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FULL COLOUR THINKING

# Evaluating Commercialisation Models in the Water Supply Sector: A Comparative Case Analysis of LWSC, Aguas Andinas and Johannesburg Water (2001-2014)

University of Cape Town

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## ABSTRACT

Most people in developing countries lack access to clean water, which leads to water-related diseases. The water supply challenges in many developing countries have persisted despite the water sector receiving considerable amount of support from the international organisations and cooperating partners. In this study I analysed different water reforms undertaken in developing market economies with a specific focus on Chile, South Africa and Zambia. The main research question I sought to address is whether commercialisation has proportionately improved water supply delivery in the aforementioned countries. The research employs a qualitative comparative case study approach of three Commercial Utilities (CUs), namely Lusaka Water and Sewerage Company (LWSC), Johannesburg Water and Aguas Andinas. Performance improvement was assessed using selected indicators under four broad criteria; accessibility, reliability, affordability and profitability for the period 2001 to 2014.

The significant finding is that all CUs with different reform models had improved performance after commercialisation which is attributed to adoption of market principles and good corporate practices. The research established that private service delivery with strong state involvement outperformed public service delivery in terms of efficiency, accessibility, reliability and affordability. Privatised Aguas Andinas exhibited the highest level of performance in terms of accessibility, reliability, profitability and affordability. Johannesburg Water performed better than LWSC in terms of accessibility and reliability while LWSC performed better than Johannesburg Water in terms of affordability and profitability across the period 2001 to 2014. LWSC improved service in terms of accessibility, reliability, affordability and operational efficiency after corporatisation.

The main conclusion is that even though Aguas Andinas has exhibited the highest level of performance, the strong performance is attributed to strong state involvement, tariff and subside systems, legal and institutional systems, management skills, sound corporate governance, customer orientation and innovation. Therefore, all the three models; privatisation, corporatisation and management contract, are suitable models for developing economies provided the state play its role and CUs adopt best practices.

## TABLE OF CONTENTS

PLAGIARISM DECLARATION ..... i

ABSTRACT ..... ii

TABLE OF CONTENTS ..... iii

LIST OF TABLES AND FIGURES ..... vii

ACRONYMS AND ABBREVIATIONS ..... viii

ACKNOWLEDGEMENTS ..... x

Chapter One: Contextual Overview ..... 1

1.0 Introduction ..... 1

1.1 Background ..... 2

1.1.1 Public Sector Reforms ..... 2

1.1.2 Water Sector Reform Policies ..... 4

1.2 Problem definition ..... 4

1.3 The Research Questions and Scope ..... 6

1.4 Purpose and Significance of the study ..... 7

1.5 Research limitations and assumptions ..... 8

1.6 Research ethics ..... 8

1.7 Synopsis of the rest of the chapters ..... 8

Chapter Two: Literature Review ..... 10

2.0 Introduction ..... 10

2.1 Commercialisation ..... 10

2.1.1 What triggered commercialisation of water sector? ..... 10
2.1.2 Privatisation ..... 11
2.1.3 Corporatisation ..... 13
2.1.4 Management contracts ..... 14
2.2 Empirical Literature ..... 15
2.3 Global Debate on Water Governance ..... 16
2.4 Good practices. ..... 18
2.4.1 Sound corporate governance ..... 18
2.4.2 Customer orientation ..... 19
2.5 Customer satisfaction ..... 20
2.6 Key Performance Indicators of water supply service improvement ..... 20
2.6.1 Accessibility Indicators ..... 21
2.6.2 Service Reliability Indicators ..... 23
2.6.3 Profitability and Affordability Indicators ..... 24
2.6.4 Efficiency Indicators ..... 26
2.7 Study period of cover ..... 29
2.8 Conclusion ..... 29
Chapter three: Brief History Zambian, Chile and South African Water reforms ..... 31
3.0 Zambian Water Reforms ..... 31
3.0.1 Regulatory Framework, National Water Supply and Sanitation Council ..... 33
3.1 Lusaka Water and Sewerage Company ..... 34
3.2 South African Water reforms ..... 36
3.2.1 The EGOLI 2002 Plan ..... 37

3.2.2 Johannesburg Water and JOWAM (Management Contract) ..... 37
3.2.3 Regulatory Framework and Tariff ..... 39
3.3 History of Reforms to the Chilean Water Sector, Aguas Andinas ..... 39
3.3.1 EMOS, Santiago's Public Water Company ..... 40
3.3.2 Regulation and Tariff ..... 40
Chapter Four: Research methodology ..... 42
4.0 Research approach ..... 42
4.1 Research design ..... 42
4.2 Sampling ..... 43
4.3 Data collection technique ..... 43
4.4 Data analysis ..... 44
Chapter Five: Research Findings, Analysis and Discussion ..... 45
5.0 Introduction ..... 45
5.1 Accessibility indicators ..... 45
5.1.1 Number of connections ..... 45
5.1.2 Water service coverage ..... 46
5.1.3 Sanitation coverage ..... 48
5.2 Service reliability indicators ..... 49
5.2.1 Water production ..... 49
5.2.2 Hours of supply ..... 51
5.2.3 Water quality compliance ..... 52
5.3 Affordability and Profitability indicators ..... 53
5.3.1 Total Revenue per service population/GNI ..... 54

5.3.2 Unit Profit ..... 55
5.3.3 Return on Capital Employed (ROCE) ..... 57
5.4 Efficiency indicators ..... 59
5.4.1 Non Revenue Water (NRW) ..... 59
5.4.2 Revenue Collection Efficiency. ..... 63
5.4.3 Operating Cost Coverage ..... 65
5.4.4 Staff per 1000 water connections. ..... 67
5.5 Good practices Adopted by Aguas Andinas of Chile ..... 68
5.5.1 Corporate Governance ..... 68
5.5.2 Customer Orientation ..... 69
5.6 Good practices by Johannesburg Water of South Africa ..... 69
5.6.1 Corporate governance ..... 69
5.6.2 Customer Orientation ..... 70
5.7 Good practices by LWSC ..... 70
5.7.1 Corporate governance ..... 70
5.7.2 Customer orientation ..... 70
5.8 Limitation ..... 71
Chapter Six: Summary of the Findings and Conclusion ..... 72
6.0 Summary of the Findings ..... 72
REFERENCE ..... 78
APENDICES ..... 83
Appendix 1: Summary of performance Status (extract) ..... 84

## LIST OF TABLES AND FIGURES

Table 2-1: Performance Indicators ..... 21

Table 3-1: Water sector reform phases ..... 32

Figure 3-2: Institution in Zambia's Water Sector after commercialisation ..... 34

Figure 3-2: Zambia's Commercial Utility Business Model ..... 35

Figure 5-1: Number of water connection ..... 45

Figure 5-2: Water Supply Coverage ..... 47

Figure 5-3: Sanitation Coverage ..... 48

Figure 5-4: Water Production in Litres per person per day ..... 50

Figure 5-5: Hours of Water Supply per day ..... 51

Figure 5-6: Water Quality Compliance ..... 52

Figure 5-7: Total Revenue per service population/GNI ..... 54

Figure 5-8: Unit Profit per cubic metre of water (US$/m3) ..... 55

Figure 5-9: Return on Capital Employed ..... 57

Figure 5-10: Non-Revenue Water (%) ..... 59

Figure 5-11: NRW (m3/Km/day) ..... 61

Figure 5-12: NRW (m3/connection/day) ..... 62

Figure 5-13: Collection Efficiency ..... 63

Figure 5-14: Collection days ..... 64

Figure 5-15: Operating Cost Coverage ..... 66

Figure 5-16: Staff per 1000 connections ..... 67

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CSO | Central Statistics Office |
| CU | Commercial Utility |
| DWA | Development of Water Affairs |
| DFID | Department of Finance for International Development |
| DTF | Devolution Trust Fund |
| GNI | Gross Nation Income |
| GTZ | Deutsche Gesellschaft für Technische Zusammenarbeit |
| IMF | International Monitoring Fund |
| JW | Johannesburg Water |
| LWSC | Lusaka Water and Sewerage Company |
| MDGs | Millennium Development Goals |
| NGO | Non-Governmental Organization |
| NPM | New Public Management |
| NRW | Non –Revenue Water |
| NWASCO | National Water and Sanitation Council |

| | |
|---|---|
| OECD | Organisation for Economic Cooperation and Development |
| PPP | Public –Private Partnership |
| PSDRP | Private Sector Development Reform Program |
| SDGs | Sustainable Development Goals |
| UNDP | United Nations Development Programme |
| WHO | World Health Organisation |
| WSA | Water Service Act |
| WSP | Water Service Provider |
| WSS | Water Supply Services |

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# Chapter One: Contextual Overview

## 1.0 Introduction

Access to water is intricately linked to public health, as such, many governments have historically owned and managed this sector in the public interest. However, water utilities in the developing world are struggling to meet the accessibility and reliability (quality) standards to water because of old infrastructure and population growth. To address this perceived failure of clean water supply delivery, international lending institutions and many governments in developing world began pushing for a market approach to managing water utilities as a solution to improve efficiency and sustainability of the water supply service (Baer, 2014). This was part of the Structural Adjustment Programmes (SAPs) aimed at liberalizing the economies of developing countries. This was also a reflection of frustration by governments and multinational institutions for poor performance of water utilities. The World Bank, in particular, advocated for the application of market principles to the water sector, including corporatizing and privatising water utilities, as the solution to high inefficiencies in water utilities (World Bank 1993, 2004). This research, therefore, contributes to the global policy debate on different types of water reform policies and their impact on commercial utilities' service delivery by providing a comparative analysis of commercial utility models being implemented in developing countries.

Lusaka Water and Sewerage Company (LWSC) of Zambia, a corporatised publicly owned CU, is used as a proxy for Zambian water utilities and compared to Aguas Andinas of Chile, a privatised CU and Johannesburg Water, also a corporatised but strategically used private operator (Management Contract) at the start of corporatisation. The case of water privatisation in Chile provides a rare example of full privatisation in a monopoly service sector that has achieved near universal access in urban areas. Johannesburg Water contracted private operators from 2001 to 2006. This was aimed at leveraging the expertise of an experienced private operator for a few years in order to establish a viable, corporatised public water utility and transfer the skills to Johannesburg Water members of staff (Marin, Mas, & Palmer,2009). This chapter sets the context for the research and the background, as well as the problem definition,

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research questions and scope, purpose and significance of the study, research limitations, assumptions and research ethics.

## 1.1 Background

Inadequate access to water is part of the cycle of poverty that affects many developing countries. In Africa, water-related diseases kill more people than all forms of violence combined including war, with between 14,000 and 30,000 people dying daily from consuming dirty water (Gleick, 2000: 1). Globally, almost 768 million people lack clean drinking water; 2.7 billion people have no access to hygienic sanitation facilities; 1.2 billion lack any sanitation facilities at all (World Bank, 2014). For Zambia with a population of about 15.02 million people in 2014, about 5.4 million people (36 percent) are without access to clean water and 7.5 million people (50 percent) are without access to sanitation facilities (UNICEF, 2014).

The growing competition for water resources caused by land use changes, climate change and growing population will further worsen the water challenges. This water crisis is not caused by lack of physical availability of water, but the poor governance systems in many developing countries. According to UNDP (2015), this crisis is partly caused by governance and thus governance reform must be a key pillar of any strategic approach to addressing the crisis.

### 1.1.1 Public Sector Reforms

Since the end of World War II, water supply service has been primarily executed by governments in both developed and developing countries through public utilities (also known as State Owned Enterprises) (Dovi, 2007:7). In the 1980s, water services deteriorated rapidly because of governments' failure to provide the necessary funds for investment, high inefficiency, non-cost reflective tariffs and an unprecedented growth in demand caused by rapid population growth and urbanisation (Richards, 2008). Most developing countries struggled to manage the water sector due to the high investment and maintenance costs involved (Baer, 2014). The under investment and lack of maintenance persisted because most governments had limited financial resources and could not obtain loans from multilateral organisations who had imposed reforms as conditionality for loans and debt service (Ukiwo, 2007).

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The poor water service provision and UN Water Decade of the 1980s triggered the new thinking on the commercialisation. The global debates on best practices and targets for water service provision intensified in 1990s, which resulted in pressure on governments to improved efficiency. According to Richards (2008) the most powerful impetus for water commercialisation came from external factors such as: public health crises arising from poor water and sanitation services; droughts because of climate change; changes in government giving the necessary push to initiate sector reforms; new economic reform policies or the liberalisation and privatisation of public utilities created the enabling framework for reforms in the water sector. The multilateral organisations, principally the World Bank and the International Monetary Fund (IMF), also influenced reforms by imposing reforms as conditionality for loans and debt service (Ukiwo, 2007). This created pressure on governments who needed funds to meet investment and maintenance requirements of the water sector. To improve public service delivery and meet multilateral organisations' conditionality most governments embarked on economic reforms, and the most common being privatisation.

Reforms are a product of both desirable and feasible ideas or models of change that are designed through complex multi-leveled networks and applied at varied speeds and extents across sectors and countries (Pollitt and Bouckaert, 2002). The speed and extend of reform implementation reflected the governments' conviction and circumstances. The public sector delivery processes and structures have faced distinct paradigm shifts as "post-bureaucratic", "managerialism", "new public management", "market-based public administration", "entrepreneurial government" and "new public policy" (Lynn, 1998; Manning, 2001). These neoliberal ideologies form part of the models of change that were advanced as an alternative to the classical Weberian public sector decision making model, since the 1940s (Lane, 2000). These paradigm shifts occurred first in the western countries with the exception of Germany, Greece, Japan and Spain; and later by the early 21st century, in Africa, South America and South Asia (Hood, 1995; Ferlie & Steane, 2002). Decentralisation of functions was one of the earliest structural adjustment programmes in many developing countries. The main idea behind reforms was to introduce market mechanism into operational decision making so as to improve efficiency in service delivery.

