usutu	Parastatal
Maguga dam	332	1042.0	2001	Komati	Public
Mnjoli dam	153	1500.0	1980	Mbuluzi	Public
Mnkinkomo weir	3.2	-	1963	Usutu	Private
Lubovana dam	155	-	2007	Usutu	Public
Nyetane dam	6.0	-	Raised 1992	Usutu	Public
Sand River dam	50	590	1965	Komati	Private
Sivunga dam	6.9	110	1972	Usutu	Public
Hawane dam	2.75	70	1984	Mbuluzi	Public
Total	743.2				

Source: Mwendera *et.al*. (2002).

A groundwater survey that was undertaken between 1986 and 1991 by the Department of Geological Surveys and Mines concluded that the resource potential was equivalent to a sustained flow of 21m^3/s (21,000 ℓ/s), of which 1,400 boreholes had tapped only 6% by 1992. Today there are over 2,000 boreholes in the country, with over 1,340 boreholes in the Swaziland portion of the Maputo River basin only. It is estimated that groundwater recharge rates in Swaziland range between 2% and 10% of average annual rainfall, as shown in Table 3 below.

Table 3: Groundwater Yields and Recharge Rates in the country

Zone	Range of yield (ℓ/s)	"Safe yields" (ℓ/s)	Recharge (%)
Highveld	0-10	8	10
Middleveld	0-20	10	5
Lowveld	0-2	1	2
Lubombo	0-5	3	5

In general, groundwater quality is good when compared with WHO guidelines, except in some areas of the Lowveld. The best quality of groundwater is found in the Highveld, Middleveld and Lubombo Plateau regions where there is a lot of flushing as a result of high rainfall and relatively steep gradients resulting from the topography of the mountains. The worst quality of groundwater is found in the Lowveld where fluoride as high as 18 g/mℓ and high salinity levels exist as a result of stagnant conditions. Nitrate conditions have been observed at 15 mg/ℓ resembling natural conditions.

Studies have indicated that Swaziland will be affected by hydrological extremes in the future due to climate change which when combined with the hitherto mismanagement of water, excessive land degradation, water pollution and poverty, will have major repercussions on Swaziland. The results of run-off simulation models show that under different climate change scenarios there will be an annual runoff change ranging from +5% to -20% in Komati river basin. The evaluation also revealed that

water requirements will be met in the Komati river basin during the winter months. However, the remaining water will not be enough to meet environmental water needs, a likely threat to the natural environment. The results indicated that there will be change ranging from +1.7% to -6.8% in the Mbuluzi river basin. The water shortage will largely occur in the months of May to September. As with the Komati river basin, under conditions of climate change, there will be increased competition for limited resources possibly leading to conflict in this shared river basin. The need to develop mechanisms for cooperation as well as adaptation strategies well ahead of this scenario is apparent. In the Ngwavuma the results reveal a negative annual runoff change ranging from -4 to -23%. The water shortage largely will occur in the months of June to October. Compliance with environmental flow and cross-border flow requirements will be quite a challenge during these months.

2.2 Water Use, Demands and Requirements

The water demands for different sectors in the river basins is shown in Table 4. Ninety six percent of the water is used for irrigation, while the water used for livestock, domestic and industry stands stand at 1%, 2% and 1% respectively. The industrial forestry sector is also indirectly using large amount of water that is directly derived from rain, and subsequently reducing runoff. Hydropower water use accounts for 857 MCM per year with a generation capacity of 60 MW. After used for power generation, the water is then allocated to other water uses. An increase in the area under irrigation has taken place over the 10 years, particularly sugarcane irrigation. The demand for irrigation water for irrigation for Komati and Lomati basin is expected to increase to 280 MCM in 2010, while those for Mbuluzi, Usutu and Ngwavuma are expected to increase to new figures of 180 MCM, 400 MCM and 42 MCM respectively. The environmental flows that are indicated for river basins are not based on any scientific investigations, but on the edicts of the IncoMaputo agreement.

Institutions that have implemented water demand management strategies include the Royal Swaziland Sugar Corporation and the Swaziland Beverages. The benefits of water demand management have been realised by the Royal Swaziland Sugar Corporation that has over 20,000 Ha of sugarcane under irrigation. Water for irrigation at Simunye Estate is supplied from Mnjoli dam on the Mbuluzi River that has limited potential for further development of storage, and the river is shared with Mozambique. After realising that there was need to reduce demand thereby making water available for expansion the Royal Swaziland Sugar Corporation decided to replace approximately 7,000 Ha of dragline sprinkler system with subsurface drip irrigation. Water use efficiency was considerably better with the subsurface drip irrigation could be utilised for expanding the area under irrigation. Another industry that uses a lot of water is the Swaziland Beverages, which uses about 17,000 Kℓ per month. The industry discharges for treatment about 136,000 Kℓ per month. The company responded to the high water usage combined with high water prices in the country (US$ 1.13/m^3 in Swaziland compared to US$ 0.22/m^3 in Zambia) by reducing water usage in order to cut costs of production.

Table 4: Estimated water demand (million m^3 per annum) on major river basins - 1997.

River Basin	Komati (includes Lomati)	Mbuluzi	Usutu	Ngwavuma	Pongola
Sector					
Irrigation*	176.0	140.0	280.0	32.2	6.4
Urban domestic	22.0	15.0	12.036	0.468	2.0
Rural domestic			3.043	0.961	
Industry & others (university, schools, etc)			12.437	0	
Livestock			9.74	2.061	
Fishery			0.191	0.034	
Forestry	50.0	0.1	62.963	0.024	0.5
Hydropower	307.7	-	525.6	23.7	-
Tourism	-	-	0.56	100.2	-
Ecological reserve	95.0	92.0	523.6	29.7	12.0

*** Based on crop water requirements.**

Source: Burke and Mogensen, 1997; Knight Piésold, 1997; Water Resource Branch, 2001; TPTC, 2002) quoted in **IUCN Swaziland Country Study Report on Water Demand Management Programme for Southern Africa Phase II.**

2.3 Key Water Resources Issues, Concerns and Priorities

Sustainable water management has become a national priority. Consensus now exists that the problems affecting water resources are no longer related solely to the protection of a natural resource for the sake of safeguarding ecosystems and maintaining environmental conditions. Instead, building sustainable water management now forms part of a broader development strategy that encompasses anticipating and avoiding water related conflicts, addressing poverty and rural development, and designing and meeting food security and health-related concerns.

The Water Poverty Index (WPI) for Swaziland, which measures the impact of water scarcity and water provision on human population, stands at 53. WPI is a number between 0 and 100, where a low score indicates water poverty and a high score indicates good water provision. It is the same as that for Zambia, with Namibia having the lowest in the region at 60. The per capita water availability for Swaziland stands at 4,090 m^3/year. Water scarcity and shortage is mainly observed during the dry months (May to October), especially in the Lowveld. Climate change effects are beginning to have noticeable effects even on this historical trend rendering some rivers with unseasonably low flows when 'normally' the flows would be higher. There are instances when schools are temporarily closed in the Lowveld due to water shortages. During the dry period, earth dams and rivers often dry up leaving only the main five rivers and some tributaries flowing. The water shortage compromises domestic sanitation practices such as regular bathing and washing and leads to poor hygienic situations in homesteads. Livestock are driven for long distances to rivers and are subjected to water stress, with reported cases of livestock loss due to water scarcity. A lot of time and energy is expended by rural people in water collection. As a result of water scarcity there is trading in water in affected areas, with water being very expensive relative to the economic status of the users. A 100ℓ container can sell for as much as R10 (US$1) in the affected areas, and yet the annual income for 70% of the population is less than US$10. In the event of river water shortages, domestic water is given a

priority for allocation, to be followed by livestock watering. Irrigation is the first sector to be rationed water.

Swazi stakeholders understand that beyond the scarcity or abundance of water, or the complex unpredictability of its behaviour, many of the problems affecting the water sector are related to issues of water governance. Consequently, increasing efforts are being directed to establish the legal, political, and institutional framework to regulate the development and management of water resources.

Issues and concerns that Swazi stakeholders have presented, and in no particular order of priority, are:

1. Slow implementation of the Water Act and water management strategies

    a. Stakeholders are concerned that the 2003 Water Act with its modern foundation on internationally recognised principles, water management institutions and governance and decentralisation of responsibility, is taking too long. The slow pace of developing important regulations on allocations, pricing, water use efficiencies particularly for irrigated agriculture, recreational use of water bodies and others whilst the resource supply dwindles in the face of changing environmental and land use patterns, is threatening the ability of stakeholders to eventually manage the resource.

    b. Finance support from government and other donors to implement the Act also appears to amount to not much and stakeholders are concerned that the eventual cost of managing the resource maybe beyond the economic means of many people.

    c. Stakeholders are very keen to encourage the Department of Water Affairs and other relevant institutions to finalise the Integrated Water Resources Management Plan as this is considered a vital step towards sustainable water management that meets the needs of all sectors.

