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DEPARTMENT OF WATER AFFAIRS AND FORESTRY

Strategic Framework on Water for Sustainable Growth and Development

Summary Discussion Document

May 2008

REQUEST FOR COMMENT

All stakeholders are invited to comment on this strategy discussion document. Comments are to reach Ms Shantal Harigobin (HarigobinS@dwaf.gov.za) or Ms Jabu Mtolo (MtoloJa@dwaf.gov.za) ***not later than 30 May 2008***.

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A more detailed version of this document is available from Ms Harigobin or Ms Mtolo on request

Executive summary

The Minister of Water Affairs and Forestry has called for a strategy on Water for Sustainable Growth and Development to answer the question: how best can the water sector respond to issues of access to water for economic growth?

The Vision underpinning this strategy is of a robust and accountable water sector, which successfully meets demand for water security and reliable and effective water services, and enables equitable, environmentally sustainable economic growth and social development in South Africa.

The major centres of economic growth have been identified in 26 nodal points in the National Spatial Development Perspective. These points are in and around urban areas. The major growth sectors of the economy also tend to be located in and around urban areas. Rural development sectors, such as agriculture and mining show little growth and are not the major contributors to the economy. The rural areas remain, however, the areas of deepest poverty.

This highlights a tension in water allocation and management. On the one hand, water is needed for economic growth in and around urban areas, which demands functional and effective water services. On the other hand, water must be made available to support economic growth and development and poverty eradication in the rural areas.

There are exciting opportunities to make water available for economic growth, whether for small enterprises or for large enterprises such as mines. These opportunities include better use of groundwater potential, adoption of new technologies for water treatment, improved water conservation and demand management, innovative approaches to reallocation of water, and appropriate technologies for local storage, distribution and pumping. More effective use of the tools for water allocation, such as licences and general authorization, will also enable the sector to respond better to the need for water for economic growth.

At the same time, the impact of these new initiatives will be limited and vulnerable if the sector does not strengthen its management of the fundamentals, such as asset management, water conservation and demand management, revenue management, monitoring, regulation, enforcement of licence conditions, prevention of water theft, and so on. The Strategy will highlight both the fundamentals that need strengthening and the new opportunities that present themselves.

A number of changing factors mean that the water sector cannot continue with business as usual in terms of providing water for economic growth. The sector must examine its performance critically and find new and better ways of managing water and making it available for economic growth. These factors include global climate change, demographic change, economic growth, international factors such as the global financial crisis and rising food prices, the need for redress in access to water, the risks posed by aging and poorly maintained infrastructure and decreasing water quality. These drivers are complicated by the ongoing institutional change within the sector. However, institutional reform also presents an opportunity for the sector to perform better.

Increasing uncertainty due to global climate change, and the risks posed by linkages to the international economy require the sector to be able to respond innovatively and flexibly to changing conditions. There is a need to develop greater capacity in the sector to respond adaptively to this increasing uncertainty and risk. Aligned to this is a need to be more innovative and bold in terms of techonology and management strategies.

This requires greater investment in people. It requires rebuilding the traditional skills base, but also requires the building of new skills sets to manage the new challenges, including resource economics, water financing, water conservation and groundwater management. Equally important is the need to rebuild the relationship between people and state representatives and to rebuild an understanding of citizens' rights and responsibilities.

Water for growth and development cannot be implemented without water infrastructure. While there is a need for further surface water development, there is also a need to look at other infrastructural approaches, including small dams, rain water harvesting, maintenance to reduce leaks and losses, and infrastructure for groundwater use. The range of approaches must align with the needs of the people, including the rural poor, for whom access to water can make a significant difference in quality of life. Effective infrastructure to provide reliable water for key growth sectors is also critical. There are also a number of sanitation infrastructure challenges that must be addressed, including how to deal with full VIPs and how to manage failing treatment works. Finally, better use of groundwater, including artificial recharge, has the potential to contribute significantly to water for growth and development.

Sustainable water management requires appropriate funding mechanisms, including through user charges. Poor revenue management in local government results in under-funding for maintenance and rehabilitation of infrastructure, and declining ability to fund new infrastructure developed needed to support growth. Combined with poor asset management, this leads to a downward spiral of service delivery, with poor water quality and interrupted supply. There is considerable evidence of such failures in water management. This impacts on economic growth as well as on human health. On the one hand there is a need to put in place financial basics in the water sector, such as proper revenue management and ring-fencing of water services finances. At the same time, there is room for innovative approaches such as the introduction of a water bank to administer water trading to achieve government's social and economic objectives.

Institutional reform has been underway in the water sector for over a decade and is set to continue. Critical issues in the institutional arena include: how to reduce the number of water institutions while enhancing the performance of the sector; how best to regulate both water services and water resources; how to strengthen alignment within DWAF of the water services and water resources functions; and how to reduce the water related costs of doing business. A review of the water services institutional arrangements at local government level is particularly important in order to ensure effective management of services to support growth and development.

All of the above issues must be supported by integrated planning – integrated between water services and water resources, and integrated between water planning and socio-economic planning. This planning must address water redress and transformation, more

efficient use of water, and environmental protection. Above all, however, such planning must ensure that other government departments, agencies and spheres are integrating water requirements into their planning processes and are not developing "dry strategies". Alignment with private sector water needs is also critical.

The solutions to these issues must be developed jointly by the water sector and relevant government, NGO and private sector players. The imminent revision of the National Water Resources Strategy will provide a key vehicle for taking forward many of the issues raised in the Strategy for Water for Sustainable Growth and Development. The scope of the NWRS must be expanded to address the interface between water services and water resources. The NWRS will be revised as a National Water Resources Strategy for Sustainable Growth and Development. Other issues, particularly those pertaining to water services, will be incorporated into relevant strategy and planning processes, and implemented with speed and dedication.

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1 Introduction

Without water, there is no life. Without adequate water of an appropriate quality, there is no social or economic development. All human enterprise is dependent, in one way or another, on water. So the development of South Africa is dependent on water. The eradication of poverty is dependent on water. The creation of a society based on social justice, equity and a decent quality of life for all, is dependent on water. Without water, none of the socio-economic rights in South Africa's Constitution can be achieved.

South Africa is rightly proud of the remarkable progress that is has made in providing safe drinking water, and in ensuring sufficient water for energy generation and for growth of the industrial, mining, agricultural and other economic sectors. It can be rightly proud that its delivery of reliable water services have supported the manufacturing, wholesale, retail and others sectors as they have grown over the past 14 years.

But it would be foolish for the water sector to become complacent because of these achievements. The failures in the South African electricity sector, failures in water provision around the world and the current global food crisis raise the warning that things can, and do, go wrong. As with electricity, the lead time for the construction of large infrastructure is long, and planning must be farsighted and proactive. As with electricity generation, poor maintenance and deferred decisions can have enormous impacts on the economy and on people.

Equally, the large number of people living in poverty in South Africa, struggling, in the face of increasing food prices to feed their families, the huge numbers of people with HIV/AIDS struggling with inadequate water supplies and poor sanitation, the avoidable deaths from contaminated water, cry out for the water sector to improve its performance. They cry out for the water sector to provide water to create jobs, to meet social needs and to drive the scourge of poverty from rural and urban areas alike. It is this challenge that DWAF must lead the sector to meet.

It is ten years since the promulgation of the internationally recognized National Water Act, and eleven years since the promulgation of the Water Services Act. These pieces of legislation are currently under revision, after a decade of implementation experience and institutional change and development. While legislative reform is necessary, it is not sufficient. The key challenge now is effective implementation. The water sector needs to look hard at its implementation performance, identify its weaknesses and failures, and find new and better ways of working to ensure that now, and in the future, there is sufficient water to support sustainable economic growth and social development.

There are exciting opportunities to make water available for economic growth, whether is be for small enterprises or for large enterprises such as mines. These opportunities include better use of groundwater potential, adoption of new technologies for water treatment, innovative approaches to reallocation of water, appropriate technologies for local storage, distribution and pumping.

At the same time, the impact of these new initiatives will be limited and vulnerable if the sector does not strengthen its management of the fundamentals, such as asset management, water conservation and demand management, revenue management, and so on. The Strategy will highlight both the fundamentals that need strengthening and the new opportunities that present themselves.

One of the key fault-lines that this document seeks to bridge for the first time is the interconnectedness between water resources management and water services which have historically contributed to breakdowns in water management: inadequate management of boreholes to provide reliable municipal supply; discharge of raw sewage in some places and discharge of poor quality effluent widely; massive water losses through leaks and spills as a result of decaying infrastructure, and gaps in alignment between water resources and water services planning.

DWAF, as sector leader, has initiated a process to develop a strategy on how best the water sector can support and drive growth and development. This summary discussion document raises some of the strategic challenges facing government and the water sector in ensuring that water is used optimally in support of sustainable and pro-poor growth and development. It highlights some key drivers of change, and reflects on current challenges and opportunities, as an opportunity to consolidate gains made, make adjustments where warranted, and broaden our vision to tackle new challenges that lie ahead. It stresses the importance of strengthening alignment across government, particularly where policy and planning impact on water supply and management.