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### 1.1.2 Water Sector Reform Policies

Different neo-liberalistic policies were proposed and advanced variedly across water and sanitation sectors depending on the circumstances (Schwartz, 2008). Some embarked on reforms to sought greater efficiency, others wanted fiscal revenue, and most utilities were sold because governments lacked funds to invest and many acted under pressure from international lenders.

The first neo-liberalistic policy was focused on decentralised decision making and service provision. This was seen as a way to devolve resources, increase systems' flexibility and grow a customer-centered service. Thereafter, Privatisation among other approaches was advanced in attempts to boost innovation, technical capacities and fiscal austerity in the water sector. In this research, I have used Aguas Andinas to represent a fully privatised CU with strong independent sector regulator. Then, there was a move to corporatise state-owned utilities with a preference for lean and autonomous organisational forms that were legally separated from the state and managed by visible managers. In this research, LWSC represents a corporatised CU. Usually, corporatisation allows Private Public Partnerships (PPPs). A corporatised CU could subcontract some functions like bill delivery and revenue collection or contract a private operator on performance-based incentive contract through management contract. Management contract attempts to employ mutually voluntary, incentive-based and time-bound contracts. Management contracts are used to inject competition and attract private participation through bids or benchmarking and assure efficient, transparent and accountable service delivery. I have used Johannesburg Water to represent a corporatised CU under management contract. All these reform policies need independent regulation or regulation by contracts to protect both customers and service providers (Mbuvi, 2012).

## 1.2 Problem definition

Access to clean water remain problematic in many developing countries. Even people who have access to water supply and sanitation services often have to cope with poor service provision. This brings into question the efficacy of water provision models. Inadequate water supply is regarded as a constraint to inclusive economic growth and development. Majority of poor



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people in developing countries lack access to clean water and good sanitation, which leads to water-related diseases and loss of time on economic activities. Women and children often spend time drawing water for household use, and time is taken away from economic activities and school. These communities are often susceptible to water-borne diseases, with time and money spent caring for patients. The ill health suffered also limits the productive capacity of individuals. The disease burden limits these residents' potential economic freedom (MCAZ, 2013). The United Nations estimated that Sub-Saharan Africa alone loses 40 billion hours per year collecting water; that's the same as a whole year's worth of labour by France's entire workforce (UN, 2015). It is for this reason that the persistence in water supply challenge in most developing countries was chosen as the areas of research. According to NWASCO (2016), Zambia did not meet the Millennium Development Goal 7: Target 7C (By 2015, halve the proportion of people without sustainable access to safe drinking water and basic sanitation) and has a huge task ahead for it to attain the Sustainable Development Goals (SDG) target 6.1 "by 2030, achieve universal and equitable access to safe and affordable drinking water for all". The problem is that despite successive global declarations and efforts, the situation remains appalling with millions suffering from lack of access to clean water. Research studies carried out for Zambian's water sector reforms by Funga (2000) and Kabinga (2012) came to the same conclusion that there has been marginal improvement in water service coverage even after corporatisation. Water accessibility challenge has persisted in Zambia as evidenced by the failure to attain MDG target 7C in 2015.

Zambia continues to face water supply challenges and a number of Zambians do not have access to clean water despite this sector receiving considerable amount of support from the international organisations and cooperating partners such as World Bank, European Union, Japan International Cooperation Agency (JICA), African Development Bank and Millennium Challenge Corporation among others. This research seeks to assess different modes of commercialisation and their influence on CUs' performance by comparing pre- and post-commercialisation performance of LWSC, Aguas Andinas and Johannesburg Water. These are commercialised water utilities in developing economies.

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## 1.3 The Research Questions and Scope

The overarching research question in this study is "how have different commercialised utility models implemented in developing economies improved overall water supply delivery?" In answering this research question, I asked the following important three sub-questions:

1. How has Zambia's Lusaka Water and Sewage Company performed pre- and post-commercialisation?
2. How does Zambia's performance compare with other modes of commercialisation implemented in developing market economies?
3. How should water utilities be managed in developing market economies?

Sub-questions one and two use selected indicators grouped into accessibility, reliability, efficiency, profitability and affordability. Question three looks at the implementation processes of the three reform models and best practices adopted by the three commercialised CUs under study.

This study is limited to commercialised utilities in developing economies, and consequently, unable to speak authoritative to water supply utilities in other contexts. Reform models are limited to full privatisation, corporatisation and management contract. Even if all the three CUs provide both water supply and sanitation services, the research is mainly focused on water supply service. Developing nations have been selected because that is where the majority of people who lack access to water services are found (WHO & UNICEF, 2010). Developing countries also have the largest proportion of the population living in extreme poverty. Over 50 percent of the population lives on less than US$1.25 per day (UN 2014). This study scope is at a policy and strategic level on the general principles underlying commercialisation and the application of the market principles to water sector.

LWSC is used as a proxy for water utilities in Zambia and is compared to two CUs operating in different developing nations. LWSC is the biggest water CUs in Zambia and operate in the capital city of Zambia and was ranked the 2014 best CU in Zambia. Besides being voted among the best four water utilities in the developing world by the Highly Commended Water Leaders Awards at the 2014 Global Water Summit in Paris (World Water Council, 2014), Lusaka city



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economic activities and diversity makes LWSC a better proxy to represent Zambian CUs for comparison with other CUs in developing nations. The other comparable case studies are Chilean fully privatised Aguas Andinas and South African corporatised Johannesburg Water which was under management contract for five years. The reform models and performance of LWSC, Aguas Andinas and Johannesburg Water before (2001) and after commercialisation (2002 to 2014) are compared using selected internationally accepted benchmarking indicators. Additionally, the study focus on corporate governance and customer orientation best practices.

### 1.4 Purpose and Significance of the study

The study aims to promote some common understanding of the commercialisation of water models and provide guidance on the implementation of water reforms and best practices for Water CUs. The study will shed more light on the water services governance in developing countries. The research will contribute to existing literature on what model of commercialisation works best for developing economies. The Zambian water model is compared to two different commercialisation models. The Chilean Aguas Andinas is considered to be a water privatisation success story in Latin America because of achieving near universal coverage to safe drinking water and sanitation in urban areas under a fully private system. The city of Johannesburg established a well-performing public water utility, Johannesburg water, by strategically contracting experienced private operator. The research findings would contribute to the empirical literature analysing the consequences of different institutional arrangements. More lessons would be unearthed on the importance of best practices in terms of corporate governance and customer orientation. Furthermore, the study contributes to existing knowledge on water reforms and amplifies on the importance of adopting best practices for CUs to realise the full benefits of commercialisation. The existing literature in developing nations can be said to have analytical and theoretical deficits on the best reform model for developing nations. Therefore, the findings would theoretically contribute to global debate on water governance and help CUs, governments and other stakeholders to implement suitable commercialisation models and adopting best practices for performance improvement in water service delivery.

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## 1.5 Research limitations and assumptions

The research is limited to only three types of commercialised utility models; privatisation, corporatisation and management contract. The factors that affect performance are many but this research assumed that different commercialised models influence performance differently. It is also assumed that all the three CUs were fully commercialised in 2001, even if the process for corporatising LWSC started in 1987. For the purpose of this research, year 2001 represents pre-commercialisation performance. It is further assumed that all the three CUs face similar operational challenges and that the only difference is the type of commercialisation model.

## 1.6 Research ethics

Research ethics of confidentiality and integrity as prescribed by the University of Cape Town, Graduate School of Business's code of research ethics (UCT, 2015) were observed. This ensured that the research was done with respect, consideration, transparency and academic professionalism.

## 1.7 Synopsis of the rest of the chapters

The research is divided into six (6) chapters. Chapter 2 is the literature review, which will provide the theoretical debates surrounding different modes of water commercialisation. Theoretical review includes definition, what triggered commercialisation and different types of commercialisation models. There is an empirical literature which reviews similar studies in different jurisdictions and in particular studies done on the commercialisation of the water sector and global debate of public versus private provision of water. The chapter also reviews the best practices in water service delivery and concludes with selected performance indicators for benchmarking.

Chapter 3 provides the evolution of the water reforms in Zambia, Chile and South Africa. In particular, it analyses the changes that happened in the water sector and provide useful background for understanding the different reform models implemented in Zambia, Chile and South Africa. Chapter 4 describes the approach and strategy (methodology) used in this study. The sampling, data collection methods used together with data sources, data analysis and



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research criteria are also discussed in this chapter. Chapter 5 covers research findings, analysis and discussion. Research findings are discussed in the context of what other similar researches quoted in literature review found. Chapter 6 is a discussion of the research conclusions with some recommendations of potential areas for future research.

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# Chapter Two: Literature Review

## 2.0 Introduction

This chapter reviews relevant literature on different commercialisation models and experiences. It begins by presenting a brief overview of commercialisation and different models of commercialisation. The chapter proceeds to discuss empirical literature on commercialisation of water supply service in developing nations. The chapter focuses on commercialisation of water services as a dominance neo-liberal models of public service delivery in water sector. It also discusses the ongoing debate on public versus private water management, human right versus water as an economic good and concludes with the discussion of key performance indicators and best practices for improved water service delivery.

## 2.1 Commercialisation

Commercialisation is a process by which market mechanisms and market practices are introduced into the operational decision making of a service (McDonald and Ruiters, 2005:17). It is often used to refer to a process of applying private sector or market principles to an organisation, state- or private-owned (Thynne, 2003; Queensland Treasury, 1994; Shirely, 1999; McDonald and Ruiters, 2005).

### 2.1.1 What triggered commercialisation of water sector?

There are many factors that prompted the commercialisation of water and sanitation services. For Zambian, the provision of water and sanitation services had been a responsibility of local councils in both urban and rural areas. By the mid-1980s, most of these councils had become insolvent (Chola, 2003), making it extremely difficult for most of them to meet the growing demand for water and sanitation services arising from the rapidly growing population. The growing population without a corresponding expansion or upgrading of infrastructure and inability to attract skilled personnel because of poor working conditions resulted in the deterioration of water and sanitation services in Zambia (GTZ, 2004).

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Commercialisation of basic services was also been driven by fiscal pressure on state resources which resulted in decline in funding the sector (Yarrow, 1999). A leading example is the massive privatisation of public service utilities such as water, electricity, gas, bus services, coal and oil in Britain to lessen government's burden of growing public expenditure (Harvey, 2005; Foster, 2005).

Low investment in water and sanitation service in many developing countries triggered commercialisation. The water tariffs were not cost reflective making the sector unattractive to private investment. Research by GTZ (2004) revealed that even countries that have made progress in attracting private investors in the water sector, private investment is relatively lower than public. Governments were also forced to introduce market reforms (Structural Adjustment Programmes [SAPs]) as a condition for accessing aid (Simutanyi, 1996; White, 1997; Cocq, 2005). In Tanzania, for instance, "privatisation of the poorly performing Dar es Salaam Water Supply and Sewerage Authority (DAWASA) was one of the preconditions given for Tanzania to qualify for the Highly Indebted Poor Countries (HIPC) initiative of the World Bank and the IMF" (Bayliss, 2003).

The decentralisation process which most governments in developing economies embarked on in the 1990s and the recognition of water as an economic good were also other triggers of commercialisation. The Dublin Statement (1992, see Principle No.4) and Agenda 21 declared water as an economic good, whose value should be realised through correct pricing. This is supported by Zambian National Water Policy of 1994 which recognises the social and cultural values of water but emphasises treating water as an economic good.

In this research, commercialisation is any process of introducing market based mechanisms approach in the running of the CU and could take the form of privatisation, corporatisation and management contract.

### 2.1.2 Privatisation

Privatisation is the process of transferring ownership, property or business from the public sector (system run by government) to the private sector. The government ceases to be the owner of the entity or business. Privatisation comes in different forms, it could be removal of barrier



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to entries preventing private operators or sale of public assets. The notion that public owned organisations are inefficient resulted in privatisation to help raise efficiency (Boycko et al, 1996). The World Bank advocated for the application of market approach to the water governance as a solution to poor management of water and sanitation services (World Bank 1993, 2004). The market approach calls for treating water as a private, economic good and introducing private sector participation into previously public water sectors through concessions between governments and private water operators (Gleick 2002). Advocates for the market approach argue that water should be treated as a fully private and tradable commodity, and that the economic value of water is equal to its market price, while opponents argue that privatisation violates the social objective of water provision, particularly, the human right to water.

There are different privatisation models in the water sector. These include subcontracting a function like bill delivery, or sale of some shares in a public company or the transferring of the entire water business to a private company (Baer, 2014). The term "private sector participation" is a broader term that describes any contract or agreement between a public agency and a non-public institution, such as a multinational private company. Most water contracts, such as concessions and leases, fall into the category of private sector participation but do not necessarily qualify as full privatisation(Baer, 2014). Chile is known as a water privatisation success story due to its high coverage of drinking water and sanitation under a fully privatised system, Hence, the inclusion of Aguas Andinas of Chile in this research. Despite the fact that the majority of water utilities in the world are still under public service provision, water privatisation has substantially increased the number of people served by private operators in the last two decades. Since the 1990s, there has been an 800 percent increase in water users in Africa, Asia, and Latin America purchasing water from European-owned water firms (Goldman 2007: 788). Several water multinational companies dominate this shift in ownership of water utilities. The French companies Suez and Vivendi (now Veolia) control approximately 70 percent of the private water markets (Goldman 2007:790). The Chilean Aguas Andinas is an example of a successful water privatised utility.

