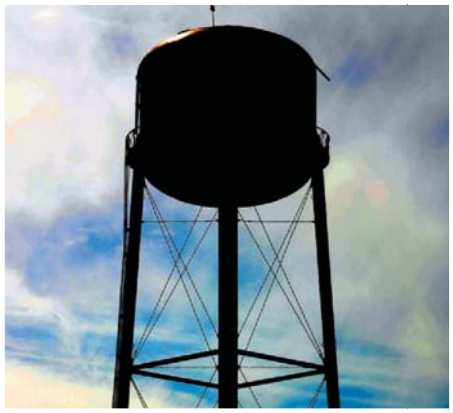
EXPLORING OPPORTUNITIES FOR DOMESTIC-LOCAL INVESTMENT IN WATER AND SANITATION SERVICES. CHALLENGES AND CONSTRAINTS

Mao Amis , Nkulumo Zinyengere, Adila Cassim



WATER RESEARCH COMMISSION

TT 725/17

Exploring opportunities for domestic-local investment in water and sanitation services. Challenges and constraints

Report to the

WATER RESEARCH COMMISSION

By

Mao Amis , Nkulumo Zinyengere, Adila Cassim

African Centre for a Green Economy

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Overview of water situation in South Africa

South Africa is a water scarce country, with very high variability and unpredictability in water availability. The rainfall is highly variable and is characterised by incidences of extreme weather conditions leading to droughts and flooding. As a result, the water management context of this is driven by these prevailing conditions, which has led to a demand for water exceeding demand by a large margin.

The availability of water resources is also not equitably distributed, with most economic hubs of the country located in geographic locations with very limited water resources, leading to high dependence on physical infrastructure to move water from very far locations. For example, Gauteng's water source is primary the Vaal River, whose water is augmented by supplies from Lesotho. Generally, most of the major economic hubs are serviced through water transfer schemes from other water sources that are located in a different water management area.

The Department of Water and Sanitation (DWS) is the custodian of water resources and responsible for coordinating investments in water infrastructure. There are about 250 water schemes in South Africa, and the department is responsible for their management. Other water infrastructure schemes that the state has responsibility over comprise those that are transboundary in nature, including the Lesotho Highland Water Project (LHWP). It's estimated that the current replacement value for the water infrastructure is about R139 billion. It's estimated that South Africa requires at least R1.4 billion investments per annum to maintain the current water infrastructure. This funding challenge has exacerbated the water management situation in the country.

The country has very old infrastructure, posing a major challenge to basic service delivery. The average age of water infrastructure is 39 years, with poor maintenance records, and frequent disruptions in service delivery having become commonplace, leading to drastic measures, such as water rationing, especially during periods of drought. Water management in South Africa has also been characterised by significant lack of capacity among water professionals. Many water professionals have been lost to the private sector, as a result of better working conditions, and South Africa generally suffers from inadequate engineering skills, which is key for infrastructure development. Even though the water sector

is plugged by major challenges, significant progress has been made in delivering water and expanding the existing water infrastructure. Since 1994, safe water access has increased by 60%, extending water service delivery to more than 90% of South Africa's population.

Many large-scale water infrastructure projects have also been financed by the government over the years, including the Berg River Dam, which is a world-class facility. The augmentation of water supply to the Western Cape water-supply system, and the development of the Vaal River pipeline are just some of the examples of successes in the delivery of water and sanitation infrastructure (Creamer 2012).

Even though South Africa has made significant investments in developing its water and sanitation infrastructure since 1994, a massive backlog remains, especially in rural parts of the country. One of the main reasons for the infrastructure backlog is the lack of financing to fund such large capital projects. In addition, an over-reliance on the public sector has also impacted on the ability of government to deliver this infrastructure timeously. Insufficient finance from the fiscus leaves massive backlogs in service delivery that requires the deployment of innovative funding mechanisms, especially through the private sector. Such private sector finance may include funding instruments such as private-public partnerships, loans, concessions, grants, and management contracts (KPMG 2011).

Project background

This study sought to develop an understanding of the perceived challenges and constraints faced by the private sector, which prevents them from harnessing the opportunities of investing in the water and sanitation sector in South Africa. This is based on the premise that by unpacking these perceived challenges, a clear picture of the investment opportunities in the sector might be unveiled to make a business case for investments in the sector.

This study is intended to inform key stakeholders in the water and sanitation sector in South Africa, including Government and, more specifically, the private sector to bolster their engagement in the sector. The main tasks that were accomplished comprised the following:

- A survey of the finance sector on their expectation and perceptions about investing in the water and sanitation sector in South Africa.
- Established the status quo and analysis of private sector investments in water and sanitation in the last 10- 15 years in South Africa.
- Convened a national seminar comprised of key stakeholders to explore the constraints and

opportunities of private sector investments in the water and sanitation sector.

Key findings on the role of private sector investors in financing water infrastructure

The main outcome of this study reflect the fact that private sector involvement in the financing of water infrastructure is still quite poor, with the public sector still bearing the large cost of infrastructure financing. In cases where the private sector is involved, it's on the basis of financing large infrastructure programmes that have been guaranteed by Government. The lack of clarity in the regulatory framework in the financing of water infrastructure has exacerbated the perception of risk by the private sector and, as a result, their participation has been quite limited. Financial status of local municipalities has also hindered them from effectively using market mechanisms for fundraising for their infrastructure programmes, because of poor balance sheets. The key headline messages from this study are summarised below: -

1. **There are significant investment opportunities**: Various studies have estimated that the total cost of funding requirement for the water sector in South Africa is around R700 billion. Most of this funding will come from the national fiscus, but there is a major funding gap, which presents an excellent opportunity for the private sector.
2. **Too much focus on new water infrastructure**. Financiers are biased towards projects that focus on delivering new infrastructure projects. Such projects are perceived to be more profitable and less risky, as they are often ringfenced or guaranteed by the public sector. This mismatch between the ease of raising funding for new projects, and gap in funding for maintenance and operations is a major challenge for the water sector.
3. **Inadequate capacity leading to under spending of allocated funds**: Even though the sector is experiencing significant funding challenges, under spending has been reported in some cases, partly attributable to the lack of capacity both at local and national level.
4. **Private sector is too risk averse to effectively invest in the water sector**: The high level of private sector risk aversion in relation to the water sector has hindered their effective participation. The water sector is very unique but critical sector, which presents significant investment opportunities. However, due to the inherent nature of the sector, there is a perception that the private sector is always on the lookout for an 'ideal' investment climate before they can commit, compared to other sectors like energy and telecoms. The risk aversion of the private sector therefore needs to improve if they are to capitalize on the investments opportunities in the water sector.
5. **More innovative funding mechanisms urgently needed to unlock investments**: The traditional

mechanism of private sector participation in water management under the private-public-partnerships (PPP), have not yielded any effective outcomes. There is an urgent need to explore more innovative funding mechanisms, such as impact investing and venture capitalism in addition the prevalent approaches being used currently.

6. **Insufficient evolution in the political landscape in South Africa poses a challenge**. The political landscape in South Africa has not evolved sufficiently enough to allow the private sector to confidently partner with Government in delivering water infrastructure. There is a strong perception in the investment community as a whole that to create a suitable investment climate de-regulation is important. This is not possible in the water sector in South Africa, as the government is obligated under the constitution to be the custodian of all water resources, and also so due to the Broad Based Black Economic Empowerment (BBBEE).
7. **The absence of an Independent Regulator is a barrier to unlocking private sector investments**: The potential establishment of an independent regulator would be an extremely useful mechanism to bolster private sector confidence in investing in water infrastructure, due to the perception that political risk is an important factor limiting private sector engagement.

Recommendations for unlocking private sector investments

This study sought to unpack the barriers and constraints of impacting private sector investment flows for water services in South Africa. Numerous barriers to entry were identified, which ranged from factors that are linked directly to water as a resource and the investment opportunity it presents, to regulatory and policy constraints, and lack of capacity of local authorities to harness the opportunities presented by the private sector.

The recommendations that have been developed are therefore linked to both furthering our understanding the scale of the challenge and how to unlock the opportunities, and further questions that will need to be asked to develop further clarity on the subject matter:

- There is an urgent need to develop a concerted effort to track information on investment flows to the water sector as a whole, but more specifically those from the private sector. The DWS started tracking public sector investments from 2008, but other than major projects, no information exists prior to that date. No such information exists for the private sector apart from funding flows for large infrastructure project. This presents a huge problem in harnessing private sector involvement in financing water services in South Africa. Even though many companies, especially large corporations, are disclosing their water -related interventions through established reporting

frameworks, such as the CDP Water Disclosure Project, little information is available on the actual amounts that have been invested.

- From a regulatory perspective, the municipalities are constrained in their ability to be able to borrow directly from the markets. To overcome this challenge may require revision of the regulatory mechanisms governing municipality financial management systems to expedite local authorities to effectively use market base mechanisms for financing water infrastructure
- Local municipalities that are poorly capacitated need to develop better relationships with their well-established counterparts to build their capacity in order to improve their financial management to stand a better chance of raising funding for their infrastructure projects.
- Municipalities also need to develop better relationships with private sector financiers, such as fund managers, to develop a clear understanding of their funding allocation priorities, and the kinds of project pipelines that they are interested in funding.
- Based on discussions with asset managers, there is significant interest in funding water projects, but the major shortfall cited was that the quality of deal flow of projects with a high potential for funding was very poor
- It's recommended that some of the funding allocated to local authorities for infrastructure development is ringfenced for project development to increase the chances of securing external funding. This would help to de-risk projects, and make them suitable to attract private sector funding.

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Mr J Baghwan	Water Research Commission (**Chairman**)
Dr AM Amis	African Centre for a Green Economy (Project Leader)
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ABBREVIATIONS

AMD	Acid Mine Drainage
BOOT	Build Operate Own Transfer
BOT	Build Own Transfer
BTO	Build Transfer Operate
CMA	Catchment Management Authorities
COSATU	Congress of South African Trade Unions
CSIR	Council for Scientific and Industrial Research
DWS	Department of Water and Sanitation
GRAPAD	Groupe de Recherche et d'Action pour is la Promotion et Development
JSE	Johannesburg Stock Exchange
KOBWA	Komati Basin Water Authority
KWASAP	Komati Scheme Augmentation Project
MaP	Maluti-a-Phofung Water
MDBs	Multilateral Development Banks
NWA	National Water Act
NWRS	National Water Resources Strategy
O&M	Operations and Maintenance
ODA	Overseas Development Assistance
OECD	Organisation for Economic Co-operation and Development
PES	Payment for Ecosystem Services
PFMA	Public Finance Management Act
PPP	Public Private Partnership
R&D	Research and Development
ROM	Rehabilitate Operate Maintain
SAICE	South Africa Institute of Civil Engineers
SIB	Social Impact Bonds
TCTA	Trans-Caledon Tunnel Authority
TTT	Taxes, Tariffs and Transfers
UN	United Nations
UNDP	United Nations Development Programme
WEF	World Economic Forum
WRC	Water Research Commission
WWC	World Water Council
WWF	Worldwide Fund for Nature

1 INTRODUCTION AND PROJECT BACKGROUND

1.1 The role of the private sector in financing water infrastructure

Water infrastructure is critical for sustaining livelihoods by ensuring access to safe drinking water and sanitation facilities. However, in many developing countries there is still a massive backlog in water and sanitation infrastructure. The World Bank estimates that Africa lags behind most developing countries in the development of water and sanitation infrastructure. Thus, many countries have not been able to meet their Millennium Development Goals (MDGs) of reducing by halving the proportion of people without sustainable access to safe drinking water.

South Africa has made significant investments in developing its water and sanitation infrastructure since 1994, however, a massive backlog remains, especially in rural areas. A lack of financing to fund large capital projects is they key reason for the infrastructure backlog. In addition, the heavy reliance on the public sector has also impacted on the ability of government to deliver this infrastructure timeously. Insufficient funding from the fiscus leaves massive backlogs in service delivery that requires the deployment of innovative funding mechanisms, especially through the private sector. Such private sector finance may include funding instruments such as private-public partnerships, loans, concessions, grants, and management contracts (KPMG 2011).

Internationally and in South Africa, the private sector has been involved for many years in supporting water and sanitation programmes. This is largely due to the fact that the sector presents investment opportunities, albeit it being considered a high-risk investment sector (Dewees et al 2011). However, in South Africa the private sector appears to not cease the opportunities that exist. It is therefore pertinent that we need to understand the private sectors perception of the water sector and to also address if they are any barriers and challenges that have prevented their participation in the water and sanitation sector

1.1 Project background

The aim of this study was is to review the role of private sector in financing water and sanitation infrastructure in South Africa. This study is particularly interested in developing an understanding on the perceived challenges and constraints faced by the private sector, which prevents them from harnessing the opportunities of investing in the water and sanitation sector in South Africa. This is based on the premise that by unpacking these perceived challenges a clear picture of the investment opportunities in the sector

might be unveiled to make a business case for investments in the sector. To achieve this objective, it would require a very thorough and meticulous understanding of the context under which water and sanitation infrastructure is financed, both globally and locally and how the private sector has been involved thus far.

The aim of this study is to inform key water and sanitation stakeholders, Government and particularly the private sector to bolster their engagement in the sector. The specific objectives of the broader study as conceived by WRC are as follows:

- Undertake a survey of the finance sector on their expectation and perceptions about investing in the water and sanitation sector in South Africa.
- Establish the status quo and analysis of private sector investments in water and sanitation in the last 15 years in South Africa.
- Establish the kinds of hurdles for financing of water and sanitation services.
- Convene a national seminar comprised of key stakeholders to explore the constraints and opportunities of private sector investments in the water and sanitation sector.

This is the final report that synthesises the outcome of this study. It consists of a comprehensive global literature review and a review of investment trends in the water sector in the last 15 years and barriers and opportunities to investing in water and sanitation. The key questions that were posed are summarised below, according to the three components outlined above:

Key questions posed for the global literature review

- How is the funding and financing of water and sanitation structured?
- What are the investments needs and funding mechanisms for water and sanitation infrastructure?
- To what extent does the perception of risk influence private financing in water and sanitation?
- What are the opportunities for unlocking private finance in the water and sanitation sector?

Investment trends in the water sector in South Africa

- How has water and sanitation infrastructure been financed in South Africa in the last 15 years?
- What role did the private sector play in financing water and sanitation infrastructure over the stated period?
- What are the opportunities for unlocking private finance in the water and sanitation sector?

Based on the above questions, this review unpacked the challenge of financing water and sanitation infrastructure broadly, and specifically the role of the private sector through the use of innovative financing. This was achieved through a comprehensive review of global trends in the sector and the use of case studies to draw lessons that can be applied to the South African context. This report is structured to highlight these key issues.

- Chapter 2: Takes a deep dive into the financing mechanisms at the global level for water and sanitation.
- Chapter 3: Unpacks the context for water infrastructure investment trends in South Africa
- Chapter 4: Review of barriers and constraints to private sector investments in South Africa
- Chapter 5: Opportunities for addressing the perceived barriers to investments

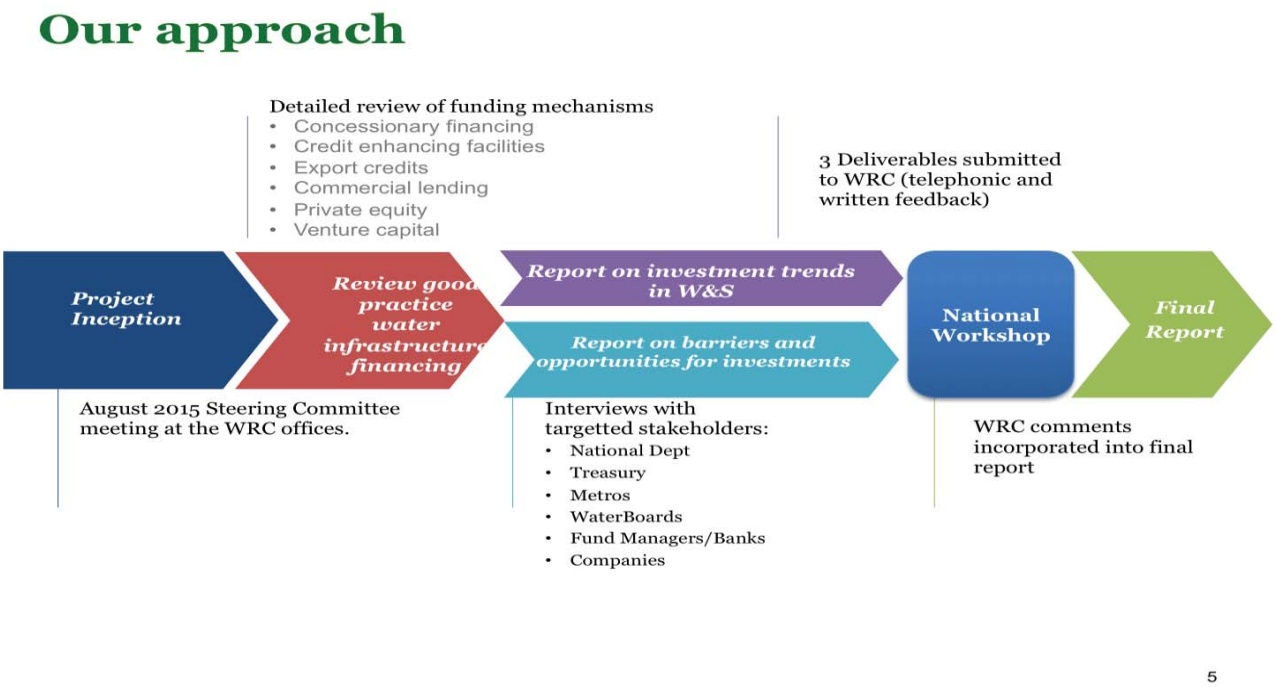

FIGURE 1: THE APPROACH USED TO UNDERTAKE THE STUDY

1.2 Context for water and sanitation infrastructure finance

Water availability and requirements

The total surface water available in South Africa is about 49,200 million m^3 per year, with about 4 800 million m^3 per year originating from Lesotho. In general, South Africa has relative low per capita water

availability compared to the global average, with only 9% of rainfall entering its rivers. Thus, South Africa has a very low ratio of Mean Annual Precipitation (MAP) to Mean Annual Run-off (MAR). Rainfall is generally higher in the northern and eastern parts of the country, compared to the western parts of the country (DWAF 2012). According to South African law, a portion of this water needs to remain in the river to sustain its ecological function. This is referred to as the Ecological Reserve. The desired quantify of the Ecological Reserve is dependent on the river, depending on the current conditions of the river and the desired conditions.

Water yield in South Africa varies considerably due to the seasonality of streamflow in most of South Africa's rivers. Water yield can be defined as the volume of water that can be abstracted at a certain rate over a specified period. Considering the fact that water requirements for domestic, industrial and mining use is relatively constant through the year, there is a need to stabilise water yield. For this reason, rivers need to be regulated to stabilise the flow to ensure that the required water yield can be sustained. Regulation of rivers by dams, enables water to be stored during periods of high flow for release during low flow, as a result the rate at which water can be abstracted is increased. The need to regulate water resources is a key determinant of how water resources have been managed in South Africa, a strong focus on 'hard' engineering solutions, such as dams and inter-basins transfers.

In addition to the variability in water availability, South Africa's economic hubs are located in regions that are water scarce, requiring significant water transfer schemes to be developed in order to reconcile water demand and supply.

Reconciliation of water demand and supply in South Africa

The DWS has developed comprehensive water reconciliation strategies for each of the water- supply systems in South Africa. The water reconciliation strategies (referred to as internal strategic perspective) have been developed using currently available information on water in each of the basins, in anticipation of potential future water challenges.

Several strategies have been devised to find the balance between water demand and supply in South Africa to form the basis of the reconciliation strategies. Some of these strategies include:

- Water demand management.
- Resource management
- Development of surface water resources
- Inter-catchment transfers
- Managing groundwater resources
- Reuse of water
- Control of invasive alien vegetation
- Re-allocation of water

The use of each of the above strategies for water reconciliation is dependendent on the water basin in question. Figure 2 depicts the options available for the Vaal River system reconciliation, which shows that the most cost-effective approach to reconcile water demand and supply is the implementation of the Lesotho Highlands Water Project Phase II, which is currently underway.

The water reconciliation strategies are therefore critical for planning investments in infrastructure. The Vaal water systems shows that by 2048 all local options for reconciling water supply in the Vaal River would have been exhausted, with the available options being an inter-basin transfer from the Mzimvubu River to the Vaal River, Zambezi River to the Vaal River or desalination of seawater. The reconciliation strategies therefore depict a very clear picture of the water situation in a specific basin, with available options for decision-makers to decide on the way forward.

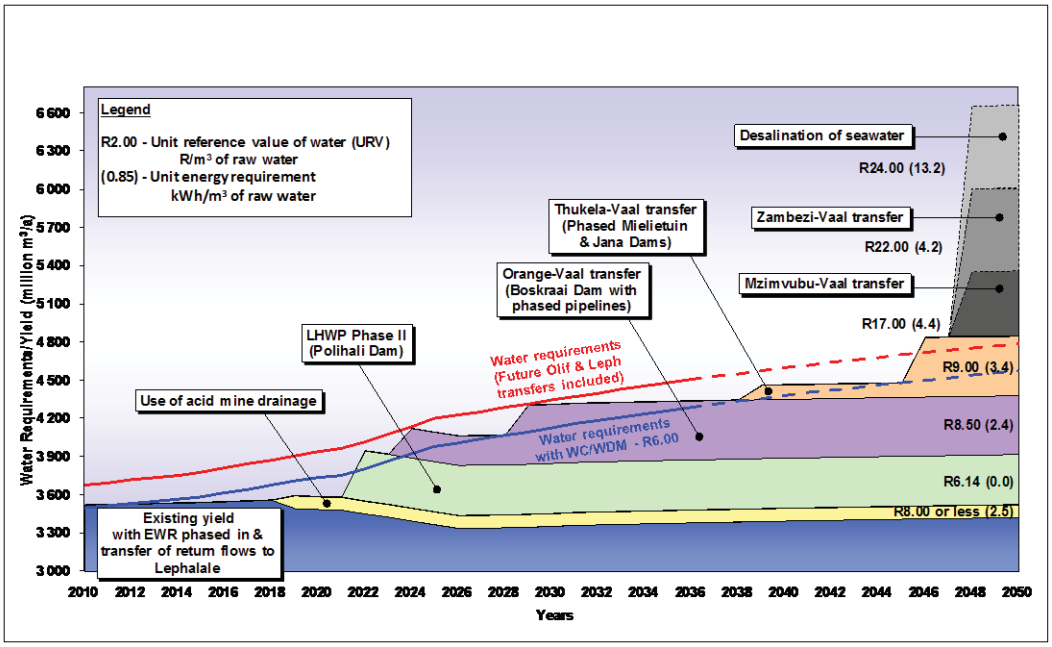

FIGURE 2: RECONCILIATION STRATEGY FOR VAAL WATER SUPPLY SYSTEM

The reconciliation strategy also provide insight into the level of assurance of supply and the implications in the case of a severe drought. For example, the Vaal River system as a whole is at risk of deteriorating water quality. Concerns include rising salinity, eutrophication, metals, endocrine disruptors, and pathogens, among others. Although none of these water-quality issues have reached crisis levels yet, cognisance needs to be taken of the water-quality problems of the region in the longer term.

In terms of the actual bulk water service provider there is minimal risk. Rand Water is well managed, and institutionally and operationally sound. The Blue Drop report for Rand Water and Ekurhuleni Metropolitan Municipality is 98.95%, and received an award. Therefore, although water-quality challenges associated with salinity in the Vaal and acid mine drainage (AMD) pose a risk, effective management has countered this. However, due to the poor record of investing in water infrastructure in South Africa in general, if that trend does not change the state of water services will deteriorate, posing a major risk for business and other stakeholders.

The purpose of water resource management

The management of water resources can be broadly stated as serving three main purposes, of securing (1) raw water, (2) potable water, and (3) ecosystem goods and services (Pegasys 2012):

- Raw water is available for agricultural, industrial, mining, power generation and household

water users.

- Potable water is available for domestic, commercial, institutional, and industrial consumers provided at point of use, as well as removal of waste water from the point of use; and
- Ecosystem good and services is related to the sustainable functioning of the aquatic environment (including biodiversity), providing attenuation, assimilation and in stream water use.

The above represents the three main products that water infrastructure is designed to serve, in concert with other fundamental strategies, such as water reconciliation and allocation, the physical infrastructure, water management institutions and capital (Pegasys 2012).

- The reconciliation of water availability, requirements and use to achieve broader political, social, economic and environmental imperatives drives and therefore underlies the entire framework for water management.
- The development, operation and management of water infrastructure (in its broadest sense) to enable this use and management of water along the entire value chain.
- The water Institutions that are responsible for the management, development and operation of this water value chain.
- The sources of capital and operating finance to resource these institutions to perform their management, development and operating costs, distinguishing recovery of tariffs and charges from access to government grants and subsidies, supported by commercial investments.

The water and sanitation infrastructure situation in South Africa

Public sector infrastructure finance is concerned with three types of investments, that seek to build new infrastructure increased demand and extension of services, refurbishment and backlogs to cater for existing users and overdue investment; and Operations and Maintenance (O&M) (Figure 3). Each of these may attract different funding sources and require different financing mechanisms.