The intention of this document is to provoke debate within and outside the water sector, and to stimulate innovative responses to the challenges. Arising from this debate, a Strategy on Water for Sustainable Growth and Development will be developed to be presented to Cabinet. The Strategy for Water for Sustainable Growth and Development will provide strategic guidance to the revision of the NWRS which must be completed during 2009. In this process, the scope of the NWRS will be broadened, to address the interface between water services and water resources management. The revised NWRS will be developed as the National Water Resources Strategy for Sustainable Growth and Development. At the same time, many of the key challenges raised in relation to Water for Sustainable Growth and Development pertain to water services, and they will be taken forward in the appropriate strategy and implementation processes across the sector, lead by DWAF.

A more detailed version of this document is available from DWAF on request.

2 Vision and principles

Vision: A robust and accountable water sector, which successfully meets demand for water security and reliable and effective water services, and enables equitable, environmentally sustainable economic growth and social development in South Africa.

This vision is underpinned by the following principles:

1. All economic and development planning must include an assessment of water availability and effluent management.
2. Decisions regarding the use of water must balance the economic, social and environmental dimensions of water.

3. Decisions regarding the use of water must focus particularly on poverty eradication and social justice.
4. Water investment should give equal emphasis to the maintenance and refurbishment of the current asset base, and the development of new infrastructure.
5. Priority should be given to optimizing efficient use and productivity to obtain more value per unit of water
6. Sound management and use of local resources, including groundwater, should be prioritized before accessing more distant resources.
7. Institutional reform should tailor the institutional arrangements of the water sector to fit more closely with the capacity to deliver
8. Sustainable service provision and water management rests on a strong partnership between citizens and government, with mutual accountability.

3 Drivers of change

There are a range of factors that require the water sector, and those dependent on water, to review current performance critically and to find new and better ways of managing water – factors that can be considered as drivers of change. In essence, the impact of these drivers is changing the context within which water is managed. This change calls for different and better performance from the water sector to be able to respond to issues of access to water for economic growth.

3.1 *Impacts of climate change*

One of the most challenging drivers of change is global climate change. Climate change is already impacting and will continue to impact significantly on the availability of water. It will impact increasingly on rainfall and run-off and will bring higher temperatures that will increase evaporation and crop water use. It will bring ever more severe droughts and flood events that will need to be managed.

The effects of climate change are compounded by poor land-use management, which impacts on run-off, groundwater recharge, siltation in dams, rivers and estuaries, and ecosystem health. Together, climate change and poor land-use practices are creating an increasingly unpredictable water resources environment. The challenge for the water sector is to manage this uncertainty to continue to provide reliable water supply for social and economic purposes. However these changes also raise critical questions around the nature of economic growth and development that the country will be able to sustain.

3.2 *Economic growth and water*

The nature and rate of economic growth impact on water, both in terms of abstraction and discharge. While providing water alone does not necessarily result in economic growth, a lack of water or poor water quality can and does inhibit growth. The challenge for the water sector is to align the provision of water with the spatial and sectoral growth of the economy. In other words, as the water needs of the economy shift, the water sector must

respond appropriately either to provide water in the right place at the right time, and of the right quality, or to be clear where further water cannot be made available.

Equally, the water sector needs to be positioned to manage increasing pollution from economic growth. The quality and ecological health of many of our river systems and groundwater has deteriorated over the last few decades. Water quality impacts on groundwater are a particular concern because of the difficulties in rehabilitation. The sector needs to be positioned to address these challenges more effectively.

The global economic context also poses challenges for water management in South Africa. Rising food prices and a slowing of the global economy raise the threat of increasing poverty and hunger in South and Southern Africa. More effective and innovative use must be made of water in order to assist in meeting this challenge.

3.3 *Migration and Demographic Change*

Just as economic change impacts on water requirements, social change affects the nature of services to be provided. Water managers must grapple with a range of complex dynamics and challenges such as chronic poverty among at least 46% of the population; ongoing circular migration between rural and urban areas; growing informal settlements on the margins of towns; high levels of HIV/AIDS, and questions about the amount of free basic water that should be provided to needy and vulnerable households and what service options will meet the needs of poor people, as swiftly and affordably as possible.

While South Africa's population growth is slowing, in part because of AIDS, the number of households has increased significantly since the 1996 census. As a result, more households require housing and services. This is exacerbated by high levels of migration between urban and rural areas which mean that people are often maintaining two households, both of which require servicing.

The level and type of services required is affected by a range of issues, including the high level of HIV/AIDS. HIV/AIDS has enormous implications for delivery of water services as people with compromised immune systems are particularly susceptible to water-related diseases, require access to increased amounts of water and close access to sanitation. Often their ability to pay for services is reduced. The highest prevalence of HIV/AIDS is in informal settlements which are frequently the most complex areas to service because of their density and location.

3.4 *Redress and Equity*

Access to, and use of water, is still highly skewed along racial and class lines with the poor black majority still experiencing the poorest access to water. While government has made significant progress in providing basic water and sanitation, much still has to be done both in this regard and to provide access to water for productive purposes. There are also growing calls for free basic water to be increased. Many argue that 'basic needs' should include water to support livelihoods strategies, including small scale market gardening.

In some cases water for redress is already available, but in others this water must be made available either by sharing existing water supplies, reducing assurance of supply for

existing users, increased storage or by more effective use of groundwater. The slow pace of reallocation of water presents a political and social risk that must be addressed.

3.5 *Aging and poorly maintained infrastructure*

A further challenge that requires significant change in the way that the water sector is currently managing water relates to aging and poorly maintained infrastructure. Much of South Africa's water storage, distribution, monitoring, treatment and waste water collection infrastructure is aging and needs refurbishment or replacement. The sector is facing the cumulative impact of decades of poor investment in preventative maintenance which has created a major maintenance backlog. Local government must tackle this maintenance backlog at the same time that it is facing increasing demands for high level services, which the municipality cannot always afford to operate and maintain effectively. Poor revenue management and water losses also contribute to under investment in infrastructure maintenance which in turn leads to periodic and sometimes systemic failure, resulting in serious pollution and water supply failures. All of this contributes to an unsustainable cycle of build, neglect, rebuild.

On the other hand, effective infrastructure maintenance can result not only in sustainable water services, but in more efficient use of water which will offset some of the increased demand for water brought on by economic growth.

3.6 *Decreasing water resource quality*

Increased water demands from higher standards of living, growing industrial and mining use, and failing water and wastewater infrastructure have had considerable impacts on water quality. Poor water quality has significant social and economic impacts, as well as negative impacts on aquatic ecosystems. Economic impacts include increased costs of treating water, inability to meet export standards for crops, and lower water availability due to dilution requirements. Deteriorating water quality also increases human health problems, particularly in areas where people use untreated or poorly treated water for household purposes. Managing water quality and preventing further deterioration is a key challenge in a growth and development scenario.

3.7 *Changing Institutional Arrangements*

All these drivers are creating new challenges for water management that requires new skills and approaches and strengthened water management institutions. The institutional environment for water management has been in flux since 1994. This flux continues to add to the complexity of the challenges and to the way in which the water sector responds to water for growth and development.

4 Water, economy, society and the environment

4.1 *The nature of the SA economy*

The nature of the economy and of future growth trends determines spatial and sectoral water use requirements, currently, and in the future. It is therefore necessary to examine the nature of the South African economy and the implications for the water sector.

South Africa's annual real GDP growth increased from 3.2% in 1994 to a peak of 5% in 2006 before declining to 4.7% in 2007. Projected growth for 2008 is 4.2%. The economy is dominated by the manufacturing, retail and services sectors which contribute nearly 50% of GDP. General government services contribute 12.7%, mining 5.8% and agriculture, forestry and fishing only 2.3% (StatsSA). The sectors contributing most strongly to growth are the manufacturing, wholesale and retail trade, hotels and restaurants, and finance, real estate and business sectors (Figure 6). The construction sector's contribution has risen strongly, while the transport, storage and communication sector has also contributed to growth.

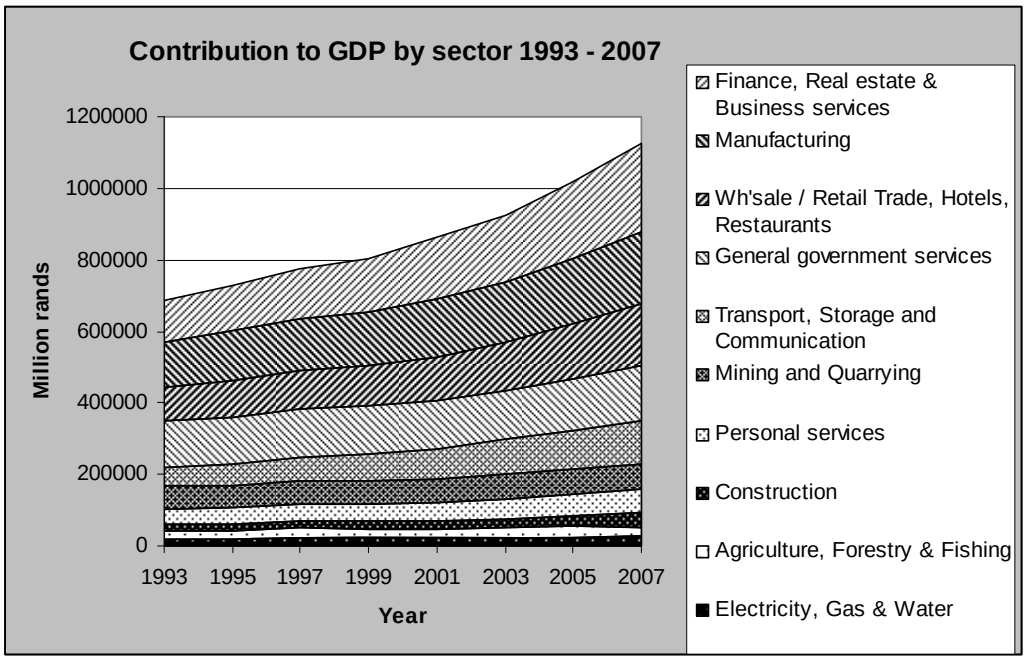

Figure 1: Contribution of economic sectors to GDP 1993 - 2007

The major growth sectors are located primarily within and around urban areas, while the rural sectors of agriculture and mining have shown little growth. This picture is expanded by the 26 national growth points identified in the National Spatial Development Perspective (see map below). These areas produce 77% of the Gross Value Added (GVA) and are where 53% of the poor people in the country live.