Water privatisation proved to be an unpopular policy in much of the developing world when it failed to deliver on promises of improved water access. Private companies often disconnect



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water supply for non-payment of water bills and push for high tariff for profit maximization. This profit motivate conflicts with the accessibility because availability at high tariff does not entail accessibility. This has led to the Suez, French Water Company withdrawing from its contracts in Latin America, including the premature cancellation of contracts amid protests in Argentina and Bolivia. Local protests in Latin America sparked a global campaign aimed at banning the sale of water utilities to private companies and for including water in the list of internationally protected human rights. This global campaign achieved a major victory in July 2010 when the United Nations General Assembly adopted a resolution recognizing the human right.

### 2.1.3 Corporatisation

Where the welfare consequences of service provision is unclear, it may be preferable to keep a service public, so that the central government retain the overall responsibility of providing that service. Subsequently, corporatisation of public firms has been suggested as market approach alternative to privatisation (Auriol & Picard, 2009).

Broadly defined, corporatisation is the placing of selected publicly-owned enterprises into a position analogous to that of the private sector while retaining public ownership (Klien, 2012). For local government, corporatisation is a process which changes the conditions under which local government businesses operate, so that they operate on commercial basis in a free market while allowing a council, as owner, to continue to provide broad direction by setting key financial and non-financial performance targets (Lock & Sulikowsk,1998). Corporatisation entail having independent managers responsible solely for the day to day operation of the organisation. The costs and revenues are ring- fenced to create a clearer monitoring mechanism, more financial transparency, reduce political interference, and strengthen managerial accountability within relatively autonomous service entities. More controversially, corporatisation has been used to create market-friendly public sector cultures and ideologies. This is part of a larger neoliberal trend towards New Public Management (NPM), often with the express intent of outright privatisation once the profit potential of a corporatised entity has been realized (McDonald & Ruiters, 2012). This prioritising of corporatisation is repeated in the World Bank's (2010:57) strategy update, in which it is termed an "innovative instrument".



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This preference for corporatisation can be related to the World Bank's aim of institutional reforms of publically owned water services, in order to make them financially efficient and "well-performing". According to the World Bank (2004a), Corporatisation requires the separation of water service into a discrete company: Creating an autonomous statutory body that offers opportunities for improvements in efficiency by (i) allowing bureaucratic administration to be replaced by commercial management, (ii) facilitating the introduction of clear financial and operational performance targets and cost accounting systems.

It is argued that corporatisation gives similar efficiency gains as privatisation yet permit greater state involvement than the privatisation model (Smith, 2006). In line with this reasoning is the argument that corporatisation maintains private sector principles such as cost-recovery and the commodification of water but is a less aggressive model than privatisation (Budds & McGrahan, 2003: 94). This is more a matter of reform-based changes within the public sector. The renewal of the neoliberal strategy is due primarily to the fact that privatisation reforms have frequently been hindered by resistance within many poor countries as well as by a lack of interest from multi-national water companies.

LWSC takes the form of corporatisation. It is a quasi-government institution formed out of the water and sewerage department of Lusaka City Council (LCC). It now operate as a commercial water utility company. LWSC was established under the Zambian's Company's Act as a limited Liability Company, and it operates as a parastatal owing to its shareholding structure. It is owned by municipal councils of Lusaka Province.

### 2.1.4 Management contracts

Management contracts is the contracting of private operators under lease or concession contracts. This attempts to employ mutually voluntary, incentive-based and time-bound contracts. These have been used to inject competition and attract private participation through bids or benchmarking and assure efficient, transparent and accountable service delivery. The use of contracts has made it easy to engage private entrepreneurs in the sector. Johannesburg Water was on management contract using a private operator from 2001 to 2006. This strategic move allowed Johannesburg Water to learn from experienced private professional.



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Management contracts have traditionally been regarded as “low powered” instruments suitable for difficult situations, and were usually implemented as a first step before a lease or concession contract. For Johannesburg Water, Management Contract was used to turn around the CUs which was essentially bankrupt to profit making.

## 2.2 Empirical Literature

According to the case studies done by McDonald (2014), corporatisation has been successful in Costa Rica's electricity utility, 'Instituto Costarricense de Electricidad' (ICE). For decades, ICE has been one of the most well run companies in all of Latin America, public or private, evolving out of Costa Rica’s social democratic experience with its solidarity model. In Uruguay, OSE is another positive example of corporatisation, providing high-quality, affordable and nearly universal water services to the country’s population for more than 60 years. Studies conducted on Chilean water privatisation concludes that privatisation had been a successful mainly because of strong state involvement and strong regulatory framework prior to privatisation. According to Baer (2014), the Chilean government subsidises the water bills to allow the private companies to charge a price that is high enough to maintain the system and make a profit.

However, the case studies on commercialisation from Africa are not quite as encouraging. Most corporatised and privatized utilities have not achieved the intended objectives of operational efficiency except a few who have recorded modest improvements like Tunisia’s state-owned electricity provider, 'Societe Tunisienne de l'Electricite et du Gaz' (STEG), which benefited from massive investments under the previous autocratic regime, Burkina Faso's corporatised water service provider, Office national de l’Eau et de l’Assainissement (ONEA) and the Uganda's National Water and Sewerage Corporation (NWSC) that has improved its services in the past decade with the help of international donor support (World Bank, 2013). Contrary to several other management contracts that had been implemented for water utilities over the last years in developing countries, most studies concluded that the five-year management contract in Johannesburg was a success (World Bank,2009).

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Research studies carried out for Zambian's water sector reforms by Funga (2000) and Kabinga (2012) came to the same conclusion that there has been marginal improvement in service delivery after corporatisation. This research will use different performance indicators, methodology and longer duration in the pre- and post-commercialisation analysis to assess the influence of commercialisation on CUs' performance. According to Kabinga (2012) the corporatisation of urban water services in Zambia has marginally improved water service delivery although problems of affordability still exist. Kabinga noted a number of factors having also influenced the observed achievements such as the donor funding and improved technical skills. Most studies concludes that most CUs in Zambia are not financially viable which is mainly attributed to non-cost reflective tariffs most CUs are charging. This makes the sector less attractive for private investment. The ideal water supply model include cost reflective tariff, independent regulator, and friendly policy to allow private participation through Public –Private partnerships (PPPs). Chitonge (2010)'s study on "A decade (2000-2010) of implementing water services reform in Zambia'' concluded that positive outcomes were recorded in reduction of political interference, stability of services, and improved capacity and management. However, most of these positive outcomes apply to high-income customers, and little improvements have been recorded in most low-income areas. Further, little progress has been recorded on core performance indicators particularly service coverage, hours of service and Non- Revenue Water (NRW).

These studies contribute to existing literature on commercialisation of water and sanitation sector. Though a lot has been written on commercialisation of water and sanitation, this study compares the influence of different water reforms using International Benchmarking Network (IBNET) indicators for Water Utilities.

### 2.3 Global Debate on Water Governance

The focus of this research is to assess the influence of different commercialisation models on water service delivery by comparing corporatisation, management contract and privatisation. The literature is divided on the public versus private water supply provision.

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Literature in favour of corporatisation tend to celebrate market-based management as an effective way to depoliticize public services and improve efficiency, yet retain ownership to public sector (Hood 1991; OECD 2005; Osborne and Gaebler 1992; Preker and Harding 2003; Shirley 1999). The advocates, mainly World Bank offers numerous rationales and incentives for corporatised reforms throughout developing countries (Andres et al. 2011; Kessides 2012; Marin et al. 2010; McDonald, 2014; World Bank 2006). The supporters of corporatisation argue that water is a human right and every government has a responsibility to make it accessible. Corporatisation enables governments to retain ownership of public organizations and then adopt market based management principles to improve efficiency.

The proponent of privatisation say water is an economic good with a measurable value. This was supported by the 1992 Dublin Principles that emphasized that "water has an economic value in all its competing uses and should be recognized as an economic good". Advocates for privatisation emphases that to realise the full benefits of the market approach water should be treated as a fully private and tradable commodity, and that the economic value of water is equal to its market price (Baer, 2014). The advocates, further argue that the role of government is to regulator the sector and protect both the investors and the customers. This research supports this view and observe that there could be a conflict of interest if government is both the provider of water service and the regulator of the sector.

The opponents of privatisation point to the pernicious effects of privatisation in low-income countries, where publicly owned service providers operate more efficiently and are more customer centric than the private operators who focus on disconnection of services to poor households, selectively offer better services to the affluent customers, and valorising new moral codes of conduct around the responsibility to pay' for market-oriented services (Blum and Ullman 2012;Magdahl 2012). This view can be managed if government is actively involved in regulating the water sector and provision of subside system to help the poor citizens.

The "water justice movement," a global network of civil society organizations, argues that water is a fundamental human right and a scarce and precious resource to be governed by private companies. This global movement claims that privatisation negatively affects the equitable access to clean water and hat privatised water utilities are undemocratic and less accountable



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than public utilities. The campaigns call for legalising the human right to water in national legislation and constitutions, banning privatisation of water companies, and increasing citizen participation in decision making about water issues (Baer, 2014).

Campaigns for the human right to water are rooted in the broader critique that neoliberal policies like privatisation pose a threat to human rights in developing countries by reducing the role of the state, specifically by restricting economic policy choices available to governments (Nelson and Dorsey 2008). Research on the human rights implications of neoliberal reforms provides empirical support for this critique. Privatisation of state-owned enterprises has been found to negatively affect the fulfillment of social and economic human rights by exacerbating economic inequality (Vreeland 2003; Abouharb and Cingranelli 2006, 2007; Franklin 1997; Keith and Poe 2000; Felice 2003; Branco 2009) and restricting governments' economic policy choices (McCorquodale and Fairbrother 1999). It is the responsible of every government to fulfilling socioeconomic human rights either through direct provision of services or by creating the legal and institutional framework through which rights can be fulfilled (Donnelly 2002; Felice 2003; Haglund and Aggarwal 2011;Hertel and Minkler 2007).

## 2.4 Good practices.

To capture the merits of commercialisation, CUs must emulate the behavior of a private company by adopting key corporate characteristics. There are so many key corporate characteristics, but for this study, only sound corporate governance and customer orientation will be looked at. Literature survey shows that the water utilities who have adopted best practices in terms of sound corporate governance and customer orientation tend to outperform those that have not adopted best practices CUs (USAID (2006).

### 2.4.1 Sound corporate governance

Corporate governance is the core of commercialisation. It is the model of governance chosen to emulate a private corporation. The OECD Principles states that: "Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, the means of attaining those objectives and monitoring



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performance are determined. A fundamental goal of corporate governance is to protect and enhance the long-term value of the company for the shareholders (government and others). This means increasing sales, controlling costs, and increasing revenues. A company should have an independent qualified Board, motivated and capable staff to implement the Board's vision, and the company's integrity among consumers, the general public, and investors.

Whether the business operates in a competitive context, or in a monopolistic market that is adequately regulated, as should be the case for the urban water and sanitation markets, sound corporate governance is cardinal to ensure stewardship of shareholders. With good corporate governance practices, CUs would improve the quality of service delivery and grow the customer base to optimized wealth creation and social benefits. Consequently, a CU with sound corporate governance practices should simultaneously obtain reasonable profitability in private and social terms (Boada, 2011). Boada concluded that good corporate governance in a water utility contributes positively to profit maximization and social benefit of the society.

According to USAID (2012) the guiding framework to evaluate sound corporate governance include the following components:

I. Defined and transparent mechanisms to monitor performance
II. Non- discrimination of government against other shareholders
III. Vesting the appropriate authority in the company and its Board
IV. Creating confidence and sustainability through transparency, documentation, and training.
V. Clear channels for reporting and accountability
VI. Alignment of individual incentives with corporate incentives and with owner incentives

### 2.4.2 Customer orientation

Customers are the source of revenue for every organisation. Good customer service is cardinal in ensuring continuity of the business. CUs must ensure transparent communication channels with customer to establish demand responsive service and monitoring of customer satisfaction. CUs must use customer charter or contracts as a commitment to service delivery. It does not matter whether CUs are monopolistic providers, customers are the reason every CU exist. Customer orientation is assessed through friendliness of billing and collection systems,



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transparent communication, time taken to attend to customer queries and general ambiance of customer service centres.

## 2.5 Customer satisfaction

Kotler (2000) defined satisfaction as a person's feelings of pleasure or disappointment resulting from comparing a product perceived performance (or outcome) in relation to his or her expectations. According to Hansemark and Albinsson (2004) satisfaction is an overall customer attitude towards a service provider, or an emotional reaction to the difference between what customers anticipate and what they receive, regarding the fulfillment of some need, goal or desire. Therefore, in this study, customer satisfaction will be assessed in terms of accessibility, reliability, and affordability. It is worth noting that in this research, performance improvement was also assessed using efficiency indicators such as Non-Revenue Water (NRW), Revenue Collection Efficiency and Number of Staff per 1000 Connections.