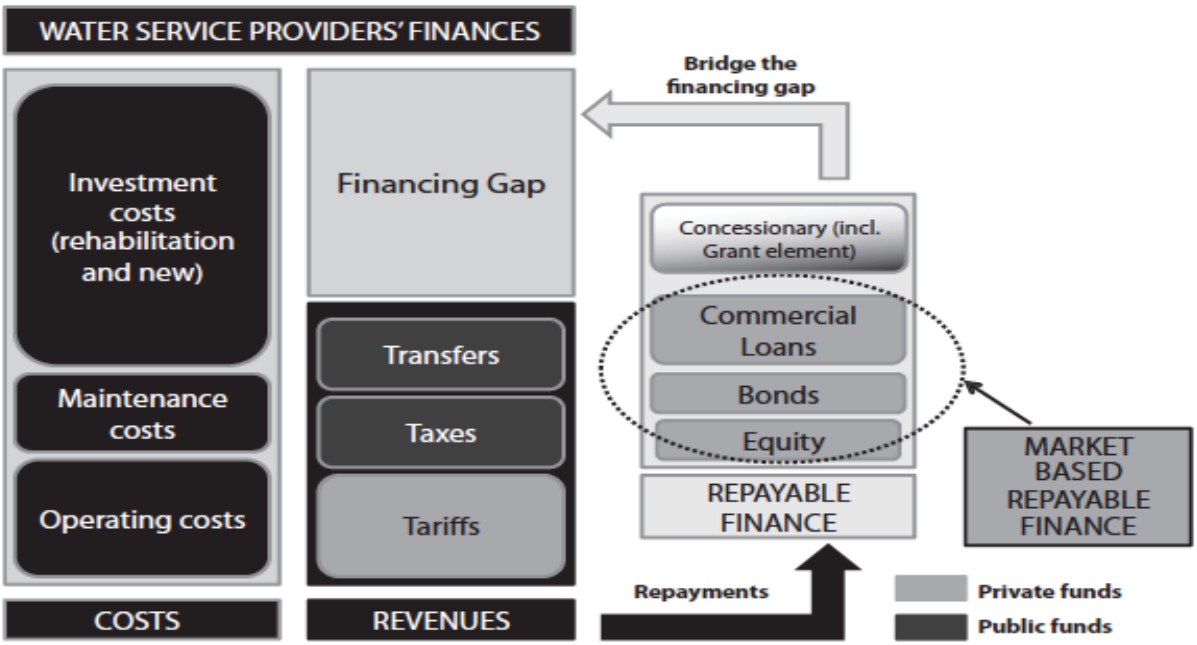

FIGURE 3: WATER PRICING AND FINANCE FRAMEWORK (OECD 2010)

Within the water sector there are two distinct categories of infrastructure – water resource infrastructure, and water services and sanitation infrastructure, including wastewater management. Once again, the financing mechanisms may differ for the two categories, due to the different institutional environments and different funding sources. However, they are also inter-linked through the value chain for water.

Regardless of the type or category of infrastructure, there are only three ways to pay for it – taxes, transfers (grants, donations) and tariffs. The 'three T' were put forward by the World Panel on Financing Water Infrastructure (the 'Camdessus Panel', established in 2001). A critical determinant of which one takes precedence is the extent to which the infrastructure is of a social or economic nature. Economic infrastructure is infrastructure where the investment can be recovered from users (tariffs), whereas social infrastructure will be reliant on fiscal funding (taxes).

Whilst the sources may be limited, there are a variety of mechanisms that can be employed to match the cashflow of these sources to the cashflow required to fund the establishment (and subsequent operations and maintenance) of the infrastructure. These mechanisms include the use of debt and equity from a range of institutions (private, public, multi-lateral, etc.). Private sector involvement can range from equity investment to long-term concessions.

The context of water infrastructure in this study is based on the entire water value chain. This broad context incorporates all aspects of water management ranging from the management of aquatic ecosystems 'natural infrastructure', to physical infrastructure required for the delivery of bulk water services, and water services. Although, this study will put more emphasis on the financing of physical water infrastructure, no specific distinction will be made from the financing requirements for natural infrastructure.

Water infrastructure consists of the bulk abstraction from the primary source, the conveyance infrastructure and local implementation and distribution (SAICE 2011). It is the responsible of government through its Department of Water Affairs for the bulk infrastructure, while Municipalities, water boards are responsible for local water quality and provision of water services.

Water infrastructure development in South Africa has evolved from the time when it was focused on developing selected rural areas, food security and political agendas in the pre-democracy years in South Africa. During this period water resources management was geared towards developing irrigation schemes for agriculture. This large-scale irrigation was facilitated by development of large water infrastructure, including interbasin transfer schemes.

In the later years, mining, and the industrial sector because key drivers of how water resources are managed in South Africa, and this dominated water policy and infrastructure development. This was because the mining sector was developing in regions with very little water availability, hence the government needed to make water available for this crucial economic activity. Since then the focus of water management in South Africa has shifted to a more integrated fashion (Figure 4) that is seeking to redress past injustices, and a recognition that the environment is also a key water user and thus needed to be factored in water management strategies. Water for economic growth however, is still critical in South Africa, because the country needs to grow to create jobs.

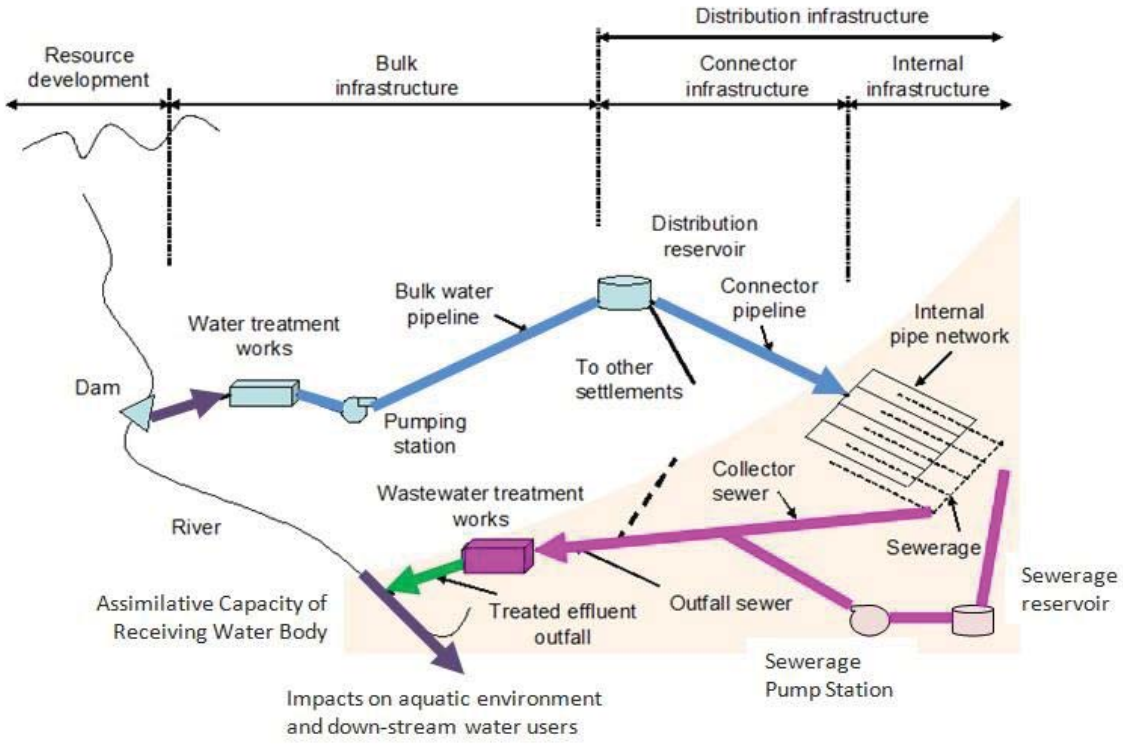

FIGURE 4: THE WATER VALUE CHAIN

The South Africa Institution for Civil Engineers (SAICE) has published a report card on the state of infrastructure in South Africa (2011). In this report card the following was found:

Bulk Water Supply

- There is significant deterioration in the condition of bulk water infrastructure as a result of insufficient maintenance and neglect from lack of capital investment.
- The report also pointed out that serious salinisation and eutrophication of many dams and rivers continue to pose a major challenge for South Africa. As a result the cost of water treatments infrastructure has increased, for example AMD is a major cause of concern (SAICE 2011).
- According the SAICE report, large dams are starting to develop serious capacity problems, while the conditions of farm dams is deteriorating rapidly due to of lack of maintenance, resulting in increased sedimentation of bulk storage infrastructure.
- The level of water supply in certain dams have fallen below the 98% assurance of supply

recommended in the National Water Resources Strategy. This is due to the long lead times required for the development of new water-supply schemes.

Urban Areas

- Major and ongoing strides in provision of water since 1994, but focus on quantity, not quality, make water services unsustainable. Water quality is a serious problem, especially outside metropolitan areas. Seeking Blue Drop status might assist in improving water quality in municipalities.
- Water wastage (through leaks) is still too high.

Other Towns

- Serious shortage of skilled personnel and officials; governance failure is increasing.
- Increase in protests in urban and rural areas – efforts to force improvement in services.

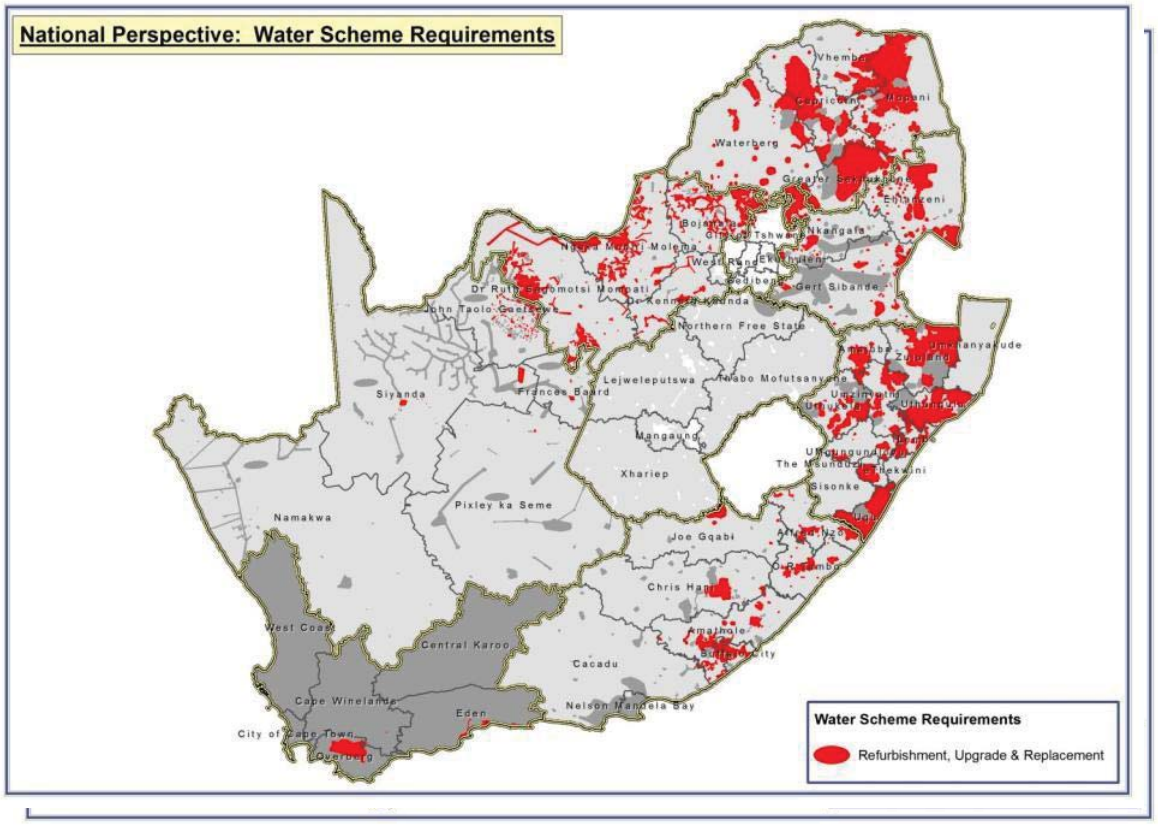

FIGURE 5: WATER SCHEME REQUIREMENTS FOR SOUTH AFRICA (DWA 2010)

Figure 5 shows the water scheme requirements for South Africa as mapped out by the DWS. The provinces that are in dire need of new water infrastructure include KwaZulu-Natal, Gauteng, Limpopo, Mpumalanga and the Free State.

1.3 Overview of investment trends in water and sanitation in South Africa

Over the past decade South Africa has experienced inadequate investment in the water and sanitation sector. The sector is in dire need of investments due the current backlogs, with 1.4 million households without adequate supply of water and 2.1 million without access to basic sanitation (IDC, 2015). According to the Minister of Water and Sanitation, R670-billion is needed to fund capital investment and infrastructure in South Africa's water and sanitation sector over the next decade. Of that total amount required, R272 billion is required for the delivery of portable water and other related services.

The capital that South African municipalities need for specific water infrastructure requirements lay beyond the scope of the fiscus (IDC, 2015). Banerjee and Morella (2011) estimates that South Africa requires approximately USD 3.3 billion per year to maintain its water and sanitation, ranking as the greatest need for annual investment in the sector on the African continent. Based on figures from the World Bank, over the past decade South African sectors, such as telecommunications and electricity, have seen much private sector participation and investment, whilst the water and sanitation sector has received the least amount of private investment measuring USD 88 million, despite experiencing considerable institutional reforms in water policy (see Figure 6) (Ruiters & Matji, 2015; Budds & McGranahan, 2003).

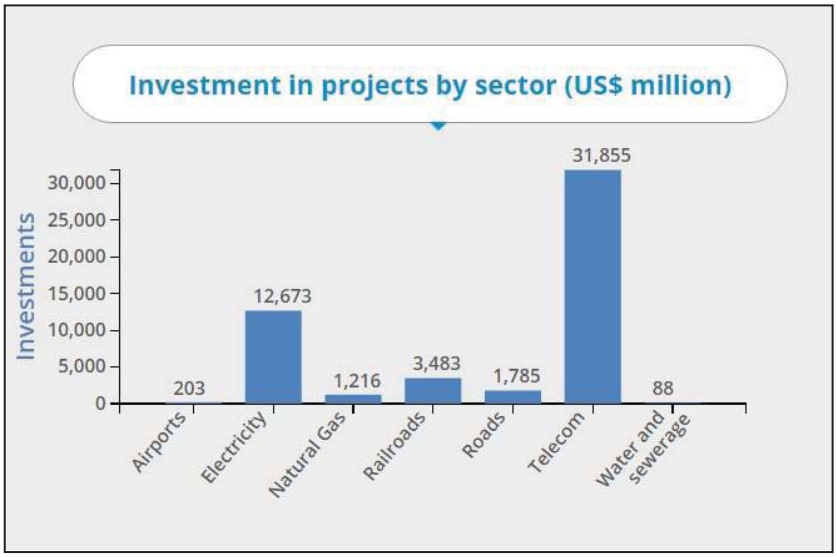

FIGURE 6: PRIVATE INVESTMENTS IN SOUTH AFRICAN KEY SECTORS (WORLD BANK 2010)

To address the water and sanitation backlogs and meet the capital requirements, private investment needs to be explored and encouraged as a possible avenue and solution. Considering the success of South Africa's Renewable Energy Independent Power Producer Procurement Program (REIPPPP) as the top market for private participation in infrastructure investment in 2015 at almost USD 4 billion, there lies great potential for attracting private investment towards the country. Current underinvestment in water and sanitation indicates that there is in fact room for improvement and potential for private opportunities. This report is dedicated to aiding the process of supporting South Africa's water and sanitation sector to achieve high levels of private investment through addressing the barriers that the sector currently faces, and provide solutions to overcome them.

The following section focuses on the key barriers related to investing in water and sanitation infrastructure, ranging from macro-economic factors, regulatory and project specific drivers of risk to investors.

The state of sanitation infrastructure in South Africa

The responsibility of providing sanitation services such as wastewater treatment and sanitation facilities falls under the DWS at the national, Municipalities and Water Boards at the local level. South Africa has extensive wastewater treatment facilities, comprising of 850 municipal treatment plants, supporting an average of 7 589 megalitres (ML) of water daily (SAICE 2011).

Since the dawn of democracy, access to sanitation services has reached to over 67% of South Africa's population (SAICE 2011). More than 3 million additional people have gained access to basic sanitation facilities since 2006. This is a clear indication that significant progress has been achieved in extending sanitation services to the wider population in South Africa, even though significant challenges still persist. According to SAICE's 2011 infrastructure report:

- Most sanitation facilities are not compliant from a technical design perspective, as a result are susceptible to quick failure and extreme maintenance requirements
- Lack of consistent communication to users on how to use the facilities has compounded the maintenance problems being experienced.
- The wastewater facilities are in an urgent need for maintenance and replacement. There is also a lack of wastewater monitoring in many plants.

Even though significant progress has been achieved in sanitation provision, the infrastructure is a in a bad state. There is also lack of capacity for their effective management thus posing a major challenge to effective service delivery.

The policy landscape for financing water and sanitation infrastructure in South Africa

Water resources are management in South Africa is governed by the National Water Act (NWA) of 1998 and the Water Services Act (WSA) of 1997. The aim of the National Water Act of 1998 is to ensure that South Africa's limited water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for all people to benefit. According to South Africa's law as enshrined in the constitution and the NWA, the national government has been entrusted as the custodian of water resources, with the power to regulate the allocation, use, flow and control of water in the Republic.

The Water Services Act (WSA 1997), outlines the role of local government as water service authorities to supply water and sanitation services, according to the set national norms and standards. Sanitation services are currently governed by the Strategic Framework on Water Services, with the DWS playing a key role in the development of policy, regulating and overseeing sanitation provision. While the Department of Human Settlements drives policy sanitation policy review processes. There are numerous policy instruments that help to put the above Acts into context, and defines their application in practice.

- **The White Paper on a National Water Policy for South Africa (1997):** This White paper was adopted in 1997, and it frames the context of water management in post democratic South Africa. It outlines the direction for the development of water law and water management systems in South Africa (DWA 2014).
- **Strategic Framework for Water Services (2003):** This sets outs the national framework for water supply and sanitation, and outlines how this vision will be achieved.
- **National Water Resource Strategy (NWRS) (2004)**: The NWRS was adopted in 2004 and outlines the strategies, plans and institutional arrangements required for the management of South Africa's water resources. It also outlines the current state of water resources, and future projects regarding water availability and requirements. These are analysis are based on the water management areas, that have been defined for South Africa.

In terms of infrastructure financing, the **Public Finance Management Act 1999 (PFMA)** is the key instrument responsible for government finances. The aim of the PFMA is to ensure efficient utilisation of public finances, with the following key objectives:

- Modernise the system of financial management in the public sector
- Enable public sector managers to manager, but at the same time be held more accountable
- Ensure the timely provision of quality information, and
- Eliminate wastage and corruption in the use of public assets.

There are other policy frameworks that have direct implications on the financing of water and sanitation infrastructure. For example, the Water Research Act 1971, which gave rise to the establishment of the Water Research Commission (WRC). The WRC is responsible for driving water research in South Africa, and although it does not directly finance water infrastructure, it provides significant leadership in developing the understanding of water resources in South Africa including, its use, protection, and financing.

2 GLOBAL REVIEW OF FINANCING MECHANISMS FOR WATER INFRASTRUCTURE

The review of financing mechanisms for enabling sustainable water infrastructure were assessed by studying current approaches to financing water infrastructure globally. The review focused on both traditional streams of financing infrastructure, such as private finance, infrastructure charges and innovative financing mechanisms such as venture capital and payments for environment services, among others.

2.1 Financing requirements, affordability and feasibility for water and sanitation

Significant funding is required for financing water and infrastructure in Sub-Saharan Africa (Figure 7). More specifically, rural and urban sanitation poses a major challenge, requiring more than USD 50 billion. It should also be noted that achieving the Millennium Development Goals (MDSs) is just the stepping stone to achieving universal coverage for water and sanitation services, as a result the costs are even much higher. To meet these costs of achieving the MDGs, various sources of funding will need to be harnessed, including user charges, public expenditures and from utilities. It is generally thought that maintenance and operational costs are best met through user charges, while public expenditure could be utilised for capital costs in partnership with utilities (Mehta et al 2005).

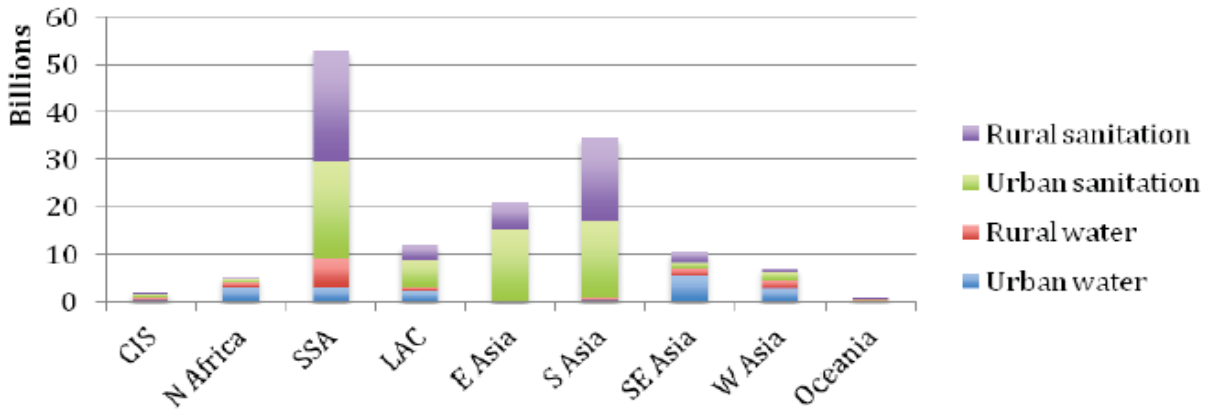

FIGURE 7: THE TOTAL CAPITAL COSTS REQUIRED TO EXPAND COVERAGE OF ACHIEVE WATER AND SANITATION (WHO 2012)

A country's affordability will depend on its economic status, and level of public expenditure. Financial requires will also vary according to the choice of technology, level of service and operations and maintenance (O&M), and the sector requirements (Mehta et al 2005).

Costs and benefits

It is challenging to estimate the costs for water and sanitation because such costs are embedded with the broader water sector comprising of drainage, irrigation, and hydropower investments. The other challenge is that there is no differentiation between investments made to build new infrastructure, to largely rural and underserved populations and those that target improvements in existing infrastructure, mostly urban areas.

In general, the cost of water and sanitation infrastructure is enormous. This is particularly true for capital costs, making it difficult for many countries in the developing world to meet this challenge (Figure 7). In Sub-Saharan Africa, for example, the World Bank estimates that at least USD 35 billion per year over the next 10 years will be required to meet its water and sewage infrastructure costs (Hall and Lobina 2012). The cost of household connections is approximate double that of improved connections such as protection of natural springs and boreholes.

TABLE 1: COST PER LIFE-YEARS SAVED AS % OF GDP PER CAPITA, SELECTED AFRICAN COUNTRIES (HALL & LOBINA 2012)

Benin	0.722	Mali	0.528
Burkina Faso	0.380	Mozambique	0.359
Cameroon	0.273	Namibia	0.310
Chad	0.205	Niger	0.675
Congo, Rep.	0.299	Nigeria	0.228
Gabon	0.150	Senegal	0.283
Ghana	0.843	Swaziland	0.116
Guinea	0.205	Tanzania	1.125
Kenya	0.605	Uganda	0.753
Lesotho	0.644	Zambia	0.283
Liberia	2.898	Zimbabwe	0.855
Madagascar	2.164	**Average**	**0.655**
Malawi	0.827		

The benefits of household connections are enormous, with various studies demonstrating the link between child mortality to the installation of household sewerage connections. For example, in Brazil it was demonstrated that child mortality fell by about 20% in the city of Salvador due to the improvement in the

water and sanitation conditions (Hall and Lobina 2012). Household water connections and flush toilets lead to average mortality reduction of 25 deaths per 1000 births, whereas improved water and sanitation technology lowers child mortality by 8 deaths per 1000 (Hall and Lobina 2012).

From an economic perspective, it has been estimated that the cost of saving a life per annum as a result of providing water and sanitation infrastructure is less than the economic output per person per year (Gunther and Fink 2010). It was also found that the cost of having full access to water through connecting the householder was more effective than existing sources (Gunther and Fink 2010). This also makes sense for many developing countries, where such improved sources of water and sanitation infrastructure are often located far away from their dwellings, and accessing them exposures them to other risks, especially to young children and women.

It is important to note that most of these benefits are realised over a long period of time, and might not necessarily be enjoyed by the investor but society as a whole. Some commercial investments might also have a detrimental effect on overall welfare, for example when manufacturers of commercial drinks encourage the purchase of sweetened drinks that will lead to a negative impact on human health (Hall and Lobina 2005). Bottled water is also economically inefficient and environmentally harmful way of distributing water, due to the transportation costs, generating plastic waste, and energy intensive.

Investment opportunities in the water cycle

There are numerous investments opportunities in the water cycle. Water treatment, for example, provides various prospects for investments related to filtration or purification including seawater desalination (Donge et al 2008). Metering technology is very important in water management, and the distribution of water requires significant investments in infrastructure such as pipes and valves.

2.2 Funding sources

Funding flows in the water and sanitation sector are derived from a wide variety of sources including ODA, loans, grants, international and private sector investments, domestic investments, the public-sector expenditure and individuals. However, the public sector remains the dominant source of funding water and sanitation infrastructure. In some cases, the traditional breakdown of 90% domestic financing against 10% external financing is shifting, with more external sources coming on board, primarily from the private sector. There are significant local investments from the informal sector in the form of small independent water providers, individual households and communities (Anamraju et al 2001).

Public contributions

The public sector plays an important role in the financing of water and sanitation infrastructure, even though private sector engagement has become increasingly prominent in some countries, in many cases water infrastructure will still be financed by the public sector. The role of the public sector according to Head (2006), will still apply specifically in cases where:

- The project is particularly large and complex
- The physical environment means that the site risks are unacceptably high
- There are commercial risks that cannot be mitigated
- An appropriate enabling environment is not present

Under the above circumstances the primarily role of delivering water infrastructure, including its financing will lay solely with the public sector, since no private sector roleplayers would be keen to get involved because of the high risks involved. To overcome capacity constraints, the public sector might partner with private institutions to address the capacity shortage for delivering the project.

Parastatal projects

Parastatal organisations are very important institutions through which the public sector works to deliver projects, which could benefit from financing mechanisms such as debt from international financial institutions or the central government. Private debt is particularly useful if the parastatal organisation can be supported using sovereign guarantee from the respective government. Such guarantees are necessary in cases where the parastatal might have no credit record and no assets, if it is newly established.

The principle advantages of this model according to Head (2006) are:

- The public sector remains firmly in control of the conceptualization and planning of the project
- Such a parastatal is free to access both public and private finance, if credit guarantees are supplied.
- Parastatals have the potential to access sources of finances that is inaccessible to the private sector, due to the government backing in the form of sovereign guarantees.
- Construction costs tend to be lower in this types of projects because of the international competitive bidding, and makes it easier to demonstrate transparency.
- In cases of a political sensitive issue, such projects tend to be less contentious compared to when private ownership is involved.