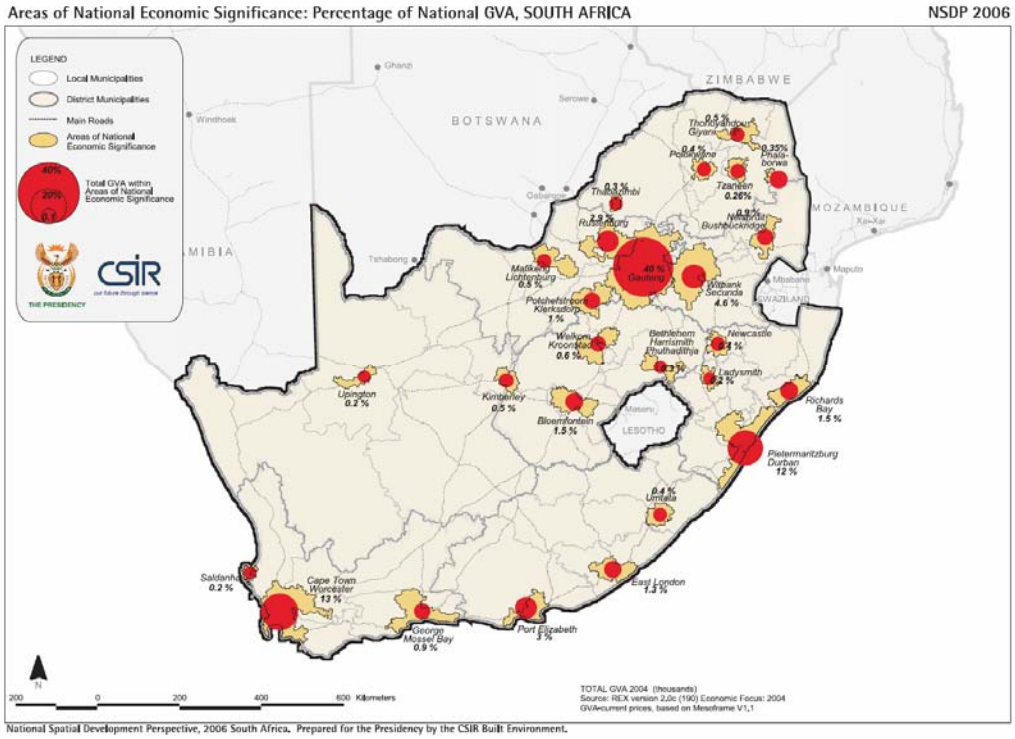

Figure 2: Areas of National Economic Significance

This highlights a particular tension of the South African economic landscape: the major growth points are in and around urban areas, while the rural economy shows little growth and contributes relatively little to GDP. But the areas of highest poverty and greatest underdevelopment remain the rural former 'homeland' areas. These trends fuel continuing circular migration between rural and urban areas.

In 2004, South Africa's GDP index placed it 55 out of 171 countries, while it ranked only 121 on the Human Development Index. This shows that the benefits of economic growth are not reaching poorer households. The 2007 Labour Force Survey indicates that while the formal unemployment rate decreased from 25.5% in September 2006 to 23% in September 2007, the number of discouraged work-seekers increased, suggesting that a many people have given up hope of finding employment. Therefore, in addition to dealing with absolute poverty, the country has to deal with high and widening inequality.

Thus, while economic growth is largely urban focused, there is a critical need for rural development initiatives to create livelihoods, jobs and food security and to reduce poverty in the rural areas. The allocation of increasingly scarce water resources to support growth and development must address this tension. A key thrust of the Strategy must be to ensure that water contributes to economic transformation with a strong emphasis on redistribution and poverty eradication. Untapped groundwater potential may be a key contributor to this transformation.

Equally, the concentration of economic growth in urban areas highlights the need for the maintenance of good quality, reliable services in these areas, and the extension of water services to serve manufacturing, services, business etc. Over the past 14 years, the focus of municipalities has been very much on providing basic services to the poor, but in order to support economic growth, equal focus must be placed on maintaining existing higher level services and providing new higher level services to support core economic sectors.

4.2 *Social value of water investment*

Safe, reliable and adequate access to water and sanitation is essential in achieving the Millennium Development Goals on eradicating extreme hunger and poverty; reducing child mortality; combating HIV/AIDS, malaria and other diseases; and halving, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. While attainment of the MDGs is a social objective in and of itself, ensuring better health and nutrition will lead to greater productivity with associated economic benefits. Greater economic benefits, if appropriately distributed, will, in turn, lead to greater social well-being.

Insecurity of water supply hits the poor hardest - inadequate access to water is both a cause and the result of poverty. The poor are more vulnerable to water scarcity due to their limited resources to adapt at a household or community level. Where a reliable and affordable basic supply is ensured, the impacts on people's quality of life are significant. Where water systems deteriorate or fail, poor people are at particular risk as they can seldom afford the kind of alternative arrangements available to wealthier households.

It is poor women who bear the brunt of poor services - fetching water, with backache from carrying heavy containers, time costs of queuing, added work of caring for sick family members, the indignity of bad sanitation, and safety risks after dark. Conversely, it is women who benefit most from good services.

Water for economic purposes is still largely in the hands of the white minority. Lack of access to water severely exacerbates poverty in rural black communities. Accelerated reallocation to and ongoing productive use of water by the poor communities is critical to successful rural development. This requires a reassessment of the current approach to compulsory licencing, and a reconsideration of how best to use licences and general authorizations to make water available. The issue of lowering the assurance of supply to existing users in order to redistribute water more widely and more effectively must also be considered.

4.3 *Economic and social value of water resource quality*

Aquatic ecosystems offer valuable goods, services and attributes that contribute to human welfare and have economic value. Goods are resources that can be harvested, such as fish and reeds, while services are processes offered by water resources such as water purification. Attributes include beauty, and educational, cultural and recreational aspects.

Aquatic ecosystem goods are critical for the poor, who often depend on them for their livelihoods. For instance, fishing is a key economic activity in poor communities on the coast, and subsistence farming in wetlands remains essential in food security for the rural poor. Changes in availability of these services affect the well being of the poor.

Already there are clear signs of degradation in some rivers, estuaries and wetlands through changes in land use, changed river flows, alien vegetation, poor agricultural practices, increased discharge of pollutants and unsustainable fishing practices. Unless controlled and mitigated, these will have a significant negative impact on aquatic ecosystems and, ultimately, on the ability of our water resources to support economic and social development.

The consequences of impacts on aquatic ecosystems may not be seen for years. This calls for careful monitoring, and better use of traditional and local knowledge in managing these impacts over time. Equally, it requires adaptive management practices in water management institutions to be able to identify and respond to changes as they happen.

4.4 *Regional development imperatives*

Growth and development are also major challenges in neighbouring states. SADC is implementing a *Regional Indicative Strategic Development Plan* (RISDP), which highlights that poverty is "one of the major development challenges facing the SADC region" and which gives priority to poverty eradication, sustainable economic growth and deepening economic integration.

A large proportion of South Africa's water resources are shared with and must serve the growth and development needs of neighbouring states. Namibia's growth rate is predicted to reach 4.7% in 2008, while Mozambique's economy grew at 7.9% in 2006 and Botswana's at 4.2%. The water needs of these states will increase with economic growth, even as South Africa's water demands are increasing. Equally, economic growth in South Africa and neighbouring states will see increasing pollution in shared rivers and aquifers.

To date, South Africa has shared transboundary water resources peacefully with neighbouring states, although there have been concerns expressed by some states that South Africa is taking more than its equitable share. The challenge is to maintain this approach in the future as pressures on water resources increase. There is also a challenge in extending the joint management of shared water to groundwater, and to enhancing joint disaster management programmes as climate change leads to increasingly severe flood and drought events.

5 Opportunities for using water to enable growth and development

This section examines opportunities for improving water management to ensure that water is used optimally to support growth and development. Many of the critical issues raised here are known to the water sector, but have not been resolved or addressed sufficiently. What is important is to find new and more effective ways of tackling these issues to create a fully functional water sector that will enable equitable and sustainable growth and development now and in the future.