## 2.6 Key Performance Indicators of water supply service improvement

In 2010 a United Nations General Assembly resolution recognized that a sufficient and safe supply of water is a human right and is essential for the realisation of many other human rights. This is because there are public health, economic and human rights-related benefits from improved water and sanitation services (Kayzer, Moriarty, Fonseca, & Bartram, 2013). Water and Sanitation services improvement could be looked at differently by various stakeholders. The government would want to fulfill the promise of universal access to water and sanitation services, social and economic benefits for the country. For the CU, improvement would mean maximizing revenue and operational efficiency. The customers want quality, availability and affordable services. For the purpose of this research, three competing water commercialisation models; corporatisation, privatisation and management contract will be compared against each other by assessing their influence on CUs' performance pre- and post commercialisation. The study used selected international accepted indicators from the International Benchmarking Network for Water and Sanitation Utilities (IBNET). The research hypotheses that CUs under privatisation perform the better than corporatised CUs in terms of reliability, efficiency and profitability; and that Corporatised CUs outperforms privatised CUs in terms of accessibility

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and affordability. The selected performance indicators for water and sanitation services improvement are divided into four main categories: accessibility, profitability and affordability, reliability and efficiency. Table 2-1 below, summarises the selected IBNET indicators used in this study.

Table 2-1: Performance Indicators

**INTERNATIONAL BENCHMARKING NETWORK FOR WATER AND SANITATION UTILITIES(IBNET)**

| | **Indicators** | **units** |
|---|---|---|
| | **Accessibility** | |
| 1 | Total number of connections | No. |
| 2 | Water Service Coverage | % |
| 3 | Sanitation Coverage | % |
| | **Reliability** | |
| 4 | Water production (litres/person/day) | liters |
| 5 | Hours of Supply | Hours |
| 6 | Water quality compliance-Chlorine Residue, Bacteriological & Physio-chemical | % |
| | **Affordability and profitability** | |
| 7 | Total revenues per service population/GNI | % GNI per Capita |
| 8 | Average Approved tariff against unit operation cost | US$/m3 |
| 9 | Return On Capital Employed | % |
| | **Efficiency** | |
| 10 | Non-Revenue Water | % |
| | Water loss per length of network per day | L/km/day |
| | Water loss per connection per day | L/con/day |
| 11 | Collection efficiency | % |
| | Collection period (Trade Receivable) | Days |
| | Operating Cost Coverage | Ratio |
| 12 | Staff per 1000 water connections | No |

### 2.6.1 Accessibility Indicators

Accessibility is measured in terms of proportion of population in serviced areas who have water and sanitation services. According to Zambia's Water Supply and Sanitation Act of 28 of 1997, accessibility implies the service provider bringing water and sanitation services to the boundary of the customer's property for individual customers and within a reasonable radius for public

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service points. If more people have access to water and sanitation services, then the researcher would interpret this to mean improved service delivery. The indicators under accessibility are:

#### 2.6.1.1 Number of connections

Business growth is measured by the number of customers a company serve. For the water utility, customer base is measured by the number of connections. An increase in number of connections means increased customer base which imply that more people are accessing water and sanitation services and sign of business growth. A connection is usually an account. In situations, where a connection has multiple accounts such as apartment complex, the number of accounts will be used to measure the customer base. The number of connections at the time of commercialisation (2001) is compared to the number of connections after commercialisation (2002-2014). However, using customer base as an accessibility indicator has one major weakness of overlooking population growth in the serviced area. Since private business owners seek to maximize shareholders' wealth, a privatised CU is likely to focus on high value customers, whereas the corporatised CU would want to fulfil government obligation of universal access to clean water. Therefore, the research hypothesis is that corporatised water utilities will outperform privatised water utilities in term of accessibility.

#### 2.6.1.2 Water service coverage

This is the population with access to water services (either with direct service connection or within reach of a public water point) as a percentage of the total population in the service area. This is a more direct indicator of water service accessibility as it incorporate the population growth. The formula for water service coverage is:

(Total Population Served/Total Population in Service Area)*100

#### 2.6.1.3 Sanitation coverage

Sanitation coverage measures population with access to sanitation services (direct service connection) as a percentage of the total population under utility's nominal responsibility. The

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formula for sanitation coverage is:

(Total Population Served/Total Population in Service Area)*100

The service coverage indicators for both water and sanitation are key development indicator. An increase in the coverage ratio indicates that more people are able to access the services which imply performance improvement.

### 2.6.2 Service Reliability Indicators

Access alone is not enough but water must be sufficient and safe for drinking to meet consumer's basic needs. Reliability of water supply service is very important due to the health impact it has on the consumers. There are national and international benchmarks for reliability in terms of water quality and water availability. Compliance with the national and international benchmarks implies service improvement. This study will use water production, hours of supply and water quality to measure service reliability. Increase in all the three indicators would be interpreted as improved performance. Privatisation is associated with high efficiency as such, a CU under privatisation is likely to perform better than corporatised and management contract models. CU under management contract, ‘’partial privatisation’’, would provide more reliable service than corporatised CU owing to the fact that management contracts are performance-based and water quality is a key performance indicator.

#### 2.6.2.1 Water production

This is the volume of treated water distributed into the network. Water should be treated and made available for consumption, therefore an increase in production of safe drinking could be interpreted as improved service delivery and a sign of company growth. Increased water production alone does not imply that the service is more reliable. That treated water is targeted at satisfying existing and potential customers. Therefore, water production indicator should not be used alone to assess the service availability. The demand for water supply service resulting from customer growth could influence water availability even when there is increased production over the period. To address this, another indicator of water availability is the hours of water supply service measured at customer’s point.

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#### 2.6.2.2 Hours of supply

Water supply availability is measured by the weighted average hours of service per day for water supply. To a customer, the primary basis for perceiving the performance of a provider is based on the hours of water supply received per day. An increase in hours of supply per day is an indication of improved service delivery. This tries to ascertain if the increased production resulted into improved hours of supply to customers. This is a more direct measure of customer satisfaction in terms of availability of the service.

#### 2.6.3.3 Water quality compliance

Reliability of water supply service for consumption is measured by the number of tests carried out on samples taken from the distribution system, as a percentage of the number required by the standard that applies in each jurisdiction. The parameters considered are bacteriological (faecal and total coliforms) and physiochemical (Chlorine residue, pH, turbidity and color). Chlorine residue test is given prominence because of its relation to the bacteriological aspect of water. The formula- Water Quality Compliance is:

> [(Total CL Compliance*0.35) + (Total BAT Compliance*0.4) + (Total PHY Compliance*0.25)]. Where;

CL - Chlorine Residual tests, BAT- Bacteriological tests and PHY- Physical-chemical tests

A high compliance percentage means that the water is safe for drinking which is an indication of good quality service delivery. According to NWASCO (2014) the water quality benchmark for Zambia is 95%.

### 2.6.3 Profitability and Affordability Indicators

Access to water for everyone does not mean free water but that everyone should have access to clean water at an affordable rate (NWASCO, 2012). Most literature suggests that water and sanitation services still remain a privilege of the rich minority whilst the poor majority are left with a sub-standard service and often times no service at all (Padfield, 2008:10). A significant number of scholars have argued that the rationale behind commercialisation is to achieve cost



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recovery, i.e. to make a profit. Thus, the improvement of profitability indicators, unit profit and ROCE is an indicator of improved CU performance. The indicator for affordability is total revenue per service population per GNI and profitability is measured by tariff over unit operating cost and ROCE. Most literature suggest that private operators are likely to charge higher tariffs than public operators because of their profit motives. Therefore, a corporatised CU is expected to provide the most affordable service, followed by a CU under management contract while a privatised CU is likely to be more profitable than both a corporatised CU and a management contracted CU.

#### 2.6.3.1 Total Revenues per Service population/GNI[1]

To enable comparison across CUs, affordability is measured by the total annual operating revenues per population served over the national Gross National Income (GNI) per capita; expressed in percentage. This measure uses household income data which is not easy to obtain. The indicator selected here, therefore, compares average per capita tariffs as a proportion of per capita GNI. The GNI (Atlas method based[2]) will be for the whole country, and not reflect local variations, but is the most appropriate consistent measure currently available for most countries. This represents the percentage of amount spend on monthly water and sanitation bill over the monthly total income or expenditure. A smaller percentage is interpreted as more affordability of the service. The smaller the amount spend on water and sanitation bills, the more affordable the bills are in that country. The natural of the products, water and sanitation makes affordability is a key performance indicator.

[1] The G**ross National Income** (**GNI**) is the total domestic and foreign output claimed by residents of a country, consisting of Gross Domestic Product (GDP) plus factor incomes earned by foreign residents, minus income earned in the domestic economy by nonresidents (Todaro & Smith, 2011: 44).

[2] The **Atlas method** is used by the World Bank to estimate the size of economies in terms of (GNI) in US dollars. The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes.



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#### 2.6.3.1 Unit Profit (Average tariff against Unit operational cost)

Historically, any business performance was measured using unit profit. This compares the unit price to unit cost of the service. An amount which is less than 0 ratio indicates that the business is making a loss, and an positive amount implies a business is making a profit. A higher amount indicates more profitable which is interpreted as improved performance. The two main components of unit profit are average tariff and unit operating cost. **Average Tariff** is the average price for each cubic metre of water sold. The Formula- Average Tariff is: Total Water Revenues / Total volume of water billed. **Unit operating cost** is the total annual operational expenses expressed as a percentage of total annual volume sold. The formula- Unit Operation Cost is: Total Operational Costs / Total volume of water billed. Unit Profit is average tariff less unit operating cost.

#### 2.6.3.3 Return on Capital Employed (ROCE)

This is a measure of the profit in percentage terms that a business is making from its investment. Capital employed equals a company's Equity plus Non-current liabilities (or Total Assets − Current Liabilities), in other words all the long-term funds used by the company. ROCE indicates the efficiency and profitability of a company's capital investments. ROCE[3] should always be higher than the rate at which the company borrows otherwise any increase in borrowing will reduce shareholders' earnings, and vice versa; a good ROCE is one that is greater than the rate at which the company borrows. The formula for ROCE: ROCE = EBIT / Capital Employed.

A higher ROCE indicates more efficiency and profitability of a company and is interpreted as improved performance of the company.

### 2.6.4 Efficiency Indicators

Commercialisation seek to capture the advantages of a privately run company which includes efficiency, productivity, and financial sustainability. The key indicator for CU operational

[3] ROCE is affected by depreciation which might distort its measure of efficiency.



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efficiency under this research are Non-Revenue Water, collection efficiency and staff productivity. The essence of commercialisation is to improve operational efficiency and make profit, therefore improved efficiency means improved performance. Private operators places more emphasis on efficiency provision of service to avoid wastage and maximize wealth creation. CUs under management contract and privatisation are hypothesized to outperform a corporatised CU in terms of efficiency. There could be no systematic difference between privatised CU and management contracted CU in terms of efficiency indicators since in both instances, it's the private operator responsible for utility management.

#### 2.6.4.1 Non-Revenue Water (NRW)

Non-revenue water is a measure of water lost in the distribution system. It is the difference between the treated water distributed in the network and the quantity of water billed. NRW consist of physical losses (leakages) and commercial losses (unbilled customers). High NRW result in loss of revenue for the CU. There is a debate as to the most appropriate measure of non-revenue water. A percentage approach can make utilities with high levels of consumption, or compact networks, look to be better performing than those with low levels of consumption or extensive networks. To capture these different perspectives the research will use three (3) measures of non-revenue water.

**NRW (%)**

Using percentages to express the amount of water losses is the most common measure of NRW. The is the difference between the quantity of water treated and distributed in the system and the quantity of water billed, expressed as a percentage of net water supplied.

**Water loss per length of network per day**

This uses the volume of water "lost" per km of water distribution network per day

**Water loss per water connection per day**

Volume of water "lost" per water connection per day is similar to volume of water lost per km, the only difference is that it uses the number of connections as opposed to length of network.



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The CU with lower NRW is more efficient and the reduction in NRW is interpreted as improved performance. For NRW, all the three measures will be compared and interpreted against the three CUs.

#### 2.6.4.2 Revenue Collection Efficiency

Like any other business, CUs have financial obligations to meet when they fall due. Inability to meet financial obligations could render a CU bankrupt as such, liquidity management is a key efficiency indicator in the water sector. This measures how a CU is able to collect its billed revenue. The effectiveness of the collections process is measured by the amount of outstanding revenues at year end compared to the total billed revenue for the year, in day equivalents, and by the total amount collected as a percentage of the billed amount. **Collection ratio** is the ratio of revenue collected to the amount billed for a period of time. **Collection period measures** the number of days the company collect amounts owed by customers from billing. Collection period, also called Debtor days is the average number of days required for a company to receive payment from its customers for invoices issued to them. A larger number of debtor days means that a business must invest more cash in its unpaid accounts receivable asset, while a smaller number implies that there is a smaller investment in accounts receivable, this means that more cash is made available for other use. The lower the figure, the more efficient the CU is in collecting its billed revenue. Also, when receivables remain unpaid for a reduced period of time, there is less risk of payment default by customers

The formula is: (Year-end accounts receivable/Total annual operating revenues) * 365

A high collection ratio and low collection days implies the CU is more efficient in liquidity management which can be interpreted as improved performance.

#### 2.6.4.3 Operating Cost Coverage

An efficiently operating provider will keep costs low in order to cover them from revenues at a certain level of tariff. The total annual operational revenues over total annual operating costs shows the extent by which a company covers its cost of operations from revenue. The formula-Operating Cost Coverage:



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(Total Operating Revenue /Operational Costs)

A higher than one coverage implies that the CU is able to meet its cost obligations which could be interpreted as a good performance.