The disadvantages of parastatal projects include:

- The risk exposure is entirely on the public sector, and if such projects fail it might have huge implication on service delivery and a potential tax burden to the citizenry.
- This model is not suitable for small projects, as it generally requires capacity building and institutional arrangements that can be expensive to establish.
- Since backing from Sovereign Guarantee will be required, such a guarantee might be difficult to obtain for all projects, since it's classified as public debt.

It is important to note that some projects might not qualify for funding under the parastatal model. In this case such projects will continue to be funded through the traditional public funding channels, and may qualify for concessionary funding, such as grants, credits or long-term loans related to market rates. In most cases such projects to be less financially viable, but could be based on a strong economic or social justification. Example of projects that may struggle to receive innovative financing include issues such as ecological benefits and flood mitigation.

The role of private sector

The role of the private sector in financing water and sanitation infrastructure is determined to a large extent by the balance between risk and reward, from a private sector perspective (Head 2006). A rigorous decision-making process is undertaken to determine whether a water infrastructure project is suitable for private or public sector financing (see Figure 8). However, in some cases, a project might be a public-private partnership (PPP), in which case some elements of the project might be typical of both a private and public sector nature.

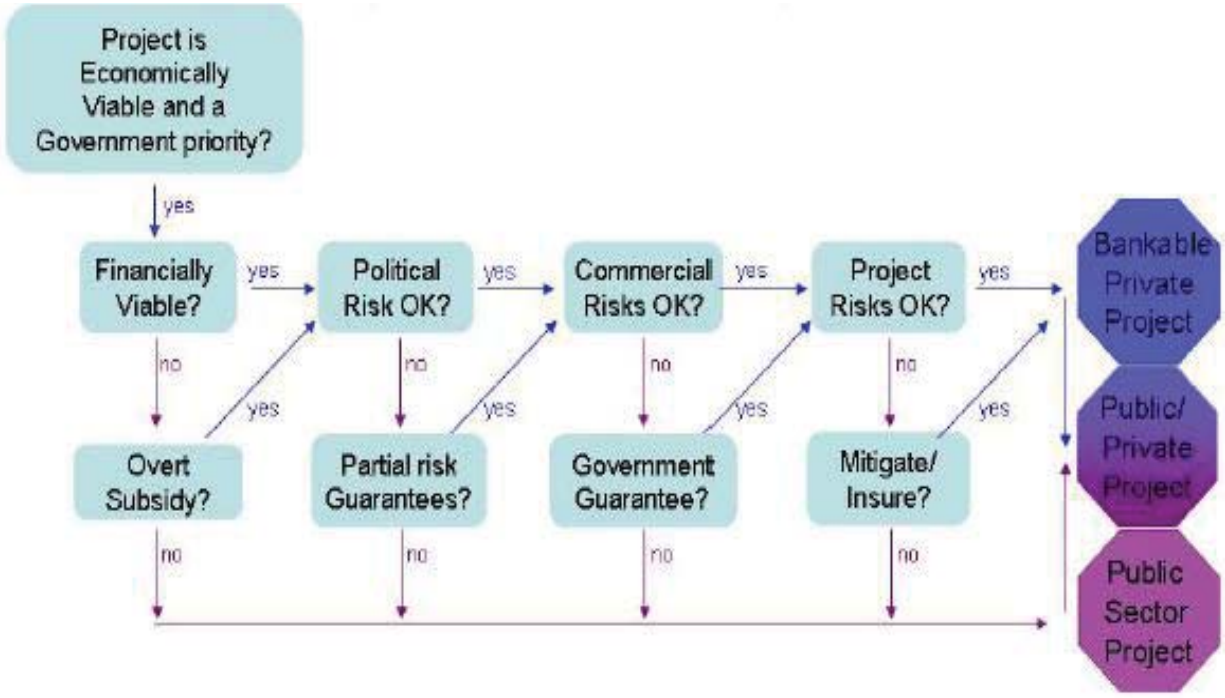

FIGURE 8: DECISION TREE TO SUPPORT THE BANKABILITY OF A PRIVATE INVESTMENT

The decision tree (see Figure 8) is extremely important in determining the type of project and how the level of risk could be mitigated to make it palatable for private sector investments. It is also important to note that even though a lot of private sector decisions are based on the level of risk, there is variation in the risk appetite, with some clients accepting to take a higher risk than others. In the case where a project is deemed to be financially unviable or unacceptably due to a high-risk profile, such a situation could be corrected by various measures, including fiscal support, subsidies, guarantees or the re-arrangement of risk (Head 2006):

i) Fiscal support could be in the form of tax breaks, such as relief from import duties or a moratorium on corporate tax during the early stages of the project.

ii) Subsidies in the financing stages is used to leverage the revenue stream, which could help to improve affordability to the consumer and improve overall financial viability of the project.

iii) Guarantees are extremely useful for projects that have an unacceptably high risk. They are a form of credit enhancement, usually from financial institutions that are used to protect lenders from risk

iv) Rearrangement of risk is another strategy for managing risk between key parties involved in the financing of water infrastructure such as the owner, contractor, and the off-taker and host

government (Head 2006).

An important aspect to consider in the financing of water infrastructure is the ownership of the physical assets and their financing, especially in the case of public infrastructure. The two main ownership models in the financing of water infrastructure are the BOOT, BTO and ROM, which are discussed in more detail below.

BOOT (Build-own-operate-transfer): Private Sector Option with Assets in private ownership

This is one of the most widely used mechanisms for private sector involvement in the financing of water and sanitation infrastructure. It involves private sector financing, construction, and operations by a company that is usually set up just to serve this purpose (Head 2006). Under this mechanism, the company owns the project based on an agreed duration for the concession, which in many cases is between 15 and 25 years. It's important that the concession period is long enough to enable the private company to recoup its initial investment.

Advantages of BOOT Model include the following:

- Due to investment primarily emanating from the private sector, the government does not have to worry about the cost of such large infrastructure, without having to worry about public depth, unless a sovereign guarantee is involved.
- Most of the risk of the project lies with the private sector, even though in practice some level of risk is borne by the government.
- Due to the large investments by the private investor, there is significant motivation to finalise the project and commission it on time, leading to efficiency in the delivery of infrastructure
- There is very low risk of political interference relative to a public sector.

There are significant disadvantages of the BOOT model, primarily linked both to the investors and the government.

- For the investor, there is no way of recovering value of the physical assets once the concession period has elapsed. In essence it means handing over assets free of charge to government, even though the project would still have a long-life span.
- Very few investors find these model attractive, as a result raising the finances can be cumbersome under this arrangement.

- The contractual arrangements for BOOT are very complex, which make it difficult to manage competitively.
- It is unsuitable for smaller projects, because of the complexity of such projects, which requires complex contract in terms of the contractual agreements.
- From a government perspective, such projects may lack flexibility when it comes to access and control over all projects with divergent stakeholders whose priorities might be changing.
- The cost to the end user may be higher compared to whether the project was financed by the public sector.

Even though BOOT models may be disadvantageous sometimes, they are widely used to fund water projects, such as hydropower, and in the energy sector they have been used to mainly fund thermal power.

BTO or ROM: Private Sector Operation with Assets in public ownership

Build Transfer Operate (BTO) and Rehabilitate Operate Maintain (ROM), are two mechanisms based on private sector financing and operation, even though the infrastructure remains a public-sector asset. The role of the state under this arrangement is more amplified, since it's responsible if anything goes wrong with the project. The public sector also has more influence as it owns the project (Head 2006).

However, this arrangement is relatively rare in the water sector, but has been used when an existing water scheme requires more investment or rehabilitation. The ROM model is still widely used for the rehabilitation and/or upgrading of hydro power plants.

The principles advantages of the BOT/ROM models are that:

- It relieves the government of direct responsibility for financing of such large infrastructure.
- There is more access and control of the infrastructure by the government, because it lays in the public sector.
- Financing is relatively easier, especially when it involves the upgrading of existing infrastructure
- Contractual arrangements are much simpler compared to the BOOT model.

The disadvantages of the BOT/ROM model include the following:

- It is a relatively awkward arrangement since one party is responsible for the routine O&M while another party owns the infrastructure.

- The concessionaire is unlikely to assume responsibility for existing works, and therefore the public partner will have to assume that risk.
- The company will require guaranteed revenue stream.
- Cost to the end user should be less than BOOT, but higher if the project had been financed by the public sector.

Public- private partnerships (PPP)

This arrangement involves the sharing of risk between public and private sectors, with each detailed financial model dependent on the specific project in question. In most cases PPPs are structured either as a private company with public sector shareholding, or they may be structured as publicly-owned parastatals.

An important consideration in PPP is the need to critically understand the concept of sharing risks, responsibilities and returns (known as the 3Rs), between the public and private sector roleplayers involved in the project. In these arrangements, it's especially important for the public sector to understand the kind of risk tolerance the private sector is able to bear. In some cases, where there are risks that the private sector cannot bear, and the public must be prepared to shoulder such risks, if such a project is to be successful.

There are numerous examples of where the nature of PPP takes the form of a public-sector shareholding in a private company. This arrangement has both advantages and disadvantages as outline in Head (2006), and summarised below:

- Injecting public finances eases the financial difficulty of a company and reduces the amount of equity held by a private partner.
- Public equity enables access to funds that would traditionally never be available for private sector companies.
- Public equity made to government is often in the form of soft loans, and the government can lend on to a private company at a higher rate to generate an additional revenue stream.

Disadvantages of public shareholding in private companies include the following:

- State needs to purchase its shareholding and needs to assume the level of risk as the private sector partners, including raising additional equity if costs overrun.
- Public shareholding dilutes the return on investments (ROI) and may lower it to such an extent

that the private sector partner loses interest in the project.

- Some private partners might be weary of including a public-sector partner with the fear that, such a partner might assume full control of the project.

The role of public sector shareholding is particularly important in cases where the projects are export orientated, because of the difference of government views on domestic and export varies significantly. Governments are generally interested in funding the delivery of water or electricity at a minimum cost. In this case the government might not be interested in the profitability of the project. As a result, there is little convergence between public and private sector in the domestic front. In the export project, on the other hand, governments are interested in generating revenue, and are therefore looking for the highest tariffs. In this situation, the host countries interests are now more closely aligned with the private sector.

2.3 Financing instruments for water and sanitation

Concessionary financing

Concessionary finance is a mechanism for financing public goods that are regarded as being of high economic value, but without a direct market value to allow conventional sources of funding to be deployed. The best example of concessionary funding is Overseas Development Aid (ODA), which comprises grants, or soft loans, with very low interest rates.

Overseas development aid

This is the form of concessionary finance provided by a broad range of international financial institutions, including Multilateral Development Banks, Regional Development Banks, bilateral agencies, Aid funds of the European Union and the United Nations, and charitable organisations.

A key feature of ODA is that the finance is publicly sourced and is concessionary because the money is disbursed either as grants or soft loans not at full market rates. The soft loans are available mostly for poorer countries in Africa, Asia and Central Asia. The very soft loans are unlikely to provide funding for water, because the amounts are limited, and may face stiff competition from other socially important sectors of the economy (Head 2006). Concessionary finance can be very useful for bolstering projects in the following ways:

- Supporting Technical Assistance studies during the project operation stage
- Lending for projects at less than fully commercial rates

- Funding parts of a project that are economically important but less commercially viable
- Lending money to government for the public equity of a private company.

Figure 9 shows the trends in funding water and sanitation projects from members of the OECD to developing countries. There was a total of close to USD10 billion commitment by both bilateral and multilateral sources of funding, however actual spending on the projects was about USD7 billion due to protracted contractual issues typical of this sector (WWC 2015).

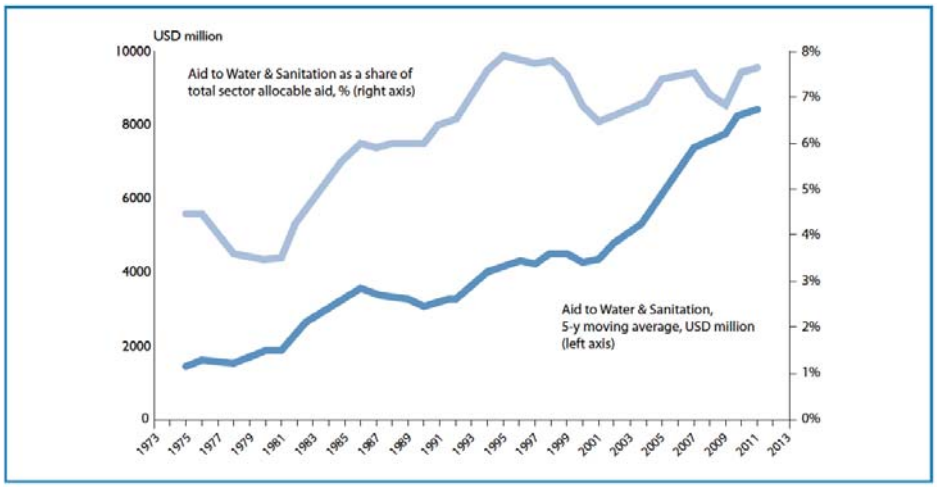

FIGURE 9: BILATERAL AND MULTILATERAL AID TO WATER AND SANITATION (WWC 2015)

According to a study by the OECD on water and sanitation infrastructure, ODA played a key role in financing water and sanitation infrastructure, with the following highlights over the last couple of years (OECD 2013).

Highlights

- Aid was instrumental in encouraging progress toward the MDG targets on water supply and sanitation. Since 1990, drinking water and sanitation coverage in the developing world has increased by 16% and 20% respectively. However, much remains to be done. Drinking water coverage averages only 63% in LDCs; and much of sub-Saharan Africa and several of the most populous Asian countries remain off track in meeting the MDG sanitation target.
- In 2010-11, total annual average aid commitments to water and sanitation amounted to **USD 7.6 billion**, representing **6% of total sector allocable aid**. The largest bilateral providers in 2010-11 were Japan (on average USD 1.8 billion per year), Germany (USD 868 million) and the United States (USD 442 million). IDA provided USD 1.3 billion and the EU Institutions USD 538 million. While aid to water and sanitation has increased in recent years, funding remains insufficient considering the needs.
- In 2010-11, aid to water and sanitation targeted regions most in need of improved access to water and sanitation: **Sub-Saharan Africa received 25% of total aid to the sector, and South and Central Asia 23%**. The poorest countries (LDCs and other LICs) received **33%** of total aid to the sector.
- Of total DAC members' aid to this sector in 2010-11, water supply activities represented **19%**, sanitation **18%**, and combined water supply and sanitation activities **42%**; the remaining **21%** consisted of sector budget support, contributions to funds managed by international organisations, waste management and education activities.

In relation to Sub-Saharan it is important to note that most of ODA originated Western countries, such as Germany and the United States. This trend is likely to change over the next couple of years as the influence of countries like China and Russia starts to hold on the continent. The recent launch of the BRICS Development Bank, for example, with a strong focus on infrastructure, could significantly change the dynamics of infrastructure financing on the continent. Many African countries view ODA from the traditional countries as restrictive, due to all the conditionality related to issues as such transparency, human rights, and governance. The result is a shift towards South-South cooperation, instead of the traditional north/west alliance. The issue that remains to be seen is whether shift in cooperation will have a significant impact on delivery of the massive infrastructure backlog the continent is experiencing (WEF 2015).

Credit enhancement facilities

Credit enhancement facilities aim to improve the suitability of a project to attract private sector finance, which enables risk mitigation for the private sector. Such guarantees will enable a project to access new sources of funding, reduce borrowing costs and extend loan maturities.

Multilateral Development Banks (MDBs) are the main sources of guarantees, with the aim of protecting

private debt against potential government failure in the delivery of infrastructure (Head 2006). There are two main types of credit guarantees that can be offered to a project:

- Partial credit guarantees are an arrangement where only a portion of the project is guaranteed, to ensure that payments of that portion of the project are guaranteed.
- Partial or political risk guarantees. This cover debt default on loans to private sector projects as a result of a government failure to meet it is commitment on the project, with such guarantees mostly covering sovereign risks such as expropriation, changes in law, and civil strife (Head 2006).

Credit enhancement facilities as stated above are issued by MDBs to member countries, with the specific rules and criteria varying widely among banks. In some case the banks may require counter guarantee from the host government, while in some cases the guarantees are complemented by loans from the same bank.

Export credits

Governments provide export credits to their national exporters through Export Credit Agencies (ECAs), as a strategy to boosting international trade. These types of credits are, however, very limited, and are not widely used in the water sector. Their main advantage is that, because they are aimed at boosting trading, their lending rates are relatively lower than those for commercial banks.

The main shortfall of export credits is that it's limited to the value of the export plus 15% to for local costs. This is not suitable for water infrastructure which involves significant local activities related to civil works, leaving a large financing gap thus unsuitable for that sector (Head 2006).

Commercial lending

These are loan facilities offered by private commercial banks or international but publicly-owned financial institutions like the IMF, and the World Bank or fixed interest bonds from the financial markets (Head 2006). Most sources of commercial lending for large infrastructure funding tend to come from international banks, especially in the developing countries where domestic banks are still not well established to tap into that sector.

Multilateral Development Banks (MDBs) also play an important role in lending through their commercial arms or as a participating bank in a syndicated lending programme with other banks. MDBs are very keen in these types of funding because they normally have better lending rates than the private commercial

banks. According to Head (2006) the commercial lending can be carried out by either a bank lending to a corporation, which then decides to invest in a particular project, or the bank could lend directly to a project. Infrastructure tends to be mostly funded through the later arrangement and referred to as project financing.

A key characteristic of project financing is that the only source of security is the anticipated revenue streams, which means they are high risk. This makes raising money for project finance to be extremely difficult, because the special purpose company that is set up for the project, usually has no assets or a revenue base being a new undertaking.

The nature of water and sanitation infrastructure, such as hydropower, is such that all the investments have to be ploughed into the project first before any revenue can be generated. Whilst the running costs of just projects are relatively low, such projects pose significant risks to investors. To overcome the high risk of such projects, commercial lenders often require stringent conditions to be met, and follow a through due diligence process. Due to the high risk in project finance, commercial lenders usually focus on mega projects of not less than USD100 million (Head 2006) and will only consider projects that are well prepared. The cost of lending will also be partially influenced by the bank's perception around risk.

Private equity

Private equity investments are structured in a way to obtain maximum returns from the investments, thus, private equity investors are only interested in deals that are highly profitable. This has lowered the level of investments in water and sanitation infrastructure especially in the developing world (WWC 2015).

It is estimated that about 15% to 40% of the total cost of private infrastructure projects is in the form of equity with a varying range of investors which may include the host government and MDBs.

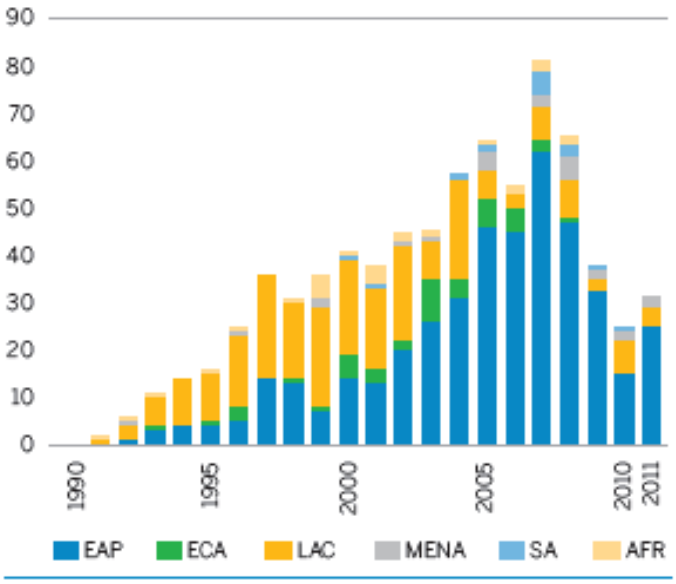

FIGURE 10 : INVESTMENT COMMITMENT ON WATER PROJECTS IN DEVELOPING COUNTRIES (1990- 2011) (WORLD BANK 2012)

Debt and equity ratio is important for financing, because it's both an indicator of the amount of exposure by a lender and the amount of debt to be raised. For example, a high debt-equity ratio of 85/15 is generally highly favoured by investors, because it implies that if the project is successful the low debt component will result in accrual of high returns.

On the other hand, lenders prefer a lower debt-equity ratio, because it means the owner of the project has invested substantially, and put its money under risk before seeking a loan. This is also important because if there is a financial shortfall, equity will be always be forfeited before debt, thus helping to cover some of the risk exposure for the lender.

There are very few documented cases of private equity investments in water has been reported in some cases globally (Table 2), with the sizes of such deals ranging quite widely, but a key feature of these investments is the focus on specific asset classes in the water sector, and location specific. All the cases of private equity investments have only been reported in OECD countries, underscoring the perception of water being high risk with relatively low returns. From a purely commercial perspective, private investors have been discouraged from investing in water companies partly because of the perceived uncertainly in

TABLE 2: SELECTED LARGE PRIVATE EQUITY INVESTMENTS IN WATER (WWC 2015)

private equity firm	investment	Year of investment	Value of deal (US$)
Clayton, Dubilier & Rice	Ashland Water	2014	1.8 bn.
Kohlberg Kravis Roberts	South Staffs Water	2013	Undisclosed
Kohlberg Kravis Roberts	Bayonne concession	2012	150 mn.
Carlyle	Park Water	2011	102 mn.
Kohlberg Kravis Roberts	United Envirotech	2011 & 2013	153.8 mn.
JPM Asset Management	SouthWest Water	2010	427 mn.
American Securities LLC	ADS	2010	undisclosed
Metalmark Capital	NI America	2007	100 mn.
Bain/Carlyle/CDR	HD Supply	2007	10.3 bn.
Apollo Global Management	Rexnord	2006	1.825 bn.
Blackstone/Apollo/GS	Nalco	2003	4.13 bn.

the future supply of water and changes in demand. Many water companies face significant risks in relation to water availability for their business, where in a recent survey it was found that 6 large US companies face significant risks, which are not reflected in municipal bond ratings, thus exposing investors. Persistent drought has been partially responsible for the significant changes in water supplies, which impacts the ability of utilities to raise funding to support their projects.

Venture capital (VC)

This is a form of equity that is directed towards start-up companies or small companies that has been in operations for a few years, but has not been scaled up substantially. The main theory of change for venture capital is that, even though most of the companies in which investments has been made will fail a few of them may be successful to yield some significant profits.

VC will play an important role in companies that are focused on developing water technologies, and is thus key for driving innovation in the sector. Technologies that are involved in a water project may affect the risk profile of the project, because new technologies generally carry a high level of risk. In general, VC is suited for new unproven technologies, while project finance is used for mature technologies (WWC 2015).

2.4 Innovative financing mechanisms for natural infrastructure

Payment for environmental services

Payments for environmental services are innovative funding mechanisms designed to recognise the goods and services that accrue from the environment. Watersheds provide important services, which include provisioning services (e.g. water supply) regulatory services (e.g. flood attenuation) supporting services (e.g. biodiversity habitats) and cultural services (e.g. aesthetic enjoyment) (Table 3). Due to the very nature of watersheds, however, these services are seldom valued because they lie outside the domain of markets (Postel & Thompson 2005). This view is starting to change with the advent of the concept of payments for ecosystem services.

Table 3: Ecosystem goods and services provided by healthy watersheds (Postel & Thompson 2005)

❖ Water supplies for agricultural, industrial, and urban-domestic uses
❖ Water filtration/purification
❖ Flow regulation
❖ Flood control
❖ Erosion and sedimentation control
❖ Fisheries
❖ Timber and other forest products
❖ Recreation/tourism

There are several mechanisms for implementing payments for environmental services (PES) at the watershed level as a form of economic incentive to secure the critical services provided by the watershed. Payments for watershed services usually involve downstream beneficiaries making a payment to upstream landowners as an incentive to protect the watershed**.** These types of payments can be categorised into three main types (Hanson 2011 et al 2009; Greiber 2009):

- Private transactions
- Cap and trade transactions
- Payments made to generate public benefits

Private transactions

The private transactions referred to here are voluntary payments made by downstream beneficiaries of an ecosystem service to upstream providers of the service. This typically involves paying landowners upstream to maintain the watershed in such a way as to avoid any negative impact on downstream water users such as altered water quality, reduction in stream flow or flooding. Another characteristic of these private PES transactions is that, in some cases, there is cost sharing among the private parties involved and if a land purchase is involved upstream, it may be leased back to the owner with the objective of ensuring the protection of the watershed (Greiber 2009). In cases where the transaction with the upstream landowner does not involve leasing the land, they may get paid to undertake restoration activities on the landscape such as riparian protection and changes in agriculture practices.

Cap and trade transactions

These types of transactions are based on existing rights, such as pollution or abstraction limits, and a trading scheme is then established to trade those rights. In these transactions credits maybe issued by an authority to a particular individual who engages in an activity that results in watershed protection, such as pollution control. The individual who owns the credits can then choose to sell them to any person who is embarking on an activity that might result in them exceeding the limits of the pollution requirement as set by the regulator. There are several examples of cap and trade schemes globally, mostly notably the United States Clean Water Act, which has a wetland-banking scheme. The wetland banking scheme requires landowners who damage wetlands to offset that by restoring and protecting other wetlands either on site or elsewhere. In this approach players, therefore, have to purchase credits in order to meet their mitigation obligations (Greiber 2009**)**. Cap and Trade schemes can be rather complex, requiring some clear guidelines as outlined

by Greiber (2009):

- Clear definition of those activities that have a negative impact on ecosystem services and thus lead to mitigation obligations;
- Development of transparent standards to quantify the unit of exchange (e.g. based on their actual value and/or function, or based on the size and/or geography of the concerned land);
- Determination of units of restored, created, enhanced or preserved ecosystem services which will be converted into tradable credits;
- Establishment of procedural frameworks for opening, managing and closing mitigation banks, for protecting the resulting ecosystem services in perpetuity, and for ensuring fair trade;
- Creation of insurance and liability systems to guarantee long-term offsetting and stewardship success.

Payments made to generate public benefits

Payments that are made for public benefits constitute an arrangement where a government entity is involved, and may include collecting fees, land purchase or granting of rights to use land resources (Greiber 2009). These arrangements mostly involve municipalities, other local government entities and utilities. This is the most common form of PES, because of the simplicity of its set up, where the public entity is the sole buyer or seller of the ecosystem service.