5.1 *Adaptation and innovation*

5.1.1 *Adapting to and managing for Global Climate Change*

The ability of society to manage the impacts of climate change will determine the severity of the impacts. Managing, mitigating and adapting to these impacts is difficult due to the unpredictable nature of the change. This is added to by the fact that historical hydrological data becomes increasingly irrelevant as weather patterns change. New approaches are

needed if we are to effectively prepare, mitigate and adapt to the effects of climate variability.

Priority must be given to developing robust strategies to ensure that demand matches supply, even where water availability is reduced. Water systems must be designed and managed to accommodate higher demands in hotter, drier seasons, floods that exceed the capacity of existing protection structures, high rainfall that exceeds existing stormwater capacities and droughts that reduce river flows and lessen dilution of polluted water. Institutions will need to identify water use trends, areas vulnerable to climate change and opportunities to respond to the emerging challenges. Schemes must be managed more effectively as integrated schemes or regional schemes.

The potential for groundwater use and artificial recharge is a crucial strategy for mitigating and adapting to climate change impacts. Substantial investments will be required in water infrastructure and other water management strategies to compensate for increased evaporation, reduced run-off and higher crop demands. There may be a need for significant shifts in allocation and increases in water pricing, with a range of knock-on impacts for the economy.

Addressing the effects of floods and droughts remains a shared responsibility between a number of government departments and an integrated mitigation and adaptive management approach is necessary.

5.1.2 *Adaptation and Management of Change and Complexity*

The combination of water related and socio-economic changes increase the risk of systems failing or performing poorly. Generally, groups with resources and alternatives are able to adapt, while marginalised communities (typically the poor) and the environment bear the greatest risks. Water institutions will have to develop greater capacity to manage risk, to manage in uncertain conditions, and therefore to adapt more readily to new and different conditions. The establishment of CMAs will facilitate this as they should be more able to adapt to local conditions and changes. Municipalities will need to gear up to manage increased run-off and stormwater, and strengthen their disaster management systems.

5.1.3 *Innovation and Appropriate Technology*

To meet the challenges in the water sector, technical innovation and appropriate technology must be encouraged, ranging from the large-scale water provision requirements for economic growth through micro-level production processes to local decentralized water supply needs for rural development. There are key opportunities such as recycling and re-use, desalination, rainwater harvesting. The increasingly important relationship between energy, water and waste needs to be engaged by government, business and civil society. This requires more sophisticated responses by the sector with multi-disciplinary expertise and the courage to adopt new approaches.

5.1.4 *Monitoring, Targets and Adaptive Management*

Being able to respond in an adaptive and innovative manner requires good information. Effective monitoring of the state of the country's water resources, water use, water

infrastructure and institutional performance, is increasingly important to inform decision making on allocation, investment and pricing. Monitoring and evaluation must be against clear targets, so that a true assessment of the achievements and failures of the water sector can be made to improve future service delivery against social and economic objectives. This requires appropriate institutional arrangements to share information and act on the outcome of monitoring and evaluation.

5.2 *Investing in people*

There is a need to invest in people for effective water management, including civil society, corporates (from large to smallest enterprises), state officials, and politicians. This should build the capacity of the latter to serve the needs and aspirations of the first two. Equally, civil society and the business community must be able to express their water needs and to contribute to decisions regarding water. A key challenge lies in implementing the very progressive policies for public participation that are already in place.

In Catchment Management Agencies and Water User Associations resource poor farmers sit at the same table as organized business, mining and other corporates. However, broadening real decision making about how resources are allocated requires far more than bringing representatives of the poor to the table. It requires training and support to level the playing fields so that these representatives can negotiate as equals.

5.2.1 *Rebuilding partnerships between providers and citizens*

In recent years, South Africa has experienced a high number of service delivery protests, driven in part by frustration over inadequate service delivery and poor relationships between citizens and government. Shortcomings in the ward committee system have lead to disengagement of citizens from public involvement.

This creates a significant constraint for citizens to learn about and exercise their rights and responsibilities in relation to matters such as incorrect billing, overcharging, faulty meters, leaking taps, and so on. These issues can lead households into a water debt trap with significant impacts on their quality of life. Equally important, if citizens disengage from public life, it undermines valuable training opportunities which can support household water conservation and management. Sustainability for the water services sector lies in re-emphasizing the reciprocity of rights and responsibilities.

5.2.2 *Skills development*

The nature of the skills shortage in the water sector is well documented. This skills shortage threatens the viability of municipalities, CMAs, smaller Water Boards, and the reliability and quality of water supply and management, nationwide. The yet to be established National Water Resources Agency will also suffer from this skills shortage.

Progress in building capacity through the Sector Training and Education Authorities has been disappointing, particularly in meeting the sector's needs for qualified artisans and operators. A range of on-the-job mentoring and support programmes are in place – Siyenza Manje, ENERGYS and others – which are helping to fill key gaps in professional skills and competencies wherever possible. These programmes must be enhanced, and stronger emphasis is needed on filling key positions with people who have both the right

skills and the necessary experience to meet the job requirements. At the same time as building the traditional skills, a cadre of people with new skills sets is urgently needed, particularly regulatory, asset management, financial, resource economic, water demand management, groundwater and water conservation skills.

The focus for the past decade has been on trying to create a sufficiently large cadre of competent officials to staff the overly large number of water management and water services institutions, with limited success. An alternative approach is to review the current water institutions and identify how rationalization and consolidation of such institutions could result in better deployment of the limited skills available.

5.3 *Leveraging infrastructure*

Significantly greater investment in water sector infrastructure is needed to safeguard water availability and assurance, not only in new infrastructure, but to meet the substantial backlog on spending on maintenance, rehabilitation and renewal. Urgent attention must be given to effective asset management of new infrastructure to ensure that it, too, does not decay through under-funding or neglect.

5.3.1 *Infrastructure development for water security*

South Africa must continue to explore new storage and transfer schemes to augment supply to buffer droughts and to serve economic growth. It is appropriate to consider a range of augmentation options, appropriate to different needs and circumstances: large and small dams; underground storage; and rainwater harvesting (in-field, in reservoirs or in household tanks).

New storage is only one option among many to increase water for economic purposes. There is enormous scope to make more effective use of existing water supplies: greater use of groundwater; more efficient production processes, particularly in agriculture, including conservation agriculture and soil and water conservation; repairing and replacing infrastructure to minimize leaks and losses; recycling and re-using water; desalination; and innovative technologies – such as reverse osmosis or bio-chemical processing to treat mine decant; and significant penalties for water theft.

Well over a quarter of South Africa's stored water fails to reach its destination as a result of leaks and losses in conveyance and reticulation infrastructure in agriculture and urban areas in particular. Loss reduction strategies can buy SA decades of greater water security, reduce conflict over competition for scarce resources, and boost municipal income nationally by billions of rand through reducing non-revenue water.

5.3.2 *Asset management: optimizing available resources*

The value of investment in water sector infrastructure is immense. In 2001, the replacement cost of water resources infrastructure was estimated at R38 bn - above R50 billion today. Water services is particularly capital intensive: in 2006, the CSIR estimated that the replacement cost of water services infrastructure falling under Water Services Authorities was at least R120-billion, and that of water boards a further R60-billion.

While some water management and water services institutions have excellent asset management systems, there is growing evidence of deficiencies across both water services and water resource management. Sound asset management is not being given the attention it warrants. The rate of reduction of backlogs in access to water services infrastructure is being tracked closely, but this is only one component of the actual backlogs; years of poor asset management have resulted in backlogs in maintenance, refurbishment and replacement across the water sector.

South Africa cannot afford the financial, economic, social or environmental cost of further deterioration of this asset base. Without adequate maintenance, the asset will fail before it reaches the end of its design life. Preventative maintenance is essential to keep the system working, and to keep reactive repair to a minimum. The life of an asset may be extended, through refurbishment or rehabilitation, before it reaches the end of its design life. But any asset has a finite life, and will need to renewed or replaced.

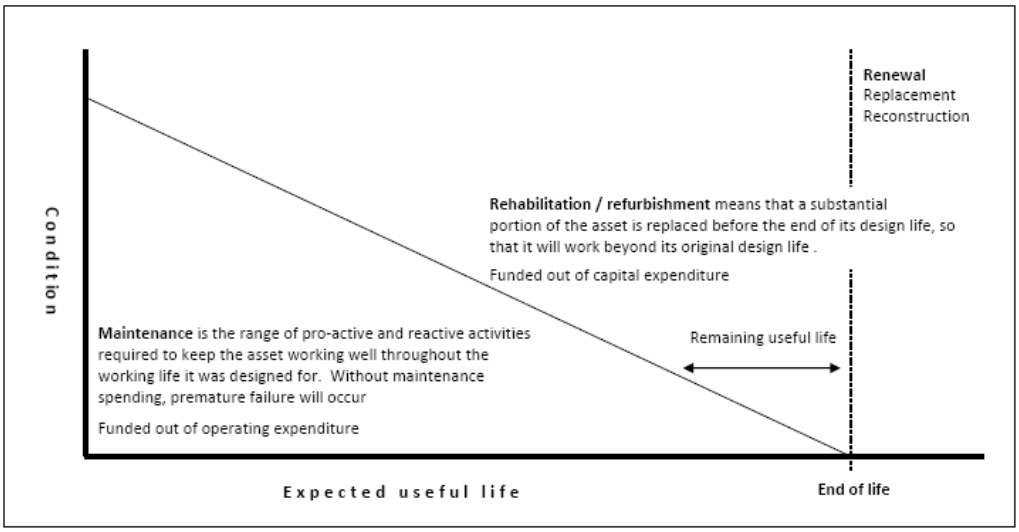

Figure 3: The difference between maintenance, rehabilitation and renewal

There is an urgent need to adopt a life-cycle approach to asset management, so that infrastructure planning looks beyond capital costs and construction to whole-life requirements. Capital costs are generally less than half the full life-cycle costs, and can be as little as 20%. Moreover, assets have different costs at different phases of their life cycle, with older assets requiring higher maintenance expenditure; this is why asset management must be supported by a comprehensive asset management plan, so that the financial and other requirements for reliable performance are understood and provided for.