#### 2.6.4.4 Staff per 1000 water connections.

Different CUs have different staffing structures based on the size, spread (area and number of towns) and operational requirements. With this consideration, it is assumed that a certain number of employees can efficiently service 1,000 connections. This is number of employees servicing 1000 water connections. The formula- Staff per 1,000 Connections:

(Total Number of Staff *1,000) / Total Connections

Therefore a lower number of staff per 1,000 connections means more staff efficiency. Private service provision are likely to use. For instance, European countries like the United Kingdom or France, the norm is about 2 or 3 staff per 1000 water connections (Bakker, 2006).

## 2.7 Study period of cover

The period covered for this research is 2001 to 2014 to allow for the comprehensive analysis of performance for all the three utilities. This is despite the fact that Lusaka Water and Sewerage Company's corporatisation process started as early as 1989. Well documented data on CUs performance and full corporatisation in Zambia was only concluded in 2000. The period would also help to assess the impact of management contract as Johannesburg Water was under management contract from 2002 to 2006. Moreover, the New Public Management reforms (which prompted corporatisation) only trickled down and proliferated in Africa in the early 2000s (Kabinga, 2012).

## 2.8 Conclusion

The influence of different modes of commercialisation on water utilities is not exactly clear in the literature. The relationships tend to be different across countries and through time. In addition, differences in implementation process and state of SOE at the time of



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commercialisation influence post commercialisation performance. This chapter established that the World Bank and IMF have promoted privatisation and imposed it on most African countries in exchange for debt relief and aid. Advocates for privatisation call for reducing the role of the state in water services, while civil society groups argue that privatisation violates the human right to water. Chile epitomize a rare success story of full privatisation in a developing countries, with close to universal access in urban areas under a fully privatised water sector. The widespread failure recorded in privatisation projects across the world led to the rise of the second phase of reforms called corporatisation. This entail creating a ring-fenced organisation under public ownership but managed using market based principles. LWSC is used to represent a corporatised CU in this study. Corporatisation permits Public- Private Partnerships such as management contract. Management contract is the vesting of operational control in another entity in return for a fee. Johannesburg Water Management (JOWAN)'s management contract of 2002 to 2006 is used in this study as one of the commercialisation models.

The water reforms in Zambia were mainly triggered by pressure from World Bank and IMF, state failure in service provision and low levels of investments. Opponents of water reform argue that any form of commercialisation violets the declaration of water as a human right because of disconnection from the water network for the non-payment of fees. Lack of access to clean water is part of the cycles of poverty which leads to adverse health effects, including gastrointestinal illness, reproductive problems, and neurological disorders. It also lead to loss of time on economic activities, with the United Nations estimating that Sub-Saharan Africa alone loses 40 billion hours per year collecting water; that's the same as a whole year's worth of labour by France's entire workforce (UN, 2015).

Performance for the three CUs was assessed from 2001 to 2014 in terms of accessibility, reliability, affordability, profitability and efficiency using selected international indicators, and good corporate practices using corporate governance and customer orientation.

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## Chapter three: Brief History Zambian, Chile and South African Water reforms

### 3.0 Zambian Water Reforms

Since Zambian's independence in 1964, the operations and maintenance of water and sanitation services systems had been a responsibility of various govern ministries, councils and districts across the country. The Ministry of Energy and Water Development (MEWD) through Development of Water Affairs (DWA) was responsible for water development and systems in Zambia. When DWA complete the project, it then handed over the schemes to local councils to operate and maintain. Most local authority failed to manage this responsibility because of low investment, overstaffing, inefficiencies and aged infrastructure which resulted in poor service delivery and low income generation for re-investment to sustain the operations. Due to the failure by the local councils to manage and maintain the water and sanitation schemes efficiently, the water and sanitation responsibilities were divided amongst various ministries, departments and local councils. Additionally, Some Parastatals, Non-Government Organisations (NGOs), donors and missions were also involved in provision of water and sanitation services (Funga, 2001). This move worsen the situation because of unclear roles and responsibilities, lack of investment, diversion of funds earned from the services and weak coordination between different players resulting in poor planning and implementation.

Ineffective management of water and sanitation system and economic liberalisation embarked on by the Zambian government resulted in delinking of the water and sanitation function from the municipal councils and creation of municipal commercial utilities for urban areas to replace fragmented service provision by local governments.

A national collaborative process between Zambia's Water Supply and Sanitation (WSS) sector stakeholders in the early 1990s culminated in the adoption of a National Water Policy in 1994 and the Water Supply and Sanitation Act in 1997. Under the policy and Act, implementation roadmap was put in place for service delivery improvement in water sector. The main aim was to devolve the authority to provide water supply from central government to local authorities. To improve efficiency, most local councils in urban areas created commercial utilities (CUs) to provide water and sanitation. (USAID, 2010). The city of Lusaka created the country's first

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Commercial Utility (CU), Lusaka Water and Sewerage Company in 1989 as a corporatised CU legally and financially autonomous public entity to be operated based on commercial principles. This differs from a full privatised Aguas Andinas and JOWAM management contract under Johannesburg Water. The 1997 Water Supply and Sanitation Act of Zambia created the regulatory agency (NWASCO) and a Devolution Trust Fund (DTF) as a financing vehicle for low-income, peri-urban areas (NWASCO 2010). The table below summarized the phases of water reforms in Zambia.

Table 3-1: Water sector reform phases

| Main reforms | Period | Key outcomes | Status |
|---|---|---|---|
| Legislative & Policy development | 1994-1998 | National Water Policy<br>National Water and Sanitation Act<br>Decentralisation Policy | Completed |
| Establishment of new institutional framework | 1998-2000 | Separation of Water and Sanitation Services from Water Resources Management<br>Establishment of National Water Supply Regulator<br>Establishment of CUs | Completed |
| Rehabilitation & expansion of infrastructure | 2000- present | Establishment of Devolution Trust Fund<br>Department of Infrastructure and Support Services takes over infrastructural development | On-going |

*Adopted from Chitonge (2011:3)*

Even if the 1997 Zambian's Water and Sanitation Act permitted full privatisation and PPPs of water and sanitation services, Zambia adopted corporatisation because very few if any private investor were willing to invest in water sector and the negative consequences of full privatisation the country experienced (Chitonge, 2010:14). Zambia began corporatizing its

water services rigorously in 2000 and by 2009 the country had successfully corporatised all of its Water Utilities (11 in total) (NWASCO, 2010:5). The exceptions were LWSC and Eastern Water and Sewerage Company which had been corporatised in a pilot project earlier in 1989 and 1992, respectively (Dagdeviren, 2000). The CUs are operated as separate commercial entities registered under the Companies Act and "regulated by private company law and not public law or statutes" (Chitonge, 2007; 2011:5).

### 3.0.1 Regulatory Framework, National Water Supply and Sanitation Council

All the 11 CUs in Zambia are regulated by National Water Supply and Sanitation Council (NWASCO). NWASCO was established by the Water Supply and Sanitation Act of 1997 of the Laws of Zambia, which regulates the provision of water supply and sanitation services in the country. NWASCO's mandate include advising the government on water supply and sanitation matters, establishing and enforcing the sector standards and guidelines, issuing operating license and disseminate information to consumers on water supply and sanitation issues (NWASCO,2010). Below are the main institutional players in the Zambian Water Supply and Sanitation Sector post Water Sector Reforms.

NWASCO regulate the water sector through monitoring of CUs, advice government and report to parliament on urban water performance. The Ministry of local Government and Housing (MLGH) oversees the water and sanitation service provision and help mobilization of resources for capital investments. Ministry of Energy and Water Development (MEWD) is responsible for the overall water policy and water resource management. Other actors include the Ministry of Agriculture and Cooperatives (MACO), Local Authorities (LA), Environmental Council of Zambia (ECZ), academic institutions, the private sector and NGOs.

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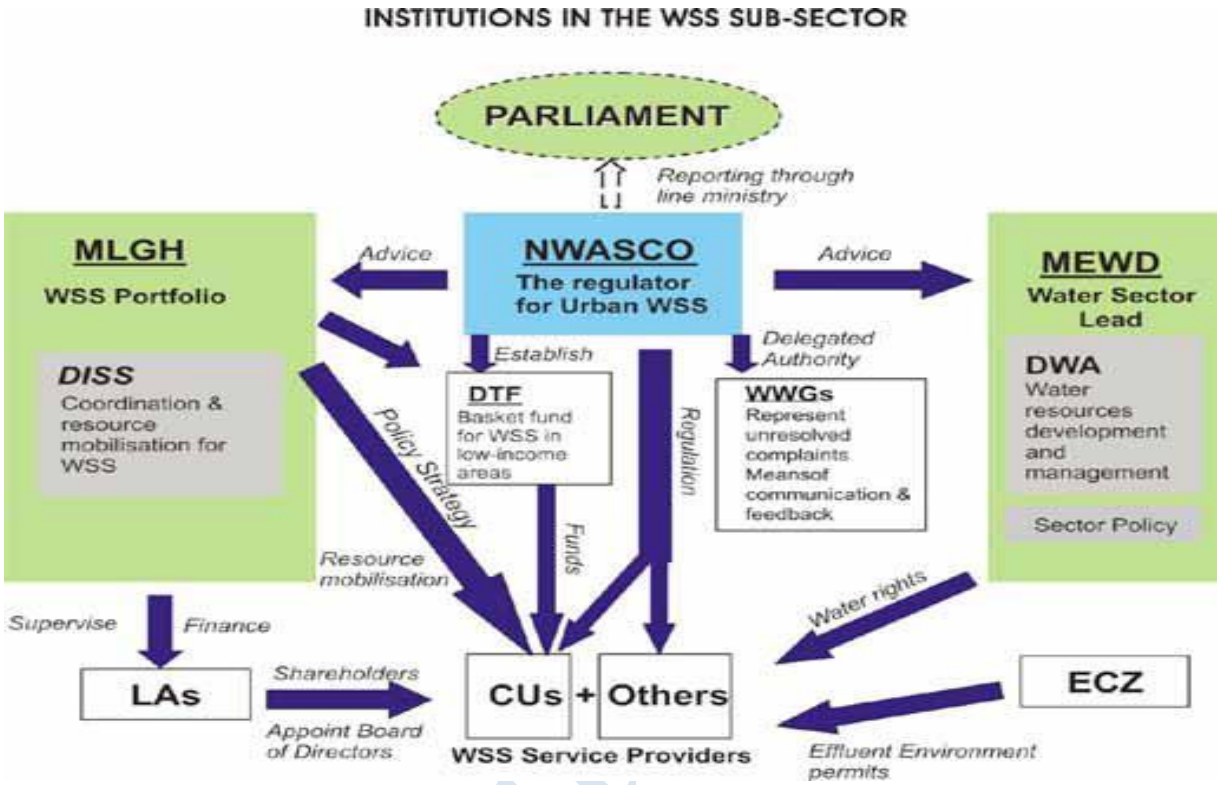
Figure 3-2: Institution in Zambia's Water supply and Sanitation Sector after commercialisation




Source: NWASCO (2010)

### 3.1 Lusaka Water and Sewerage Company

Lusaka Water and Sewerage Company (LWSC) provides water and sanitation services to Lusaka Province. The company was established in 1988 but started operating in 1990. Although LWSC was established under the Company's Act as a limited Liability Company, it operates as a parastatal owing to its shareholding structure. Initially LWSC's mandate to provide water and sewerage service was limited to the City of Lusaka. In 2008, this was extended to cover the whole Lusaka Province which at that time included Kafue, Lusaka City, Chongwe and Luangwa, with respective councils holding shares in the company as follows; Lusaka City Council 60%, Kafue 20%, Luangwa 10%, Chongwe 10%. LWSC has a Board and management. The Board recruit the management on competitive basis from the market. So all processes are handled just like private companies.

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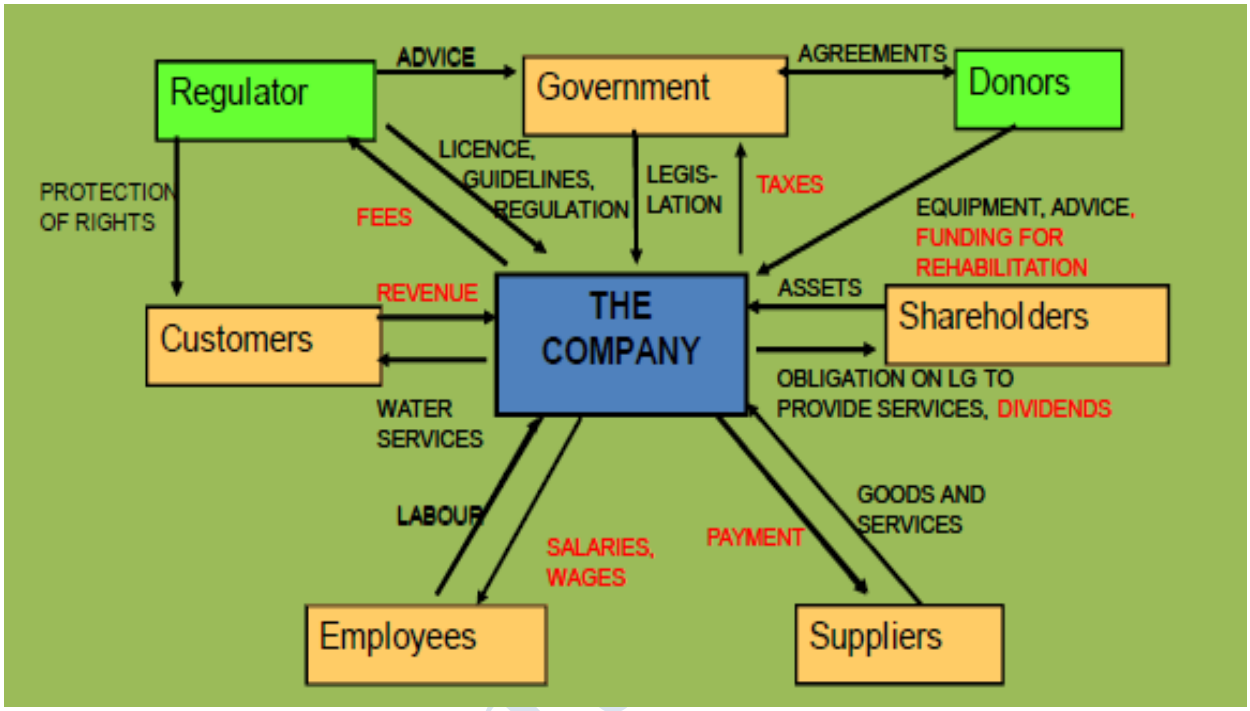
Lusaka water and Sewerage Company and other Zambian commercial water utilities have adopted the following business model.