2. Degradation of the resource through poor catchment management

    a. Stakeholders are concerned that the business-as-usual approach to land management is adversely affecting both quantity and quality of water. Sedimentation of reservoirs, impacts of low flows on aquatic ecosystems and accelerating rates of natural and manmade erosion are all negatively affecting the sustainable utilisation of the resource.

    b. Invasive alien plants are also cited as an increasing concern and issue in catchment. Few studies have been done to quantify the impacts, but stakeholders are sure it is not a positive effect and that basin authorities will have to dedicate coordinated resources to tackle the problem with relevant government departments.

    c. Stakeholders also raised concerns that naturally important ecosystems like wetlands are being destroyed resulting in immeasurable losses in water regulation, supply and quality.

3. Agro-chemical run-off and other forms of pollution

    a. Stakeholders have noticed that the quality of water passing through intensive agriculture areas is showing signs of nitrate or nitrite contamination which can place higher risks on human life.

    b. Water bodies passing through urban and industrial areas have also been shown to be highly degraded as a result of industrial pollution. Greater monitoring of industries close to water bodies is needed and imposition of punitive fines as provided for in the water pollution control regulations.

4. Impact of climate change on water resources

    a. Stakeholders have noted that the impacts of climate change and or droughts are having and will have significant impacts on water resources. Long-term decline in rainfall received is already resulting in rivers with very low flows that affect many rural communities in particular but also more important water users like industry and agriculture.

    b. Stakeholders expressed a wish that relevant government departments and institutions upscale rural water supply projects to meet Millennium Development Goals as well as objectives of the Poverty Reduction Strategy and Action Plan. More small earth dams, rainwater harvesting for agriculture and domestic uses and even larger water storage dams are considered to be a high priority.

    c. Stakeholders would like to see relevant government departments begin to mainstream climate change issues into all development plans and projects particularly projects that utilise significant volumes of water. Adaptation and mitigation strategies are urgently needed to reduce risks.

5. Transboundary issues

    a. Stakeholders are well aware of international water obligations both upstream and downstream of Swaziland's borders. Concerns have been expressed that the quantities of in and outflows need to be rigorously monitored to ensure equitable allocation of water.

    b. Stakeholders would like to see greater inter-governmental cooperation of water issues notably more accurate and timely flood warnings. Dam operators in South Africa were cited as passing flood waters too quickly into transboundary rivers without warning resulting in infrastructure damage and other forms of livelihood losses.

6. Institutional capacities and training

    a. Stakeholders have noted that national human resource capacities are inadequate for the 'job in hand' in managing the national resource. Inadequate training is on offer by the University to equip new graduates with the skills needed for sustainable water management.

b. Stakeholders would like to see water management issues be introduced into school curricula to ensure a more informed populace.

7. Information dissemination

   a. Stakeholders noted that institutions that gather and collate hydrological data do not effectively interpret and pass such information to water users.

   b. Government departments seldom publish annual work plans or annual reports on their activities and progress and stakeholders would encourage a more open and participatory dissemination of important hydrological and climate data that will assist water users, large and small, to better plan investments and resource use.

8. Sanitation issues

   a. Stakeholders noted that sanitation requirements and needs are often overlooked in water project planning. Poor health stemming from poor sanitation is a systemic problem in communities without proper systems for disposing and treating of effluents.

   b. About 60% of the rural population still do not have access to safe drinking water and sanitation. This demonstrates that water resources are prone to contamination, considering that 70% of the population live in rural areas. Contamination of water through improper disposal of waste is taking place in both urban and rural areas, but data on the extent of the contamination are not available.

CHAPTER 3: ACTUAL STATE OF THE IWRM PROCESS

3.1 Policy and Legislation

The existing legislative framework enshrined through the 2003 Water Act, is used to guide stakeholders in the water sector in Swaziland by establishing mechanisms for key focal areas:

- Institutional Arrangements
- Water Resources Development
- Water Resources Management
- Water Resources Information Management
- Water Supply and Sanitation Service Provision
- Legal Regulatory Instruments of Good Practice
- Capacity Building, Research and Training
- Awareness Creation and Stakeholder Participation

Water legislation was formally introduced in 1967 with the Water Act of 1967. This Act created the Water Apportionment Board to apportion water to various users and uses. The Minister responsible for water could hear appeals against the decisions of the Board and had power to over-rule the decision of the Board. The Act did not deal with the fragmentation of water among different ministries and departments or sectors. It also did not allow for stakeholder participation in management issues that would affect them. Most of the authority still rested with government. This

Act was effective for over 30 years but as times changed, the need to review and update it to meet the needs of more modern times, increased water demands and international obligations, a new Act was drafted.

In 2003 a new Water Act was signed into law. The Act departs from history in that it integrates and decentralizes water management and therefore forms a strong foundation for IWRM. The 2003 Water Act seeks to consolidate the administration of all water under one ministry. Water is now managed through the National Water Authority (NWA). The NWA is composed of representatives from government ministries (Ministry of Agriculture, Ministry of Economic Planning and Development, Ministry of Natural Resources and Energy and Ministry of Health and Social Welfare) three representatives from industry (Swaziland Sugar Association, Swaziland Citrus Board and Swaziland Chamber of Commerce and Industry) and three representatives from associations, co-operatives and individuals on Swazi Nation Land. This broad representation enhances public and commercial involvement in water resources management as partners in water development. The Act calls for the establishment of basin level structures (River Basin Authorities, Irrigation Districts, Water User Associations and Project Boards in exceptional cases) with significant powers to manage the resource. The Act also established the Department of Water Affairs to provide secretariat services to the NWA and oversee management of water resources development and management issues in the country.

The 2003 Act therefore, encompasses the core principles of IWRM by:

- Establishing a legal set-up that allows for the appropriate management of the nation's water resources;
- Ensuring effective and responsible institutional set-up with skilled personnel;
- Facilitating an informed and involved public (stakeholders and the private sector); and
- Developing appropriate water management policies and strategies.

The legal framework for water management is informed by the Constitution of the Kingdom of Swaziland Act (2005). The Constitution declares water as a national resource. Section 210 further provides that water use has to take into consideration the principle of sustainable development. Section 215 prohibits private ownership of water naturally found in Swaziland, thus making it possible for the government to deal with water taking cognisance of the international agreements that the country has entered into regarding the equitable utilization of water. With all that being said, this supreme law mandates Government to put into place appropriate legislative measures for a comprehensive approach in the preservation of the environment of which water is a component. It provides that every person should promote the protection of the environment, which includes water resources for the present and future generations. It goes on to state that industrialisation and urbanisation shall be undertaken with due respect for the environment. Further, that the Government shall ensure a holistic and comprehensive approach to environmental preservation and shall put in place an appropriate environmental regulatory framework. In terms of Section 63 a citizen has a duty to protect and safeguard the environment.

Currently two River Basin Authorities (Usutu and Komati) have been established, and are yet to be gazetted, and the others are in the process of being established. The Act also drastically enhances water management in the country in a number of ways. With regard to water allocation it brings allocation of surface and groundwater under the same authority. This will enhance the

understanding of water allocations in the country and facilitate enforcement of conjunctive use of surface and groundwater resources. The act also increases the penalties for water pollution and irresponsible waste management. Among many other changes that are being introduced by the Act, is the introduction of volumetric water allocation, which will facilitate enforcement of water conservation and rationing measures in times of drought.

The Act calls for the NWA to develop and adopt a National Water Resources Master Plan that should include the generally accepted principles of river basin management. Primarily it should contain an inventory of the total water resources of the country and comprehensive programme of action in which the maximum value can be obtained from the resources for the benefit of the people of Swaziland. The requirements of the National Water Resources Master Plan are in line with the goal of the IWRM strategy, which is to develop and manage water resources in a planned and coordinated manner taking into account the projected requirements of various economic, environmental and social sectors that depend on enhanced availability of sustainable quality water to meet their respective goals. The IWRM approach has thus been taken in preparing the National Water Resources Master Plan whereby the NWA has joined forces with the Swaziland Water Partnership to prepare an Integrated Water Resources Master Plan. The Dutch financed project in Swaziland, the Partnership for Africa's Water Development (PAWD) and the Government of Swaziland fund the exercise. A consultant was engaged to prepare it. Different sectors are expected to have input in the developing the National Water Resources Master Plan, as they are represented in NWA and River Basin Authorities.