Three sources of information indicate that there are severe problems associated with the current condition of water sector infrastructure assets. Firstly, the Minister reported to Parliament in March 2007 that 160 out of 294 dams owned by the Department (54%) require maintenance to meet current safety standards, although none are structurally unsafe; repairs are underway on 42 of these dams. In addition, 17 canal schemes require major rehabilitation. Secondly, expenditure on maintenance of water services assets has consistently fallen below the Construction Industry Development Board (cidb) guideline estimate of 4% of total replacement value per year. This would imply an expenditure of R7.2 billion annually, yet municipalities barely spend this amount on their maintenance

activities across all sectors. Finally, asset performance appears to be declining, with a growth in unplanned network outages reported.

Investment in municipal water services infrastructure is rising by about 26% per year, but without a linked rise in revenue. In many areas, the gap between expenditure and income is funded through under-spending on maintenance, rehabilitation and renewal, leading in practice to asset stripping. Annual budgets are often inadequate because of limited financial capacity (together with increasing responsibility) or inappropriate allocation of funds. This relates primarily to the operating budget, because significant grant funding is available for capital expenditure for basic services for the poor. However, many municipalities are struggling to raise funds for new infrastructure or rehabilitation of existing networks servicing non-poor users. Deterioration in the quality of service delivery is inevitable, which is likely to affect payment levels and compound the downward spiral.

A 2007 DPLG report notes that capital subsidies have displaced private sector borrowing, and overall capital investment in services infrastructure has decreased in real terms over the last decade. If true, this is a deeply unfortunate consequence of well-intentioned grant funding. An equally unfortunate consequence is that as capital expenditure continues to drive the extension of service coverage, the gap between operating expenditure and revenue income is likely to widen. In many areas, it would appear that the MIG is funding infrastructure which is too costly to operate without significant subsidies, beyond the Equitable Share. Careful assessment of the long-term trajectory of this type of investment is needed to ensure that MIG funds assets, not liabilities.

While municipalities are allowed to fund infrastructure renewals out of MIG, available grant funding falls far short of need. Treasury is exploring a separate renewals fund to extend the working life of existing assets; but without proper asset registers it is difficult to assess requirements effectively or allocate funds. Very few WSAs - 25% of Metros, 9% of Districts and 7% of Local Municipalities who responded to a mid-2007 survey - currently have an approved asset register in place. Just two municipalities nationally have completed an asset management plan, while asset management planning is underway in a further 23. The Municipal Finance Management Act requires a municipality's accounting officer to take 'all reasonable steps' to compile an asset register; are stronger sanctions required where this requirement is disregarded?

A clear distinction must be drawn between historical maintenance and rehabilitation backlogs, for which municipalities have a legitimate claim to funding support, and current bad practice. Providing further funding to pay for the consequences of poor management of new assets will create perverse incentives to continue to neglect asset and revenue management.

An urgent review of the state of municipal investment in water services infrastructure is needed to turn this situation around. A focus on providing basic services is essential, but the needs of the poor are best served through an integrated approach which addresses the water services requirements of the broader economy as well, as these are the vehicles for generating cross-subsidies and jobs. There is also scope to use MIG conditionality to require municipalities to honour the maintenance commitments they make when applying for grant funding, and to turn around current poor performance in maintenance spending.

5.3.3 *Managing water quality through blending*

As raw water quality deteriorates, increasing volumes of good quality water are required to dilute the impacts of salting and high nutrient loads. This has implications for the availability of water in the system, and adds to infrastructure requirements for storage and transmission. Alternatives include desalination or reverse osmosis, but the cost is prohibitive except at small point-of-use installations for specific industries. These challenges underline the urgency of implementing the waste discharge charge mechanism, to incentivize better waste discharge management and water resource protection and support pollution abatement measures.

5.3.4 *Meeting people's needs*

Making more water available to poor households will not eradicate poverty on its own, but international experience is emphatic that access to water for productive uses enables a more diverse range of livelihoods activities, reducing exposure to risk. Investing in small, household-scale storages in under-developed areas could lessen the need for rural-urban migration and improve socio-economic conditions in these areas.

There are a range of opportunities to meet people's needs for water, beyond domestic consumption or large-scale irrigation, such as water for small-scale productive uses and micro-enterprises. Few of these require potable water, and alternative sources should be explored and developed.

Additional storage is needed particularly in rural areas, since the poorest rely on rain-fed agriculture and are vulnerable to dry spells. A little water can make a critical difference for the poorest. Individual or communal storages linked to multiple use systems is where new effort is needed. Thus, there are strong arguments to expand individual homestead rain water harvesting (RWH) systems. This is not 'cheap storage for the poor'; cost per volume storage is high, but the impact is equally high: an Internal Rate of Return of 15% has been calculated on the recorded value of food production from homestead RWH tanks.

However, investment in new storage needs to be in step with investment in enabling factors and the capacity to use the water: not only the distribution network and institutional systems and arrangements to enable continued and reliable supply, but also roads, markets, access to micro-credit, business support and extension services, and so on.

South Africa has embraced the approach of multiple use systems to address the multiple water needs of communities for both domestic and productive use. The challenge remains in enabling local government to plan for and implement this approach. Implementation has particular challenges in urban and peri-urban areas where the use of potable water for food gardens is inappropriate and expensive. Creative approaches must be developed to ensure conjunctive use of water sources to enable productive use without using potable water. The use of groundwater, where feasible, is particularly useful in this regard.

5.3.5 *Review current approaches to consolidate the gains made in improving sanitation*

Despite nearly three million households having received toilets since 1994, backlogs, particularly in rural areas, remain high. The focus has been on infrastructure, rather than broader sanitation improvement, and many of the new toilets are no longer usable. A

growing number of new flush toilets malfunction, particularly those built swiftly to meet bucket eradication targets. The number of sewage spills from overloaded systems is rising steadily. Many VIPs are built badly, some are not being used at all, and full pits are driving people back to unimproved toilets or open defecation.

Swift action is needed to avoid a second generation of sanitation backlog that is far more complex than the first. VIP toilets need movable top-structures, bigger pits, better solid waste management, more effective information for users, and clearly defined maintenance roles and responsibilities and guidelines for desludging. Most municipalities do not know how to deal with full pits, and users do not see this as their responsibility. The pressure to deliver new toilets swiftly is constraining scope for innovation and correction.

The Basic Household Sanitation policy should be updated, the meaning of Free Basic Sanitation for non-flush systems clarified, and a clear policy to guide full life-cycle management of VIP toilets developed as a matter of urgency.

In water borne systems, many wastewater plants are poorly maintained and under-staffed, raising the question as to whether we have the skills to achieve safe and effective wastewater treatment on the scale required. The majority of works are discharging poorly treated effluent - raw sewage, in some places - which puts the health of downstream users at risk, feeds algal blooms that choke the environment and, under certain conditions, breed toxins that endanger human health.

The current state of sanitation provision warrants frank discussion. In many areas, what is being provided is not sustainable, and it is the health and dignity of the poorest that is compromised when systems fail. We need options that are more manageable. In many urban areas, less complex, more reliable, less skills-intensive ways of treating wastewater are needed. Source separation technologies should be revisited, with a collection service for less hazardous dried waste, and properly managed composting. Piped water supplies should never be provided without adequate arrangements for wastewater management.

5.3.6 *Boost water security with groundwater and underground storage*

Water resources management in South Africa has, historically, focused on surface water, resulting in an extensive network of dams, inter-basin transfers, and pipelines. However, recent work has revealed significant reserves of groundwater that are not being fully utilized and that can be harnessed for growth and development. This has implications regarding the infrastructure required to access this water, management systems and capacity, and planning at the municipal and national levels.

In the light of global climate change, the use of groundwater is particularly important because it is less vulnerable to evaporation due to rising temperatures. There is considerable potential to boost groundwater yields and increase borehole reliability across most parts of South Africa through better management. Over 300 towns, and a far higher number of villages and rural settlements, depend solely on groundwater, but there is little monitoring and management to ensure abstraction does not exceed recharge rates, with the result that many boreholes, and in extreme cases, aquifers, are being over-pumped. In a growing number of settlements, rising demand is leading to borehole failures and severe

water shortages. In several North West towns, for example, water is now available only for several hours a day, and sometimes not at all.

The primary cause of borehole failure is mismanagement, and with proper management and information, far greater volumes of water can be made available. While overly strong borehole pumps can lead to borehole failure, continuous steady pumping at a lower rate can often deliver far greater volumes. Water failures each summer in Prince Albert in the Karoo, for example, have been reversed through installing smaller pumps.