Figure 3-2: Zambia's Commercial Utility Business Model




*Source: Adapted from Masupha (2010:2)*

From the Figure above, a CU interacts with the state which formulate laws all the CUs conform to. All CUs funding agreements with donors are signed by the Government of Republic of Zambia (GRZ). Government retain responsibility for overall water provision in the country. NWASCO gets fees and performance data from the CUs. All the CUs sign NWASCO service level agreements to protect the consumer rights, by virtue of the consumer providing the CUs with revenue in exchange for water services. The CU is obliged to deliver local government services and is accountable to the shareholders who enjoy the dividends from the CU.

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The Map of Zambia below shows the towns in which LWSC operates

Figure 3-3: LWSC area of Operation.

Source: LWSC (2013)

## 3.2 South African Water reforms

The end of apartheid in South Africa came with numerous economic reforms which included major institutional re-arrangement and combination of municipalities into new ones. This left city of Johannesburg with multiple departments involved in water and sanitation services, all operating with no cohesion. This lead to uncoordinated actions which resulted into low employee motivation, poor customer service, budget overran and high inefficiency especially in attendance to problems of the sewerage system (City of Johannesburg, 2012). To address these challenges, the municipality decided to create a corporatised utility (Johannesburg Water) based on more business-oriented practices and to enlist the private sector's help in doing so, the city of Johannesburg entered in management contract with private operators at the time of corporatizing Johannesburg Water. Johannesburg Water is a 100% publicly-owned, corporatised water and sewerage company serving the Johannesburg area.

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### 3.2.1 The EGOLI 2002 Plan

There were 13 local government offices before 1993 in Johannesburg which were combined into 5 councils during the transition period up to 1995. The Greater Johannesburg Transitional Metropolitan Council (GJTMC) formed the top tier, with four independent metropolitan local councils (MLCs) below (City of Johannesburg, 2013). After municipal elections in 1995 the Greater Johannesburg Metro Council (GJMC) replaced the GJTMC. In the bid to improve the city and public service provision, the city of Johannesburg ended up over spending which was not matched with revenue collection. The GJMC had no reserves and owed debts which were in excess of its revenue. By 2000, the City of Johannesburg was effectively bankrupt (City of Johannesburg, 2013).

The municipality of Johannesburg was the first to engage in Public –Private Partnership (PPP) through a management contract, and followed a different strategy. The strategic was to contract outside private professional skills but keep the CUs under public management over the long term. The aim of the Public Private Partnership (PPP) was not to transfer the utility to a private operator over the long term, but rather to leverage the expertise of an experienced operator for a few years in order to establish a viable, corporatised public water utility (Marin, Mas, & Palmer, 2009). The thinking was that the private operators have more experience in water supply operation and could pass on the knowledge to Johannesburg Water members of staff.

### 3.2.2 Johannesburg Water and JOWAM (Management Contract)

In South Africa, a few municipalities contracted private operators during the 1990s under lease or concession contracts, but these arrangements proved to be controversial ((Marin, Mas, & Palmer, 2009). This is because the strong commercial motivate to charge cost-reflective tariff resulted in some conflicts for customers who could not afford to pay utility bills. The municipal authorities in Johannesburg had a different idea of using a private operator for a few years to help establish the public utility and pass it over to public management. The competitive tender launched in 2000 attracted interest from the largest international operators, and was awarded to a consortium led by Suez (Marin, Mas, & Palmer, 2009). As part of the formation of Johannesburg Water (JW), professional experienced expertise was prioritized. An advisory



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board of specialists to guide the creation of Johannesburg Water was recruited in 1999 (Johannesburg water, 2008). The winning bidder formed a subsidiary for the contract, named Johannesburg Water Management (JOWAM). JOWAM was a joint venture between the Suez Group of France, and its subsidiaries in the UK and SA. Suez held 66 percent of shares in JOWAM, with WSSA and Northumbrian UK holding the rest. JOWAM was brought in to assist JW with its operations for five years from 1 April 2001 until June 2006 (City of Johannesburg, 2013).

The aim of contracting a private experienced operator was not only in improving customer service and efficiencies, but rather to pass on the knowledge in water management. This included building capacity, and managing an internal transformation to rapidly empower a new black management team. Moreover, the goal was to make the utility financially viable without big tariff increases which was a big challenge since the water and sanitation services were essentially bankrupt by 2000 (Marin, Mas, & Palmer, 2009).

Management contract resulted in improved financial performance of the CU, taking the utility from bankruptcy to a small profit with a tariff increase of only 6 percent in real terms. By the end of the management contract Johannesburg Water was ranked the best large municipal water and sanitation utility in South Africa. The overall cost of the management contract was around US$10 million, more than ten times less than the estimated benefits for the municipality, and representing just about 0.5 percent of the annual turnover of Johannesburg Water (Johannesburg Water, 2008). The private operator was essentially used as a change agent and helped in influencing work attitude and culture (Marin, Mas, & Palmer, 2009). Though, Johannesburg Water is mainly used because of a different reform policy, the management contract of 2001-2006, This study review the evolution of Johannesburg Water from 2001 to 2014, including the performance of Johannesburg Water after the end of the contract and its transfer to public management in 2007. This would reveal whether the gains achieved by the management contract have been sustained.

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### 3.2.3 Regulatory Framework and Tariff

The formulation of policy governing water resources management and water supply is under the Department of Water Affairs (DWA) in the Ministry of Water and Environmental Affairs. The governance of water is under City Councils. According to the Water Services Act (1997) and the Water Services Amendment Act (2004), the local governments assume responsibility for water services, and distinguished between Water Service Authorities (WSAs), local government and Water Services Providers (WSPs). The Act requires all WSAs to prepare a Water Services Development Plan as part of the municipality's overall Integrated Development Plan (IDP). There is also the Municipal Services Act (2000) which designate municipalities as Water Services Providers (WSPs) with the responsibility for water and sanitation services provision. The municipality has the choice to either provide such services itself, or to contract out service provision functions. The policy decisions relating to water supply and sewerage/sanitation services are determined by the city government. In many areas, this has an impact on the company's operations, for example, the Free Basic Water Policy[4].

The tariffs charged are regulated and typically vary with consumption, with higher tariffs applied to higher consumption. Johannesburg Water provide between 6 and 15 cubic meters of water per month for free, depending on the poverty level of residents.

## 3.3 History of Reforms to the Chilean Water Sector, Aguas Andinas

The Chilean water sector was managed and financed by the state and financed with national funds until 1973. Despite initiating the reforms in the 1970s, Chile process only intensified in 1990s after the creation of SENDOS (the National Service of Water and Sewerage Works) had unified the entire water services industry by combining all government activity in the water and sewerage sectors into one organization (Morandé and Doña 1999). In early 1980s, although the water companies were public owned, they were highly efficient and provided excellent water services. The state began selling its shares in 1999 beginning with EMOS in Santiago. In 1999, 51 % of EMOS shares was sold to Sociedad Inversiones Aguas Metropolitana, a

[4] South Africa's Free Basic Water Policy stipulates that each person shall receive 6 kiloliters of water per month for free



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consortium composed of Suez Lyonnaise des Eaux of France and Aguas de Barcelona of Spain. CORFO, the Chilean Economic Development Agency, retained 35 % of the shares (Aguas Andinas 2007). In 2001 the company changed its name from EMOS to Aguas Andinas. The main reason given for privatising water companies in Chile was that the state owned water companies did not have sufficient earnings to meet the investment needs required for developing wastewater treatment plants (Morandé and Doña 1999; Shirley et al. 2000).

### 3.3.1 EMOS, Santiago's Public Water Company

Santiago's water system, operated now by Aguas Andinas, is one of the best in the region with close to 100 % coverage for water and sanitation and high quality drinking water. EMOS became a highly efficient company as a result of the government's reforms to the water sector in 1988–1990 described above. In addition to the high quality of services, EMOS was considered to be an excellent company by its workers, its customers, and outside evaluators (Shirley et al. 2000; Sjodim 2006). While Aguas Andinas did not have to invest heavily in expanding the existing network, a problem that Suez faced in its contracts with public water companies in Bolivia and Argentina, the company was obligated to invest in the expansion of wastewater treatment.

### 3.3.2 Regulation and Tariff.

The SISS (Superintendencia de Servicios Sanitarios) is a regulatory body attached to the Ministry of Public Works. It regulates tariffs, sets technical standards, and grants concessions for services. The creation of the SISS signaled the Chilean government's commitment to effectively regulating the sector and to preventing "consumer exploitation" as the sector moved toward privatisation(Shirley et al. 2000: 29). The role of the regulator is to regulate the coverage, quality, costs, and tariffs in a way that the consumer is in the same position as if there were a choice of water service carriers. In this way the regulator acts as a counterbalance to the extreme power that any water company holds over its captive customers. Chile's water regulatory system is considered a model of best practices for the region (Lentini 2011). This reputation is based on its independence and neutrality (Shirley et al. 2000), its strength vis-à-vis the companies it regulates, and the method used to determine tariffs. The regulatory

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framework for the water services sector is particularly strong in Chile in part because it was established by law and is backed by constitutional safeguards (Shirley et al. 2000), unlike in other countries where regulation is usually determined by contract (Jouravlev 2008; Lentini 2011).

The tariff setting process estimates the tariffs the model company would theoretically charge given the need to meet investment requirements, operation and maintenance costs, and a minimum annual return on assets of at least seven percent (Shirley et al. 2000: 32). It is worth noting that state influence is very strong through the SISS which is under the supervision of the President of Chile and subside system. Further, the government of Chile spends approximately $46 million/year on subsidies to help pay the water bills for approximately 680,000 households, about 17.4 % of the total clients (SISS, 2007). This enables the water companies under both public and private ownership to raise the water tariffs to levels that allowed for self-financing.

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# Chapter Four: Research methodology

## 4.0 Research approach

This study relies on a qualitative deductive approach to address the research questions outlined in Chapter 1. A deductive approach as opposed to a inductive approach was preferred since I was testing known theories rather than inferring theoretical concepts and patterns from observed data. Therefore, the findings will be used to refine, improve and validate the existing theories (Bryaman & Teevan, 2005),

I used a comparative qualitative case study approach but made use of some descriptive statistics to support the analysis of pre – and post-commercialisation performance of CUs. A comparative case studies of LWSC and two other CUs, Aguas Andinas of Chile and Johannesburg Water of South Africa was conducted. A case study enabled detailed description of data that could help in validating the theory and provide solid evidence (European Commission 2007b; Cullen et al 2008). Performance before and after commercialisation for the three CUs will be reviewed and compared using International Benchmarking Network For Water And Sanitation Utilities (IBNET) indicators listed above in 2-2 above. The study used multiple cases to avoid single perspective or unit providing a full explanation of the research issue. Using three cases would provide more generalizable and balanced findings which is crucial to theory testing (Eisenhardt & Graebner, 2014).

## 4.1 Research design

To address the first two sub-questions outlined in chapter one, qualitative approach was used though data was analysed using descriptive statistics. The advantage of using qualitative research owes to its suitability in exhaustive literature review, flexibility and openness in the information gathering. To answer the third sub-question, qualitative approach was used to establish the best way of managing CUs in developing economies and assess whether LWSC has adopted the best practices in terms of corporate governance and customer orientation.

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## 4.2 Sampling

The setting of this study is the water sector in developing economies because of the sector's theoretical and practical importance. The study review different water reform models and best practices in provision of water supply service. The three cases chosen in this study have different reform models and implementation processes. Aguas Andinas of Chile is fully privatised and will represent fully privatised water CUs in developing economies. Johannesburg Water entered into PPP at the time of corporatisation. The inclusion of Johannesburg Water under management contract presents a rare opportunity of comparing two corporatised CUs with different implementation strategies. LWSC is corporatised and owned by five different Municipal councils.

## 4.3 Data collection technique

The study relies mainly on secondary data to address the three research sub-question. The study used data from LWSC, Johannesburg Water and Aguas Andinas' Annual reports and NWASCO sector reports, which have comprehensive records and information of the performance of LWSC. The data collected will then be analysed and compared across periods and against the international water and sanitation benchmarks using statistical description, which includes the use of graphs and tables to interpret data.