Part III of the Water Act of 2003 acknowledges international water bodies and sets out the institutional framework for discussions and implementation of recommendations on shared water courses. Specifically the Act recognises the supremacy of the Joint Water Commission established by the Governments of Swaziland, the Republic of South Africa and the Republic of Mozambique. This commission, including any future committees or authorities that have been or may be established between the Governments of Swaziland, the Republic of South Africa, and the Republic of Mozambique, are all duly recognised. Discussions and commitments on the equitable sharing of water between these three states are legally recognised and the three parties regularly meet and undertake basin-wide studies on evaluating the shared resource ensuring that each party has a fair and equitable share of the resource.

There is partial provision that balances water needs between economic sectors as the irrigation districts includes users from all the sectors. In the event of insufficient water due to climatic conditions irrigation will be the first subsector to be rationed water. Domestic consumption and stock watering will be the last to be rationed.

Water is featured as the main catalyst of national development, and this is confirmed by the creation of the Swaziland Water and Agricultural Development Enterprise (SWADE). It is a company owned by the government mandated to facilitate the planning and implementation of the Komati Downstream Development Project (KDDP) and the Lower Usutu Smallholder Irrigation Project (LUSIP), and any other large water projects that Government may assign from time to time**.** The Komati Downstream Development Project aims to alleviate poverty in rural agricultural communities through participation in commercialised, irrigated businesses. It covers an area of 14,500 Ha and will benefit 19,500 people. It is situated along the Komati river basin. The Lower Usutu Smallholder Irrigation

Project on the other hand is situated along the Usutu river basin and the first phase will develop 6,500 Ha for irrigation. Water for implanting the two projects is sources from Maguga dam and Lubovana dam respectively, both of which the government was fully involved in their construction. Two other major dams that were funded by the government are Mnjoli dam and Luphohlo dam. The Ministry of Agriculture is also engaged in construction of small reservoirs to be used for irrigation and small-scale irrigation. Prior to the Water Act of 2003, the responsibility for water supply and management was fragmented across several ministries. The Water Act provided for alignment between water sector and other sectors to some extent, as it recognises all the sectors as stakeholders and allowed for their representation in the decision making bodies that include the National Water Authority, the River Basin Authorities, the Irrigation Districts and Water User's Associations. The Act is explicit about control of water pollution, water sport control and use of water for irrigation purposes among others.

The key drivers and considerations that prompted the review of the existing water laws and the promulgation of a revised law were:

- Fulfilment of international environmental commitments as articulated in the Rio Conventions
- Acknowledgement that the existing system of water allocations and management were not functioning effectively
- Prepatory stages of the Komati River development (Maguga Dam) project and the Lower Usutu Smallholder Irrigation project that required international consensus and coordination on the use and storage of international waters
- Ratification of the SADC Protocol on Shared Watercourse Systems in 2000 that required national regulatory instruments be in place

Historically, water management was a shared responsibility between several government ministries that as a result of the cross-sectoral nature of water use and management was a difficult sector to plan developments and increase efficiency. Today, at least, the cross-ministerial confusion has decreased with the Water Act being the supreme law governing water and assigning responsibility of its management to the Department of Water Affairs. One weak area of the Water Act is its lack of recognition of the importance of sanitation. Little is said on provision of water for sanitation and there is no formal policy to guide rural sanitation needs. Urban sanitation requirements are handled by the Swaziland Water Services Corporation who treat and distribute bulk water supplies and also treat waste water. They are also entrusted with maintaining and developing the physical infrastructure.

The Water Act of 2003 recognises the fundamental importance of IWRM and the key principles are enshrined in the Act - Economic Efficiency, Social Equity and Ecological Sustainability.

The absence of an approved policy does hamper strategic decision-making by the entities mandated to manage and utilise water. To fill this policy gap, the Government of Swaziland in association with the Global Water Partnership, is developing a water policy. It is likely that this policy will be put to stakeholders before the end of 2009.

3.2 Institutional Arrangements

The National Water Authority (NWA) is responsible to advise the Minister on policy directions relating to water affairs at national level. It is also responsible to coordinate the work of different

boards, water sector agencies and international water commissions. The Department of Water Affairs within the Ministry of Natural Resources and Energy is the secretariat for the NWA, and it provides technical support and advice to the authority. It is composed of the Water Resources Branch, the Rural Water Supply Branch and the Geological Surveys Unit. The other ministries that are recognised as key to water resources development are the Ministry of Agriculture, the Ministry of Economic Planning and Development and the Ministry of Health. The Ministry of Agriculture has a Land and Water Development section that is responsible for designing and construction of small irrigation dams. The Environmental Health department of the Ministry of Health is responsible for construction of pit latrines and providing hygiene education on proper use of drinking water and sanitation facilities. On a smaller scale, the department is also involved in spring protection. The Ministry of Economic Planning and Development is responsible for allocating resources to national policy objectives and priority development initiatives and for co-ordination and monitoring of the technical and financial implementation of all the development plans and programmes.

The Swaziland Water Services Corporation is a parastatal organization that is responsible for operation and maintenance of water and sewage facilities in urban areas of the country. The Rural Water Supply Branch of the Department of Water Affairs on the other hand is responsible for design, construction and maintaining water supply schemes in rural areas. The Swaziland Water and Agricultural Development Enterprise facilitate small-scale irrigation for commercial purposes. The other private irrigation water service providers are Mhlume Water Company, Big Bend Canal Users Association, Inyoni Yami Swaziland Irrigation Scheme and Komati River Basin Authority. These service providers supply bulk water for irrigation within different basins. The Mhlume Water Company, Inyoni Yami Swaziland Irrigation scheme and Komati River Basin Authority supply water to irrigators within the Komati river basin, while the Big Bend Canal Users Association supply water within the Usutu river basin.

A total of five River Basin Authorities are to be established in the country. The Act calls for establishment of the basin authorities within five years after coming its coming into force. However, currently only two River Basin Authorities have been established (Komati and Usutu). A River Basin Authority consists of representatives of all the relevant water sectors in the basin, and the members are nominated by basin stakeholders. The River Basin Authorities report to the National Water Authority. The specific duties of the River Basin Authority are to allocate water within river basin, to monitor water use and pollution and to collect levy and water use charges. The Irrigation Districts are responsible for efficient utilization of water within their sub basin. They ensure that every one takes water according to the permitted volumes and they encourage efficient use of the available resource in the local area. It is the responsibility of the Ministry to establish Irrigation Districts upon recommendation of the NWA. Two thirds of the permitted users of water in an area have to partition the NWA to incorporate an Irrigation District. The Irrigation District reports to the River Basin Authority. A Water Users Association can be formed by permit holders in a defined area with the objective of maximizing the benefits from such permits to members of the association is not a statutory body.

The Water Act of 2003 calls for decentralization of water management, but the process is not yet fully operational. The decentralization as envisaged in the Water Act allows for policy development, water regulation, water resources infrastructure management and water monitoring and auditing at basin level. It does not adequately allow for catchment management and water supply and

sanitation. The mandates and roles of institutions that are established by the Water Act are clearly defined within the Act. The implementation of the Water Act is however behind schedule, and it is hindered by the lack of a national water policy, capacity and funding constraints among others. A draft water policy has been produced and is being refined. The NWA has reasonable capacity within the Secretariat (Directorate of Water Affairs). On the other hand there are envisaged problems with the other two statutory bodies (River Basin Authorities and Irrigation Districts) as the Act does not establish Secretariats for them. Board members are expected to undertake their duties on part time and voluntary basis being supported by dedicated professional staff for technical issues and operational procedures. The tasks expected from these bodies need full time officers with adequate financial and institutional support and recurrent budgets financed through water levy's. Consultative meetings have been held within the different river basins to make stakeholders aware of the Water Act and its implications, including the institutions that it created.

Bilateral and multilateral donor institutions that support Swaziland in the water sector include the Canadian International Development Agency (CIDA), Department for International Develoment (DFID), United States Agency for International Development (USAID) Republic of China, United Nations Development Program (UNDP), World Health Organisation (WHO) and the European Union (EU). On the other hand there are several NGOs operating in the country that have interest in water issues and include World Vision, Yonge Nawe and African Corporation Alliance Trust (ACAT). Such interest varies between advocacy and improving rural water supplies and sanitation coupled with small-scale agriculture. The traditional leadership that consists of chiefs and *indunas* who administer customary laws, play an important role in utilsation and management of water resources though they are often ill-equipped to handle the technical complexities of water management.