There is also significant scope for increased underground storage through managed aquifer recharge. While not all aquifers are suitable, in appropriate areas artificial recharge costs a fraction of other storage options, and can be implemented incrementally, saving on huge initial capital outlays. The potential for increased use of groundwater and underground storage heightens the importance of minimizing water contamination, from mining, industrial, agricultural and domestic sources.

5.4 *Finance and pricing*

There are a number of areas of improvement in terms of finance and pricing that will support water for growth and development.

5.4.1 *Strategic Asset Management, Financing and Pricing*

The importance of physical asset management has been outlined above. This is critical in an environment where water infrastructure is increasingly financed through a mixture of public funds and private capital. It implies that asset management must consider both the physical requirements for effective and safe operation, and the financial requirements for debt acquisition and repayment. Raising debt on existing or future infrastructure requires assurance of a future income stream for repayment, which in turn depends upon adequate maintenance to ensure the supply of water against this income stream.

This is important for the water resources infrastructure that will be managed by the NWRIA, but also for bulk and retail water services infrastructure. The setting of charges and tariffs for recovery of infrastructure development and operating costs must increasingly consider the debt repayment period against the timeframe for the next infrastructure or augmentation project, rather than a simplistic design period. To be effective for water resources management infrastructure, this should be linked to system-based charges, rather than scheme charges, as is done in the Vaal system.

5.4.2 *Water pricing, tariffs and user charges*

The Raw Water Pricing Strategy regulates charges on water users who abstract water directly from, or discharge waste directly to, the resource; while water and sewerage tariffs are levied by Water Boards and Water Services Authorities. Water pricing aims to cover the financial (infrastructure) and the management costs of water, although significant subsidies to agriculture and emerging users exist. Broadly, the economic cost (opportunity cost) and the environmental (externality) costs of water are not incurred by water users but are borne by society at large through the fiscus, and by the environment. A combination of water pricing that recovers costs of activities (water charges) and water

pricing that seeks to change water use behavior and drives efficiency (water taxes) will be needed to ensure sustainable water management and more efficient water use.

A number of aspects of pricing and tariffs should be considered under a revised Raw Water Pricing Strategy. The first aspect is that water pricing should recover the full financial (infrastructure) and management costs of water in both water services and water resources. Within this, there is space for targeted subsidies that support government's social and economic objectives. This approach will see escalating costs in coming years as the real costs of providing water are calculated and charged to users. Added to this, water pricing (raw and treated) should more closely approximate the opportunity cost of water, thereby driving towards increased physical and economic efficiency in water use. The polluter pays principle, which has already been negotiated with stakeholders, should be implemented through the waste discharge charging strategy as soon as possible. Finally, pricing strategies should be developed that support the re-allocation of water to achieve redress, international obligations and the requirements of the Reserve, and the clearing of alien invasive plants.

Equally, municipal tariffs should move beyond full cost recovery (infrastructure and management) to encourage water saving amongst domestic and commercial users, with stratification to ensure affordability is not compromised for the poor.

5.4.3 *Financial Support, Subsidies and Grant Funding*

The Equitable Share subsidises urban households disproportionately, because water consumption is higher where people have yard or house connections, despite the higher proportion of poor households in rural areas. In many urban areas, subsidies disincentivise effective revenue management and operational efficiency by providers.

Unconditional Equitable Share transfers are provided in part to subsidize Free Basic Water for poor households, but some municipalities are not setting aside sufficient funds for this purpose, leading to shortfalls in operation and maintenance budgets. This raises the question as to whether the provision for Free Basic Water in the Equitable Share should be allocated differently, perhaps as a ring-fenced conditional grant. Equally, should the grant be provided to the water services provider, or to the beneficiary household?

This links to calls to raise the FBW amount to address the needs of vulnerable households, and those with chronic illnesses (notably HIV / AIDS), and the need for additional water for good hygiene and home-based care. Calls have also been made for FBW to cover the requirements for flushing toilets in line with Free Basic Sanitation. Consideration should be given to whether the objective of providing support to poor households is best achieved through social grants or through subsidized water or through some other mechanism.

5.4.4 *Revenue management*

Most municipal revenue management systems require substantial strengthening, with a strong emphasis on effective revenue collection. Project Consolidate interventions have achieved a number of successes, and approaches to strengthen financial and revenue management are now being extended under the comprehensive inter-departmental five year local government support programme. Improved revenue management is a core

focus area, with increasing emphasis being given to the preconditions for effective and sustainable implementation of free basic services policy. Effective revenue management in local government is imperative for the development of a functional water sector and the delivery of reliable water services.

5.4.5 *Water Trading and Banking*

The current water market, enabled through water trading under the NWA, represents significant opportunities to achieve a number of water resource management objectives through a market approach that reduces the need for government resources (compared to, for example, a command-and-control approach). A market-based approach can support allocation reform, drive technical and economic efficiency, and align water use and allocation with emerging economic trends. However, an unfettered water market can lead to perverse outcomes which disadvantage the poor – thus a water market must be administered and regulated to ensure that government's social and economic objectives are achieved. The institutional form of such an administered market would be a water bank, where a public institution (the bank) facilitates, regulates and administers trade within a capped quantity of allocable water.

5.5 *Institutional reform*

The South African water sector is over-burdened with institutions, many of which lack the capacity to adequately perform their functions. In the creation of so many institutions and the complexity of processes within and between these institutions, transactional costs have escalated unnecessarily. Institutional reform has been ongoing over the past decade across the water sector and the prospect of further restructuring prompts fatigue. Nonetheless, if water is to be used effectively to support sustainable growth and development, several elements of institutional reform must be initiated and driven speedily to conclusion.

5.5.1 *Reform of Water Management and Water Services Institutions*

There is a need in the water sector to reduce institutional fragmentation, strengthen accountability and consolidate the capacity to support social transformation and economic growth. There are more than 300 public institutions in the water sector, excluding water user associations. The pool of available sector expertise cannot support this vast number, and the overheads costs are inappropriately high. Growing water quality failures, decaying infrastructure and weak management are putting reliable water provision at risk. At issue is how best to leverage available capacity to strengthen sector performance, in ways that maximize scale economies and promote good governance.

DWAF is already reconsidering the number of catchment management agencies to be established. The challenge is to maintain stakeholder involvement at the catchment level, while reducing the number of actual institutions. Consolidation will enable more effective use of limited resources and reduce the regulatory burden on the state. A challenge also exists to establish the National Water Resources Infrastructure Agency swiftly and to transfer functions smoothly and efficiently.

There is a challenge in managing water services effectively from a financial perspective within local government. Only eight out of 169 WSAs have ring-fenced their water services finances fully; seven of these are served by an external provider, indicating that

contractual arrangements drove ring-fencing, rather than the inherent requirements of sound management. A further 17 are partially ring-fenced, but sound management is unlikely if the total costs of service provision, including asset management, are not known or managed against income. Strong emphasis on the economic and financial dimensions of water services management is necessary if the current deterioration of the asset base and declining service quality is to be reversed, and this must include consideration of the most appropriate institutional mechanisms.

There is scope, for example, to consolidate existing provider capacity into regional entities, serving more than one WSA, or to consolidate municipal operating staff and assets into a single municipal-owned entity, as Johannesburg and Maluti-a-Phofung have done. In dispersed rural settlements, a municipality could consolidate provider arrangements through one entity, whether public, private or community-based.

Comprehensive Section 78 assessments are needed before external provider arrangements can be considered. The Municipal Finance Management Act prohibits the sale of public assets required for basic service delivery, and the Municipal Systems Act makes any form of lease or concession difficult. However, the MFMA allows municipalities to bypass standard procurement processes if they wish to contract public entities such as water boards, and there are a growing number of public-public arrangements. It is critical to consider on one hand whether the hurdles for private sector involvement are too onerous, and on the other, whether water boards should not be subject to competitive tender to safeguard the interests of consumers and WSAs.

5.5.2 *Strengthen alignment within DWAF*

Historically there has been a separation between the water services and water resources functions within DWAF, resulting in an unfortunate gap in alignment, understanding and processes between the two. Focusing on Water for Sustainable Growth and Development provides an opportunity for DWAF to develop a much stronger interface between water services and water resources management. Critical interface areas include municipal and regional water planning; groundwater management for domestic use; water demand management and water quality and effluent management. The opportunity also enables DWAF to examine and consolidate its new role in relation to policy maker, oversight, information management, and national water resources planner.

It also provides an opportunity to put in place a process to decide on the most appropriate institutional arrangements for regulation of the water sector (see 5.5.3 below).

5.5.3 *Reducing the cost of starting a business*

A high cost of doing business has been identified internationally as a key constraint to economic growth. Delays in obtaining authorization to use water or to discharge effluent add substantially to the cost of starting a business. Although considerable work has been done to speed up the issuing of a license by DWAF, there are still substantial time delays. Such constraints impact on both small and large enterprises, costs jobs and incur significant opportunity costs. While the use of licencing is important in controlling large water users it is also important for greater use to be made of General Authorisations for smaller water users, and to facilitate speedy access to water for HDIs in particular.