To gain more insight into the topic, I looked at global literature on public sector management, with particular focus on the water supply experiences in developing countries. The three cases have different regulatory systems and level of government interference. An extensive literature review of LWSC, Johannesburg Water and Aguas Andinas was done to respond to research questions in chapter one. Performance statistics were collected form Annual reports and other company documents to answer the research sub-questions. Documents were sourced from the internet using CUs website and other relevant websites.

The study uses International Benchmarking Network for Water and Sanitation Utilities (IBNET) Toolkit. The IBNET Toolkit provides a set of financial, technical and process indicators (mainly capturing the institutional context in which the utilities are operating) for the assessment of utility performance in the provision of water and sewerage services. This set of



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indicators provides the basis for the cross-utility and cross-country comparisons. IBNET caters for a large number of indicators which are all useful to understanding the performance of the water utility (IBNET, 2012). However this research only used 16 selected indicators to assess the accessibility, reliability, profitability, affordability and operational efficiency listed in table 2-2. This research uses yearly data, spanning the period 2001 through to 2014.

### 4.4 Data analysis

The first phase of data analysis was collection of 2001-2014 key performance statistics for the three CUs using secondary data. I used table the appendix 1 to summarise the ratios and computed their mean values for period 2001 to 2014. The mean values were compared to 2001(base year) values to determine the general trend movements for the period 2001 to 2014 so as to assess the performance levels pre- and post- commercialisation. I then developed histograms on each of the 16 key indicators to descriptively compare performance of the three CUs across the period 2001 to 2014. Using the 16 selected indicators and CUs performance review in chapter 2 and 3, the ratios were interpreted and analysed accordingly.

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## Chapter Five: Research Findings, Analysis and Discussion

### 5.0 Introduction

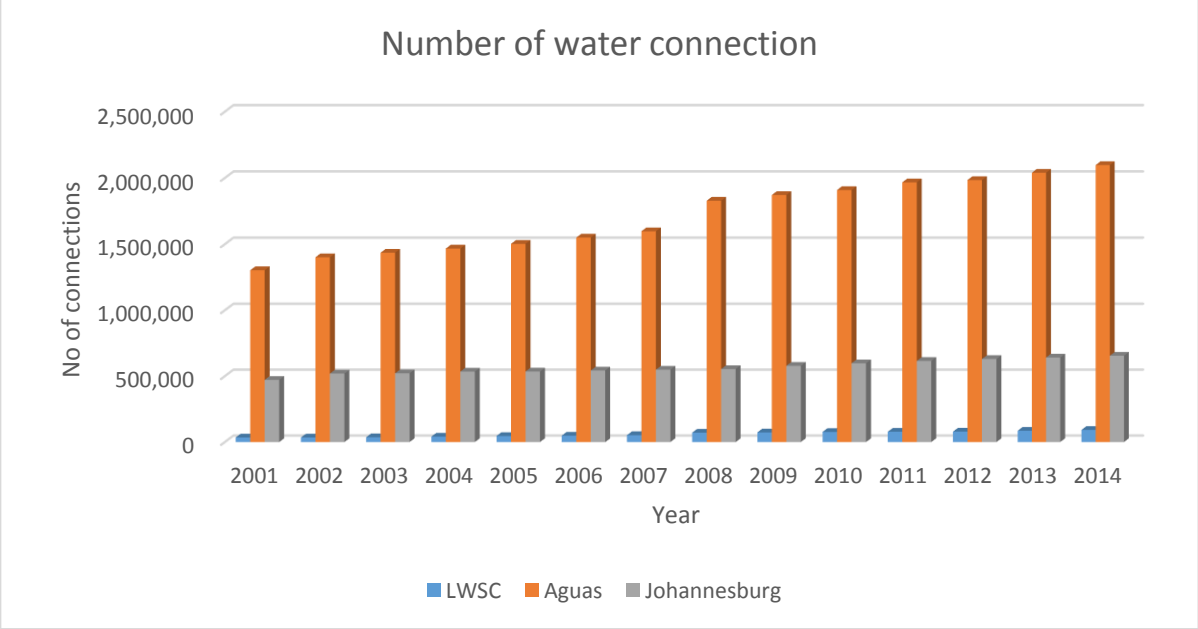
This chapter looks at critical analysis of key performance indicators by comparing the data at the time of commercialisation and after commercialisation for all the three CUs, reform implementation processes and best practices of commercialised CUs. A comparative performance across period was conducted even though it was noted that these three CUs operate in different environments in terms of geographic coverage, level of economic activity in the area of operation, state of infrastructure and level of external support.

### 5.1 Accessibility indicators

Accessibility is measured using three key performance indicators; Number of connections, Water supply coverage and sanitation coverage. The figures below summarises the accessibility data for the three CUs covering period 2001 to 2014

#### 5.1.1 Number of connections

Figure 5-1: Number of water connection



Form Figure 5-1 above, it is clear that Aguas Andinas and Johannesburg Water had more water connections than LWSC across the period 2001-2014. The number of connections rose from 34,814 in 2001 to 94,440 in 2014, representing a 165.5% increase for LWSC, .from 1,303,880 in 2001 to 2,096,999 in 2014, representing a 60.8% increase for Aguas Andinas and from 471,776 in 2001 to 654654 in 2014 representing 38.8% increase for Johannesburg Water.

From the figure above, it is very clear that all the three CUs had increased the number of connections. The figure also shows that LWSC had the lowest number of customers across the period 2001 to 2014. However, LWSC recorded the highest increase in the number of connections (165%), followed by Aguas Andinas (60.8%) and Johannesburg Water (38%) in percentage terms. This improvement for LWSC could be attributed to extension of operating license to four more districts; Kafue, Luangwa, Chongwe and Chirundu districts. Since all the CUs had increased the number of connections after commercialisation, this is interpreted as improved performance through growing customer bases after commercialisation. LWSC's performance has improved after commercialisation as evidenced by 165% increase in customer base from 2001 to 2014. This research finding gives a different result from the research hypothesis. Using the number of connections as an accessibility indicator has one major weakness of overlooking the population growth.

### 5.1.2 Water service coverage

Figure 5-2 shows that LWSC water supply coverage had been lower across all years than both Aguas Andinas and Johannesburg Water. Though it is worth noting that the water supply coverage for LWSC had improved significantly from 80% in 2001 to 86% in 2014. The improvement in water supply service coverage could be explained by the various water improvement projects LWSC had undertaken with support from the World Bank, Millennium Challenge Corporation and other cooperating partners to urban poor areas. Aguas Andinas has maintained an almost 100% water coverage (Universe access) from 2001 to 2014. This level of performance could be attributed to innovative and customer orientation approach adopted by Aguas Andinas. Johannesburg Water improved the water supply coverage from 85% before management contract in 2001 to 98% at the end of management contract in 2006 and to 100% in 2014.

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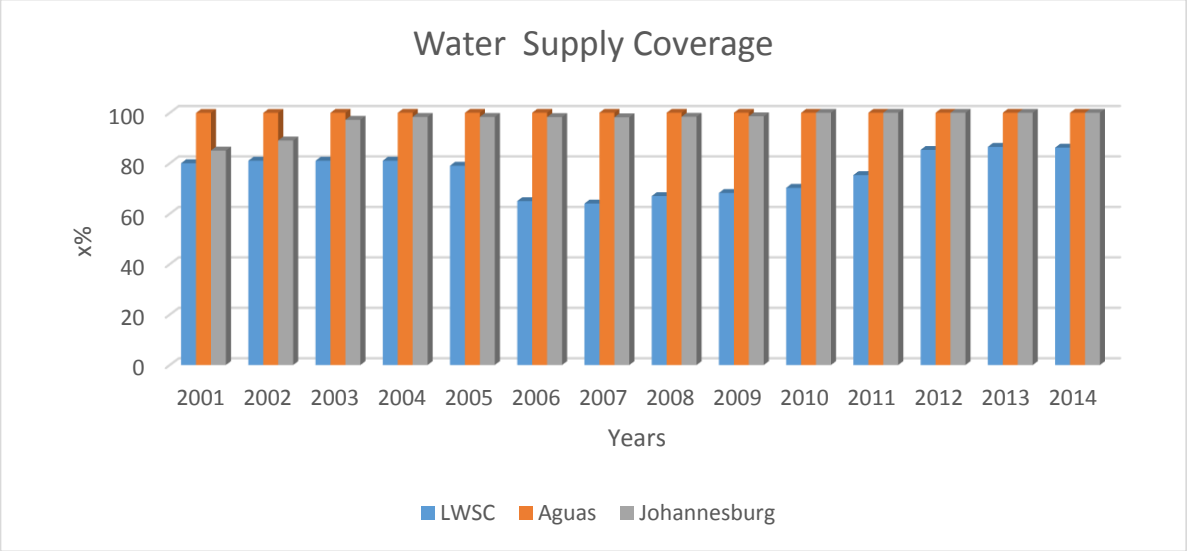
Figure 5-2: Water Supply Coverage




The trend shows that the water coverage for Aguas Andinas had been almost 100% before and after commercialisation. Johannesburg Water has significantly improved the water supply coverage from 85% in 2001 to almost 100% in 2004[5] and 100% in 2014. LWSC's water supply coverage was 80% in 2001 and declined to 64% in 2006 and 2007, it improved to 67% in 2008 and to 86% in 2014. LWSC exhibited the lowest performance in water supply coverage across the period 2001 to 2014. This finding supports the theory that public service provision is less aggressive in growing customer share compared to private service provision. Over the period 2001 to 2014, the mean values are 76.4% for LWSC, 100% for Aguas Andinas and 97.2% for Johannesburg Water. Though there had been stabilisation towards the means for Aguas Andinas and Johannesburg Water, there had been mixed progress for LWSC which recorded a decline in 2006 and 2007 before stead improvement started in 2008 through to 2014.

Generally, LWSC and Johannesburg Water have recorded improvement in performance after commercialisation in terms of water supply coverage. Aguas Andinas has maintained almost 100% service coverage which support Baer's (2014) findings that the Chilean government sold

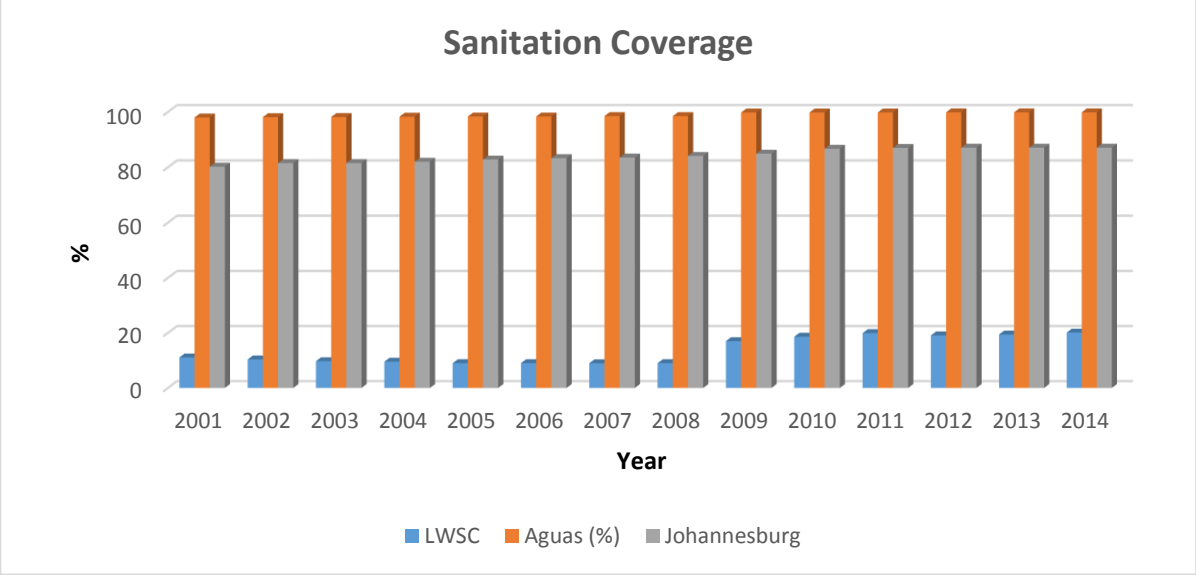
[5] 2004 was the third year of operating under management contract using a private operator. The introduction of a private operator was closely aligned with the corporatisation process for the new water and sanitation utility. The management contract was tendered in June 2000 and started in April 2001, only four months after Johannesburg Water had been created.

efficient public companies, such as EMOS in Santiago, that were built with public investment and that the government established a strong regulatory framework prior to privatisation.

### 5.1.3 Sanitation coverage

Figure 5-3 below shows that Aguas Andinas had the highest sanitation coverage with an average of 98.9% followed by Johannesburg Water with an average of 84.2% for the period 2001 to 2014. LWSC sanitation coverage was the lowest with the average of 13.6% for the period 2001 to 2014. LWSC had had improved the sanitation coverage improved from 11.08% in 2001 to 20.11% in 2014. Therefore, performance for LWSC improved after corporatisation for service coverage. Generally commercialisation has resulted in improved service delivery in terms of sanitation coverage as evidenced by improved in sanitation coverage for both Aguas Andinas and Johannesburg Water from 98% and 80% in 2001 to 99.85% and 87.07% in 2014.