3.3 Water Strategy and Instruments

An IWRM approach requires positive change in the enabling environment, in institutional roles, and in management instruments. Fundamentally, it is about change in water governance, i.e., the range of political, social, economic and administrative systems that are in place to develop and manage water resources and deliver water services, at different levels of society. An IWRM approach requires that policies and priorities take water resources implications into account, including the two-way relationship between macro-economic policies and water development, management, and use. It also requires that there is cross-sectoral integration in policy development. The stakeholders should be given a voice in water planning and management, with particular attention to securing the participation of women and the poor. Water-related decisions made at local and river basin levels should be in-line with, or at least not conflict with, the achievement of broader national objectives, and water planning and strategies should be integrated into broader social, economic, and environmental goals. In the end, success or failure depends on the ability to catalyze change. This is what matters - not the specific process, not the form of the strategy, but whether or not positive action results. The Swaziland Water Partnership has been working closely with all stakeholders in facilitating the change that is needed. Workshops and information brochures and newsletter are used to broaden knowledge and exposure to the practicalities of IWRM planning.

At the time of this report preparation, Swaziland does not have an approved IWRM Plan. The formulation of the plan began in 2005 with funding through the Global Water Partnership and is still a work in progress.

The IWRM Plan is expected to articulate and recognise the key principles of IWRM. The Government of Swaziland has recognised this process and will integrate its strategic direction into its long-term water management planning process.

The Water Act of 2003, though not specifically recognising the need to prepare an IWRM Plan, does require the Department of Water Affairs to produce a Water Resources Master Plan (WRMP). Consultants were appointed in 2008 to prepare this plan. The WRMP is broadly a combination of an IWRM Plan and a WRMP. The resulting document will be an Integrated Water Resources Master Plan that combines essential IWRM principles and procedures (namely stakeholder consultation, capacity building, training and research in water development and management). It will also encompass sustainability issues by developing a strategy for financing IWRM implementation and also reviewing national development plans, policies and strategies and recommend guidelines for integrating water issues into the said instruments.

It is the intention of the Department of Water Affairs and relevant ministries to embrace both activities and produce a synergistic plan for IWRM in Swaziland.

The objectives of the Integrated Water Resources Master Plan (IWRMP) are to consolidate information accrued from various national and regional studies on water into one strategic document quantifying available water resources in each river basin, present and future water requirements by sector for the years 2015 and 2025, reaffirm the country's transboundary water requirements and quantify environmental flow requirements.

In addition the IWRMP will:

1. Identify and fill information and data gaps in water resource development and management looking at domestic water supply and sanitation and assess the potential for large water transfer schemes to service large national projects in water scarce areas
2. Investigate potential for groundwater utilisation and development
3. Identify alternative sources of water, eg water demand management and rainwater harvesting
4. Develop a national water allocation criteria
5. Propose water quality management interventions
6. Propose good practice guidelines for catchment management
7. Evaluate systems for prioritising water resource development
8. Develop an implementation plan and financing mechanism for water resource management and development

The preparation of a now revised IWRM Plan, with the financial support of the Global Water Partnership, has been mandated to the Swaziland Water Partnership office. This office and its officers are being housed and supported by the Swaziland Water Agriculture Development Enterprise (SWADE), a government parastatal mandated to implement large-scale water management projects

that focus on poverty alleviation and commercialisation of agriculture.

Through this office, various studies and consultative workshops and meetings have paved the way towards more informed decision-making by stakeholders.

The formulation of the IWRM Plan is being conducted in a participatory manner. Civil society, private sector and government departments have all been targeted with a range of information on IWRM to better facilitate participation and decision-making.

The formulation of the revised IWRM Plan is still a work in progress and such progress has been hampered by capacity constraints within water professionals in the country. Much of the technical capacity to collect, collate and develop strategies is limited to a few individuals. Funding constraints has prevented regional or even international technical assistance in the process. Though this maybe considered a negative, in reality it's a positive as the process has built up a national sense of duty or obligation that will ensure the final plan recognises the core concerns of stakeholders and recommends enlightened and practical strategies to meet national water demands.

Linkage with other sector planning processes

Swaziland's highest level development plan, the National Development Strategy (NDS), was finalised in late 1999. The NDS recommended the following strategies on water resource development:

a) Policy and Legislative Matters
- Develop an overall policy to cover all water use.
- Establish a water sector committee and initiate the statutory adoption of the draft Water Act.

b) Planning and Management
- Enter into negotiations for shared waters guided by a National Water Master Plan.
- Promote catchment management plans for major river systems, dams and irrigation works.
- Establish a research programme in land and water management, irrigation system design within a designated Ministry.
- Integrate water supply, sanitation and health education into a single programme.

c) Research
- Update information pertaining to all the river basins to facilitate detailed investigation for future water resources development.
- Explore future exploitation of ground water resources.

d) Access and Use
- Combine hydro and agricultural uses.
- Increase access to safe drinking water from the present status.
- Expand smallholder irrigation within a national irrigation development plan whilst encouraging farmers to utilise all available water catchments.

e) Water Conservation
- Encourage implementation of watershed conservation plans for each dam system.
- Plan and construct small to medium size dams to provide a reliable source of water for small scale irrigation, livestock, fisheries and domestic use.

f) Efficiency
- Optimise available resources, land, human and finance in promoting irrigated agriculture.

- Promote and foster efficient and sustainable land and water resources.

g) Participation

- Encourage and facilitate the participation of private commercial estates, communities, farmers and other agencies in irrigation development.
- Increase participation of communities in the planning, implementation and maintaining of water supply systems.

A review of these strategies suggests that many of them have still to be either implemented or initiated through the IWRM planning process.

As the highest level policy for Swaziland, the NDS was supposed to foster integration of development planning across all sectors and ministries. In reality the level of integration has been mixed. It is not uncommon to find sectoral policy strategies, e.g. health or agriculture, to conflict with some of the NDS recommendations.

Sectoral policy formulation has been, in certain cases, characterised by poor coordination and oversight to ensure that conflicts that may arise between policies are corrected. A Public Policy Coordination Unit (PPCU) was established under the Prime Minister's Office to provide this oversight, but in some cases, usually due to differing levels of understanding by the PPCU of the technicalities of the sector, disjointed and even conflicting strategies have slipped though.

The PPCU should not shoulder all the blame as the water sector entities themselves very often did not participate in the policy formulation processes and thus their insight and familiarity of IWRM and its principles were never adequately recognised. In addition the utilisation of various consultants to facilitate the policies often led to differing emphasis on issues with which the consultant was more familiar, e.g. the Housing Policy (2001) concentrates on the provision of urban sanitation and water supply without recognising the physical constraints of providing expanding settlements with potable and affordable water.

Policies formulated in more recent times, i.e. since 2004, have generally recognised the practical and natural limitations of water and sanitation provision and have sought guidance from the water sector on how to overcome these challenges to ensure the policy if relevant and appropriate.

Along with legislative instruments institutional arrangements to effect policy and legislation, within the water sector, have been established. The National Water Authority is now the supreme body on all water issues. The mandate and composition of this body has already been reported on in 3.2.

3.4 Practice (Implementation) of IWRM

The implementation of IWRM has not taken place in Swaziland so far. As has been described previously, the process of formulating an IWRM plan is still on-going, however, from the activities so far carried out by national water managers, it is becoming clear that the practicalities of implementing IWRM at basin level is achievable.

With the guidance provided by the Water Act of 2003 coupled by the efforts of the Swaziland Water Partnership, decision makers, water users and the general public are more informed on the practicalities of IWRM implementation. However more informed does not necessarily mean that all sectors are prepared for the impacts that will arise in IWRM implementation. Sectoral conflicts over a

scare and valuable resource will arise as the IWRM plan is implemented. Each sector will believe that they deserve a greater proportion of the water than a perceived less important entity. The reform of the previous water management approach will take time and during this transition a lot of effort will be needed to bring consensus amongst all stakeholders. The coordinated development of any developing nation is a mammoth undertaking. Satisfying the water needs and aspirations of the various water users will require a balanced approach supported by concrete data and information on the physical existence of water in the country. Once the inflows and outflows are calculated and known, this water pie can be divided up.

The Global Water Partnership has defined the IWRM as a process: "which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems". Thus IWRM builds on three basic pillars: (1) an enabling environment of proper water resources policies and legislation; (2) an institutional framework of capable institutions at national, local and river basin levels, and (3) a set of management instruments for these institutions.

The above process has to assume (or works in parallel to the formulation) that policies or plans for land and related resources have been developed and that a balance has been agreed upon for economic and social development and that the ecosystems upon which all water is obtained have themselves been identified and are being managed in a manner which does not degrade them. It is highly unlikely that any country has achieved this level of integrated planning and Swaziland would be one of those countries. Hard choices and decisions will have to be made to reduce areas of conflict over this resource in a vacuum of limited knowledge and planning on all cited elements. The realities of implementing IWRM, in its strictest interpretation, will remain an unknown until the day comes to make the hard choices and decisions.