In cases where Government is the purchaser of such ecosystem service, it may take the form of engagement that ensures the protection of 'public goods and services'. For example, Government may pay landowners to protect a watershed to yield benefits to the general public as opposed to designated groups such as those involved in private PES transactions. Public goods are generally underfunded because they are benefits that are enjoyed by all, and watershed payments can be a useful mechanism for boosting such areas (Hanson et al 2011).

There are several examples of regulator driven PES schemes, such as the widely-implemented land stewardship programme under the United States Department of Agriculture (USDA). Under this scheme private landowners sign agreements with the government authorities to ensure that they conserve the natural resources in their private lands, such as wetlands, soils, floodplains and forests. The government will, in turn, pay the landowners for undertaking such conservation activities.

Another widely cited example of is that of the Catskills watershed in New York City, where authorities opted

to conserve the upstream watershed as an alternative to building additional water treatment plants. To date, more than USD1.5 billion has been spent by the city to sustain the critical water-supply services provided by the Catskills watershed. The payments in this scheme are directed towards forest conservation, habitat rehabilitation and the creation of green corridors to link up reservoirs. Investing in this green infrastructure turned out to be cheaper than the construction of a water filtration plant. Voluntary non-financial mechanisms for conservation.

Most voluntary mechanisms for conserving natural capital have some element of financial compensation (Rissman & Syre 2011) as discussed under the financial mechanisms. However, there are cases where private landowners voluntarily give up their land for conservation purposes without expecting any compensation. This may be in the form of donating the land itself to a conservation organisation, where for example, in South Africa, the World Wide Fund (WWF) for Nature, owns large tracks of land, which has been voluntarily donated by private landowners through endowments for conservation purposes. In some cases, the landowner may enter into a long-term agreement that prescribes specific land use activities, but retains the land tittle, and therefore ownership of the land.

Voluntary mechanisms for conservation can also take the form of government-assisted community programmes. In this case, Government works with local communities to protect critical ecosystems, raise funds to purchase land or make arrangements for co-management of conservation lands. Government assistance to such community conservation programmes may include provision of money, training or the setting up of conservation groups (Stoneham et al 2000).

2.5 Financing water in developing countries

The financing of water and sanitation infrastructure in the developing world has largely been the preserve of the public sector, primarily because of the perception around political risk in these countries, and also because the water sector is not as attractive as the extractives sector, for example. Many of these countries have had to rely heavily on ODA to close the funding gap for financing water and sanitation infrastructure.

Multilateral and bilateral agencies (overseas development aid) are traditionally the major sources of funding for large water infrastructure such as dams, especially in developing countries. Due to the environmental and social impacts of large dams however, there is a general reluctance of donor agencies to fund these kinds of projects today, with the exception of water provision and sanitation. Funding by global players is not immune to other external drivers, such as the recent global economic had a major impact on infrastructure financing, The World Bank is estimating a finance gap of USD270 billion per year

in infrastructure funding. While other large existing infrastructure will experience a shortfall of close to USD70 billion, mostly in developing countries. It is, therefore, clear that relying on global finance alone for funding infrastructure can be risky.

In terms of water infrastructure, the World Bank estimates that 900 million people globally don't have access to safe drink water. The challenge therefore remains enormous in trying to meet the MDGs. In an attempt to meet the infrastructure challenges faced globally, between 2003 and 2008 the bank's lending to infrastructure related spending grew by almost 88%. This expenditure was further scaled up when the World Bank, through its Infrastructure Recovery and Assets (INFRA) platform and International Finance Corporation's (IFC) Infrastructure Crisis Facility (ICF), launched a USD55 billion facility to finance infrastructure projects in developing countries for a period of 3 years.

The EU, on the other hand, supports 60 developing countries in the water sector, most of them located in Africa and Asia. The focus of the support is on water supply and integrated water resource management in addition to political engagement. In 2006, the EU established the EU-Africa Partnership for Infrastructures. This project, among others, focuses on the management of cross-border catchment areas, flood defence, capacity building and water resource monitoring.

Financing small water supply and sanitation service providers

Mehta and Virjee (2003) suggest that small water and sanitation providers in Sub-Saharan Africa play a major role within the continent, providing water and sanitation to poor rural populations as well as poor urban populations. These small water and sanitation providers are playing a major role in helping African governments achieve the MDGs pertaining to water and sanitation.

Small water and sanitation providers in Sub-Saharan Africa, mainly come in the form of community-based small service providers (CSSPs), private small service providers (PSSPs) and households as self-service providers (HSSPs) (Virjee 2012). It is estimated that 12 000 water schemes are managed by communities in rural Ethiopia and 30% of the rural population in Kenya. Private and informal providers account for the serviced population in urban areas in Kenya (WSP-AF 2003). The vast majority of these small water and sanitation providers rely on microfinance institutions to fund their projects. According to the ICC report published in 2002, these microfinance institutions may be commercial banks, specialised microfinance banks or institutions, NGO-linked microcredit, licensed operators, village banks and other membership-based operations.

Case studies of small water supply and sanitation service providers

An example of a microfinance institution is the MicroSave-Africa project. The project is funded by CGAP, DFID and UNDP. The project is aims to promote the development of savings and other client responsive financial services among microfinance institutions in 11 countries in East and Southern Africa. The project has played a major role in mobilising savings, market research and product development of microfinance in order to assist small water and sanitation providers to provide water and sanitation (MicroSave-Africa 2001 & Wight 2001).

The Groupe de Recherche et d'Action pour is la Promotion et Development (GRAPAD) is a microfinance institution that provides loans to clients in organised groups to fund water and sanitation. The institution was funded with the assistance of the Catholic relief services in 1993. The microfinance institution funded a group, FIFA in the peri-urban district- of Hlazounto in Cotonou, Benin, to assist them finance the installation of a water pump. Microfinance institutions such as the Initiatives au Development (IAD) have also helped FIFA to finance 80% of the installation cost of the project. The project is estimated to cost around USD2, 857. The GRAPAP funded the remaining 20% in the form of a loan (ICC, 2002).

The Nderu water project is a community-based project in Kenya, operating two boreholes that were previously dilapidated. The project aims to provide water to the surrounding community. The community based organisation borrowed USD4 500 from two microfinance institutions – Tharira Technical Institute & Mirithu Secondary School to rehabilitate the boreholes. The project serves about 1 200 families with water today. The community-based providers for this project were able to collect enough revenue to pay back the loan after meeting its operation costs, after six months (WSP-AF, 2001).

Gitaru self-help water project is an example of a successful community run water-supply project. The project currently provides 600 households with piped water from three boreholes in Kenya. According to Virjee (2002), the extension of this service depends on the available capacity. The new user has to pay a connection fee and adhere to the scheme bylaws. The new user is required to install a water meter and local pipes to his/her property. The new user is charged for water according to a rising block tariff. The self-help group has savings at a local branch of the Kenya Commercial Bank, which is often used to offer bill collection services. However, the community faces major difficulties in financing large repairs, as collections are not sufficient enough for such costs. The community thus has to rely on informal finance routes, such as the use of harambee, to finance major repairs and expansions (Gichuri 2002 & Virjee 2002).

2.6 Perceived risks in the financing of water and sanitation infrastructure

Perception of risk is related to the financing of water and sanitation infrastructure and it is also responsible for the lack of effective participation of the private sector in the sector. The main drivers of this perception are that water is often a contested resource and brought into the political arena with engagement of the private sector perceived as an attempt to benefit from a commodity, which is essentially a public good. Water is an important input for achieving other development goals. The government is a custodian of our water endowment, hence, Government may implement policy changes or allocation decisions that could affect the investments of the private sector (World Bank 2012).

Risk perception in the water and sanitation sector is linked to the operations of utilities. Poor management of these institutions, which in many cases tend to be Government parastatals, does not inspire investor confidence. The World Bank (2012) postulates that these institutions often fall short due to asserts being poorly or not inventoried, unknown location of pipeline network and an undocumented customer base. This is very basic information that any company requires in order to attract potential investors.

The long turn-around periods, typically 20 years for capital infrastructure, often makes the sector unattractive to investors. This is because significant investors are required to be made upfront, yet to recouping the investments take longer, which are not favourable with lenders (World Bank 2012). The key reason water risks are not perceived in a positive light by investors is likely due to the low returns 'upside' of taking risk. If one considers the fact that the extractives sector experiences considerable risks, yet there is no shortage of prospective investors in the sector. It is very good example which highlights the perceived low returns of taking risks. This is primarily because the high risks are offset by the anticipated returns from the investments, which are generally higher than the investment costs.

Generally, the risks associated with investing in the water and sanitation sector can be attributed to various factors and is shared by various stakeholders, ranging from the society businesses and to individuals. Even though the nature of risks faced by the water and sanitation sector is universal, the degree of risk various according to the nature of finance (equity loan, bond or microfinance) and the nature of water assets being invested in (water distribution, household sanitation services, or wastewater treatment) (WWC 2015).

The World Water Council suggests that the key issues in understanding risk in water and sanitation

infrastructure finance are:

- Understanding the risk-reward calculation is important for accessing the right type of financing.
- Water financing involves the usual project risks, including some specific risks to the sector.
- Risks have to be shared amongst the financing parties according to the risk preferences of the different parties.
- Some risks can be mitigated in various ways by using guarantees and other devices.
- The test of successfully allocating and mitigating risk is minimizing the Weighted Average Cost of Capital (WACC) of the project concerned.
- Some risks and uncertainty may remain after all these processes, which have to be borne by the equity holders.
- In strategic projects public authorities are likely to have a major presence as providers of equity, long term loans and guarantees.
- Large multi-purpose carry additional layers to risk and the problem is compounded by trans-boundary issues (WWC 2015).

Hydrological risks

Hydrological risks may arise when any water dependent activities and infrastructure such as water-based sewage; water intensive industries or power stations experience a water shortage. This may disrupt economic activities that result in an array of repercussions. International experience has shown that debilitating water shortages have threatened to impede economic activities. Durban, South Africa is almost on a brink of severe water shortages as the dam levels have receded significantly due to insufficient rainfall over the last couple of years.

The water risks companies are not only faced with limited physical availability of water, but companies that are highly dependent on water are also faced with major reputational risks, particularly if they are perceived to be wasting water in times of scarcity, or if they pollute water resources.

With regards to water projects, they may face risk related to failure of new distribution networks and irrigation systems may fail due to reliance on sources that run dry. Reservoir capacity may also not fill up during periods of drought, this is particularly true in Durban at present. Flooding could also negatively affect the ability of wastewater treatment plants to treat waste, resulting in overflows (WWC 2015).

Financial risks

Financial risks affect lenders, investors, sponsors, bondholders and all those exposed to water projects, business models and service providers. Commercial risks are associated with the project directly or linked to the market where the project is operating. For example, the water projects will face financial risks, because water is generally plugged by the risk of low cost recovery, making it unattractive for investors who are looking out of high rewards. Some of the risks related to water may include the following:

- Delays in construction of water infrastructure; technological problems and political instability, resulting in financial loss.
- Due to the nature of some water projects, construction of dams that involve extensive civil works such as excavation, tunnels, canals and underground pipelines. These types of undertakings could cause considerable delays in the project, posing a major risk to the project.
- The risks associated with technology that could result in financial loss due to as a mechanical, equipment or installation failure (WWC 2015). Desalination and wastewater treatment, in particular, are more prone to technological failures.
- Revenue risks, including offtake risks, are important because of the high cost of infrastructure development, where most of money is invested upfront the form of capital investments. Therefore, water infrastructure needs to be profitable or generate revenue after it is commissioned.
- Input risks, such as energy failure could pose significant financial lose to a water project. Environmental risks are also a major issue, where large infrastructure projects are required to adhere to stringent environmental regulations.
- Macro-economic risks are driven by other factors that operate the national level of the economy, such as growth of GDP, inflation, interest and foreign exchange rates (WWC 2015).
- When government policies change that is considered as unfavourable, a political risk might manifest. Other political events such as war, civil disturbance all poses a risk to infrastructure projects.

Sharing risks

The mitigating risks related to financing can effectively be done, provided that the risk is shared between affected parties. The risk is allocated on the basis that the party that is most suitable to address the risk be given responsibility to address that particular risk. Another element of sharing risk is that the party that has greatest control over the risk should bear primary responsibility for the risk (WWC 2015).

In the case of Engineer, Procure and Construct (EPC) and turnkey projects, the contract usually bears the risks on their own. A turnkey project, in this case, refers to projects where the contractor is responsible for the delivery of the complete project, fully equipped and ready for operation. In both of the above cases, the contract may include penalties due to late delivery, and a financial incentive for early completion. However, when budgets are exceeded no reimbursement will be effected. Apart from very restricted cases.

Allocating the risks in project finance depends on the specific case, an illustration of how this allocation could be achieved is shown in Figure 11. Based on the principle of risk sharing, most of the financial risks in a project finance would therefore be borne by the lender, the public sector would be responsible for political risk and the contractor would be responsible for risks linked to the construction of the project.

FIGURE 11: ILLUSTRATION OF RISK ALLOCATION IN PROJECT FINANCE (WWC 2015)

Mitigating risks

There are various mechanisms for mitigating risks, once these risks have been shared by the different parties, and these mechanisms may comprise of financial guarantees, insurance, currency hedging and establishing escrow accounts.

Case study of allocating and mitigating risk for financing water utilities in PERU:

The Concession Agua Azul

The Concession Agua Azul is a special purpose company that was appointed to take on a 27-year DBFO concession for a drinking water treatment near Lima. This concession was issued by SEDAPAL, a public services company that is responsible for Lima services. The CAA is estimated to issued local bonds worth USD45 million for infrastructure developments of that amount, USD10 million was raised by local funds.

The CAA is an example of how successful turnkey contacts are effective in mitigating risk. The CAA took full responsibility of the risk of the design, financing, construction, operating and maintenance, whilst the pension funds assumed credit.

The Concession Transvase Olmos:

The Concession Trasvase Olmos (CTO) is a special purpose company that was awarded USD242 million for a 20-year project to build a large inter-basin project for the Regional Government of Lambayeque. The funding for the project was structured as follows: -

- USD100 million of corporate bonds,
- USD77 million worth of loans from the Government of Peru
- USD77 million from the CAF
- USD60 million form pension funds took from bonds in private offerings.
- USD40 million was taken up by local insurance companies.

The CTO take responsible for all risks (design, construction, and operation risks, while institutional investors and creditors took credit risks.

Financial guarantees

Financial guarantees are a form of insurance against a specific risk that may be linked to a default on credit or bond repayment, regulatory or political risk. Bond insurance is issued by private companies at

commercial rates, however, the financial crisis of 2007 had a massive impact on these insurance companies, with many of them running bankrupt (WWC 2015).

International financial institutions, such as the World Bank and IMF, and regional developments such as AfDB, offer financial guarantees which tend to be more relevant. Financial guarantees generally cover four main types of risks incurred by lenders and equity investors in developing countries.

Political

- This includes war, terrorism, kidnapping, expropriation without compensation as well as the restriction of foreign currency needed for a project.
- Institutions such as the Multilateral Investment Guarantee Agency (MIGA), the World Bank, bilateral agencies and private insurers offer financial guarantees to various stakeholders within the sector.

Regulatory and contractual

- This includes breach of contract by public offtake, adverse decisions by regulators or other public agencies due to political pressure.
- The MIGA Breach on Contract and Honouring of Sovereign Obligations policies and the World Bank's Partial Risk Guarantee offer product specific guarantees.

Credit

- This includes late payments or default on loans or goods and services.
- Partial Credit Guarantees (PGC) as well as insurance policies that are sold by momoline companies could mitigate financial risks for stakeholders.

Foreign exchange

- Foreign exchange risk can be associated with devaluation which increases local cost of debt servicing, dividend remittances and other commitments of foreign exchange.
- In order to mitigate against such risks it is suggested that local currency is used.
- The hedging of currency could sustainably decrease loss associated with foreign exchange fluctuations.

Insurance, currency hedging and escrow accounts

Apart from financial guarantees there are other means for risk mitigation, which include insurance, currency hedging and escrow accounts.

- Insurance should be taken out against specific risk (e.g. weather insurance risks). The use of escrow accounts – these accounts enable one to ringfence water infrastructure developments and to prioritize the payment of debt service or dividends.
- The use of financial products with terms that change according to the performance of the underlying asset or project. e.g. loans that can convert into equity loans that are index-linked to output prices of the venture, or Islamic sukuk bonds that pay according to the profit made by the underlying asset.
- The author also encourages the issuing of junior debt in an attempt to encourage creditworthiness of senior debtors.

TABLE 4: RISKS THAT ARE INHERENT IN THE WATER AND SANITATION SECTOR, RANGING FROM COMMERCIAL, POLITICAL TO REGULATORY RISKS (OECD 2007)

Water-related risks	Mitigation mechanisms	Country experiences
Commercial: Tariff affordability and resistance Project cash-flow profile Credit risk Contractual risk Performance risk Demand and markets Inappropriate technology Information gaps / hidden costs Costs of inputs (energy)	**Careful project design & review** **Partial Credit Guarantee**: covers different events causing non-payment, incl. commercial risk. Offered by multilaterals – IFC – and some bilaterals. Traditionally used by governments or public entities, but also recently by sub-national governments, municipalities, private companies. **Pooled financing**: to allow smaller cities to aggregate financing needs, diversify credit risk and spread transaction costs of bond issuance.	PCG: Johannesburg, Mexico PIDG (private infrastructure development group) related Emerging Africa Infrastructure Fund (long-term financing + provision of guarantees) & GuarantCo (PCG on LCU debt issued by PS infrastructure companies and municipalities from lower income countries). Innovative combination of pooled financing & PCG in Tamil nadu (India): Municipal Urban development Fund issued bonds with PCG from USAID's Development Credit Authority.
Political: Expropriation Political interference New standards and directives Sub-sovereign agencies Local stakeholder actions Devaluation	**Bilateral investment treaty, dispute resolution mechanisms** embedded in contract (i.e. the Convention on the Settlement of Investment Disputes between States and Nationals of other States - ICSID) **Political Risk Insurance**: covers war and civil disturbance, expropriation and confiscation, currency convertibility and transferability (export credit agencies, investment insurers, private political risk insurers and multilaterals - MIGA) Foreign exchange risk usually covered through government exchange rate guarantees, indexation of tariffs or local finance in LCU (joint ventures with local partners, split-currency revenue arrangements: costs in LCU, repatriation of profits in foreign currency). Development of local capital market.	156 States have signed the ICSID convention. However, Bolivia became 1rst country to denounce the convention in May 2007. Long term currency swap contract ADB/Philippines for LCU loans. IFC & EBRD have created municipal finance units and provide loans and PCG to sub sovereign entities. WB / IFC Municipal Fund. IADB & MIGA provide PRG & PRI for municipal concession projects. Asian Bond Market Initiative: guarantee facility for LCU debt

2.7 Synthesis: Emerging trends and opportunities in water infrastructure finance

This literature review sought to develop a deeper understanding of the financing of water and sanitation infrastructure globally, with a specific focus on how such deals are structured and the sources of funding. More specifically, the review unpacked the potential role of the private sector in the financing of water and sanitation infrastructure. The following key emerging issues were identified:

- **Infrastructure finance still mostly covered by Government**: The financing of basic water and sanitation infrastructure is still largely the preserve of national governments across the globe, but more specifically in the developing world. This is partly because the water and sanitation sector is still perceived as high risk, and low return. As a result private sector are cautious of investing in the sector. In cases where the private sector has got involved, government still play a critical role either by providing guarantees or having significant shareholding of the project being undertaken.
- **Overseas development aid (ODA)** has played a key role in closing the financing gap for water and sanitation infrastructure in the developing world. This has helped many countries to achieve their MDGs. ODA funding is mostly used to bolster infrastructure finance through technical support and lending. In terms of private sector involvement through.
- **Private sector involvement** in water and sanitation infrastructure has largely been through public-private partnerships, with very few reported cases of innovative financing such as private equity. However, it was found that venture capital mechanisms that focus on start-up companies will be critical for driving technological innovation in the water sector globally.
- **Risks in the water and sanitation sector.** The lack of effective private sector engagement in the water and sanitation sector, was mainly attributed to the perceived risks in the sector. The main risks comprise of hydrological and financial risks, and others such as technological and macro-economic risks.
- **Mitigating risk in financing water and sanitation infrastructure.** The best approach to mitigate risk is by sharing the risks, based on the principle that risk should be allocated on the basis of the primary party that is affected and its potential to address that risk. For example, the lender would be primarily responsible for the financial risk, while Government would address any political risks to a project. In terms of specific risk mitigation mechanisms, offering financial guarantees is a key strategy for addressing various risks. Insurance, currency hedging and escrow accounts, also play an

important role in mitigating risks in project finance.

In conclusion, the challenge that South Africa is grappling with in relation to making the water and sanitation sector attractive to private sector investors is not an isolated case, since the same concerns are shared with most developing countries. The opportunity for South Africa is that it has a fairly well developed financial services sector, which is in a good position to mitigate the potential risks associated with the sector. Considering that South Africa has most of the basic water and sanitation infrastructure laid out, the key gaps are potentially in the O&M of the infrastructure, which is less costly compared to the cost of the main infrastructure. As a result it might be possible to make a business case for the private sector to capitalise on the investment opportunities in the sector.

3 REVIEW OF INVESTMENT TRENDS IN WATER AND SANITATION SECTOR IN SOUTH AFRICA

3.1 Key sources of funding for water and sanitation infrastructure in the last 15 years

Public sector infrastructure finance is almost always concerned with three types of investment: new build to cater for increased demand and extension of services, refurbishment and backlogs to cater for existing users and overdue investment; and operations and maintenance (O&M). Each of these may attract different funding sources and require different financing mechanisms. Within the water sector there are two distinct categories of infrastructure – water resource infrastructure, and water services and sanitation infrastructure, including wastewater management. Once again, the financing mechanisms may differ for the two categories, due to the different institutional environments and different funding sources. However, they are also inter-linked through the value chain for water.

Regardless of the type or category of infrastructure, there are only three ways to pay for it – taxes, transfers (grants, donations) and tariffs. The 'three T's' were put forward by the World Panel on Financing Water Infrastructure (the 'Camdessus Panel', established in 2001). A critical determinant of which one takes precedence is the extent to which the infrastructure is of a social or economic nature. Economic infrastructure is infrastructure where the investment can be recovered from users (tariffs), whereas social infrastructure will be reliant on fiscal funding (taxes).

Whilst the sources may be limited, there are a variety of mechanisms that can be employed to match the cashflow of these sources to the cashflow required to fund the establishment (and subsequent operations and maintenance) of the infrastructure. These mechanisms include the use of debt and equity from a range of institutions (private, public, multi-lateral, etc.). Private sector involvement can range from equity investment to long-term concessions. Investments in the water sector in South Africa in the past 15 years have been funded via three main sources:

1) **National Revenue Fund**: National Treasury (NT), uses funds received by the national government through taxes, levies, duties, fees etc. to finance water sector activities through payments, and transfers via national departments (DWS, Department of Cooperative Governance and Traditional

Affairs (COGTA), and municipalities). R13.6 billion was allocated to water and sanitation from the NRF in 2014/15. An example of investments from the NRF is the National Water Resources Infrastructure Program (NWRIP).

2) **Government grants:** Government grants account for approximately 57% of capital spending by local municipalities on water services. They are conditional. Common grants in the water sector include the Municipal Infrastructure Grant (MIG), equitable share and Regional Bulk infrastructure Grant (RBIG). Total conditional grants to local government increased from R26.5 billion to R35.6 billion from 2011/12 to 2014/15. The MIG allocations increased from R11.4 billion to R14.7 billion over the same period and totalled an estimated R90 billion other 10 years from 2003/04.

3) **Tariffs:** Tariffs form the primary source of revenue for water and wastewater services in South Africa, deriving over 80% of income in the water sector. Tariffs allow for users to contribute to the cost of service provision and operation and are set on the basis of social equity, environmental sustainability, financial sustainability and financial efficiency. Domestic water tariffs (<30kl) increased from about R2/kl to about R4/kl between 1995/96 and 2003/04. The average bulk price charged by water boards in 2011/12 was about R5/kl. Water boards' charges generated revenue increased from R7.2 billion in 2007/08 to about R8.1 billion from tariffs in 2009/10. Surplus in 2009/10 was a little under R1 billion. Most water boards and water service authorities struggle to cover their operating and maintenance costs from tariffs.

Other forms of funding are accessed via:

- **Financial markets**: Through the use of special purpose vehicles such as the Trans-Caledon Tunnel Authority (TCTA) and Komati Basin Water Authority (KOBWA), the DWS generates off-budget funds from financial markets. As at 2013, a total, R32.2 billion had been raised from the capital and financial markets for the implementation of large water infrastructure projects (Ruiters, 2013). Details of the operation of the TCTA and managed projects are in section 4.
- **Public Private Partnerships (PPPs):** Arrangements where the government and/or its representing bodies work with private sector companies to generate funds for water sector activities (management, infrastructure development, etc.) in South Africa are few and far between. PPPs have been in the form of 10-year leases, 25-30 year concessions or 5-6-year management contracts. Investment costs have been largely below R500 million.

The above funding sources, along with the funding flows in the South African water sector, are shown in (Figure 13). An in-depth description of selected investments through the national treasury and the DWS follows. This covers the first two main sources of funding in the water sector and gives a general depiction of public sector investment in the water sector in the past 15 years.

They are discussed as follows:

1. Municipal Infrastructure Grant (MIG)
2. Regional Bulk Infrastructure Grant (RBIG)
3. Municipal Water Infrastructure Grants (MWIG)
4. Accelerated Community Infrastructure Programme (ACIP)
5. National Water Resources Infrastructure Programme (NWRIP)
6. Regional Implementation and Support Programme (RISP)
7. Acid Mine Drainage (AMD)

Municipal Infrastructure Grant

The municipal Infrastructure Grant (MIG) provides the main funding for infrastructure development in South Africa, including but not limited to water and sanitation programmes. The MIG was instituted in 2003/04 with the intention to provide capital finance for basic municipal infrastructure for poor households and removing the backlog with regard to access to basic municipal services. MIG funds are commonly used to upgrade and build new infrastructure up to a basic level of service and to rehabilitate existing infrastructure for basic services for the poor. Municipalities in the urban renewal and rural development programmes are favoured for the MIG.