5.5.4 *Improving regulatory capacity*

Regulatory capacity in the water sector is poorly developed. A draft Water Services Regulation Strategy is nearing finalization, and sector debate is now broadening to explore mechanisms for regulation across the sector as a whole, including the alignment of water services and water resource management regulation. There are a number of areas of regulation which may require different capacity and institutional arrangements, such as regulation of water quality, regulation of institutional performance, and tariff regulation.

In the water resources arena, establishment of the National Water Resource Infrastructure Agency will allow a structural separation between raw water provision, pricing and regulation. But thinking about water resource regulation is in its infancy. A number of questions remain to be answered, such as the optimal institutional arrangements, and the scope of such regulation.

In the water services sector, the emphasis on 'developmental regulation' has blurred the distinction between support, intervention and enforcement, as DWAF partially assumed accountability for provider performance through its support activities. Stronger regulation is required, with firm action taken against municipalities who have the means to perform better. This raises important questions about the location of the regulator – within or outside of DWAF – and to whom it accounts.

The Presidency is exploring a multi-sectoral Economic Regulator. The water sector needs to give consideration as to whether it would be desirable to incorporate economic regulation of the water sector into a multi-sectoral Economic Regulator.

The Water Services Act distinguishes between an authority and provider function in local government, and the draft Water Services Regulation Strategy is premised on the WSA being able to regulate the performance of its WSP, ideally through a performance based contract. But there is a gap between theory and practice. The vast majority of WSPs are internal and there is seldom a separation of WSA and WSP roles except where a separate institution – another municipality, Water Board, private company or municipal-owned entity – is acting as WSP. Few municipalities with internal WSPs have sufficient staff to separate the WSA and WSP functions, and it is generally municipal councilors who frame policy, set targets and hold service departments to account. This approach falls short of the regulation the sector requires. The blurring of authority and provider roles on the ground challenges the key assumptions of the water services regulation strategy, and may warrant review, as the gap between the conceptual and policy framework and sector practice remains wide.

5.6 *Integrated planning*

Government has a national planning framework to guide economic and social development planning, including planning at national, provincial and local government level. The various plans should talk to each other in an integrated planning framework, which can then be implemented, if necessary, through the mechanisms outlined in the Intergovernmental Relations Act. The challenge for the water sector is to ensure that water issues are fully integrated into national, provincial and local planning processes.

5.6.1 *Planning for redress and transformation*

There is a need to improve alignment between water planning and economic and social transformation planning. This alignment is necessary to ensure that water is made available to historically disadvantaged communities and individuals, and to poor women and men, for food gardens and small enterprises. A particular challenge exists in harnessing water effectively for rural development and poverty eradication. This challenge is made more critical by the impacts of the current rise in food prices on the poor. A huge opportunity exists to harness groundwater potential to support redress and transformation.

5.6.2 *Integrating economic and development planning with water planning*

Since economic and development plans have water implications, it is important for government agencies and departments to cooperate during strategy development in order to avoid "dry strategies". DWAF and the CMAs have a particular role in ensuring that government plans align with water availability.

DWAF is responsible for national water resources planning, while water supply and sanitation planning is the responsibility of municipalities. Water Boards play a role in planning of bulk water services provision, along with DWAF and municipalities. Increasingly, Catchment Management Agencies will do catchment level planning. There is thus a complex array of institutions responsible for water planning that must engage effectively with the planning of an equally complex array of departments, spheres of government and government agencies. As demands on water increase, and the impacts of pollution and habitat destruction increase, the need for integrated planning that includes water as a key input to all growth and development opportunities becomes more critical.

DWAF is confident that its water resource planning and infrastructure development can support the objectives of the National Spatial Development Perspective, and particularly water supply to the 26 identified nodal growth points. But there is concern about the adequacy of many regional bulk schemes to meet growing municipal demand. The missing link in the planning chain is master-planning at municipal level; very few municipalities have up-to-date master-plans detailing water services infrastructure capacity and augmentation needs for bulk infrastructure, and WSDPs seldom provide the requisite technical detail to inform robust regional planning. This gap compromises the accuracy of DWAF's water services Reference Frameworks, which inform water resource macro-planning and infrastructure development. At local level, there is a high risk of infrastructure falling short of requirements when inadequate planning combines with poor asset management.

Treasury has allocated R1.8-billion over the next three years to augment regional bulk infrastructure, but the short-list of projects warranting urgent funding is R4.5 billion, and the likely overall figure is substantially more. But without local master-plans, it is difficult to quantify the actual funding required, or to prioritise allocations. Infrastructure macro-planning at local level must be strengthened as a matter of urgency, as must the links between municipal water services planning and national resource planning.

The National Water Resource Strategy, a particularly important tool for aligning macro water availability issues with economic and development plans, must be revised by 2009. The revision will ensure that water is used optimally to support growth, development and

poverty eradication. The challenge in this process is to ensure that the links between water services and water resources planning are strengthened and embedded.

Overall, water sector institutions need to engage more proactively in government planning processes. It is important to note that water planning takes place within an international framework, where international agreements reached under the SADC Protocol on Shared Water Resources determine how much water must be released for riparian states. Current sharing arrangements are likely to be increasingly contested over time.

Water and energy planning
Water is a critical input to power generation and in 2007 Eskom used around 1.9% of the water consumption in the country. From a sectoral planning perspective, the integrated energy modeling initiative by the Department of Minerals and Energy (DME) is a step in the right direction. In terms of the National Integrated Energy Modeling System (NIEMS), water as an enabler of, or constraint on, project development and operational issues in the energy sector, has been identified as an area that requires detailed, scientific modeling.

The Water Supply Module will be used to model the key variables, including water availability and quality from various sources. In addition, interactions between this and other modules, such as Renewable Fuels, Coal Supply, Electricity and Petroleum, and Climate Change, will be modeled. Importantly, where the modeling requirements are already being met via existing systems and processes, the aim will be to define interfaces with such systems and processes and thus avoid duplication. For this approach to be effective, co-operative arrangements between the DME and DWAF will be crucial.

5.6.3 *Planning for WC/WDM*

Water conservation and demand management are critical activities to provide more water for growth and development. The National Water Conservation and Water Demand Management Strategy has not yet been integrated into the plans of other government departments, spheres or agencies. All state institutions need to demonstrate how WC/WDM has been included in their water planning decisions, and how it has been budgeted for and implemented. Building capacity to implement WC/WDM strategies will require a re-orientation in skills development and deployment across the sector. DWAF needs to play a stronger role in regulating and enforcing efficient water use. DWAF also needs to play a stronger role in establishing funding mechanisms to support WC/WDM.

5.6.4 *Integrating environmental planning into water planning*

Environmental considerations must be incorporated into all water planning to ensure that economic growth and social development are sustainable in the long term. There are excellent policies in place but the implementation of these policies remains a challenge. One of the key challenges is to understand the cumulative abstraction and discharge impacts across a catchment and to be able to plan and manage accordingly (including the issuing of licenses). Strategic environmental assessment (SEAs) and environmental management frameworks (EMFs) may be useful in this regard, particularly in alignment with Catchment Management Strategies.

6 Conclusion

This document has reviewed a wide range of challenges and opportunities which the Water for Sustainable Growth and Development Strategy should tackle in achieving the vision of a robust sector able to play its part in achieving national economic, social and environmental objectives. An effective water sector is the essential precondition for sustained growth and pursuit of new opportunities.

Widespread consultation and joint decision-making, within and beyond the water sector, will be needed to shape an action plan and formulate workable strategies to meet the diverse water requirements for growth and development. One key action is the revision of the National Water Resources Strategy. Other actions are already in place but may need strengthening or redirection. It is likely that consultation will generate new issues for consideration, and will require new processes to support focused action. Some actions are urgent, and need clear time frames with specified goals and milestones; others will require more careful planning and consideration, and will unfold over the next few years.

Strong partnerships will be needed – within government, and between government, civil society and the business sector - to forge common understanding of the tasks ahead, and to leverage the strengths of different sector roleplayers in pursuit of common goals.

A. Appendix A: Water resources and water services status quo - setting the picture

Water availability

South Africa has low rainfall by international standards – 60% of the world average - and only 9% of rainfall reaches rivers, compared to an average 31% worldwide (DWAF, 1996). Rainfall is generally higher in the north and east, and decreases significantly in the south and west. Rainfall is highly variable within and between years, with the spectre of drought always present. The result is high variability in river levels, dam storage and groundwater levels over time.

South Africa has developed sophisticated surface water infrastructure such as storage systems and inter-basin transfer schemes and most catchments are linked to a degree that is unusual elsewhere. Tunnels, pipelines and canals transport water over long distances, from areas of relative abundance to areas of relative scarcity. These bold engineering schemes provide 'structurally-induced relative water abundance', but South Africa is approaching full utilisation of available surface water yields, and is running out of suitable sites for new dams.

The focus on surface water means that South Africa has underexploited its groundwater reserves. While historically attempts to quantify groundwater resources and their sustainable yields were often compromised by lack of suitable data, many parts of South Africa rely heavily on groundwater for irrigation, livestock watering and domestic use. New data, however, indicates considerable potential to further use groundwater to meet rising water demand that must be further examined.