As discussed above, achieving integrated environmental objectives for water resource management, including international obligations, without an explicit and integrated policy framework will require the support and cooperation of many different stakeholders. At the time of writing, Swaziland does not have an approved environment policy but does have an Environmental Action Plan (1999) which does not explicitly contain strategies for water resource management.

To ensure that environmental (catchment/ecosystem) requirements are adequately reflected in the decision made on national water resource management a stronger policy or strategy will be required.

Part V of the 2003 Water Act requires that any entity wishing to abstract water from a river or groundwater requires a permit. Currently, pending the establishment of River Basin Authorities, these issuing of these permits rests with the Water Apportionment Board. Certain obligations are passed on to the user to ensure that the conditions of the permit are not abused. The allocating authority has the power to change these conditions during times of low flows and other hydrological emergencies. In applying for a water permit, the user is required to answer questions regarding the ultimate use and quantity of water being requested. As a result of this process, data and information on who uses water, where and how are recorded and can, in due course, be analysed to extract sectoral users and quantities allocated. In terms of the Water Act, the powers, duties and functions of River Basin Authorities include the following:

- to keep a data base of basin information, including water availability and water demand data, and to monitor and keep record of changes in water conditions in the basin;
- to issue, amend and renew or suspend water permits;
- to impose water restrictions on all water users in times of water shortage;
- to investigate the need for water resources development and management and to advise the Authority on the need to appoint Project Boards;
- to investigate the need for inter-basin transfers, to negotiate it with other basin authorities, and to advise the Authority in respect thereof;
- to arbitrate user disputes;
- to monitor and control water quality and enforce effluent regulations;
- subject to the approval of the Authority, to levy and collect rates and charge to defray part or all costs of the River Basin Authority;
- have authority over Irrigation Districts, Project Boards and User Associations.

With experienced and knowledgeable basin managers, the collection, collation and interpretation of the data collected through water permits can be used to effectively manage and allocate water to users. Clear guidelines or operational procedures will need to be developed by each basin to ensure the equitable sharing of the resource, without degrading the ecosystems upon which it depends, can be achieved.

Swaziland is currently in the process of establishing five River Basin Authorities. This process is being driven by the Department of Water Affairs who are providing the institutional support to interim steering committees, elected by basin stakeholders, to organise themselves into functioning entities. Each RBA is or has developed their own constitution that reflects their collective responsibilities and obligations as described in the Water Act. Empowering the RBAs to become self sustaining water authorities is the objective of this establishment process. Identifying strategic allocations that benefit both the economic development of the country as well as the social and environmental requirements is one area that the RBAs will have to address. Such allocations can be achieved indirectly, often through gains in water efficiency, using tools such water pricing and tariffs, the introduction of appropriate incentives and subsidies, and the removal of ill-considered incentives and subsidies both inside and outside the water sector. Many challenges lie ahead for these authorities with respect to securing technical and financial support to ensure that the operational obligations of each RBA can be achieved.

One of the key activities of each RBA is to become a self sustaining entity. The Water Act empowers each RBA to develop its own pricing structure for the water that they allocate and manage. The Act stipulates that each RBA can “levy and collect rates and charge to defray part or all costs of the River Basin Authority”. Currently bulk water is provided to users free of charge, beyond the cost of the permit. The implementation of a pricing mechanism to cover RBA operational and developmental plans will likely be met with some resistance until demonstrable benefit is observed on how the collected funds are effectively utilised. Sensitivity in developing the pricing structure will play a key role in ensuring acceptance of the principle of user fees. It is likely that the NWA will, for many years to come, be heavily relied upon to provide for shortfalls in income generation by the RBAs.

In the absence of a water policy and limited institutional support, international principles and approaches for water management will be selective. Currently the only effective instrument to

ensure that these broad principles are considered is the implementation of the Environmental Management Act, which requires that for almost all water resource development projects, environmental impact assessments are carried out to identify the core environmental challenges and opportunities. Depending upon the experience of the consultants used to prepare these impact statements, the inclusion of international principle for water development projects should be achievable and binding.

Through the Swaziland Water Partnership supported in part by the Department of Water Affairs, stakeholder empowerment on IWRM has and is taking place. Since the start of the IWRM formulation process stakeholders have had the opportunity to attend various informative workshops on IWRM. To provide a visible illustration of IWRM, the Swaziland Water Partnership has initiated the rehabilitation of a community managed small earth dam. This dam and catchment have been used to implement several key IWRM philosophies and also to demonstrate several catchment management practices that ensure the sustainable utilisation of the impounded water that benefits both humans and livestock and considers the environmental needs of the catchment.

3.5 Monitoring and Evaluation

Monitoring and information systems to support decision making, evaluation and review of water resources will be critical in achieving sustainable water resource development and utilisation. Decision-makers have to base their decisions on up-to-date data and information. In terms of the 2003 Water Act, RBAs have a variety of responsibilities for monitoring water quantities and qualities within their basins. The Act is silent on how this is best achieved and such decisions are left to the governing bodies of each RBA. Ideally the monitoring and information systems will be digital so that modern GIS approaches and software can be used to assist in decision-making. Lessons can be learned or successful examples of existing structures and systems reviewed and or visited regionally to explore viable and relevant options RBAs can adopt or adapt to their specific needs. South Africa is probably the best example of RBA type structures that have been operational for several years with mixed results.

In terms of the 2003 Water Act each RBA will be required to implement some form of monitoring procedures. The form and nature of such a system will be left to the RBA governing bodies informed and or supported by the NWA.

Swaziland does not have a formal M&E mechanism for policy or development plans. Fiscal M&E does take place for some projects but this is often due to donor requirements. RBAs will have to develop their own systems of monitoring national plans that affecting their basin. To assist in this the NWA is often a participant on major project committees and can thus relay information down to the RBAs on issues or activities that may affect them. RBAs will also be represented on project committees within their basin particularly if such projects are large-scale. Mechanisms are still to be developed on the roles and responsibilities of RBAs on basin projects. In addition, information can be gained via the RBA membership, which includes representatives from the following user sectors: domestic, agriculture, forestry, conservation and mining/industry.

CHAPTER 4: ACTUAL STATE OF WATER ACCOUNTING

4.1 Reliability of the Water Use Information

In general water use information is lacking. Water allocated for irrigation is more closely monitored due to the permit requirement but the actual volume of water abstracted/used is poorly monitored and any data or information that is collected is not easily accessible. Accurate and reliable data on water use is available at a national scale from the Department of Water Affairs. Such data was last captured in 1996 (see Tables 4, 5, 6 and 7). No systematic process in place to collect or make available the water use by sector. Accurate and reliable data on water use in the different basins is available. More detailed information and data exists in the large-scale irrigation project areas, eg LUSIP and KDDP. Inadequate or outdated data is available on water uses for sanitation. In urban areas this data is obtainable through the Swaziland Water Services Corporation in rural areas such data is very limited. Future water demand (2010) has been estimated by river basin and by sector (million m^3 per annum) as shown in Table 5. The present water demand by sector (for 2005) is shown in Table 6, while Tables 7 and 8 show projected irrigation water demand and projected domestic water demand respectively.

Table 5: Future water demand by river basin and by sector

	River Basin				
Sector	**Komati (includes Lomati)**	**Mbuluzi**	**Usutu**	**Ngwavuma**	**Pongola**
Irrigation	280.0	180.0	400.0	42.0	8.5
Urban domestic			30.2	2.1	
Rural domestic			5.11	1.43	
Industry & others (university, schools, etc)			13.35	0	
Livestock	30.0	25.0	11.32	2.4	3.0
Fishery			0.38	0.07	
Forestry	55.0	0.2	62.963	0.024	0.5
Hydropower	-	-	525.6	23.7	-
Tourism	-	-	0.56	100.2	-
Ecological reserve	95.0	92.0	523.6	29.7	12.0

Table 6: Present water demand (2005) has been estimated by sector

No	Key Water Balance Area	Irrigation (Mm^3/a)	Industrial (Mm^3/a)	Rural (Mm^3/a)	Urban (Mm^3/a)	Forestry (Mm^3/a)	Inter-basin Transfers (Mm^3/a)	Total Consumptive Use (Mm^3/a)	Total Consumptive Use (as %)
1	**Ngwavuma**	41.96	0.16	0.89	0.78	12.95	0.00	**56.76**	**8.5**
2	**Upper Mkhondvo**	0.26	0.08	0.26	0.17	13.10	0.00	**13.87**	**2.1**
3	**Mkhondvo**	1.17	0.00	0.22	0.22	1.28	0.00	**2.89**	**0.4**
4	**Pongola**	3.87	0.00	0.00	0.00	0.00	0.00	**3.87**	**0.6**
5	**Ngwempisi**	0.32	0.00	0.46	0.11	19.80	0.00	**20.69**	**3.1**
6	**Upper Great Usutu**	14.86	1.56	0.30	0.56	15.40	0.00	**32.68**	**4.9**
7	**Lusushwana**	23.15	4.18	1.04	17.53	34.40	0.00	**80.30**	**12.1**
8	**LUSIP**	237.27	0.17	1.08	0.38	0.00	0.00	**238.90**	**35.9**