As shown in (Figure 12A) 59% of reported water projects since 2011/12, were MIG supported projects, taking up 37% of all funds towards water projects during the same time (Figure 12B). MIG projects over the period from 2011/12 had an accumulated cost of over R50 billion. Although MIGs do not cater only for water, a large portion is allocated to water projects. Allocations to water supply and sanitation projects have been more than 50% of the total MIG since 2010/11 as shown in (Figure 13). Allocations from the national budget for Municipal infrastructure grew from R4.1 billion in 2003/04 to R5.9 billion in 2006/07, R9.7 billion in 2010/2011 and R14.2 billion in 2013/14. As such funding through MIG has grown

significantly since its institution, more than tripling in a decade (Figure 14).

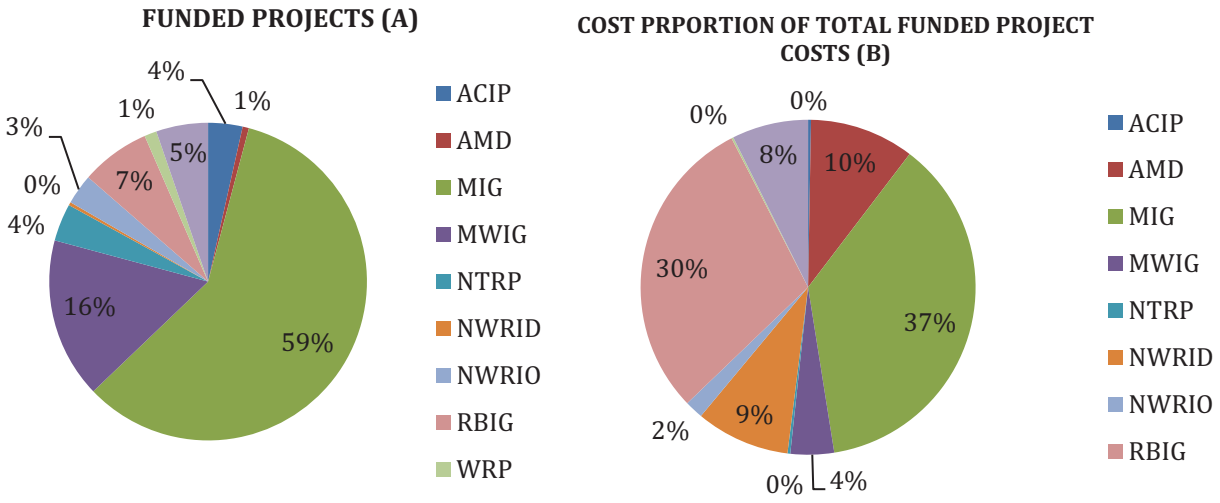

FIGURE 12: PERCENTAGE OF TOTAL PROJECTS (A) AND PERCENTAGE COST OF FUNDED PROJECTS (B)

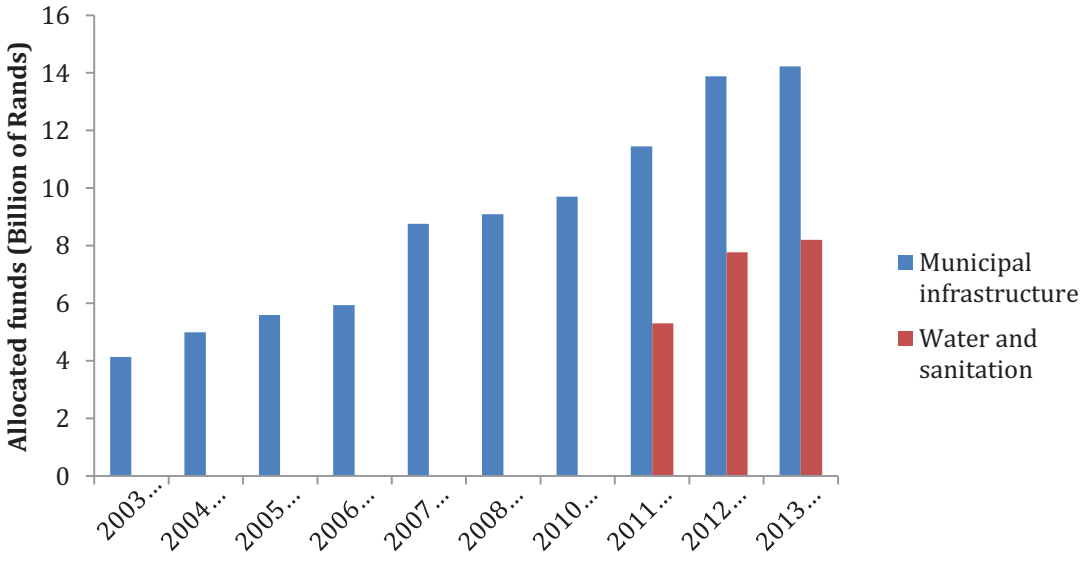

FIGURE 13: MUNICIPAL INFRASTRUCTURE GRANT (MIG) ALLOCATIONS SINCE 2003/04 AND THE POSITION ALLOCATED TO WATER AND SANITATION FROM 2011/12

Municipal Infrastructure Grant (MIG), Regional Bulk Infrastructure Grant (RBIG), Municipal Water Infrastructure Grants (MWIG), Accelerated Community Infrastructure Programme (ACIP), National Water Resources Infrastructure Programme (NWRIP), Regional Implementation and Support Programme (RISP), Acid Mine Drainage (AMD). National Water Resource Infrastructure Development (NWRID), National Water Resource Infrastructure Operations (NWRIO), Water Resources Program (WRP), Water Boards (WB)

Regional Bulk Infrastructure Grant

The focus of the Regional Bulk Infrastructure Grant (RBIG) is on regional and local bulk water supply and sanitation services. The rapid increase in water services infrastructure provision at municipal level has necessitated the need for more regional bulk schemes. Bulk schemes have been estimated at R83.2 billion for the regional bulk, R47.1 billion for internal bulk, R40 billion for sanitation and R1.6 billion for implementation readiness studies for the next 10 years, a total estimate of R172 billion. The RBIG was therefore established in 2007 to supplement the financing for the development of regional bulk water infrastructure and regional bulk sanitation as well as regional water and waste water treatment works (social component only). Investment requirements for RBIG were estimated at R60 billion (Blazer, 2010).

To initiate the RBIG programme, R1.4 billion was made available by treasury over three years. A total of R4.42 billion was allocated for three years from 2010. By 2013/14, total allocations for RBIG totalled an estimated R8 billion. In 2011/12, RBIG projects consisted of about 7% of the total projects estimated to have been underway (Figure 12A). The proportion of total funding requirements of projects to be funded under RBIG was up to 30% of all project funding requirements during this time (Figure. 13b). This gives an indication that RBIG projects have a large costs demand. However, so far bulk funding is very low and this is delaying implementation. Funded projects accounted for only about 19% of the estimated costs of all RBIG projects from 2011/12 to 2014/15 (R40 billion). While there has been an annual increase of funding for water projects through RBIG, the amount of funds allocated so far fall way below the funding needs so far.

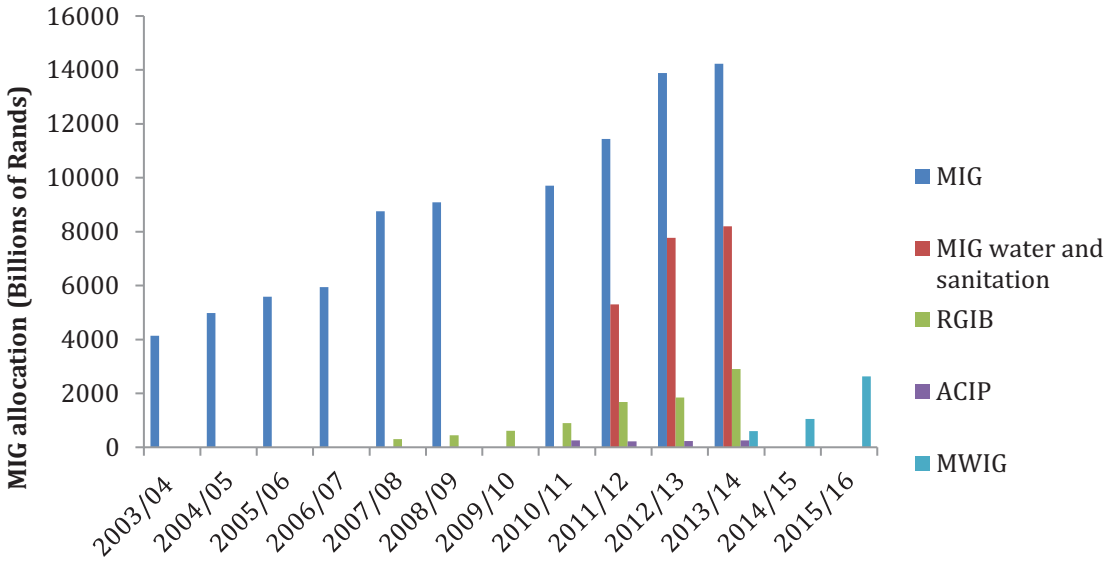

FIGURE 14: ANNUAL ALLOCATION TO VARIOUS FUNDS SINCE 2007/08

Regional Bulk Infrastructure Grant (RBIG), Municipal Water Infrastructure Grants (MWIG), Accelerated Community Infrastructure Programme (ACIP), National Water Resources Infrastructure Programme (NWRIP), Regional Implementation and Support Programme (RISP).

Municipal Water Infrastructure Grants

The Municipal Water Infrastructure Grant (MWIG) was set up to assist water service authorities to provide water services to consumers currently without basic water supply, particularly those in rural areas, through the facilitation, planning, acceleration, and implementation of various projects. The MWIG was initiated in 2012, and initially focused on 24 districts municipalities with the highest backlogs. Since its inception, projects earmarked for MWIG consist of the second largest number of projects after MIG projects, although, the funding requirements are much lower.

It was estimated that backlogs to be addressed under MWIG were in 757 700 households or a population of 1.56 million, and the total cost to address the backlogs were in the order of R27 billion in total and about R21 billion in the initial 24 priority district municipalities. Budget allocations to MWIG have increased by almost double annually from R602 million in 2013/14 to R2.63 billion in 2015/16 (Figure 14). A total allocation of R4.3 billion has been made so far under MWIG. It is estimated that these allocations to the MWIG constitute only a 4% of the total funds allocated to water projects over the same period (Figure 13a). This is despite that MWIG account for up to 16% of all recorded projects over the same period, the second most projects after those funded under MIG projects (Figure 13b).

Accelerated Community Infrastructure Programme

The Accelerated Community Infrastructure Programme (ACIP) is a 'quick-fix' programme that was initiated in 2010/11 to accelerate the achievement of universal access to water and sanitation services. The ACIP was set up to focus on water conservation, demand management, community infrastructure, water supply, wastewater, and infrastructure refurbishment. The programme is one of the least investment demanding programmes in the water sector in South Africa.

For the 2010/11 financial year, a budget of R259 million was allocated. Annual allocations have remained fairly stagnant. A total of R709 million was allocated for the 2011/2012 for the next three years, with an allocation of R252 million for the year 2013/14 (Figure 15). Over the years since its institution, at least 50% of the allocated budget has been spent on wastewater infrastructure refurbishment. Projects under ACIP constitute about 4% of all projects carried out over the period 2011/12 – 2014/15 and a negligible funding requirement (Figure 13a).

National Water Resources Infrastructure Programme

The responsibility of the National Water Resources Infrastructure Programmes (NWRIP) is to provide transfer funds to be managed by the Water Trading Entity. NWRIP supports the construction, operation, and maintenance of bulk raw water resources infrastructure in an efficient and effective manner by strategically managing risks and assets. It consists of two components, one for infrastructure development and another for the operations of water resources.

Allocations to the NWRIP increased considerably from 2006/07 to 2014/15, rising from R853 million in 2006/07 to R2.2 billion in 2010/11, and to R2.9 billion in 2014/15. Over the period 2011/12 to 2014/15, projects funded under the NWRIP comprised around 3% of the total recorded projects by the DWS (Figure 13a). However, despite the fairly small number of projects, they took up a large portion of the project funding. A total of 11% of all funds allocated to the water sector during this period were through the NWRIP (Figure 13b). Most of the funds were allocated towards infrastructure development and rehabilitation.

Regional Implementation and Support Programme

The Regional Implementation and Support Programme (RIPS) was set up to ensure the availability of water supply for domestic and agricultural use, institutional support through the refurbishment of prioritised

schemes for municipalities, support for the local government water sector, improvement of the protection of water resources, and to improve water use efficiency to previously disadvantaged communities. RISP finances water sector activities via transfers to provinces and municipalities.

Allocation through the RISP increased from R2.5 billion in 2007/08 to R4.3 billion in 2010/11, and increased further to R6.1 billion in 2013/14. The growth was mainly due to additional transfers to local government for the construction of water supply and distribution infrastructure (Figure 14).

Acid Mine Drainage (AMD)

South African mines are confronted by the environmental legacy of past mining, particularly AMD from abandoned coal and gold mines. Nearly 6 000 abandoned mines exist, which may result in uncontrolled AMD. These are mostly concentrated around Gauteng, particularly the traditional gold-mining areas of the Witwatersrand, Mpumalanga, and KwaZulu-Natal. In recent years, AMD has begun to take centre stage in the water management discourse. Most government interventions came into being only after AMD had started decanting from the mines in 2002 and started affecting the greater Gauteng metropolitan region (Frank, 2013).

It has been estimated that R30 billion will be required to clean up the 6 000 abandoned mines in South Africa (WWF, 2012). In the 2011/2012 budget, R225 million over three years was allocated to deal with AMD. In 2011, the state owned TCTA was instructed to deliver an immediate to short-term solutions at a total cost of some R2,2 billion, in response to decanting in the West Rand. Of all the recorded projects in the past few years, AMD projects consist of only 1% of planned and implemented projects, yet investment allocations towards AMD constitute a significant 10% of total allocations during that period (Figure 13). The majority of these projects emanate from the Gauteng province's gold mines. At least 11 projects in Gauteng comprising a combined estimated R12 billion have been instituted since 2011 for long-term solutions to the AMD problem. Other investments into AMD have come from joint programmes made up of private institutions with the Development Bank of South Africa (DBSA) and the Industrial Development Corporation (IDC), totalling R78 million in 2011. AMD has been identified as presenting an opportunity for PPP.

Regional distribution

More than 60% of the AMD projects are based in Gauteng. Around 90% of all project funds were allocated to projects in Gauteng (Figure 15). Most NWRIP supported projects over the period 2012/12 to 2014/15 were predominantly based in KwaZulu-Natal, making up over 50% of all projects. However, most of the project funding for NWRID (over 60%) was availed to projects based in the Limpopo province. About 30% of all MIG supported projects were based in KwaZulu-Natal consisting over 50% of all project fund allocations. RBIG, ACIP, MWIG and NTRP funded projects were fairly distributed across the national provinces with equitable distribution of funds allocated across projects (Figure 15). Overall, KwaZulu-Natal and Limpopo received the highest proportion of project funding among all the provinces. The project funding distribution is mainly in response to the huge backlogs in water services as well as the dilapidated nature of water infrastructure in KwaZulu-Natal and Limpopo, which has called for various combinations of funding models to eradicate the challenges.

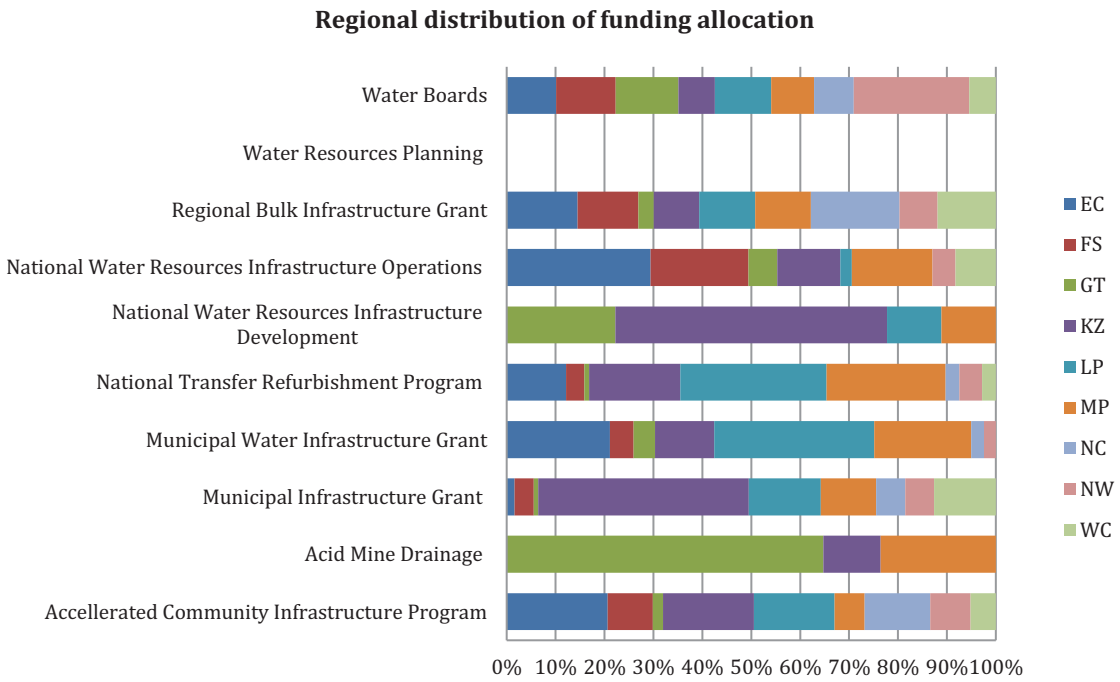

FIGURE 15: REGIONAL DISTRIBUTION OF FUNDING ALLOCATION

3.2 Review of case studies of key water and sanitation infrastructure investments

Understanding investment flows in water and sanitation infrastructure is very challenging, because there is no comprehensive source of information. DWS only started compiling such a database in 2008. The database gives useful insights into existing and planned infrastructure projects, but does not give detailed information on the financial aspects of the projects, such as cost, funding mechanisms and private sector participation.

According to information obtained from the DWS, there are currently 151 water infrastructure projects in various stages of completion in South Africa. The estimated costs of these projects between the 2009/09 and 2014/15 financial year was R69 billion (Creamer 2014).

Spending on water infrastructure has increased from R2.3 billion in 2008/09 to R4.4 billion in 2011/12, and is expected to increase further to R6.4 billion over the medium term. Between 2012/13 public expenditure on water and sanitation increased from R22.5 billion to a projected R45.9 billion by 2018/19 financial year. In 2016, a total of R15 billion was allocated to the regional bulk infrastructure grant, and R122 billion allocated to water services infrastructure grant, and R5.5 billion to the Water Trading Entity. This funding is in addition to funding that is raised individual Water Boards, and the TCTA directly from the market for large water infrastructure. The TCTA is the state-owned entity responsible for delivery of mega water projects, and over the last 15 years have invested in several such projects.

De Hoop Dam

The De Hoop Dam is a large dam by classification category. The dam wall is approximately 1 015 m in length and 81 m in maximum height. At full supply level the reservoir covers a surface area of approximately 1 690 ha and have a capacity of 347.6 million cubic meters. The dam was constructed from roller compacted concrete (RCC) with conventional concrete in the upstream and downstream facings. By concrete volume it is one of the largest RCC dams in the world. De Hoop Dam ensures economic upliftment to the rural population (unlock large scale agriculture and mining projects) and water supply to Steelpoort pumped storage scheme (1 500 MW) in an environmentally sensitive area.

An amount of R2.5-billion was spent up to 2011/12 for the construction of the dam and R373.8-million

will be spent over the current MTEF period. The surplus of R225.8-million will be reallocated to other infrastructure projects, such as the Mokolo-Crocodile project.

Mokolo-crocodile water augmentation project

The Mokolo-Crocodile water augmentation project aims to supplement water supplies required for the coal fields in Waterberg area, where ESKOM is constructing the Medupi Power Plant. This project entails the construction of two bulk water transfer systems and associated infrastructure. The components of the scheme are to develop abstraction weirs, pump station, pipelines and balancing storage. According to Aurecon, who played a key role in the implementation of the project, it comprises two main phases.

- Phase 1 comprises a 4.5 MW pump station and 81 km of up to 1 000 mm-diameter pipeline delivering approximately 40 million cubic meters per annum at a rate of 1.6 cubic meters per second from Mokolo Dam.

- Phase 2 consists of a number of components, including an abstraction weir in the Crocodile River, de-gritting channels with high and low lift pump stations and a 128 km of pipeline with break pressure and balancing reservoirs. The abstraction weir has a capacity of 25.5 cubic metres per second, while the estimated pump capacities for the low lift and high lift pumps will be 3.6 MW and 15 MW respectively, based on an initial demand of 5.4 cubic meters per second.

The main source of funding for this project came from commercial sources, with total cost of the project estimated to cost R13.4 billion. Due to delays in the project an additional R2 billion had been approved until 2017. It is anticipated that revenue collection from the sale of bulk raw water will be used to repay the project debt, with National Treasury having issued an implicit debt guarantee. The DWS will pay the social component of the project for water supply, amounting to 25% of the total cost of the project.

Komati Water Scheme Augmentation Project (KWSAP)

The KWSAP was designed to deliver 57 million cubic meters of water per year to the Komati water scheme. It involves the construction of a water pump station at the Rietfontein weirs, with a total flow capacity of 2.16 cubic metres, using 1 100 mm-nominal diameter steel pipeline. A second pipeline was built from Rietfontein weir to Matla power station over a 12.9 km with a flow capacity of 0.474 cubic metres a second. The Komati is one of the DWS's strategic infrastructure projects on water and sanitation, which is part of a 10-year plan to address the backlog in sanitation, and deliver services to between 1.4 million and 2.1 million

households. The project will build new infrastructure, rehabilitate and upgrade existing infrastructure and manage water infrastructure. The total value of the project is 1.2 billion, with the cost of the project expected to be recovered from revenue generated from sale of water to Eskom over a 20-year period.

Berg River Dam

The Berg River Dam supplies water to the City of Cape Town, augmenting supplies from 768 million cubic metres to 898 million cubic metres. The Berg River Dam is the first dam projects that was designed, constructed and operated according to the guidance of World Commission on Dams. This guidance ensures that the project is environmentally sustainable, by ensuring that the dam maintained the ecological integrity of the river. This was achieved, by ensuring regular releases from the dam both during low flows and high flows are designed to mimic the naturalflows of the river.

The Berg River Dam cost R1.6 billion from off- budget sources, using loans from local sources and foreign funders. Revenue from the sale of raw bulk water to the City of Cape Town will be used to repay the loans. In order to increase the credit rating for the project, raw bulk water is sold to the DWS, who, in turn, sells the water to the City of Cape Town. This arrangement is done to maintain reduce financial risk of the project, since the national government has a higher rating than the city of Cape Town (TCTA 2009). The Western Cape population contributes to the project in the form of an annual increase in water tariffs of 2.5% between 1999 and 2009.

Lesotho Highlands Water Project

The Lesotho Highlands Water Project (LHWP) is a transboundary project spanning the borders of South Africa and Lesotho. This is a water-supply project with a hydropower component, the purpose being to supply Gauteng Province with water, while acting as a source of income for Lesotho. The LHWP's primary infrastructure for Phases 1 encompassed the building of three dams, i.e., the Katse, Mohale and Muela; an intake tower; transfer tunnel; a delivery tunnel; and a hydropower station (TCTA 2015).

The LHWP is a multipurpose undertaking that transfers 780 000 million litres of water and generates 72 MW hydropower at the Muela Power Station. The water is transferred to South Africa through the Vaal River to supply Gauteng Province. This is the largest water-supply scheme in Africa. Phase one of the project was completed in 2003, and the second phase was commissioned in 2014. The second phase of the project will include the development of a pump storage scheme to generate 1200 MW, through the

construction of an additional reservoir in Kobong Reservoir (TCTA). This phase will guarantee water supply to Gauteng and the Vaal River water supply region, and the project is due for completion in 2020.

Funding for the project came from commercial sources; with the South African government responsible for the water transfer costs, as a resulted provided the guarantees to secure commercial loans. The government of Lesotho incurred the costs of implementing the Muela Hydro Power and thus raised the guarantee required for secure funding (LHDA 2015).

Mooi Mgeni Transfer Scheme

The Spring Grove Dam was constructed to curb the severe water challenges being experienced in the Mgeni Water Supply System. This system supplies water for five million people in KwaZulu-Natal, including the cities of Durban and Pietermaritzburg.

Due to the growth in water demand and intermittent drought periods experienced since 2003, the DWS decided to implement phase 2 of the Mooi Mgeni Transfer Scheme (MMTS-2). Phase I of the MMTS comprised the construction of a weir on the confluence of the Mooi and Little Mooi rivers, which are downstream of the Spring Grove Dam. From there the water is transferred to the Midmar Dam via the Mpofana River. The MMTS Phase 2, comprised three main aspects:

- The construction of the Spring Grove Dam, and two measuring weirs (one in the Mooi River and another in the Mpofana River);
- The construction of a pumping station and transfer pipeline (including a break pressure tank and the outfall works) from Spring Grove Dam to the Mpofana River; and
- An artificial fish barrier on the Mooi River upstream of the Inchbrakie Falls on the farm Coldstream.

The project was spearheaded by TCTA, with funding from the European Investment Bank (EIB), Agence Francise de Development (AFD) and the German Development Bank (KFW). The costs for the project are expected to be covered using revenue generated by the sale of bulk raw water from water users. Local financiers also came on board to provide loan facilities, including Nedbank and the DBSA:

- Bridging Finance: A R200 million bridging facility with Nedbank was utilised to fund 'upfront costs'

- Long Term Funding: The European Investment Bank (EIB), Agence Francaise de Development (AFD) and the German Development Bank (KfW) project committed long-term credit facilities for a total of €195 million (Approx. R1.85 billion).
- Revolving Credit Facility: TCTA is negotiating a R250 million Revolving Credit Facility with the DBSA.

Clanwilliam Dam

The raising of the Clanwilliam Dam in the Western Cape was a project instituted in 2011. The dam is being raised to restore safety, improve assurance of supply, provide for the Ecological Reserve (in-stream flow requirements) and to provide for additional allocation to resource poor farmers as the dam was over-committed. The additional yield resulting from raising the dam by 13 m was assessed at 69,5 million cubic metres per annum.