Increased awareness of groundwater potential calls for more sophisticated strategies for conjunctive use of ground and surface water and a lot of effort is already going into improved understanding of the interaction between groundwater and surface water to ensure sustainable management. Artificial recharge can contribute significantly towards maximising the use and sustainability of available water resources, and DWAF is promoting it as an integral part of water resource planning and catchment management.

Declining water quality raises new challenges around the availability and fitness of water for use. Clean water is needed to dilute contaminated return-flows and mitigate the effects of rising salinity and nutrient levels, particularly in the Vaal river system. Domestic water supplies also face quality and safety challenges, while the poor quality of discharged effluent is contributing to rising eutrophication and bacteriological contamination of rivers and dams, and impacting on the nature of the flows through tunnels, pipelines and canals.

Historically, access to water was highly skewed in favour of the white minority and access to water continues to confer significant advantages to those who receive it, either through historical water abstraction rights or through convenient access to abundant safe water, while under-development and poverty persist and deepen, particularly in the ex-homeland areas.

The first edition of the NWRS (September 2004) provides a clear indication of the overall state of the country's water resources, stating that "In general, sufficient water can be

made available at all significant urban and industrial growth points in the country for water not to be a limiting factor to economic development. However, given the long lead times for developing new supply schemes, co-operative planning will be required between water users and water management institutions to ensure that water can be made available when it is needed."

State of water services delivery

South Africa's water services policy framework is based on the principle of access to water as a basic human right. High-level commitment, backed by substantial spending on infrastructure development and servicing subsidies, has led to some extraordinary achievements.

However, there is a tension between provision and ongoing servicing which has played out in a context of rapid decentralization of these functions in tandem with massive changes in the form and function of local government: integration of racially-distinct municipal administrations, new structures for democratic, accountable government, new systems for improved operational and financial management, and an entirely new conception of the role of local government. One consequence is that national policy objectives have not always aligned with the capability to implement that policy. Another consequence is that the immense water sector gains of the first decade of democracy are at risk, in some areas, of backsliding in the second.

Extending access

DWAF figures show that between 1994 and March 2007, 17.5-million people were provided access to improved water supply infrastructure taking the total up to 94% of the population, while at least 86% of people had access to the RDP minimum standard of 25 litres per person per day within 200 metres. Over the same period, the data shows that ten million more people gained access to improved sanitation facilities, raising total access to 71%. However, this data excludes informal settlements, which are addressed separately through comprehensive settlement upgrading initiatives led by provincial and national Housing departments. Consequently, the figures exclude an estimated 15% of the total population[1], which should arguably be included.

Nearly half the new infrastructure is in areas with predominantly very poor rural populations, raising critical questions around sustainability, given limited municipal capacity to operate and maintain hundreds of dispersed schemes, and given that the costs of operating many of these schemes are not adequately recovered from either the Equitable Share or user payments.

Significant backlogs remain in all areas, including the major cities. The most severe backlogs are in the former 'homeland' areas and KwaZulu-Natal, Limpopo and the Eastern Cape, thus the bulk of the task of eradicating service backlogs and providing free basic water lies with the least resourced municipalities. This has critical implications for institutional reform, and is discussed under Section 3.5.3

[1] DWAF uses a figure of 1.2-m households as the estimated population of informal settlement nationally, which would constitute roughly 10% of households nationally. But the 2007 StatsSA *Community Survey* indicates that 14.5% of people live in informal settlements, which translates to 1.8-m households.

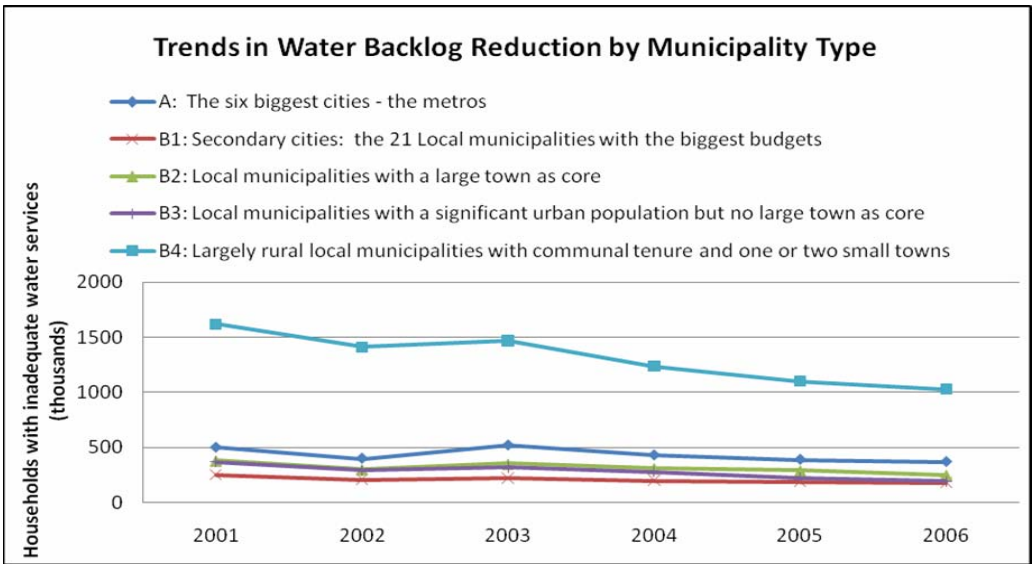

Figure 4: **(DWAF DPLG SALGA 2007: 6)**

Free Basic Water

98% of Water Services Authority are providing free basic water, with 16 claiming to provide FBW to all. The Free Basic Water policy is intended to target poor households, thus the critical percentage is not total coverage nationally (84%), but the proportion of poor households (those with an income below R800 per month), who receive free basic water: 72.75% of those with access to infrastructure. This raises two key challenges: it is primarily poor households who do not yet have access to basic services, and among those who are served, the poor are least likely to be receiving free basic water.

Quality of services

An audit in 2006/07 by the CSIR on behalf of DWAF of a 10% sample (248 projects) of MIG water and sanitation bulk and household projects showed poor compliance with national policy objectives and construction norms. Just 2.6% of household water projects and 20.7% of bulk water projects met the 95% benchmark, with both scoring poorly in reliability. 13.4% of bulk water projects completed since 2003 had broken down three or more times and 9% of breakdowns took more than a month to repair. 21% of electrical pumps and 14% of diesel pumps were out of order, and a further 57% of diesel pumps lacked fuel. More than 16% of street and yard taps were not working, with a similar percentage damaged. 22.6% of yard taps did not have a water meter, while 16.8% had meters that did not work.

When 77 WSA managers surveyed for the 2007 Masibambane II evaluation were asked whether those who were served would in future be rejoining the backlog queue as a result of defective infrastructure in recently completed projects, 51% said this was happening already. 16% of beneficiaries in settlements with recent water projects said they now had to walk more than 200 meters to fetch water.

A root cause of these failures is the sheer pace and scale of delivery required to meet targets, in a context of a shortage of key personnel. There are now one seventh of the civil engineering posts in local government that there were in 1990. There is a deficit of about 1 400 municipal engineering professionals, over 3 000 plant operators and a broad range of

artisans. To complicate the picture, employment equity targets do not align with the pool of available and experienced technical staff.

Integrated service delivery

In their commitment to eradicate water and sanitation backlogs, municipalities are giving priority to extending service coverage, and neglecting sound maintenance of both new and existing schemes; this neglect is eroding their asset base and compromising revenue generation and broader economic development prospects. Leaks, bursts and sewer spills are increasing. Deferred maintenance is costly: the longer it is deferred, the higher the cost of the eventual repair or refurbishment; and the longer leaks and spills are left unattended, the higher the cost to the municipality of non-revenue water.

Drinking water quality and effluent management

South Africa's traditionally high drinking water quality standards are being compromised in some areas as expanded service coverage and water treatment has lead to a growing operation and maintenance load. There have been a number of severe diarrhoea outbreaks from contaminated water and several instances of typhoid – most notably in Delmas where at least 13 people died in 2005; more recently in Ukhahlamba District Municipality, at least 78 infants died between October 2007 and March 2008 as a result of contaminated municipal drinking water.

The 2007 National Benchmarking Initiative revealed decreasing compliance of municipal wastewater treatment samples with minimum standards, and a 'severe, widespread and apparently growing threat to health and the environment'. A 2006 survey of 51 wastewater treatment plants in eight provinces found a critical shortage of trained and skilled staff. Just 4% of the plants surveyed were operated and maintained adequately, and 'immediate intervention" was needed in 30% of works to avoid health crises. Many treatment works are staffed by a single operator during office hours only, although the treatment process runs continuously.

Even fairly low-tech systems are suffering from accumulated neglect and poor operation. A 2006 survey of 47 Free State oxidation ponds revealed that over half were illegally discharging effluent with high faecal coliform loads into local rivers, as a result of poor operation and overloading. DWAF figures (March 2008) show that wastewater treatment in more than half (55%) of the Free State's 87 towns is non-compliant, and requires attention in a further 26%. One contributing factor is the rapid upgrading of bucket toilets to flush systems. Bulk supplies and infrastructure in a number of towns cannot cope with the additional demand for water for flushing, or with the additional load on the sewer system and treatment works; there are several examples of projects where bucket toilets have been replaced by water-borne systems without water or sewer connection. Household members now have to dispose of their excreta themselves, without the support of a municipal collection service.

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