No	Key Water Balance Area	Irrigation (Mm^3/a)	Industrial (Mm^3/a)	Rural (Mm^3/a)	Urban (Mm^3/a)	Forestry (Mm^3/a)	Inter-basin Transfers (Mm^3/a)	Total Consumptive Use (Mm^3/a)	Total Consumptive Use (as %)
9	**Lower Usutu**	187.22	3.58	0.01	1.41	0.00	0.00	**192.22**	**28.9**
10	**Lusushwana**	0.00	0.00	0.05	0.00	10.88	0.00	**10.93**	**1.6**
11	**Mpuluzi**	0.00	0.00	0.07	0.00	12.00	0.00	**12.07**	**1.8**
12	**Middle Usutu**	0.00	0.00	0.02	0.00	0.00	0.00	**0.02**	**0.0**
13	**Mbuluzi**	329	10.2	0.60	12.00	-	7.60		
14	**Komati**	261		22					
15	**Lomati**								
Total Sector Water Requirements (Mm^3/a)		**510.08**	**9.73**	**4.40**	**21.16**	**119.81**	**0.00**	**545.37**	
Total Sector Water Requirements as %		**76.7**	**1.5**	**0.7**	**3.2**	**18.0**	**0.0**	**100.0**	**100.0**
Total Sector Water Requirements as a %		**76.7**	**1.5**	**3.8**		**18.0**	**0.0**	**100.0**	**100.0**

Table 7: Projected Irrigation Water Demand (Mm^3/a)

Catchment	Year					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Ngwavuma	47	48	48	48	48	48
Upper Lusutfu	40	41	42	43	43	43
Lower Lusutfu	269	338	562	562	N/A	564
Mbuluzi	239	N/A	261	N/A	292	N/A
Komati						
Lomati	225	262	N/A	N/A	N/A	N/A

N/A ï not available.

Table 8: Projected Domestic Water Demand (Mm^3/a)

Catchment	Year					
	2005	**2010**	**2015**	**2020**	**2025**	**2030**
Ngwavuma	1.67	1.79	1.87	1.92	N/A	2.04
Upper Lusutfu	20.99	22.78	24.16	25.27	N/A	27.69
Lower Lusutfu	3.38	3.62	3.79	3.90	N/A	4.13
Mbuluzi	12.6	N/A	16.7	N/A	22.7	N/A
Komati						
Lomati	14.98	22.0	N/A	N/A	N/A	N/A

N/A ï not available.

4.2 Allocation of Water

The responsibility of water allocation is with the Water Apportion Board. The powers of the Water Apportionment Board are to be transferred to each River Basin Authority as soon as the River Basin Authorities are established. The water allocation system is based on area of land, as well as available

water in a river close by. The Board allocates water to one irrigated hectare on the theoretical basis of 0.771ℓ/s per ha above 530 meters above sea level and 0.875ℓ/sec below 530 metres above sea level, 24 hours per day and 365 days per year irrespective of the crop grown.

The standard figure for livestock water demand is 75 ℓ /cattle head per day. Extrapolating the standard figure of cattle head to livestock unit (LSU) the requirement per head of goat or sheep can be estimated to be 17ℓ, since six head of goat or sheep are often regarded to be equivalent to one LSU.

The National water Authority has endorsed the following volumetric allocations for different crops on the basis of crop water requirement:

- 8,000 m^3 per hectare per annum for irrigation of maize and vegetables
- 10,881 m^3 per hectare per annum for irrigation of sugarcane around Malkerns area
- 13,650 m^3 per hectare per annum for irrigation for irrigation of sugarcane in the north and south regions of the country
- 13,487 m^3 per hectare per annum for irrigation of sugarcane in the LUSIP area

The Water Act of 2003 has introduced volumetric allocation and discussions are ongoing at the level of the Water Apportionment Board and the National Water Authority on effecting the volumetric allocation. In the Komati, allocations are already in volumetric terms (at 12,000 m^3 per hectare per annum), although this is viewed as an interim arrangement.

Two hydroelectricity generation systems of Swaziland are located in the Usutu basin. The third one is located on Maguga dam along the Komati basin. The water is used for electricity generation, and let to flow back into the river, and therefore is available for other uses such as irrigation, domestic and urban water supplies. For the Ezulwini power station a flow of 0.5m^3/s is necessary for each MW generated, while a flow of 1m^3/s is necessary for each MW at the Edwaleni power station. The compensation flow, which is the flow to be maintained in the river for environmental purposes, has been set at 0.14 m3/s for Luphohlo-Ezulwini as well as the Lusushwana river and the Usutu river. A total of 60 MW is generated from hydroelectricity facilities. Two other private generation plants producing 3 MW are located along the Ngwavuma and Usutu River. The Water Apportionment Board allocated 750ℓ/sec on the Ngwavuma and 0.5ℓ/s along the Usutu River. When allocating water, domestic water requirement takes priority, to be followed by environmental requirement and then industry. Agriculture gets the last priority in water supply.

4.3 Water Pricing and Tariffs

Water pricing and tariffs are only applied to treated water or companies that manage large irrigation water distribution networks. Historically water has been treated as a free resource requiring only permission to abstract certain quantities at certain times of the year. This lack of valuation of water has resulted in major inefficiencies in its utilisation, particularly where it has been used for irrigation as 95% of Swaziland surface water is used for irrigation. In terms of the 2003 Water Act, water now has a value. Several references are made on the establishment of water user fees. In Part II, section 10 subsection 6(f), one of the objectives of the Water Resource Master Plan is “to develop a water

pricing policy based on the economic value of water". In Part II, section 8 (c), one of the functions of the NWA is "the setting of fees or charges for covering operation, cost and maintenance of government works, application fees, fees for appeals or charges for use of water". In Part IV, section 28 (2) where the powers, duties and functions of River Basin Authorities are stated, the following forms one of the responsibilities of each RBA – "subject to the approval of the Authority, to levy and collect rates and charge to defray part or all costs of the River Basin Authority". Although the Water Act has now been in effect for five years, little movement has been reported on implementing the above requirements due to the on-going process of preparing the Water Resources Master Plan and the establishment of RBAs. It can be expected that once the WRMP has been completed and approved, the NWA will initiate its responsibilities as presented in Part II, section 10 subsection 6(f). However, Part II, section 8 allows for the gradual implementation of the Plan and by default any strategy recommended in the WRMP can be delayed. Section8 reads "The Authority shall develop and adopt the Plan in stages and shall prepare for the approval of the Minister a schedule and timetable for the proposed development of the Plan".

It is likely that once a pricing and or tariff policy or regulations are in place that charges will be based on volumetric units. It is also likely that each RBA will establish its own pricing structure reflecting its water development needs and basin management complexity. As presented above, no pricing structure is yet in place for bulk water abstraction, however, a pricing structure does exist for the sale of treated water in mainly urban areas but also in some rural areas. Treated water pricing that is reviewed annually is available from the Swaziland Water Services Corporation (SWSC). The SWSC uses meters to charge customers for the water. If the property is connected to the public sewerage system, a charge of 90% of water consumed is levied against the property. It sets different tariffs for residential and non-residential consumption as shown in Table 9. The minimum monthly charge for residential is R52.85, while that for non residential is R198.60. The cost for $1m^3$ for public connections/prepaid meters is R3.65. Rural water supplies are priced for operation and maintenance and costs covered by users either monthly usage fee (flat rate) or via meters.

Table 9: Tariffs for treated water charged by the SWSC

Volume (m^3)	Charges for residential (R)	Charges for non residential (R)
1-10	2.55	6.55
11-25	6.55	6.55
26-50	9.80	11.15
>50	11.15	11.15
Monthly minimum charge	52.85	198.60

Source: Swaziland Water Services Corporation (www.swsc.co.sz)

4.4 Economic Data

Gross domestic products figures are compiled by the Central Bank of Swaziland for each sector at national level, but not at sub-national level. The GDP figures for example show that agriculture forms the backbone of the country's economic activity. A large part of the GDP is directly related to agriculture, as much as the value added in the manufacturing sector arises from processing agricultural products. The GDP figures are further presented on the basis of land tenure. For example the GDP on Swazi Nation Land rose by 27% in 2007 due to good performance of the maize sub sector during the 2006/2007 cropping season. This was because of good rains, as agriculture in Swazi Nation

Land heavily relies on rainfed agriculture. The Title Deed Land that relies on irrigation is less affected by drought where water storage facilities are available and comprises mainly sugarcane, citrus, timber and pineapple. This sector displayed positive growth during 2007, with real value added expanding by 1.7%, compared to a decline of 1.6% in 2006.