The project is an on-budget funded project. It was initially estimated to cost R1.8 billion to complete. However, costs up to R2.2 billion owing to delays in the implementation of the project. While initially expected to be completed by 2015, the project is now expected to be completed only in 2018 at a cost of R2.4 billion.

Tzaneen and Nwamitwa Dams

The raising of Tzaneen Dam and the construction of the new Nwamitwa dams for the Groot Letaba River development project was aimed at augmenting the supply of water to meet the growing demand from the domestic sector in Limpopo, improve water availability in the riverine ecosystem and stabilise water availability to the irrigation sector. The construction of the dams was funded on-budget. The commissioning of the Tzaneen Dam was scheduled for April 2016, while the Nwamitwa Dam is set for a 2018 commissioning. The project is estimated to cost R1.7 billion.

Nandoni water treatment works and distribution networks

This project includes new steel pipelines for Xikundu Distribution Scheme and Nandoni Distribution Scheme and to replace problematic GRP pipelines, including the Valdezia Pipeline. It was instituted to augment water supply for domestic use, irrigation, forestry and ecosystem support. The Nandoni water treatment works and distribution networks project will augment water supply to the Vhembe district

municipality in Limpopo. Construction began in 2006/07.

The project was funded via the Water Trading Entity. The total value of the project was estimated at R2 billion, R276.7 million of which had been spent by 2012/13. The pipeline project that was aimed at delivering water for the district was delayed due to the quality of the pipes and contract management issues leading to costs increase from R200 million to R750 million. R317 million was spent by 2012/13.

3.3 Investments in sanitation infrastructure

South Africa has a significant backlog in sanitation infrastructure. According to the South Africa's Institution of Civil Engineers (SAICE 2011) Infrastructure report, an estimated 11% of households in South Africa have no sanitation services. The sanitation services of 26% of households are below quality standards owing decline in the infrastructure due to inadequate maintenance, operation and refurbishment. The areas that require the highest levels of infrastructure maintenance are located in Limpopo, KwaZulu-Natal, Free State, Mpumalanga, the Northern Cape and the Eastern Cape.

Bulk sanitation infrastructure in South Africa is also highly impacted due to poor maintenance of wastewater treatment works, only 40 out of the 826 wastewater treatment works assessed in 2011 achieved Green Drop status. Based on 2011 pricing structures, it is estimated that about R44.75 billion is needed – about R13.5-billion to supply basic sanitation services to unserved households and about R31.25 billion to refurbish and upgrade existing sanitation infrastructure.

3.4 Private sector participation in water and sanitation financing in South Africa

Overview of private sector engagement in the water and sanitation sector

This section presents an overview of some of the private sector engagements in South Africa's water and sanitation sectors in the form of Public-Private Partnerships (PPPs). There were ten identifiable projects that were used as case studies for this section (See Appendix 1).

Some of the earliest projects with private sector engagement in the sector featured during the transformation phase of South Africa. The Queenstown Concession, Stutterheim, and Fort Beaufort Lease-affermage projects were three of the initial cases to be implemented during the early 1990s. Most

notably, all three were based in the Eastern Cape Province and consisted of a mutual private operator; Water and Sanitation Services South Africa (WSSA). Between 1996 and 1998, the period reveals a gap in the implementation of water and sanitation projects. It was after this period in the year 1999 that the majority of historical water and sanitation projects with private sector engagement featured in South Africa. Four out of five of the projects were implemented in KwaZulu-Natal with the remaining project in the Mpumalanga Province. Two of the most recent PPPs were applied in Gauteng during 2001 and the Free State in 2006. In all identifiable cases, the private sector has engaged in the water and sanitation sector as projects initiated under PPP arrangements.

Lease-affermage contracts appear as one of the oldest PPP arrangements seen in Stutterheim/Amahlati and Fort Beaufort/Nkonkobe in 1993 and 1995, respectively. Concessionary arrangements have characterised five out of ten PPP case studies: Lukhanji, Ilembe, Mbombela, the KwaZulu-Natal Project, and the Durban Water Recycling Project. With the exception of Queenstown/Lukhanji as a PPP-Concession developed in 1992, all the other concessions were implemented in 1999. No other concession arrangements have surfaced in South Africa beyond 1999. As somewhat of an outlying PPP, the Ethekwini Metro Water Services 'Waterborne Shallow Sewer System' (WSSS) project has been characterised as a 'research partnership and pilot project' (according to Blanc & Ghesquières (2006), a WSSS, also referred to as a 'condominial sewerage system' is a community- maintained sewer network whereby houses are linked to a main sewer system through one communal connection). In contrast, the recent PPP case studies in Gauteng and the Free State have operated under Management Contract arrangements.

In all PPP cases, the public partners have been local municipal authorities, transitional local councils, or entities in the form of Water Service Providers (WSP) created or owned by local authorities (e.g. Durban Metro Water Services, eThekwini Water and Sanitation Unit, Johannesburg Water (Pty) Ltd., and Maluti-a-Phofung Water (Pty) Ltd.). The private partners, in all but one case, have been locally formed private entities. The KwaZulu-Natal Project is the only PPP with a non-local private partner, namely Vivendi Water Systems.

The nature of Private Sector Participation (PSP) and investment roles and responsibilities

Amongst the case studies identified, the areas of water and sanitation were the main focal elements of the majority of PPP projects (See Appendix 2). Investments in wastewater have been made as well by private operators WSSA, Vivendi Water Systems, and Durban Water Recycling, but not to the similar

extent of water and sanitation. In a particularly unique case, WSSA was the only private operator identified to invest solely in sanitation.

Some of the roles undertaken by the private operators have been similar in cases of both lease-affermage contracts and management contracts. Variations are apparent among the private operators under concession agreements and unique or unconventional private entity roles are seen in the cases of WSSA in the WSSS Project and Durban Water Recycling.

Under the concessionary arrangements of Queenstown/Lukhanji, Dolphin Coast/Ilembe and Nelspruit/Mbombela, private partners WSSA, Siza Water and Sembcorp Silulumanzi were all responsible for the operations, maintenance or rehabilitation, and management of the existing water and sanitation systems and infrastructure. During the latest concessions of 1999, Siza Water and Sembcorp Silulumanzi shared the common responsibility of ensuring the procurement of raw water supplies from state owned entities Umgeni Water and the Bushbuckridge Water Board, respectively. Within both lease-affermage arrangements, WSSA is seen as responsible the operations and management of water and wastewater treatment works.

Vivendi Water Systems and Durban Water Recycling were concessionary arrangements whereby both private operators were responsible for water resource management and maintenance, and water treatment. However, Durban Water Recycling had a very distinction difference compared not only to Vivendi Water Systems, but to all of the other projects identified; the difference in responsibility of Durban Water Recycling was due to the unique quality of the project, which was to finance, design, construct and operate a tertiary water treatment plant in alignment with the existent Southern Wastewater Treatment Works in Durban. Under the 'research and pilot project' of the WSSS, WSSA was primarily responsible for sanitation infrastructure provision and one of the few operators to focus solely on sanitation as an investment. JOWAM and Uzinzo Water Services shared a similar role in the management functions and capacity enhancement through building support and transferring expertise and knowledge to their clients.

Beneficiaries

An overview of South Africa's private engagement in the water and sanitation sector (See Appendix 2) show that in all cases, the private sector partners have been responsible for servicing residents in areas

that they operate in, whether directly or indirectly. The majority of serviced areas include rural or poor unserved and underserved communities in former Homeland regions of KwaZulu-Natal and the Eastern Cape that have faced neglect during the apartheid era. In the particular case of Siza Water operating in the Dolphin Coat/Ilembe Municipality, the company has had to service both of the country's poorest and wealthiest residents. Siza Water and Durban Water Recycling have serviced residential and commercial/industrial users; commercial clients of Siza Water included those in the light industrial sectors, new business and the new airport hub, Dube TradePort; and Durban Water Recycling has serviced clients Mondi and SAPREF. In contrast, JOWAM and Uzinzo Water Services have serviced residents of Johannesburg and the Free State indirectly. The direct beneficiaries of JOWAM and Uzinzo Water Services are in fact, the locally owned private utilities, Johannesburg Water (Pty) Ltd and Maluti-a-Phofung Water (Pty) Ltd, respectively.

Project risks, terms and obligations

An overview of the projects showcases the variations in types of risks and costs faced by each private operator (See Appendix 3). WSSA, Siza Water and Sembcorp Silulumanzi (under concessionary arrangements), all faced a commercial risk under their contracts. Within both lease-affermage cases, WSSA were faced with operational costs of the leases. Both the concessions of Vivendi-Water and Durban Water Recycling shared a similar risk to WSSA in their WSSS project, which included operational, commercial and management risks. JOWAM and Uzinzo Water Services were void of any commercial risk and only faced operational and management risks as part of their management contracts.

Investments and financing Mechanisms

Not all projects required the private operators to dedicate investments toward water/sanitation/wastewater infrastructure and technologies. It was the nature of each PPP arrangement that determined whether the private partner needs to make investments into the projects or not. WSSA were not entitled to pursue capital investments under both lease-affermage projects. Capital investments were borne by the local authorities in both the Stutterheim/Amahlati and Fort Beaufort/Nkonkobe cases.

Similarly, JOWAM and Uzinzo Water Services were not responsible for financing investments of existing or new infrastructures. This responsibility fell under the municipal authorities. JOWAM was, although, involved in capital investments through being responsible for the 'capital investment programme'

implemented by Johannesburg Water. The investment planning strategy involved: using the utility's own staff to evaluate infrastructure expansion and rehabilitation needs; and promoting "asset sweating" as preventative maintenance for the utility to postpone investment in rehabilitation or expansion.

Private sector finance is, however, apparent in all concession case study arrangements as well as in the WSSS research and pilot project of WSSA. Siza Water and Sembcorp Silulumanzi had committed investments in the form of private finance obtained via loans. Private finance investment from Durban Water Recycling was partially obtained via loans and shareholder equity. Vivendi Water and the WSSS project of WSSA have contributed investments with funding sourced from trisector finance (from private partner, public partner and research bodies or non-governmental organisations).

Project outcomes and experiences of private sector engagements in water and sanitation

Overall, all five concessionary arrangements are currently ongoing projects, two projects have been concluded (both management contracts), two projects have been terminated and remunicipalised (both lease-affermage projects), and one project has been halted (the one and only research and pilot project) (See Appendix 4).

WSSA had both lease-affermage projects in the Eastern Cape terminated and remunicipalised in the early 2000s. Both projects were terminated over contract issues. In Stutterheim/Amahlati, a major flooding event occurred in 2000 and the municipality claimed that WSSA was to be held responsible for repairs of damaged infrastructure under 'operations and maintenance'. WSSA, however, claimed that the repairs were characterised as a new capital investment and rightfully fell under the municipality's ambit (Plummer, 2000). In Fort Beaufort/Nkonkobe, a High Court Order in 2001 had found the contract invalid for numerous reasons. The contract was never published public comment and the project never received any approval from the Local Government MEC (Queinnec, 2006). The WSSA contract surprisingly included a 'secrecy clause' preventing members of the public from seeing the document (at least, not without approval from WSSA) (Chandra et al., 2005)

WSSA had their WSSS project halted mainly due to conflicting election promises that water would be a free service for all people which stalled the project after residents assumed connection charges would be waived and a deadlock ensued. In addition, the type of simplified sewers (the condominial sewerage

system), did not comply with the National Building Regulations and therefore, had to be halted (Brocklehurst, 2001)

Improved water and sanitation access, improved water quality, and reduction in unaccounted-for water

There were various improvements in access and quality of the service and product provided to users enabled by the private operators. WSSA under the Queenstown/Lukhanji Concession, had made improvements in the levels of services provided to users and had reduced 29 unaccounted-for-water rates from 45% to 21% (Blanc & Ghesquières, 2006). Sembcorp Silulumanzi managed to achieve the Blue and Green Drop awards for excellence in water and effluent quality under The KwaZulu-Natal Project (Chetty & Luiz, 2014). JOWAM made notable improvements in water and sanitation access by households. Water access improved from 97.2% to 98.7% and sanitation access improved from 89.2% to 94.1% (van Rooyen *et al*., 2009).

Cost savings and delayed capital investment for municipalities

WSSA managed a 17% cost savings for the Queenstown/Lukhanji Municipality since 1992 which has been received well by the local councillors (Blanc & Ghesquières, 2006). JOWAM has enabled a reduction in operational costs in wastewater treatment plants of up to 70% leading to R34 million in savings for authorities (van Rooyen *et al*., 2009). Durban Water Recycling, on the other hand, exemplifies a unique case of delayed capital investment. Durban Water Recycling was able to treat domestic and industrial wastewater to a potable standard for both industrial and residential re-use. Due to the economical design of the wastewater treatment plant, Durban Water Recycling was able to save eThekwini Water and Sanitation Unit by delaying capital investment for pipeline capacity and bulk potable waste supply infrastructure. In addition, Durban Water Recycling efforts reduces the city's wastewater discharge by 10%, and reduces the partially treated load on marine environments by up to 24% (Gisclon *et al*., 2002).

Savings induced by surrounding developments taking place

Siza Water was assisted in their private capacity efforts through major commercial and property developers building their own infrastructures, thereby reducing the obligation on behalf of Siza Water to invest in infrastructure expansion. Not only did this release the pressure of Siza Water, but it also enabled a financial boom for Siza Water between 2005 and 2008 (SADC, 2012).

Despite the efforts made by the private sector in each of the case studies, some projects have had negative

outcomes, which impacted on their capabilities in some instances, to deliver on their own terms.

High non-payment rates, payment disparities

WSSA experienced issues in receiving payment in at least two of their Eastern Cape contracts. Within Queenstown/Lukhanji Municipality, an extension in municipal boundaries and increase in financial charges lead to high non-payment rates of between 40-45% of households from the Ezibeleni and Mlungisi areas (PDG, 2003). Within Fort Beaufort/Nkonkobe Municipality, residents were also unable to pay for the service provided by WSSA and were in fact, dissatisfied with the service (Chandra *et al*., 2005). Within the Dolphin Coast/Ilembe Municipality, Siza Water experienced that mostly the wealthy residents were able to pay, whereas poor residents were still struggling to afford the service (PDG,2003).

User riots, employee strikes and disputes

It is unfortunate that WSSA, Sembcorp Silulumanzi and JOWAM were all private operators that encountered user protests, employee strikes and other disputes. WSSA was unlucky in two of their Eastern Cape contracts whereby internal organizational and wage disputes surfaced from trade unions and their own employees in Queenstown/Lukhanji Municipality (Blanc & Ghesquières, 2006). In Fort Beaufort/Nkonkobe Municipality, strikes ensued after disputes between SAMWU and WSSA over wage differentials among all three WSSA employees in Queenstown, Stutterheim and Fort Beaufort (Hall *et al*., 2002). In the case of Sembcorp Silulumanzi, the PAC launched a defiance campaign and staged pickets outside the private operator offices and illegally reconnected themselves to water supplies after residents in arrears had been cut off from water supplies and risk being sued by the Council which hired a legal firm to track defaulters (Hall *et al*., 2002). When JOWAM installed pre-paid water meters in Soweto and Orange Farm and cut water supply to non-paying residents, an anti- privatization movement called Operation G'cin amanzi erupted which protested against JOWAM's efforts as well (Blanc & Ghesquières, 2006).

Public private contractor companies dominated by non-local companies and their interests

Although appearing as South African private entities, WSSA, Siza Water, Sembcorp Silulumanzi, Durban Water Recycling, JOWAM and Uzinzo Water Services are all companies with majority foreign ownership. WSSA is a joint venture company between Northumbrian (UK), Suez-Lyonnaise des Eaux International (French), and Group 5 (Local) (Plummer, 2000). Siza Water (Pty) Ltd is in fact, a private entity that was foreign-funded with majority foreign shareholding. Siza Water was founded in 1999 by French-company SAUR (Societe d'Amernagement Urbain et Rural) Services Limited, a water subsidiary of French industrial group Bouygues S.A., which then became a subsidiary of Dutch-company Cascal N.V. in May 2007 (Cascal N.V. was 58% majority-owned by SAUR, with the remaining minority shareholders consisting of South

African empowerment partners, Metropolitan Life Limited., Women's Development Bank Investment Holdings, The Investment Progress Group Holdings, and NANO Investment Holdings (Pty) Ltd.) (Farlam, 2005). Sembcorp Silulumanzi is actually a private entity under majority foreign private hands. Silulumanzi is currently a subsidiary of Sembcorp Industries of Singapore. The entity formerly belonged to The Great Nelspruit Utility Company (GNUC) up to July 2010 of which Biwater Capital B.V. of The Netherlands had a majority shareholding of 64%, with Biwater Operations (Pty) Ltd South Africa a 26% shareholder, and Sivukile Local Empowerment Partner with a 10% shareholding (Bender & Gibson, 2010). Although assumed to be a public private entity, Durban Water Recycling (Pty) Ltd majority shareholders are also foreign. Vivendi Water Systems and Marubeni Europe are majority shareholders whilst local companies Khulani Water Limited, Umgeni Water and Zetachem (Pty) Ltd are minority shareholders (Gisclon et al., 2002). JOWAM is in fact, a subsidiary of Suez Group of France, and subsidiaries of other UK and South African companies (Blanc & Ghesquières, 2006). Finally, Uzinzo Water Services actually operates as a joint venture between non-local WSSA and local Amanz'abantu Services (Mayher et al., 2009).

Private finance sourced through public funds

In cases of the private operators below, each one has had to source or supplement their project with public finance in the form of loans, mainly from the DBSA. This presents a concern over private sector operators contracted to provide a service but being unable to afford providing the services to municipalities (who cannot afford the service themselves either). While under Cascal N.V., the private operator in Nelspruit/Mbombela had obtained two-thirds (R124 million out of R195 million) of its project funding via public loan from DBSA (Hall *et al*., 2002). Siza Water obtained a public loan sourced from DBSA and private banking and investment firm Investec (Khanyile *et al*., 2008; Bender & Gibson, 2010). Vivendi Water had 45% of their project (R34 million out of R74 million) financed through a public loan from DBSA (Hall et al., 2002). Durban Water Recycling (Pty) Ltd had funding sourced through the most channels namely: DWR's shareholder equity; and loans from Societe Generale Group (French Bank), Natixis (French corporate investment banking company), the French Government, Rand Merchant Bank and DBSA (Gisclon et al., 2002).

Financial issues and delayed profits

Siza Water encountered financial issues when the private company was unable to pay its concession fee of R3.6 million to the Ilembe Municipality in April 2001. This was partially due to experiencing a 20% increase

in the cost of raw water supply from Umgeni Water, as well as being compelled to make a R7 million initial investment for the companies Black Economic Empowerment Partners which placed further financial strain on the operator. Although declaring no profits up until 2005, Siza Water's majority shareholder SAUR, continued to receive a management fee from Siza through accumulating 21% return on investment from the first year of the concession. SAUR in this case had secured better terms for themselves in passing on the risk to Siza Water (Farlam, 2005).

High risk involved in events of contract restructuring and renewals

Although the Queenstown/Lukhanji Municipality contract is ongoing, the local council is undecided over further extending the municipal boundaries, and there is uncertainty as to whether WSSA would continue to enter in such an agreement (PDG, 2003). Siza Water was cushioned from failure when the Ilembe Municipality revised their contract in May 2001 after Siza Water experienced serious financial issues due to revenue shortfalls. Although the municipality approved water price increases by 15% plus inflation, and cut Siza Water's investment commitment by 60% from R25 million to R10 million over 5 years, Siza Water was obliged to ease the municipality's fiscal debt burden of R15 million, with all loans to be fully redeemed by Siza Water shareholders either in the form of new equity or shareholder loans (Hall & Lobina, 2004). In one of the most concerning of cases, although having a good performance rating and exceeding their targets, JOWAM was not awarded a contract extension by the local authorities because they felt that the JOWAM-trained locals could manage without JOWAM by the end of the contract. Therefore, good performance did not manage to guarantee a contract extension (van Rooyen *et al.*, 2009).

3.5 Synthesis: Emerging trends and opportunities in the financing of water infrastructure

The role of the public sector

There is a clear domination of public funding in the water sector in South Africa. A trend of growing investment over the past 15 years is apparent. Annual budget allocations to the water sector have continued to increase, funding in some cases has tripled in under a decade. Investments in the water sector in South Africa have not only increased with increasing demand in water infrastructure and services but have also been fairly responsive to emerging challenges as and when they occur:

- Small funds and programmes have been instituted where need arises to provide "rapid interventions" (e.g. Accelerated Community Infrastructure Programme).

- ❖ Similar action has been taken with more investment demanding emerging challenges in the water sector (e.g. AMD).

This has allowed for investment funds to address the diversity of needs within the sector, ranging from domestic water use to commercial demands. There is growing interest in investing funds in smaller towns and rural areas as demand for improved water services grows in these areas. These efforts are being made to redress historically inherited service backlogs by targeting communities that were previously disadvantaged. A great deal of projects has been funded in Limpopo and KwaZulu-Natal for example.

Although investment has increased, it hasn't been able to meet the rising costs of projects in the water sector. It is estimated that only about half of project costs in recent years have been funded. Large-scale projects have commonly been delayed partly because of funding, management, and capacity challenges. This has frequently led to higher project costs and increased investment demand on already strained public funds. This therefore suggests there is a need to supplement the available funds from treasury by exploring innovative funding models while plugging on any inefficiencies within the current funding and project implementation framework. This provides an opportunity for private sector involvement.

3.6 Overall trends and opportunities for the private sector in water and sanitation investments

Private sector operators have had some unfortunate experiences, with very few cases of success in South Africa's water and sanitation sector. The current operational projects are all concessionary arrangements, and only two (Durban Water Recycling (Pty) Ltd, and Vivendi Water) have been operating successfully. The remaining concessions by WSSA in Queenstown/Lukhanji, Siza Water and Sembcorp Silulumanzi are either currently stressed or have been experiencing stressors. After the remunicipalisation of WSSA's projects in Stutterheim/Amahlati and Fort Beaufort/Nkonkobe, and the discontinuation of its WSSS project all under local authority instruction, it is highly unlikely that they will renew their contract with the municipality of Lukhanji.

The only outstanding example of a successful private sector operator engaged in a project is Durban Water Recycling (Pty) Ltd. The project serves two major industrial clients, Mondi and SAPREF, recycles their wastewater, and is able to redistribute the end product as potable water not just for industries, but

residential users in previously disadvantaged peri-urban areas too. The company also reduces the environmental impact that the wastewater previously had on the environment, and the company could delay capital investment for the public operator.

In the instance of The WSSS Project, WSSA were only barred from pursuing their project and effort to install sanitation infrastructure because of issues with regulations, and not the lack of skills, finances or construction materials. The National Building Regulations should therefore, be revised to allow innovative infrastructures (like the condominial sewerage system) to be implemented. This is important because the WSSS project was a pro-poor sanitation project that was only prohibited from implementation through unaccommodating laws.

Water and sanitation remains a sector with much needed investment in South Africa to the present day. However, investments will be largely dependent and determined on a private operator's willingness to engage in contracts that service South African residents in accordance with the pro-poor and socially-cognisant ideologies of the South African government. An amicable balance between business, social and environmental needs will need to be established in each case if water and sanitation investors intend to thrive in these sectors.

4 KEY BARRIERS AND OPPORTUNITIES TO PRIVATE SECTOR INVESTMENTS IN WATER INFRASTRUCTURE

Barriers to investments in infrastructure can broadly be categorised into macro-economic factors, which affect the overall investment climate at a national level. Commercial barriers to investments consist of factors such as high upfront cost of infrastructure, cashflow issues, and contractual terms and conditions. Regulatory barriers are primarily related to policy issues and government as the primary custodian of water resources. In the following sections, the barriers are discussed in greater depth based on the data collated in the course of this research.

4.1 Macro-economic climate

The Macro-economic climate plays an important role in determining future viability of investment. An unstable macro-economic climate such as high inflation or a volatile exchange rate can weaken the position of creditors, resulting in their inability to access capital. The recent decline in the South African Rand, and the potential downgrading of South Africa to Junk status by the credit rating agencies, are examples of how macro-climatic factors have the potential to have negative implications on infrastructure investments.

Macro-economic stability has a direct implication on economic growth. It has been found that it can depress economic growth by 2% and can dampen prospects for pro-poor growth strategies (Fiestas & Sinha 2011). Macro-economic factors also affect firms directly, as they are likely to go bankrupt or get acquired. In some case issues related to high interest rates and availability of funding in banks, can impact the ability of a company to operate, as access to finance is limited, and can affect the growth rate of a business. All of these may affect investments in water infrastructure, as it is regarded as a high risk and low returns sector to invest in.

The policy interventions that are required to overcome investments constraints at the macro-economic levels, generally require that fiscal and monetary stability is prioritized (Sirmaneetham and Temple 2009). The South African, government implements a policy of inflation targeting. Hence, allowing it to implement policies that can control inflation, to bring stability to the economy. South Africa has a strong monetary policy, and very sound financial systems, which helped the country to withstand the financial crisis in 2008, when most countries in the world were affected.

Inflation and currency instability

South Africa's currency lost 26% of its value in six months from June 2015 and has continued to lose value into the first quarter of 2016. This loss in value is likely due to recent events such as troubled Chinese markets and also a culmination of a trends that has persisted for a decade from a stronger Rand trading at a low of 6.4 in 2005, to below 15 in 2015 to the US dollar. Resultant rising interest rates in response to the weak Rand have considerable effects on small private business in the water sector, especially given the poorly developed local financial markets. Foreign private companies in PPPs within the water sector also stand to incur increasing foreign exchange rate risk and potentially suffer losses in repatriation of profits to more powerful home country currencies. Continued currency instabilities can easily spark currency devaluations in South Africa. In addition, if one considers the complex and politically sensitive pricing process, it can potentially increase the costs of water utility operations and decrease consumers' ability to pay for water.

Country credit rating

Institutional investors use credit ratings to assess the credit-worthiness of a country to make investment decisions. A very poor credit rating, is likely to affect Foreign Direct Investments (FDI), as potential investors will view the country as high risk and plough their investments elsewhere. South Africa is currently rated as BAA2, while standard and Poor has rated South Africa as BBB- and Fitch rating for South Africa is BBB, as of 1 April 2016.

There were significant concerns that South Africa could be degraded into Junk status in 2016, which is possibly due to poor leadership capacity. It is projected that if South Africa is downgraded into Junk status, it will take the country at least five years to fully recover. This would be a significant impediment in achieving its infrastructure target and other investment needs.

Such a downgrade will not only affect the central government, but all institutions in South Africa including those responsible for raising capital for investing in water. For example, some of the major Water Boards, such as Umgeni Water and Rand Water, rely on their individual ratings to access capital at favourable commercial rates. If the country's credit rating is downgraded, the borrowing capacity of these institutions will be severely affected, posing a major challenge to service delivery.

In the recent past, considerable institutional reforms have been carried out in the South African water and sanitation sector to improve provision of and access to water. However, some regulatory, governance and political barriers still loom large on private sector participation. Private participation and investment is affected by both regulation and a lack thereof. Regulation that overly limits activities can be stifling, while

a lack of regulation could potentially lead to the depletion and abuse of a shared resource, ultimately threatening private business. Within the private sector investment, regulation is seen as playing the role of mediator between potentially but not necessarily contesting interests. For example, the private operator and the profit motive, the consumer, related government bodies and stakeholders. Regulation therefore assumes a role that provides for a level playing field, which if not exercised well can be deterrent to private investment and participation in the water sector. Private companies are more inclined to protect themselves from any eventualities that can emanate from the political landscape. Politically, South Africa is a medium to moderate risk state, with seemingly high levels of corruption and growing civil unrest, but with well-established rights (Barnard & Croucamp, 2015). It is regarded as one of the lowest political risk states on the African Continent. The following section discusses the regulatory and political challenges which exist in South Africa that can be a barrier to private investment in the water and sanitation sector.

Shifting roles and directives

The three spheres of state governance at which regulation in water and sanitation sector is performed in South Africa are (1) Department of Water and Sanitation (DWS), (2) Water Services Authorities (WSA) (district and local municipalities) and (3) Catchment Management Authorities (CMA), potentially provide a challenge to an investor. The municipalities (district and local) have the responsibility to deliver water services, set tariffs, allocate water to service providers and determine the conditions under which service can be discontinued or limited. Through the DWS, the minister is able to prescribe norms and standards in respect of tariffs and water service provision. The minister can also prescribe compulsory provisions in water service provider (WSP) contracts to ensure provisions of the Waters Services Act (particularly equity). The arbitrary nature by which the minister through the DWS can intervene and reassign responsibilities across local authorities and impose on contractual agreements, while enshrined in the Water Services Act and the National Water Act may be considered a significant business risk by investors. It affects the ability of private investors in various forms of PPPs (service, management, lease, BOT) to confidently carry out activities such as raising tariffs, hence hindering their ability to fulfil contractual obligations.

Lack of information and personal capacity

Research and discussions with leading experts in the water and sanitation sector suggest that a lack of regulatory capacity and good quality information to underpin regulation and investments. These are highlighted in;

- The largely monopolistic traditional service aspects of water that have provided very little data on the state of water systems, sensitivities to declining water demand, volatile supplies, and

variable costs of energy and other system inputs

- The limited or unavailable municipal accounting, reporting and monitoring and evaluation systems to ensure that regulators and prospective financiers can assess a municipality's standing to make informed decisions
- The limited market experience and knowledge that is concentrated on a relatively small number of successful organisations, leading to a lack of understanding of the actual on-goings of investment in the W&S sector
- The existing shortage of specialized intermediaries to assist investors in sourcing, evaluating, and making investments.

4.2 Inadequate regulatory framework

The regulatory framework for water and sanitation services provision in South Africa could be stronger and better coordinate regulatory standards and processes of various government departments and regulatory institutions. The framework does not appear to fully incorporate the entire water value chains to ensure a well-rounded and inclusive system that can guarantee equitable and sustainable regulation. Hence, a regulatory framework can regularly lead to negative perceptions, such as incoherence around power dynamics and regulatory discretion, rate setting, processes and channels of appeal in case of dispute, amongst others. . All of these features heighten the risk associated with large and long-term investments.

Scale mismatch

In South Africa's water and sanitation sector, it is difficult to reconcile the rules and legislation at the national, provincial and local levels. The scale or level at which regulation takes place can profoundly affect investment outcomes. This is because different groups and different viewpoints making regulatory decisions at various spatial scales pose a possible threat for critical contestation for regulatory power. Furthermore, ad hoc boundary demarcations, and shifts in powers and functions between district municipalities and local municipalities have occurred regularly in South Africa since apartheid. Significant changes occurred between 2000 and 2003, resulting in new boundaries that typically merged a number of previously separate councils, including both rural and urban settlements. For example, the Mbombela local municipality was replaced by the Nelspruit Transitional Local Council with boundaries that more than doubled the population of the municipality. Boundary shifts are usually accompanied by significant shifts in staff, assets and liabilities. When addressing the complexity of this regulatory situation, cognisance needs to be given to the context, policies, legislation, institutional arrangement and frameworks and implementation dynamics, as this all makes the incorporation of risk averse private interests even more

challenging.

Institutional arrangements for tariffs

Globally, the economic and price regulation of the water and sanitation sector receives significant attention, however, this is not the case in South Africa. This is largely due to the fact that the institutional arrangements of the regulator do not correspond to the separate policy and regulatory needs of tariff regulation. Hence, the price of water has generally been kept artificially low, which entails that revenues are seldom enough to cover costs. Such an environment presents a disincentive for private sector involvement and investment.

Governance and expropriation

While South Africa has one of the most progressive constitutions and protections of transacting and property rights, recent developments in the South African political arena are prone to make private investors anxious. Opposition voices that have regularly questioned the pro-business National Development Plan (NDP) and pushed for nationalisation such as the Economic Freedom Fighters (EFF) and NUMSA stimulate fears of potential reactionary politicking from the ruling party to counteract the rising voices e.g. through the expropriation bill of 2015. Although the expropriation of property in South Africa is unlikely, albeit possible (Index of Economic Freedom, 2013), statements such as the one below issued by NUMSA (NUMSA central committee statement, 2013; internet) give indications towards growing voices of opposition towards expropriation.

> *"…Inevitably, the rupture in COSATU (Congress of South African Trade Unions) is between those who want to see an ongoing implementation of the Freedom Charter, thus a rejection of GEAR and the NDP, and those who are consciously or unconsciously defending South African capitalism and imperialism by defending the NDP and not openly supporting the implementation of the Freedom Charter, especially its nationalisation demands".*

Uncertain and indecisive state political responses to opposition pressure pertaining to private property rights and nationalization is likely to make private players anxious. This can be seen in responses of the private sector to political uncertainty. In the second quarter of 2013, it was reported that as much as 67% of South African's privately held businesses and were putting off their investment decisions due to their uncertainty about the future political direction of South Africa (IRMSA Risk Report, 2015).

Declining trust in South African politicians can potentially add to the anxiety of private investors. Transparency International (2014) rated South Africa 44th out of 100 as a corruption score. This is likely due to the perceived misuse of state money, acts of bribery, nepotism and tender fraud within government

(Transparency International, 2014). Given the power which the state has through the minister of water affairs, private players could be wary of the fluid political landscape in the country.

Civic action

South Africa's historical disparities between racial groups make it politically unacceptable to marginalise low-income and previously disadvantaged communities, irrespective of whether they can afford water and sanitation services. Strong opposition has been shown over the years towards various services that have been offered in low-income areas. For example, the installation of standpipes, despite research showing that it has health benefits from yard or household connections have been resisted. Furthermore, the pre-payment cards associated with the collection of revenue were also controversial. Alternative sanitation plans, based on pit latrines and the bucket system offered in low-income areas of Johannesburg and Cape Town (even as temporary measures) has received resistance and resulted in civic action. These have played strongly around discrimination and marginalisation narratives that underlie the historical past of thecountry.

South Africa is ranked as having moderate risk for civic unrest (Baard & Croucamp, 2015). Civic unrest in South Africa is characterised by protests, serious disruptions as well as private property destruction. Civic volatility through service delivery protests in South Africa (with municipal services such as water and electricity have increased significantly, in 2007 there were approximately 90 protests and in 2014 more than 200 occurred (Powell et al., 2014). Of these, violent protests increased from 45% to 83% of all recorded protests from 2007 to 2014 (Powell et al., 2014). A considerable amount of the strikes are linked to the largely unionised labour market in the country, which is not effectively regulated. It is thus likely that any private players seeking to service South Africa's low income areas with water, will be wary these volatile dynamics.

4.3 Commercial barriers to investing in water and sanitation

Commercial barriers related to investments in water are risks that investors face due to the exposure to large infrastructure projects. Commercial risks faced by investors in the water sector range from large upfront costs, poor project cashflow profiles to lack of effective accounting practices.

Large upfront costs

The cost of water and sanitation infrastructure is very high due to the complexity of such kinds of projects. For example, the construction of bulk infrastructure is typically in the order of several hundred million dollars. In most cases these large amounts need to be invested all at once, before returns from the project can start to accrue. This despite of the fact that returns are relatively low in the water sector, requiring a long period of time before the cost can be required.

The large upfront costs involved, is a key factor preventing effective private sector investments in the water and sanitation sector. This is due to the fact that for companies their primary responsibility is to ensure that they are profitable, so as to provide value to their shareholders. Committing a large amount of money on investments that are perceived to be high risk and low returns does not make business sense to some business. Thus, to bolster private sector investments in W&S, it requires effective mechanisms such as financial guarantees to enable private sector participation.

Project cashflow profile

Large infrastructure projects such as water and sanitation are impacted by fluctuations in cashflows, which are dependent to a large extent on the effectiveness of tariff collections. Cashflows from rates, fees and taxes also often don't cover the full cost of the investment (Johnson 2012). As a result, additional funding is required to be raised from elsewhere to cover the costs of the investment. This is because in many cases, there is a strong social element to the investment, especially in cases where the purpose of the investments is to provide water to new users. In such a case often time the public sector has to raise the additional funding required. This presents significant uncertainties in the cashflow profile of a project, making it seem unattractive to investors.

4.4 Challenges in assessing short term performance of infrastructure programmes

Infrastructure investments are often affected by short-term performances issues that could potentially affect the ability of an entity to raise capital. Fluctuations in financial results could result in depressed share prices of water utility companies, which will in term affect their ability to raise capital. Institutional investors such as the Public Investment Corporation (PIC), that hold a massive potential to bolster private investments in W&S, are often under immense public scrutiny, and as a result their investment decisions are frequently questioned. For this reason, such investment vehicles will steer clear of sectors that are perceived to be high risk, such as water.

The fact that internal structures of potential investment entities such as management incentives or board compensation are linked to financial performance, might impact the ability of such companies to

invest in ventures that require a long-term view to yield results (B20 2014).

Contractual issues

Private investors will not invest unless guaranteed at the least an adequate rate of return through the existence of contractual safeguards for their ability earn to enough to cover operations and maintenance costs, debt service, taxes and profit. However, contracts in South Africa are prone to meddling. The Water Services Act and the National Water Act guarantee the minister's discretion and right to step in with regard to issues of water provision. These and other legislation seek to ensure that various socio- economic grouping and marginalized geographic areas are treated equitably. This has however heightened the risk of breach of contracts especially where low-income areas are concerned e.g. via challenges to tariff increases and disconnection conditions. The operator in the Nelspruit concession, for example, fought hard to avoid the provision of free water, as it wasn't stipulated clearly in the contract. The operator's efforts to disconnect non-paying households were heavily disputed and ended through concerted local campaigns. Owing to the volatile nature of low-income areas and potential breaches of contracts, weak protections and potential meddling owing to the ministerial mandate in such areas, past engagement by private sector has sought to avoid these areas, a sign of private sector anxiety about the risk contained in such areas.

4.5 Case studies illustrating barriers encountered in the South African context

Over the past decade, South Africa has seen a very conservative amount of private- sector participation (PSP) and private investment in its water and sanitation sector. In total, there have been eight water and sanitation projects with PSP and private investment across the KwaZulu-Natal, Eastern Cape, Mpumalanga, Free State and Gauteng Provinces.

South African authorities implemented PPPs within the water and sanitation sector due to the lack of local private sector companies and individuals skilled in water and sanitation to serve the population, and address the massive backlogs in basic services mainly among the poor in rural and peri-urban regions. Over the past decade two management contracts, two lease-affermage, three concessions, and one BOOT-type PPP-contract have been implemented. In all cases, the private operating companies were formed as purpose- built local public entities by international water companies given majority company shareholding.

The following section gives an in-depth account of the private operators experience in each of the PPP-projects and describes the responsibilities and risks that they faced throughout the duration of their tenures. The outcomes and status of the projects are also defined.

Political interference and lack of long term commitment to service provider

Johannesburg water PPP

The Johannesburg Water PPP was established in 2001 as a five-year management contract awarded to private operator Johannesburg Water Management (JOWAM). As the private operator, JOWAM was responsible for the daily operations and management of the water-utility Johannesburg Water (JW) (Pty) Ltd (owned by the City of Johannesburg). Although JOWAM highlighted technical superiority, the City of Johannesburg prohibited JOWAM from procuring investment in providing core water services to the poor within the region (Blanc & Ghesquières, 2006). This area of investment was believed to be most valuable for the City to strategically provide itself for political reasons. Despite the provision of an effective and successful service, the City of Johannesburg did not offer to extend JOWAM's contract and it was concluded in 2006. Therefore, JOWAM's investment in procuring the management contract did not guarantee further procurement for the private operator even in the event of exceptional service.

Maluti-A-Phofung PPP

In 2006, Uzinzo Water Services (Pty) Ltd procured a five-year management contract to supply the local water service provider, Maluti-a-Phofung Water (MaP) (Pty) Ltd, with management support, knowledge transfer and capacity building to service areas within the Free State Province (Tucker et al 2010).

New capital infrastructure risk to performance related ROI

Uzinzo were faced with a challenge throughout their investment which precipitated from the responsibilities of their public partners. New capital infrastructure projects fell under the authority of the Maluti-a-Phofung Local Municipality. However, MaP Water found this problematic since their designated area of responsibility, reticulation and maintenance, were aspects intertwined with new infrastructural projects (Mayher et al 2009). Uzinzo's performance incentive was determined by growth in revenue, but with new infrastructure responsibilities a problematic concern between public authority members, this hampered their performance-related return oninvestment.

Lack of clarity in risk attribution and mitigation

The Stutterheim/Anahlati municipality project

The Stutterheim/Amahlati Municipality Project was established in 1993 within the Stutterheim District of the Eastern Cape Province with the project procured by WSSA (then Aqua Gold) (Ruiters, 2002). The responsibility of WSSA included O&M. Major flooding incident occurred in 2000 which caused some damaged to the existent water infrastructure. The Amahlati Municipality stated that the infrastructural repairs were a part of WSSA's responsibility under O&M. However, WSSA stated that the repairs fell

outside of their ambit because it constituted a new capital investment. A dispute between the Municipality and WSSA ensued over the lack of clarity provided within the contract in the event of such environmental damage (Plummer, 2000). As a result, WSSA had their lease-affermage contract remunicipalised and their private investment relations subsequently brought to a halt.

Inability of poor municipalities to pay management fees and ineffective tariff collection

The Fort Beaufort/ Nkonkobe municipality project

In 1995, WSSA were awarded a lease-affermage contract to oversee the O&M of water and wastewater services within the Nkonkobe Municipality and Fort Beaufort region in the Eastern Cape. WSSA agreed to provide their services to the Municipality for a 10-year period. Throughout WSSA's term of service, the municipal authorities struggled to pay the management fees to WSSA (Chandra *et al.,* 2005). This was due to the fact that Nkonkobe comprised of poverty-stricken rural areas with people unable to pay for the service being provided (Ruiters, 2002).

The Queenstown/Lukhanji municipality concession

The Queenstown/Lukhanji Municipality Concession was initially established in 1992 between WSSA and the Queenstown Municipality. Later in 1995, the municipal boundaries were extended to include the Ezibeleni and Mlungisi townships later forming the Lukhanji Municipality. Although a major increase in the consumer base, there were considerable low consumer payment rates in Ezibeleni and Mlungisi which affected the Municipality's capability of paying WSSA for their service (Ruiters 2002).

Poor labour relations

During the late 1990s and early 2000s, WSSA had three ongoing contracts within three different municipalities in the Eastern Cape alone: Stutterheim/Amahlati, Fort Beaufort/Nkonkobe, and Queenstown/Lukhanji. When WSSA employees in all three different municipalities learnt that WSSA was paying employees different wages, a strike led by the South African Municipal Workers Union (SAMWU) ensued and brought operations to a halt.

WSSA also experienced internal organisation and employee wage disputes in the Queenstown/Lukhanji Municipality Concession, surfacing from Trade Unions. After employee disciplinary dismissals in 2002, two strikes ensued as a result which halted operations at WSSA (Chandra *et al.,* 2005).

Challenges associated with implementing B-BBEE

The Ilembe-Siza water concession

In 1999, a 30-year concession was formed between Siza Water (Pty) Ltd. and the Ilembe District Municipality. Under the Concession, the majority shareholder and owner of Siza Water, French-company Saur (Societe d'Amernagement Urbain et Rural), were obligated to make an initial investment of R7-million towards four of their B-BBEE (Broad-Based Black Economic Empowerment) partners who were given minority shareholder ownership of Siza Water (Farlam, 2005). This meant that the concessionaire required additional funds at the initial stages. A loan was obtained from the DBSA. However, this added financial pressure on the concessionaire to provide their service from the outset of thecontract.

Inadequate water supply and fluctuations in the price of bulk water

The Mbombela Sembcorp-Silulumanzi concession

The Mbombela Concession was established as a 30-year contract in 1999 between Singaporean-company Sembcorp-Silulumanzi (a subsidiary of Sembcorp Industries of Singapore) and the Mbombela Local Municipality to provide 400 000 users with water and sanitation services (Chetty & Luiz, 2014). As the private concessionaire, Sembcorp-Silulumanzi were responsible for the management and financing of water and sanitation services, O&M, and infrastructure upgrades and rehabilitation.

Sembcorp-Silulumanzi were faced with a risk to their operations due to the under- capacity the water supply from the Kanyamazane Water Treatment Plant. Illegal water reconnections exerted further pressure on the system (Bender & Gibson, 2010). At present, the concession is ongoing but currently stressed.

The Ileme-Siza water concession

When Umgeni Water increased the price of bulk water by 20%, Siza Water, which had a concession with Umgeni Water, encountered financial difficulties and were subsequently unable to pay the municipality its lease payment of R3,6-million in April 20 2001 (Hall & Lobina, 2014). Furthermore, there were lags in the development and construction of housing projects, airport construction, and commercial developments, which meant that the demand for water lagged. Consequently, Siza Water experienced lower than expected consumer demand and declared no profits up until 2004/5 (SADC, 2012).

5 Opportunities for addressing the commercial and regulatory barriers to investing in water and sanitation

The use of innovation finance mechanisms to raise funding

There is significant momentum building globally around the move towards sustainable investments. Many investors, including institutional investors, are seeking for investment opportunities in sectors that yield social and environmental returns, including financial returns. Water having a strong social element is well placed to capitalize on this innovative finance mechanism.

National Treasury, in partnership with research institutions in South Africa, have been investigating the opportunity of issues social impact bonds (SIBs) to address the system funding challenges in South Africa. If such a move is successful, it will create a new stream of funding for social and environmental enterprises in South Africa.

Social impact bonds could play a significant role in boosting economic development and job creation in South Africa. According to a report by the Bertha Centre for Social Innovation (2014), SIBs could improve service delivery in South Africa through these pathways:

- **Rigour:** SIBs bring greater focus on agreeing the outcomes desired by a programme upfront, and then measuring the effectiveness of delivery in order to decide payment.
- **Innovation:** SIBs transfer risks to socially-motivated investors who have a greater appetite for testing innovation and funding new models.
- **Flexibility**: SIBs create incentives to put in place the necessary feedback loops, data collection and performance management systems required to learn from local circumstances, resulting in a bottom-up, client-centred, and potentially a more effective approach to service delivery.

SIBs hold high potential in the water sector due to the strong social dimension of the sector, and the recognition that water is the engine of South Africa's economy, in addition to energy. It's possible to raise substantial funding through such a mechanism, for example. the Inter-American Development Bank Group, not long ago announced a programme to test SIBs in Latin America and the Caribbean. It would be useful if National Treasury, in partnership with the DWS, could explore the potential of developing SIBs specifically for the water sector in South Africa.

5.1 Promote innovative partnerships between private-public and civil society

There is a need to encourage innovative public–private–civil society partnerships to provide services in low-income areas to improve the commercial viability of water projects, and to reduce the risk borne by investors. The 1999 case of Durban Metro, Vivendi and Mvula Trust is an example of such arrangements

in South Africa, where lessons could be drawn and partnerships strengthened and replicated. The state could offer partial risk guarantees to cover for any contractual eventualities related with the high-risk socio-economic regions. Partial guarantees of up to 10% of project private investments can easily encourage confidence. The Inclusion of labour in negotiations of contracts in an open and inclusive manner can help to dispel some of their concerns, and to engage them more in positive discussions on solutions to resolve labour issues amicably where they arise.

5.2 Improved capacity and information access

Infrastructure investments entail complex legal and financial arrangements, requiring a lot of expertise. The South African water sector lacks much of the required expertise. There should be efforts to develop and implement a system for the effective collection of data from all water sector institutions, into a centralised, easily accessible national water resources information system and ensure that high-quality data and information for supporting research, regulation, and monitoring and compliance enforcement are made accessible to public and private organisations. Strengthening the municipal accounting and reporting systems to ensure that prospective financiers can assess a municipality's financial standing. Along with the data transparency system, this will provide better information to investors for informed decision-making. One way to reduce the knowledge and experience gap in investing in water is to have multi-stakeholder dialogues that bring all the players to the same table to increase networking, communication and information sharing. The state can provide access and facilitate such dialogues.

The elaborate and stringent codes and approval systems for PPPs has shown through the extended periods it takes to acquire approval that there is a shortage of expertise for such processes. Targeted skills development needs to be instituted to reduce the time scales of project evaluation and lessen the cost burden on prospective investors.

5.3 Set up an independent regulatory body

There is need for the strengthening and harmonization of current regulations and the consideration of new national policy and legislation for an Independent regulator in the South African water and sanitation sector. A strong and dependable regulator will restore investor confidence through an objective and fair outlook that comes from autonomy to withstand pressures from both the state and private players. Such a regulator should be considered dealing with issues regarding:

- The scale at which regulation could operate e.g. centralised or decentralised.
- The appropriate scope of regulation (i.e. whether a regulatory body should regulate price,

quality, or both).

- The source of funding for the regulatory body.

Having this body outside the ministry of water affairs and the DWS can help to streamline current management of water resources in South Africa. Safeguards could also be instituted to ensure the regulator is unbiased, such as:

- Having a transparent decision-making processes.
- Providing for a reliable appeals process for the regulator's decisions.
- The use of external auditors or watchdogs.
- A mechanism for the removal of the regulator in the event of poor performance.

5.4 A sound regulatory framework

The development of a clear regulatory framework for water resources management and service provision is pertinent to attracting private investment and to better coordinate regulatory standards and processes with other government bodies and regulatory institutions. Such a framework could seek to adopt best practices in regulatory framework design using case studies such as Chile, Argentina, and the United States. To increase the utility of the regulatory framework for attracting private investment it should seek to determine and clarify:

- The degree of independence from the ministry of decision making entities in the water value chains.
- Separation of technical and economic regulation.
- The harmonisation of scale mismatches i.e. national, provincial or local regulation.
- A reasonable balance between profit and price control.
- Best systems for monitoring outputs and setting affordable rates.
- Basis and criteria for appeals to regulatory decisions.

The regulatory framework will need to extend beyond just the authorisation of water use by the DWS towards other issues that concern skill shortage which often results in bureaucracy and higher transactional costs. The framework needs to be developed towards encouraging competition and a staunch political commitment to address corruption.

Regulatory alignment

Water legislature (e.g. Water Services Act) need to be aligned with other national legislation that governs local government. This harmonisation will help in better regulation of water service provision

and reduce confusion and mixed messaging in a manner that could help attract more private participation. Alignment could be followed by the development of integrated and more streamlined approaches to regulatory approval for projects involving private sector players e.g. the more recent desalination of water. This will make the current unclear regulatory approval process more investor friendly. Overall, alignment could seek to achieve a more comprehensive, systematic and consistent approach across the full water value chain.

5.5 Political risk insurance

Private players seeking to invest in the water and sanitation sector in South Africa will need insurance against civil disturbance, expropriation and confiscation and currency convertibility. This can partly be achieved through:

- Government exchange rate guarantees
- Split currency revenue arrangements i.e. where costs are incurred in local currency while the repatriation of profits in made in foreign currency
- The institution of dependable dispute resolution mechanisms.

5.6 Champion innovative solutions for low income areas

Despite their volatility, low-income areas can provide an opportunity for a private investor since they form the bulk of the unserved or underserved communities in the country. Capitalising on this opportunity will require innovative delivery methods and revenue collection methods. These methods will need to be location specific as the dynamics of communities is considerably diverse. However, it would be beneficial for the state to provide incentive for such innovation through offering financial guarantees and risk insurance for potential investors who wish to 'experiment' with innovations in selected areas. Furthermore, local private players that are more attuned to the local disparities could be promoted to fill the low-income area challenges, especially considering that successes in innovative low-income area servicing are difficult to replicate, larger private investors may not suit these areas. The local private operators could be supported to play a more important role in the private financing of smaller projects in such communities through business development training in water and offering co-funding based on performance.

REFERENCES

Barnard, S. & Croucamp P. 2015. Comprehensive Political Risk Assessment of South Africa. *Problems and Perspectives in Management.* 13(1): 131-142.

Berng A. 2009. Water, Sanitation and Hygiene: Sustainable development and multisectoral approaches: Microfinance for water and sanitation: A case study from Tiruchirappali, India 34th WEDC International Conference, Addia Anaba, Ethiopia, 2009 Andrew Barenberg, USA.

Bender, P. & Gibson, S. 2010. Mbombela (Nelspruit) W&S Concession, South Africa.

Blanc, A., & Ghesquières, C. 2006. Decentralisation and the free basic water policy in South Africa: What role for the private sector.