The Central Statistics Office on a monthly basis compiles the national consumer inflation index. The overall index for 2006 was 5.3, while that for 2007 was 8.1. The GDP figures are reliable as a dedicated unit of the Central Statistics Office calculates them on a monthly basis. They are available on request from the Central Statistics Office, and the Central Bank of Swaziland collates and interprets them every year, and presents a trend on the performance of the country and different sectors and sub sectors over the years. Table 10 shows GDP figures for Swaziland for 2003 to 2007.

Table 10: Percentage sector contribution to GDP at basic prices

Sector	Year				
	2003	2004	2005	2006	2007
Agriculture, hunting, forestry and fishing	13.9	13.1	13.4	12.8	12.7
Mining and quarrying	0.3	0.3	0.3	0.3	0.2
Manufacturing	33.3	32.7	32.1	31.9	31.7
Electricity, gas and water supply	1.5	1.4	1.4	1.5	1.5
Construction	4.6	4.4	3.7	3.7	3.5
Wholesale, retail, hotel and restaurants	7.1	7.5	7.9	8.5	9.0
Transport and communication	8.5	9.8	10.5	10.4	10.3
Financial intermediation	4.2	4.2	4.2	4.3	4.3
Real estates and renting	6.9	6.8	6.7	6.7	6.7
Public Administration	18.2	18.3	18.1	18.4	18.6
Other community and social activities	1.6	1.6	1.5	1.5	1.5
Total value added	100	100	100	100	100

Source: Central Bank of Swaziland (www.centralbank.org.sz)

4.5 Economic Water Accounts

Economic water accounting is a relatively new concept that has been implemented by a number of developed countries and some developing countries, including Botswana, Namibia and South Africa. It has not yet been implemented in Swaziland. The Water Resources Master Plan as required by the Water Act of 2003 however encompasses some principles of integrated environmental and economic accounting for water resources. The plan intends to contain an inventory of the total water resources of Swaziland, and a comprehensive programme of action in which the maximum value (however this will be defined) can be obtained from this resource. The objective of the plan includes setting down social and economic criteria for evaluating alternative water resources development and developing water conservation objectives including water quality objectives. The River Basin Authorities are responsible for keeping an active database of basin information, including water availability and water demand data, and to monitor and keep records of changes in water conditions in the basin. The Water Resources Branch of the Department of Water Affairs is responsible for collecting and keeping information on river flows and to some extent water usage. Estimates of allocation of water per sector for 1996 for different river basins are available and they can be used to generate economic water accounts, even though the accounts may not be reliable (see Tables 4, 5, 6, 7 and 8). It is expected that one of the outcomes of the Water Resource Master Plan will be up-to-date and

reliable information on the physical water supply and current use by sector and indications of future water requirements or demands. Information on costs associated with water use and supply in Swaziland is currently not available, and it needs to be collected and determined. The Central Statistics Office of the Ministry of Economic Planning and Development is responsible for collecting and compiling information of social and economic indicators in the country, however the office does not collect and keep up-to-date, detailed information on water use and supply for the different river basins and water use sectors. The introduction of a broader 'natural resource accounting' system would provide many benefits to sectors beyond water use including land use and natural vegetation use.

In order to generate economic water accounts, information needs to be colleted from various sources that include government departments, industries, water suppliers and local councils. The water sector situation report that was conducted by Knight Piésold in 1997 provided a good source of information on water assets (for river basins and groundwater water) and water demand for the different sectors. The Water Allocation Board also keeps records of water allocation for the different river basins. The Swaziland Water Services Corporation has records on urban and industrial water uses over the past 20 years. Information on water that is stored in the dams in the country is available from the Water Resources Branch of the Department of Water Resources. Human capacity may not be available within the National Water Authority to introduce economic water accounts since the concept is relatively new in the country, but they will need to find ways of achieving this.

CHAPTER 5: FUTURE PERSPECTIVES

5.1 Key Lessons from the Country Experience

The Water Act is the authoritative piece of legislation on water management issues in the country which integrates and decentralises water management and it establishes a number of institutions. River Basin Authorities were to be established within five years after the signing of the Act, however, five years down the line only two River Basin Authorities have been established. With regards to establishing institutions, it was easy to form River Basin Authorities in the Komati and Usutu basins because there exists organisations that have united some stakeholders on a common cause (irrigated agriculture). In the case of the Komati basin, small-scale irrigated farmers have already created water user associations, and are using water from Maguga dam to irrigate their fields under the Komati Downstream Development Project (KDDP). In the case of Usutu basin, small-scale farmers fall under the LUSIP and are in the process of forming water user associations to exploit the water resources being made available to them through the project. The small-scale farmers responded positively when meetings were called to discuss water issues, and to nominate their representatives to the basin authority. The time frame of five years given to establish River Basin Authorities appeared to be enough, but it has been shown that when different stakeholders are involved in setting up institutions, more time is needed to inform and create awareness to the stakeholders. Stakeholders' participation in the form of capacity building and creating awareness is costly, as there may be need of financial or technical benefits before they can take part in the process. The financial incentives may come in the form of refunds for transport costs, provision of meals or some personal allowances. Financial requirements for implementation of IWRM may go beyond government allocations and there is need for creative and sustainable means of raising additional funds. When

forming the institutions that are established by the Act there may be problems of imbalance between the stakeholders in terms of capacity to understand the concept of IWRM and to follow proceedings, as representatives of small-scale farmers in Swazi Nation Land may have a lower educational background compared to representatives of large-scale commercial companies. This imbalance may lead to domination of activities by representatives of large companies who may be experts in IWRM leaving the smaller water user unsatisfied.

Water use and water allocation is a sensitive issue for customary use. The Act sets a limit of one quarter of a hectare for irrigation under customary use, and a herd of 30 cattle for livestock watering. This implies that anyone who irrigates above a quarter of a hectare or waters more than 30 cattle will need a permit. Such requirement is likely to face opposition within the traditional structures of the country, as it is believed that water is a free commodity. The larger water users have often commented that the collective resource made available for 'primary water' can far exceed that being sought by the large and economically active, water users.

Human capacity in the form of experts in IWRM will be a problem in Swaziland. Very few people are trained in the field, and those who are trained are in high demand, and they often leave government and public institutions for private institutions (home and abroad) that may offer better terms and conditions of service. Without government's resource commitment and political will, the process of IWRM will not be successful.

5.2 Future Perspectives and the Need to Continue the Process

Swaziland has made a decision to adopt the IWRM approach in preparing the National Water Resources Master Plan, which is a statutory requirement. According to the Water Act, the Plan should be reviewed every three years. It is expected that the Integrated Water Resources Master Plan will be completed by July 2009. Through this process it is expected that up to date information on national water resources will become available that will assist in planning and allocation. The next step will then be the implementation of the Plan. The following actions are needed in order to continue the process of IWRM:

1. **Setting up all institutions that were established by the Water Act of 2003:** The Water Act established a number of institutions that are crucial in implementing the Integrated Water Resources Master Plan in the country. They include the Department of Water Affairs, the National Water Authority and five River Basin Authorities. The Department of Water Affairs and the National Water Authority has been established as well as two River Basin Authorities. The National Water Authority in conjunction with the Swaziland Water Partnership is facilitating the establishment of the other river basin authorities. Their constitutions have been prepared and consultation with stakeholders is in progress.

2. **Capacity building on IWRM:** The Swaziland Water partnership held a one day introduction training course on the IWRM Tool Box for stakeholders in the country. The concept of IWRM was discussed with the need to achieve a balance between economic efficiency, ecosystem sustainability and social equity. There is need for follow up training workshops with all relevant stakeholders on implementation of IWRM particularly at RBA level once these have been established.

3. **Creation of secretariats for new institutions:** There will be a need to create secretariats for each of the institutions that will be established. Capacity will have to be built for staff of the secretariats and this will require an action plan and funds, which the NWA may have to budget for within the next financial year.

4. **Training and retaining of staff of DWA:** The DWA will need to be strengthened by training more staff on IWRM, filling all vacant positions and improving working conditions in order to retain staff within the department.

5. **Strengthening of institutions offering water related courses:** The three faculties that offer water related courses at the University of Agriculture are the Faculty of Agriculture, the Faculty of Health Sciences and the Faculty of Science. In all the three faculties the programmes are at degree levels in different areas of specialisation. IWRM is not fully articulated in school curricula and efforts need to be made to engage with the Ministry of Education to include broad IWRM principles in schools. There is a need for the institutions to train personnel that will be competent and instrumental in implementation of the IWRM as well as to fill the positions that will be created by the establishment of the River Basin Authorities, the irrigation districts and other institutions that will support the implementation of IWRM. There is also need to train personnel at technician (diploma and certificate) level so that they can provide stakeholders with technical solution on water issues.

6. **Improving metering and accounting for water:** The majority of water abstraction points are not metered and yet the Water Act calls for the volumetric allocation of water. There is need to enforce the metering of water abstraction as well as to devise some innovative ways of estimating water usage in cases where metering is not available.

7. **Innovative mechanisms of fundraising:** The River Basin Authorities and their supporting institutions, e.g. irrigation districts, will need significant recurrent financial resources to undertake their duties as outlined by the Water Act and their respective constitutions. Funds may not be readily available to set up the infrastructure required. In that case they should devise some innovative methods to raise the required funds, e.g. water levy's.

8. **Improved ways of disseminating information:** Institutions involved in water issues capture and keep large volumes of information. Stakeholders may not be aware of the availability of such information, and an improved method of keeping and disseminating the information is needed. This could take the form of a website where institutions (DWA, NWA, river basin authorities, irrigation districts, etc.) can upload the information but this will need dedicated financial and human resources to achieve. The website could be maintained by the DWA.

9. **Development and finalising of policies and regulations:** The National Water Policy is still at draft level and there is need to finalise it in order to give direction to the sustainable utilisation and management of water resources. The water pricing regulations are still outstanding and they need to be finalised and gazetted as a matter of urgency. The uncertainty of the likely cost of water in the various RBAs is hampering future irrigation and industrial project planning.

Value added by GWP and the Swaziland Country Partnership

GWP established the Swaziland Water Partnership (SWP) in 2004, following a multi-stakeholder engagement process that resulted in the Framework for Action. The SWP has a wide range of partners ranging from members of parliament to local rural users. Through GWP's facilitation, Swaziland has embarked on a number of activities, including IWRM planning process. The Government of Swaziland appointed the SWP to facilitate the IWRM planning process that also included broadening the stakeholder participation process and other essential activities. A memorandum of understanding was signed between the SWP and NWA to merge the IWRM and the Water Resources Master Plan formulation processes into an Integrated Water Resources Master Plan. The SWP has been instrumental in establishing IWRM institutions, as it facilitated the development and dissemination of the guidelines to do so. SWP also facilitated the writing of constitutions for River Basin Authorities. The SWP has been instrumental in creating political awareness and commitments through dialogue and advocacy on water issues.

The SWP offered a one-day training course on IWRM Tool Box to stakeholders. The course was held on the 10th of November 2006. It highlighted that several challenges still had to be dealt with to facilitate the implementation of IWRM in the country. The challenges were mostly related to institutional capacity building, financial resources to undertake IWRM and customising the IWRM Tool Box to Swaziland.

The Global Water Partnership organised a workshop for Swaziland and Mozambique where steps towards developing action plans to address water issues in their respective national development plans and poverty reduction strategy papers were discussed. The workshop was held on February 9-10 in Swaziland. The delegation from Swaziland committed to the following:

- Support the establishment of a cross-sectoral water resources management committee to be anchored in the Ministry of Economic Planning and Development
- Identify the water and IWRM-related actions in the National Development Strategy and PRSP and other water-related sector plans, and develop coordinated programmes for implementation as part of the IWRM Plan
- Incorporate water issues outlined in national development strategies into the IWRM plan and analyze the impacts and consequences on water resources
- Participate in the working groups of other sectors to better understand the planned programmes that may impact on water resources
- Develop and implement a collaboration strategy with other sectors
- Implement awareness campaigns on the importance of sustainable water management and an IWRM approach in development and implementation of other sector plans, strategies or programmes

The support of GWP-SA is necessary for the continued success of activities and action plans of the SWP. Financial support is needed to support the office beyond 2010 and to oversee the implementation of the IWRM plan. GWP-SA may provide experts from an expert pool within the region to build capacity by training local stakeholders on IWRM implementation and to assist in

establishing functional River Basin Authorities and other institutions that will be directly affected by the implementation of the Integrated Water Resources Master Plan.

5.3 Constraints, Opportunities and Perspectives

Strengths and weaknesses of IWRM

IWRM involves managing water resources at the basin or watershed scale, managing demand and optimizing supply including assessments of available surface and groundwater supplies and evaluating the environmental impacts of distribution and use options. IWRM principles are based on equitable access to water resources, broad stakeholder participation and an inter-sectoral approach to decision making. The institutional arrangements needed to bring IWRM into effect include organisational structures at basin and even sub-basin levels to enable decision-making at the lowest appropriate level, rather than a centralized decision-making model with government coordinating the national management of water resources across water use sectors. The strength of the Water Act of 2003 is that it decentralised the management of water resources to river basins and irrigation district level, and gives the NWA the responsibility of coordinating water issues. The Department of Water Affairs, under the Ministry of Natural Resources and Energy is the secretariate for the NWA.

The Water Act of 2003 provides guidelines on utilisation and management of water resources but a policy on water use and management and regulations to enforec the Water Act and envisaged policy is still to be finalised.. One weakness is that it is taking longer than expected to establish the required institutions. The IWRM plan is still being prepared and its components are not yet known and as such no comments can be made about it at the moment. The Government of Swaziland is committed to improved use and management of water resources as demonstrated by the investment in water harvesting and storage structures, and funding of the process of developing an IWRM plan.

The shortage of skilled personnel to implement the IWRM plan will be another challenge in the country as the DWA is short staffed and the other institutions created by the Act will require experts in IWRM and basin administration. The current pool of experts in the country is limited. The implementation of IWRM plan has significant financial implications, and may not be a top priority for the country as it is faced with other socio-economic problems that include a high HIV/AIDS endemic and food shortages. The Government and the RBAs will face many challenges to source funds needed to implement the plan and manage their respective basins.

To achieve long term sustainability, the plan should be seen as revolving with features of evaluation and reformulation at periodic intervals to reflect adjustments to changing situations, eg the impacts of climate change on water resources. It is important to follow each component of the IWRM plan and assess whether the people involved in this part of the plan have sufficient knowledge to be able to participate effectively including from the beginning, the knowledge of the politicians and the skills of the management team. To faciltate this, the NWA is often a participant on major project committees. However the RBAs will have to develop their own systems of monitoring and evaluating projects and activities within their basins.

The implementation of the IWRM plan will, to a larger extent, depend on metering and accounting for water usage. Bulk water is abstracted without without metering in many instances, and there is need to install them or find innovative ways of accounting for water.

Opportunities

The IWRM planning process provides an ideal vehicle to ensure a greater degree of management is applied to water resource development and utilisation. Institutional weakness and inadequate numbers of trained and experienced water managers have been noted. Such weaknesses need to be converted to strengths to overcome the many challenges Swaziland faces in the management of its valuable water resource.

The IWRM planning process has provided a forum for many existing and aspiring citizens to expand their knowledge and experience in water resource management. Such interest needs to be recognised and nurtured though training and professional development. The numerous international institutions affiliated to the GWP offer various training opportunities to motivated citizens. Scholarships and awards are available and more effort is needed to bring such opportunities to the attention of those that would like to start a new career or expand an existing career.

The political will that was once limited has been greatly strengthened during the IWRM planning process. Swaziland Water Partnership officers have reported that through the efforts of the office, supported by other institutions, the priority water now receives in government budgets and planning have greatly increased.

Through the various studies commissioned by the SWP and others, the level of new knowledge upon which decisions can be made has greatly expanded. The GWP and supporting institutions and projects, like the PAWD and the IWRM Toolbox, have provided useful tools to facilitate sound decision-making. Case studies and global reports and activities have provided useful targets that have motivated all water sector managers to strive for what used to be believed the impossible. Dissemination of this knowledge through printed and web media supported by regular symposia would provide additional awareness and exposure for national water managers to receive and exchange information and ideas. The NWA need to embrace this opportunity and interest and facilitate broad professional development and stakeholder empowerment.

Funding IWRM implementation is going to be very costly so innovative methods of revenue generation and sustainability funding needs to be secured. The hope is that once an IWRM plan is approved and adopted, additional funding from supporting donors will be secured to continue on the long road ahead.

In conclusion, it should be reported that Swazi stakeholders are very optimistic for the future of sustainable water management that encompasses the three important E's - Economic Efficiency, Social Equity and Ecological Sustainability. The stakeholders consulted during the preparation of this report have all been confident that these three E's are not only achievable but also that the country can deliver on them and contribute towards a more just and informed society that appreciates the challenges water modern water managers face.

Appendix 1: Participants for focus group meetings and report validation meting

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