Brocklehurst, C. 2001. Durban metro water: private sector partnerships to serve the poor. *W&S Program-Africa, Nairobi*.

Budds, J. and McGranahan, G., 2003. Are the debates on water privatization missing the point? Experiences from Africa, Asia and Latin America. *Environment and Urbanization*, *15*(2), pp.87-114.

Burger, R. 2005. What we have learnt from post-1994 innovations in pro-poor service delivery in South Africa: a case study-based analysis. *Development Southern Africa*, *22*(4), 483-500.

Camdessus, M. 2003. Report of the World Panel on Financing Water Infrastructure. World Water Council. Paris, France.

Chandra, M., Girard, R. & Puscas, D. 2005. Corporate Profile- Suez. Polaris Institute Researchers.

Chetty, S., & Luiz, J. M. 2014. The experience of private investment in the South African water sector: The Mbombela Concession. *Development Southern Africa*, *31*(4), 563-580.

De la Harpe, J. 1998. Guide to the National Water Act. Department of Water Affairs and Forestry, South Africa.

Department of Water Affairs and Forestry. 2005. W&S Business: The roles and responsibilities of Local Government and Related Institutions. Department of Water Affairs and Forestry, South Africa.

Department of water affairs documents library.https://www.dwa.gov.za/Documents/

Department of water affairs program management system (ppms). Department of water affairs.

Https://www.dwa.gov.za/dir_ws/dpms/default.aspx

Eberhard, R. 2004. Administered Prices: *WATER.* A report for National Treasury. National Treasury, South Africa.

Eslick, P. & Harrison, J. 2004. *Lessons and Experiences from the Ethekwini Pilot Shallow Sewer Study* (No. 1146/1, p. 04). WRC Report.

Farlam, P. 2005. *Working together: assessing public-private partnerships in Africa*. South African Institute of International Affairs.

Gichuri, Wambui. 2000. "Kabuku Water Project in Kenya." Paper presented at the International Workshop on the Role of Women in Poverty Alleviation through Sustainable Irrigation, South Africa.

Gisclon, A., McCarley, S. & McNally, K. 2002. The Durban water recycling project– The vision becomes reality. In *Biennial Conference of the Water Institute of South Africa* (pp. 19-23).

Greiber T. 2009. Payments for Ecosystem Services. Legal and Institutional Frameworks. IUC, Gland, Switzerland. xvi + 296 pp.

Hall, D. & Lobina, E. 2012. Financing water and sanitation: public realities. University of Greenwich, London, UK.

Hall, D. & Lobina, E. 2004. Private and public interests in water and energy. In *Natural resources forum* (28(4), 268-277). Blackwell Publishing Ltd.

Hall, D. Bayliss, K. & Lobina, E. 2002. Water Privatization in Africa. Paper presented at Municipal Services Project Conference, Johannesburg. Public Services International Research Unit.

Hanson C., Talberth, J. & Yonavjak, L. 2011. Forests for water: exploring payments for watershed services in the US. South. World Resources Institute, Issue Brief 2, http://siteresources.worldbank.org/INTINFNETWORK/Resources/ApproachestoPrivate ParticipationWaterServices.pdf

ICC (International Capital Corporation). 2002. "Rapid Assessment in Sub-Saharan Africa on Financing Water and Sanitation through Microfinance." Report prepared for the Water and Sanitation Program- Africa.

Index of economic freedom. 2013. The Heritage Foundation and Dow Jones & Company. http://www.heritage.org/index/pdf/2013/book/index_2013.pdf

Institute of Risk Management South Africa (2015). IRMSA Risk report: South Africa risks 2015. IRMSA, Sandton, South Africa.

Khanyile, S., Wiese, M. & Robbins, G. 2008. Ilembe Case Study. The Water Dialogues.

Lesotho Highlands Development Authority (LHDA) 2015. Lesotho Highlands Project, Phase I.

Mayher, A. & Robbins, G. 2009. Maluti-a-Phofung Case Study. The Water Dialogues. Paterson, C., Mara, D., & Curtis, T. 2007. Pro-poor sanitation technologies. *Geoforum*, *38*(5), 901-907.

Meera, M. & Virjee, K. 2003. "Financing Small Water Supply and Sanitation Service Providers: Exploring the Microfinance Option in Sub-Saharan Africa". Available: http://www.wsp.org/sites/wsp.org/files/publications/329200795910_afFinancingSmallWaterSupplySa

nitationProvidersMicrofinanceSSA.pdf

MicroSave-Africa. 2001. “MicroSave-Africa: Rationale and Project Description.”

National treasury data base. www.treasury.gov.za/documents/

National Union of Metalworkers of South Africa. 2013. Numsa Special Central Committee Statement [online] http://www.cosatu.org.za/show.php?ID=7632

National Water Resource Strategy 2 (NWRS2), 2013: Water for an Equitable and Sustainable Future. Department of Water Affairs, South Africa.

National Water Resource Strategy. 2012. Department of water affairs.

OECD. 2012. Meeting the Water Reform Challenge, OECD Studies on Water, OECD Publishing. http://dx.doi.org/10.1787/9789264170001-en

OECD 2010. Innovative financing mechanisms for the water sector, Paris, France.

OECD. 2013. Financing water and sanitation in developing countries: the role of external aid. Paris, France.

Palmer Development Group. 2003. *Water PPPs in South Africa and Their Impact on the Poor.* Report prepared for the Department of Water Affairs and Forestry, Government of South Africa

Plummer, J. 2000. Favourable Policy and Forgotten Contracts: Private Sector Participation in W&S Services in Stutterheim, South Africa. *Building Municipal Capacity for Private Sector Participation Series-GHK Working Paper*,*442*(01).

Postel, S. L. & Thompson Jr, B.H. 2005. Watershed protection: Capturing the benefits of nature’s water supply services. Natural Resources Forum 29: 98- 108.

Queinnec, Y. 2006. Public Private Partnerships and Water Multinationals practices.

Ruiters C., Matji M., P., 2015. Water institutions and governance models for the funding, financing and management of water infrastructure in South Africa. Water SA 41(5):660-676

Ruiters, 2011, Funding models for the financing of water infrastructure in South Africa: a framework and comparative analysis of alternatives. MBA thesis. University of South Africa.

Ruiters, C 2013. Funding models for financing water infrastructure in South Africa: Framework and critical analysis of alternatives. Water SA 39(2).

Ruiters, G, 2002. Debt, disconnection and privatisation: the case of Fort Beaufort, Queenstown and Stutterheim. In McDonald, DA & Pape, J (Eds), Cost recovery and the crisis of service delivery in South Africa. Pretoria: HSRC Press.

Ruiters, G, 2002. Debt, disconnection and privatisation: the case of Fort Beaufort, Queenstown and Stutterheim. In McDonald, DA & Pape, J (Eds), Cost recovery and the crisis of service delivery in South Africa. Pretoria: HSRC Press.

SADC. 2012. A Case Study on Ilembe-Siza Water Concession. SADC PPP Case Studies

SAICE 2011. Infrastructure report card for South Africa. Pretoria, South Africa.

Schreiner B., Chimuti S., Gouws M., Mbanda V., 2010. Water regulation in South Africa: understanding the challenges. PEGASYS. [online] http://www.ewisa.co.za/literature/files/318_250%20Schreiner.pdf

Trans-Caledon Tunnel Authority (TCTA) (2009). The Berg Water Project (BWP), Franshoek, Cape Town. South Africa.

Transparency International, 2014. Corruption Perception Index 2014. [online] http://www.transparency.org/cpi2014/results#myAnchor2

Trémolet, S., Kolsky, P. & Perez, E., 2010. Financing on-site sanitation for the poor: a six country comparative review and analysis. (WSP Sanitation Programme Technical Paper) [online] WA DC: WSP-Water and Sanitation Program and WB-World Bank.

Tucker, J., Calow, R., Nickel, D., & Thaler, T. 2010. A comparative evaluation of public-private and public-public partnerships for urban water services in ACP countries. *Brussels: European Parliament, Directorate-General for External Policies of the Union (www. europarl. europa. eu/activities/committees/studies/download. do*.

Van Rooyen, C., De Wet, T., Marais, I. & Korth, M. 2009. Johannesburg Case Study. The Water Dialogues.

Virjee, Kameel. 2002. "Financing Small-Scale Water and Sanitation Service Providers in Kenya: Current Mechanisms and Future Options." Processed.

World Bank, 2006. Private Participation in Infrastructure Database. Available: http://ppi.worldbank.org/snapshots/country/south-africa

World Bank. 2010. Africa's infrastructure: A time for Transformation. World Bank, Washington DC.

World Bank 2012. Investing in water infrastructure: Capital, Operations and Maintenance. World Bank, Washington DC.

World Bank, 2006. Approaches to Private Participation in Water Services: A Toolkit. URL:

World Economic Forum (WEF) 2015. The Africa Competitiveness Report 2015. WEF, Davos.

WSP-AF (Water and Sanitation Program-Africa). 2001. "Kenya's Small Towns and Rural Water and Sanitation Projects: Summary Report of a Study Tour by a Delegation of Mozambican and Ugandans."

WSP-AF (Water and Sanitation Program-Africa). 2003. "Sector Finance and Resource Flows for Water Supply and Sanitation: A Pilot Application for Kenya." Draft Report.

WSP, 2014. Toolkit: Structuring Private-Sector Participation (PSP) Contracts for Small Scale Water Projects. URL: http://www.wsp.org/sites/wsp.org/files/publications/PPP- Contracting-Toolkit.pdf

Appendixes

Appendix 1: Global Case Studies of Global Venture Capital funds with Water investments

S. No	VC firm	Investee companies
1	Acumen Fund	Ecotact, Water Health International, Pharmagen Healthcare Limited
2	XPV Capital	APT Water Inc., Filter Boxx Water and Environment Corporation, Pionetics Corporation
3	Khosla Ventures	Nano H2O, Solum
4	Taprogge Watertech	Inge Water Technologies
5	Siemens Venture Capital	Inge Water Technologies
6	Dow Venture Capital	Clean Filtration Technologies, Inc., BioPetroClean Inc.
7	Baytech Venture Capital	Inge Water Technologies
8	Aqua Resources Fund Limited	Bluewater biointernational
9	SAIL Venture Partners	Micromedia Filtration, Water Health International Inc., M2 Renewables
10	South Yorkshire Investment Fund	Atranova
11	Kinrot Ventures	Ecochemtech, Hydrospin, Aquarius Spectrum, Diffusair Limited
12	Cambridge Innovation Center	Electrolytic Ozone Inc.
13	Plymoth Venture Partners	Pump Engineering Inc.
14	BDB Technologies and Hi-tech Investments	Rotec
15	MeidLinger Partners	Triton Format, Environmental Operating Solutions, Liberty Hydro
16	Avishakar Venture Management	water Life India Pvt Ltd, Saraplast
17	GE Capital	212resources
18	Gemini Israel Funds	Takadu
19	Giza Venture Capital	Takadu
20	Draper Fischer Jurvetson	Oasys Water
21	ICOS Capital	BiAqua, Dutch Rainmaker
22	Frog Capital	Ostara Nutrient Recovery Technologies Inc., Quay Technologies
23	Vantage Point Venture Partners	Ostara Nutrient Recovery Technologies Inc.
24	Peepul Capital Fund II LLC	Aqua Designs India
25	India Value Fund Advisors Pvt. Ltd	UEM Group
26	Prime Partners Asia Merchant Capital	Halosource in partnership with Eureka Forbes
27	IDFC Private Equity Fund II	Doshion Ltd
28	Sage Capital	Concord Enviro Engineers Ltd

Appendix 2: Key Private-public partnership projects in South Africa

Project Name	Private Partner/Opera tor	Public Partner	Year of Contract Adoption	Contract Duration (in years)	Region	Contract- type	Responsibility & Risk
Johannesburg Water PPP	Johannesburg Water Management (JOWAM) (Pty) Ltd	Johannesburg g Water (Pty) Ltd (JW)	2001	5 years	Gauteng	Management Contract	O&M
Maluti-a-Phofung PPP	Uzinzo Water Services (Pty) Ltd	Maluti-a- Phofung Water (Pty) Ltd	2006	5 years	Free State	Management Contract	O&M
The Stuterheim/Amahlati Municipality Project	W&S Services South Africa (WSSA)	Amahlati Municipality	1993	10 years	Eastern Cape	Lease- affermage	O&M
The Fort Beaufort/Nkonkob e Municipality Project	W&S Services South Africa (WSSA)	Nkonkobe Municipality	1995	10 years	Eastern Cape	Lease- affermage	O&M
The Queenstown/Lukh anji Municipality Concession	W&S Services South Africa (WSSA)	Lukhanji Local Municipality	1992	25 years	Eastern Cape	Concession	Capital Investment; Commercial Risk; O&M

The Ilembe-Siza Water Concession	Siza Water Company (Pty) Ltd	Ilembe District Municipality	1999	30 years	KwaZulu- Natal	Concession	Capital Investment; Commercial Risk; O&M
The Mbombela Sembcorp- Silulumanzi Concession	Sembcorp Silulumanzi (Pty) Ltd	Mbombela Local Municipality	1999	30 years	Mpumalanga	Concession	Capital Investment; Commercial Risk; O&M
The Durban Water Recycling Project	Durban Water Recycling (Pty) Ltd	eThekwini W&S Unit (EWS)	1999	20 years	KwaZulu- Natal	BOOT-type Concession	Asset ownership; Capital Investment; Commercial Risk; O&M

Appendix 3: Summary of Private Engagement in Water and Sanitation Projects in South Africa

Project	Project Date	Location	Type of PPP	Project Duration	Partners		Reference(s)
					Public Entities	Private Entities	
The Queenstown Concession/ Lukhanji Municipality Project	1992	Lukhanji Municipality, Eastern Cape	Concession	25 years	Lukhanji Local Municipality	Water and Sanitation Services South Africa (WSSA)	Blanc & Ghesquières (2006); Chandra *et al.* (2005); PDG (2003); Ruiters (2002)
The Stutterheim Affermage/ Amahlati Municipality Project	1993	Amahlati Municipality, Eastern Cape	Lease-affermage	10 years	Stutterheim Transitional Local Council	Water and Sanitation Services South Africa (WSSA)	Plummer (2000); Hall *et al.*, (2002); Burger (2005); Ruiters (2002)
Fort Beaufort Affermage/ Nkonkobe Municipality Project	1995	Nkonkobe Municipality, Eastern Cape	Lease-affermage	10 years	Nkonkobe Municipality	Water and Sanitation Services South Africa (WSSA)	Chandra *et al.* (2005); Queinnec (2006); Hall *et al.*, (2002); Ruiters (2002)
Dolphin Coast/ Ilembe-Siza Water Concession	1999	Ilembe District Municipality, KwaZulu-Natal	Concession	30 years	Ilembe District Municipality	Siza Water Company (Pty) Ltd	SADC (2012); Hall & Lobina (2004); Farlam (2005); Hall *et al.*, (2002)
The KwaZulu-Natal Project	1999	Pietermaritzburg and Durban, KwaZulu-Natal	Concession- BOT	20 years	Durban Metro Water Services (DMWS)	Vivendi Water Systems	Brocklehurst (2001); Hall *et al*. (2002)
Nelspruit/Mbombela Concession	1999	Mbombela Municipality, Mpumalanga	Concession	30 years	Mbombela Local Municipality	Sembcorp Silulumanzi (Pty) Ltd	Chetty & Luiz (2014); Bender & Gibson (2010)
The Durban Metro	1999	eThekwini	Research	-	Durban Metro	Water and	Brocklehurst (2001);

Water Services-'Waterborne Shallow Sewer System' (WSSS) Project		Municipality, KwaZulu-Natal	Partnership and Pilot Project		Water Services (DMWS)	Sanitation Services South Africa (WSSA)	Paterson *et al.* (2007); Eslick & Harrison (2004)
The Durban Water Recycling Project	1999	eThekwini Municipality, KwaZulu-Natal	Concession	20 years	eThekwini Water and Sanitation Unit (EWS)	Durban Water Recycling (Pty) Ltd	Gisclon *et al*. (2002)
Johannesburg Water PPP	2001	Johannesburg, Gauteng	Management Contract	5 years	Johannesburg Water (Pty) Ltd (JW)	Johannesburg Water Management (JOWAM) (Pty) Ltd	van Rooyen *et al*. (2009); Blanc & Ghesquières (2006)
Maluti-a-Phofung Project	2006	Maluti-a- Phofung Local Municipality, Free State	Management Contract (*Former Public-Public Partnership since 2000, transitioned to a PPP in 2006*)	6 years	Maluti-a- Phofung Water (Pty) Ltd	Uzinzo Water Services (Pty) Ltd	Mayher et al. (2009); Tucker et al. (2010)

Appendix 4: Focal Sectors, Responsibilities, and Beneficiaries of Private Sector Partners

Private Operator	Focal Elements	Responsibilities	Services Beneficiaries
WSSA *Queenstown Concession/ Lukhanji Municipality Project*	Water Sanitation	• Operations, maintenance/rehabilitation, management of existing water and sanitation systems and infrastructure	Queenstown, Ezibaleni, and Mlungisi residents
WSSA *Stutterheim Affermage/ Amahlati Municipality Project*	Water Sanitation Wastewater	• Operations and management of water and waste water treatment works	Stutterheim and Mlungisi residents
WSSA *Fort Beaufort Affermage/ Nkonkobe Municipality Project*	Water Wastewater	• Operations and management of water and waste water treatment works	Alice, Middledrift, Fort Beaufort, and Seymour residents
Siza Water *Dolphin Coast/ Ilembe-Siza Water Concession*	Water Sanitation	• Operations, maintenance/rehabilitation, management of existing water and sanitation systems and infrastructure • Raw water supply procurement	Ilembe Municipality residents and commercial users
Vivendi Water Systems *The KwaZulu-Natal Project*	Water Wastewater	• Water resource management and maintenance • Wastewater treatment	Pietermaritzburg and Durban residents
Sembcorp Silulumanzi (Pty) Ltd *Nelspruit/Mbombela Concession*	Water Sanitation	• Operations, maintenance/rehabilitation, management of existing water and sanitation systems and infrastructure • Raw water supply procurement	Nelspruit, Nsikazi townships (Kanyamazane, Tekwane, Msongwaba, Matsulu), and Peri-urban area (Zwelisha, Mpakeni, Luphisi) residents

WSSA *The Durban Metro Water Services-'Waterborne Shallow Sewer System' (WSSS) Project*	Sanitation	• Sanitation infrastructure provision	Briardale and Emmaus residents
Durban Water Recycling (Pty) Ltd *The Durban Water Recycling Project*	Water Wastewater	• Water resource management and maintenance • Wastewater treatment • Finance, design, construction and operation of a tertiary water treatment plant	South Durban peri-urban residents and commercial clients Mondi and SAPREF
Johannesburg Water Management (JOWAM) (Pty) Ltd *Johannesburg Water PPP*	Water Sanitation	• Management functions and capacity enhancement and support	Johannesburg Water (Pty) Ltd
Uzinzo Water Services (Pty) Ltd *Maluti-a-Phofung Project*	Water Sanitation	• Management functions and capacity enhancement and support	Maluti-a-Phofung Water (Pty) Ltd

Country	Municipality/Utility (Population)	Management Framework	Recent Financing	Rationale for case study
Asia & Near East				
Egypt	Alexandria/ Alexandria Water Company (4,500,000)	Autonomous public Company	Loans from Egypt's National Investment Bank	On path to transformation through major changes in management structure, combined with performance improvement measures
India	Municipality of Alandur Underground Sewerage Project (165,000)	Non-autonomous department of municipal government	Financing of new sewer and wastewater treatment system through package of grants/subsidies, loans, and financing by build-own transfer (BOT) operator	Success in executing entirely new sewage system based on a package of customer charges, private sector investment, and public loans and subsidies. Good example of financing with credit enhancements.
Philippines	Metro Manila East/Manila Water Company Inc. (3,900,000)	Concession	Financing by concessionaire, Recent initial public offering raised substantial capital	Success in transforming a poorly performing public utility to a well-functioning enterprise.
Europe & Eurasia				
Hungary	Debrecen/ Debrecen Water Works Company (220,000)	Autonomous publicly owned water company	Commercial loans and public sector grants and subsidies	Transformation from poorly-performing utility to bankable utility during time of national transition from a centrally planned to a market economy.
Latin America & Caribbean				
Colombia	Cartagena/ Aguas de Cartagena (ACUCAR) (900,000)	Autonomous utility, managed by private partner through management contract	Private financing through mixed capital company, ACUACAR, owned jointly by District of Cartagena, private water company, and other private shareholders	Dramatic turnaround since municipal utility was liquidated and replaced in 1993, due to serious performance problems, and a management contract tendered on competitive basis

Mexico	Tlalnepantla de Baz/ OPDM (862,000)	Autonomous publicly owned company	Bonds issued by private trust, with partial guarantee from International Finance Corporation, letter of credit from a private financial institution property tax pledge from municipality, and water fee pledge from OPDM	Identified as a financing success story by IFC. Good example of financing through limited trust financing backed by public guarantee.

Appendix 5: Case study 1 and 2

Case Study 1: Microfinance for water and sanitation in India (Bareng 2009)

Project context	Financing approach
A micro-lending program carried out in and around the city of Tiruchirappalli (Trichy). Gramalaya, a Trichy based water and sanitation focused non--government organization (NGO), implemented this program in partnership with Water Partners. • Mostly latrines, toilets, bathing facilities, water connections, and stand posts • 2,190 women's SHGs with over 32,000 members currently active • 2004 - current	The program involved the construction of water and sanitation facilities by mobilizing a network of women's selfhelp groups (SHGs) to utilize a revolving loan fund. Software support for sanitation promotion and hygiene education • Facilitated access to credit via sanitation revolving funds - As of December 2007, Gramalaya had disbursed nearly $200,000 in loans directly, with an average loan size of $91 per borrower. Loans were for 24 months with a 12 or 18 percent interest rate • Subsidized interest rates on loans for hardware construction (accounting for about 3% of hardware costs) • Public funds = 7% of total costs of sanitation adoption
Outcomes of the intervention	
• A total of 667 loans have been supplied for water improvements, and 1,496 have been executed for sanitation improvements, benefiting over 10,000 people. • Over the course of its loan program, Gramalaya has realized an overall average repayment rate of 82%. While initial repayment rates under the program were quite low, under the most recent year of its loan program, Gramalaya's repayment rates have averaged nearly 100%. This significant increase in repayment rates is attributed in part to the microfinance training Gramalaya received to further develop their loan program management capacity. • These startup costs, here experienced as both low initial repayment rates and capacity building activities, associated with new product development will be important to keep in mind for other organizations attempting to replicate such a program. Program activities have considerably increased the pool of loan capital available to poor women and their families for water and sanitation improvements in the program region. Gramalaya found a greater demand for its loan product than it could meet through its available loan capital.	

- In response, they facilitated over $390,000 in additional loans from commercial banks (43%), internal SHG savings (41%), and government subsidies (16%) for SHG members to install new water and sanitation improvements. This capital enabled the program to reach an additional 24,000 people and marked one of the most significant achievements of the program.

- Commercial loans had not been previously available to women in these communities for water and sanitation improvements. One SHG member who lives in Melandulavur reported in an interview with Water Partners staff, "No one has approached the bank directly without a SHG for a loan because the bank is not in practice of giving those loans."

- Furthermore, the program's success has drawn the attention of local financing institutions. Several commercial banks and a development bank are interested in providing significant additional capital for Gramalaya's program. Gramalaya plans to leverage its revolving loan fund as a loan guarantee to obtain the additional capital from commercial loan sources. The banks have discussed aggregated commitments as high as $2 million dollars in 2008, which would potentially serve over 60,000 people with water and sanitation improvements.

Case Study 2: Financing on-site sanitation for the poor in six countries (Kolsky 2010

Project context (level of service, population that adopted sanitation during the project, study period)	**Financing approach**
Vietnam Sanitation Revolving Fund (SRF) - urban areas • Mostly bathrooms and septic tanks • 194,000 people • 2001 to 2008	Software support for sanitation promotion and hygiene education • Facilitated access to credit via sanitation revolving funds • Subsidized interest rates on loans for hardware construction (accounting for about 3% of hardware costs) • Public funds = 7% of total costs of sanitation adoption
Maharashtra (India) Total Sanitation Campaign (TSC) using CLTS approaches -rural areas • Improved latrines • 21,200,000 people • July 2000 to November 2008	Software support for community mobilization, including outcome-based financial rewards to villages reaching Open Defecation Free (ODF) status to be spent on sanitation investments • Outcome-based hardware subsidies for below-poverty-line households (covering about 22% of hardware costs for beneficiaries) • Access to credit in some districts only • Public funds = 9% of total costs of sanitation adoption
Bangladesh DISHARI (based on Community Led Total Sanitation) - rural areas • Basic latrines • 1,631,000 people • 2004 to 2008	Software support for community mobilization, sanitation promotion, and local government strengthening, including outcome-based financial rewards to villages that are 100% sanitized. Rewards come with no strings attached and do not necessarily need to be spent on sanitation. • Up-front in-kind hardware subsidies targeted to the poorest (covering about 42% of hardware costs for beneficiaries) • Public funds = 31% of total costs of sanitation adoption
Mozambique Improved Latrines Program (PLM) - urban areas • Improved latrines • 1,888,000 people • 1980 to 2007	Software support for sanitation promotion and establishment of local workshops building slabs and latrines • Output-based subsidies to local sanitation providers for each slab or latrine sold (intended to cover 40% to 60% of hardware costs) • Public funds = 58 % of total costs of sanitation adoption (estimated)
Ecuador PRAGUAS - rural areas • Sanitation units (toilet, septic tank, sink, shower) • 143,000 people • 2001 to 2006	Software support to strengthen municipalities to work in sanitation, for technical designs and monitoring • Up-front fixed hardware subsidies (covering about 60% of hardware costs) provided to communities • Public funds = 85% of total costs of sanitation adoption

Senegal PAQPUD - urban areas • Range of options: improved latrines to septic tanks • 411,000 people • 2002 to 2005 (not including extensions via GPOBA)	• Software support for sanitation promotion, including hygiene promotion and education, community organization, technical support • Output-based hardware subsidies to local sanitation providers for each sanitation solution built (covering about 75% of hardware costs) • Limited schemes to facilitate access to credit • Public funds = 89% of total costs of sanitation adoption


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