Figure 5-3: Sanitation Coverage




From the analysis above, the number of connections have increased for all the three CUs and more people have access to water and sanitation services, therefore, all the three CUs have improved service delivery in term of accessibility after commercialisation. All the three CUs adopted customer orientation approach and invested in water improvement facilities. LWSC has improved the most but though the overall performance was lower than both Aguas Andinas

and Johannesburg Water. The slow improvement in service coverage for LWSC could be attributed to both the rising population pressure and low investments for infrastructural development in the water sector (Kabinga, 2012).

Since all the accessibility indicators, number of connection, water and sanitation coverage show improvement from 2001 to 2014 for all CUs, and from 2001 to 2006 for Johannesburg Water, there had been improvement in performance in terms of service accessibility for all the CUs after commercialisation. Even though LWSC had improved performance after commercialisation, it exhibited the lowest level of performance across the period compared to Johannesburg Water and Aguas Andinas. Aguas Andinas outperformed Johannesburg water and LWSC. The strong performance by Aguas Andinas is not attributable to the merits of privatisation, but to Chile's strong state capacity to govern the water sector in the public interest.

This finding is not in line with the research hypothesis that privatised CUs perform better than corporatised CUs in terms of service accessibility. It disapproves the finding that privatisation has posed a challenge for protecting access to quality services for the poor in other social service sectors such as water, health and education (Kaufman and Nelson, 2004).

## 5.2 Service reliability indicators

The three water reliability indicators for this research are water production, hours of supply and water quality.

### 5.2.1 Water production

To compare different CUs, this research uses the litres of water produced per person in a day (Water production per litres/person/day). In the WHO Global Water Supply and Sanitation Assessment 2000, reasonable access was defined as 'the availability of at least 20 litres per person per day from a source within one kilometre of the user's dwelling'. Using litres per capital will allow across utility trending analyses and across period analysis be undertaken within a utility. Drawing conclusions from Inter utility comparisons would be subjective, given the different mix of household sizes and dwellings served by one connection. This is especially the case between utilities in different countries. .



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Figure 5-4: Water Production in Litres per person per day

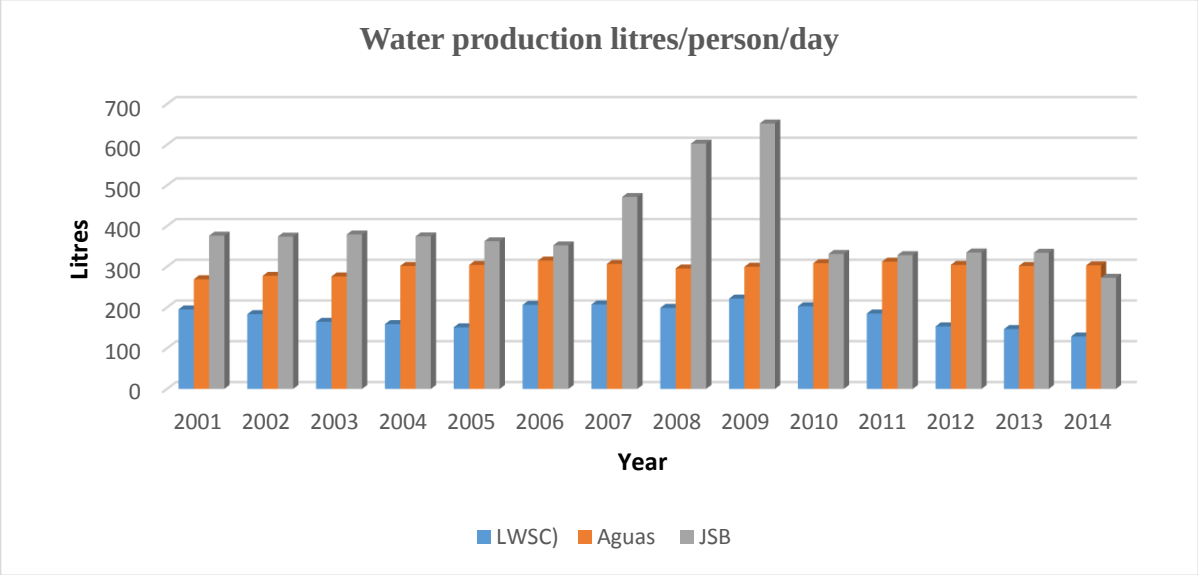


Figure 5-4 above shows that Johannesburg Water produced more water per capita followed by Aguas Andinas and LWSC produced the lowest litres of water per capita per day. Johannesburg Water buys bulk water from Rand Water, therefore the risk of water losses during water abstraction and treatment remains with Rand Water. This could explain the strong performance in water production for Johannesburg Water.

Figure 5-4 shows that there had been minimal change in water production per capita with only Aguas Andinas showing positive trend. Water production per person increased from 269.3 litres per person in 2001 to 303.12 litres per person in 2014 for Aguas Andinas. Johannesburg Water had mixed performance with improvements between 2006 and 2009. LWSC recorded reduction from 195litres in 2001 to 129 litres/person/day in 2014. The reason for decrease in water production per capita for LWSC could be attributed to rapid increase in population because of urbanization in Lusaka city (NWASCO,2015). Population growth rate could have been more than the rate at which the CUs were increasing their water production. Therefore, only Aguas Andinas' performances has shown improvements after commercialisation. However, according to WHO Global Water Supply and Sanitation Assessment (2000) benchmark of at least 20 litres per person per day, then all the three CUs are performing way above the benchmark.

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### 5.2.2 Hours of supply

All things been equally, an increase in water production should result in improved hours of supply to customers. The acceptable benchmark for hours of supply in Zambia is 18 hours per day (NWASCO, 2014).

Figure 5-5: Hours of Water Supply per day

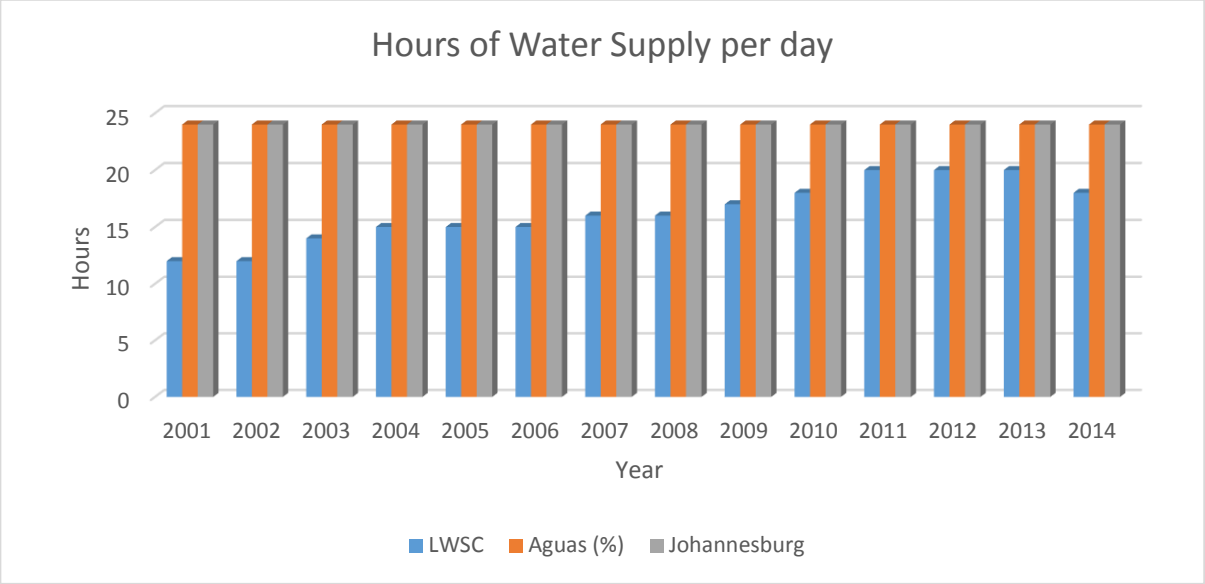


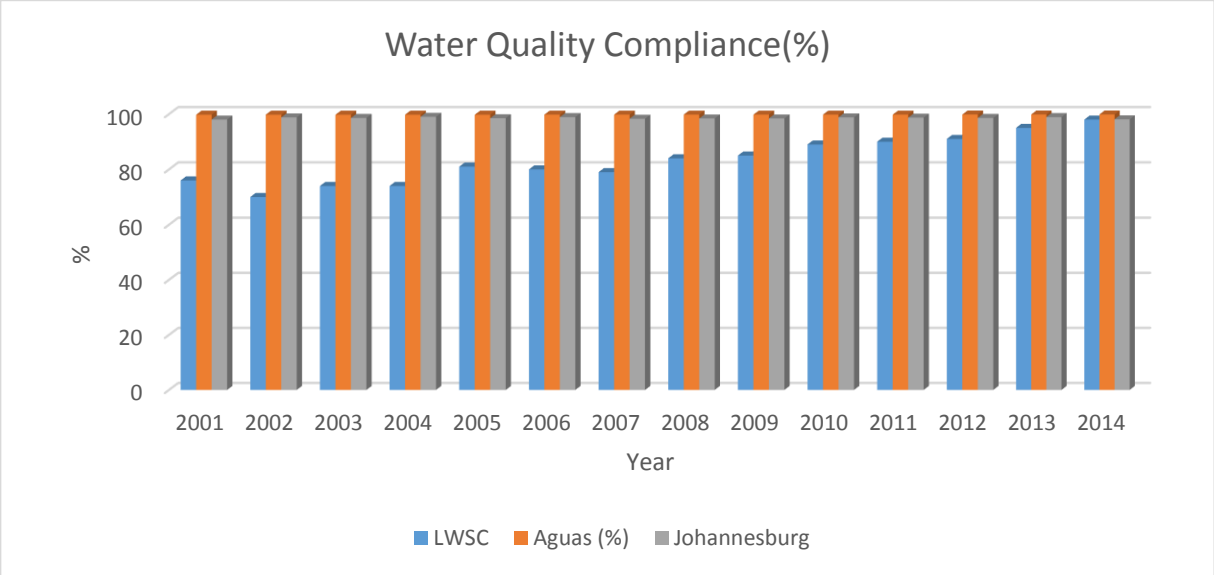

Figure 5-5 above reveals that Johannesburg Water and Aguas Andinas have an average of 24 hours of water supply in a day compared to LWSC with an average of 16 hours for the period 2001 to 2014. These two CUs were already well performing even before commercialisation. There had been improvement regarding the hours of water supply for LWSC from an average of 12 hours in 2001 to 18 hours in 2014. Thus, on average, service hours for LWSC increased by 6 hours per day between 2001 and 2014. This is mainly because of water improvement projects LWSC embarked on in 2011 (LWSC, 2014).

The trend pattern for LWSC is positive and shows that the hours of water supply has improved. LWSC's hours of supply from 2011 onward has improved to above NWASCO benchmark of 18 hours per day. The trend patterns for Johannesburg Water and Aguas Andinas are flat and identical at 24 hours of supply. This means that Aguas Andinas and Johannesburg Water have sustained their excellent performance of supplying water for 24 hours in a day. LWSC had

improved hours of water supply which is an indication of improved service delivery in terms of reliability of service. LWSC's water production and hours of supply were mainly affected by power outages and low water production caused by the draught in 2013 and 2014. This greatly affected LWSC's water production as ground water sources (boreholes) account for 60% and surface water sources account for 40% (LWSC, 2015).

### 5.2.3 Water quality compliance

Figure 5-6: Water Quality Compliance




From the figure 5-6 above, it is clear that Aguas Andinas has the highest compliance percentage with an average of 99.8% followed by Johannesburg Water with an average of 98.5% for the period 2001 to 2014. It is worth noting that Aguas Andinas and Johannesburg Water have maintained above 98% of water quality compliance. The underlying reason for this superior performance could be attributed to strong corporate governance and customer orientation practices.

The average for Johannesburg Water during management contract period (2002 to 2006) was 98.8%. LWSC had the lowest water quality compliance percentage with an average of 83.3% for the period 2001 to 2014. This level of performance which was below international and national quality standards stems from pre-corporatization poor and weak corporate governance

at national level to enforce compliance adequately. The average is far below the Zambian nation benchmark which is 95%. LWSC has however, improved the quality compliance percentage to 98% in 2014.

In 2014, all the three CUs record a high compliance percentage. This means that the quality of water service delivery had improved after commercialisation for all the three CUs. LWSC has improved performance in water quality compliance after commercialisation from 76% in 2001 to 98% in 2014.

The research shows that there had been improvement in hours of water supply and quality of water after commercialisation for LWSC. The most important measure of customer satisfaction is availability of the service which is measured by hours of supply and quality of the service. Since the two indicators, water quality and hours of supply, showed positive trend for LWSC. Even though the water production per litre per capita recorded a minimal decline in litres per person, the research concludes that there has been improvement in service delivery in terms of reliability for LWSC. Both Aguas Andinas and Johannesburg Water maintained strong performance for all the three reliability indicators, this is because both CUs consult and communicate with the customers to establish demand response service and monitor customer satisfaction. The strong performance could also be attributed to strong corporate governance practices in Chile and South Africa as explained in best practices section below.

It was further established that LWSC had been the lowest performing amongst the three case study CUs before and after commercialisation. This finding supports the research hypothesis that private water service provision outperform public water provision in terms of reliability.

### 5.3 Affordability and Profitability indicators

A significant number of literature argue that the rationale behind commercialisation is to improved efficiency and attain financial viability. Thus, the improvements in profitability indicators, unit tariff against unit cost and ROCE imply financial viability and performance improvement. Affordability is measured by the total revenue per service population per GNI and profitability is measured by tariff over unit operating cost and ROCE.

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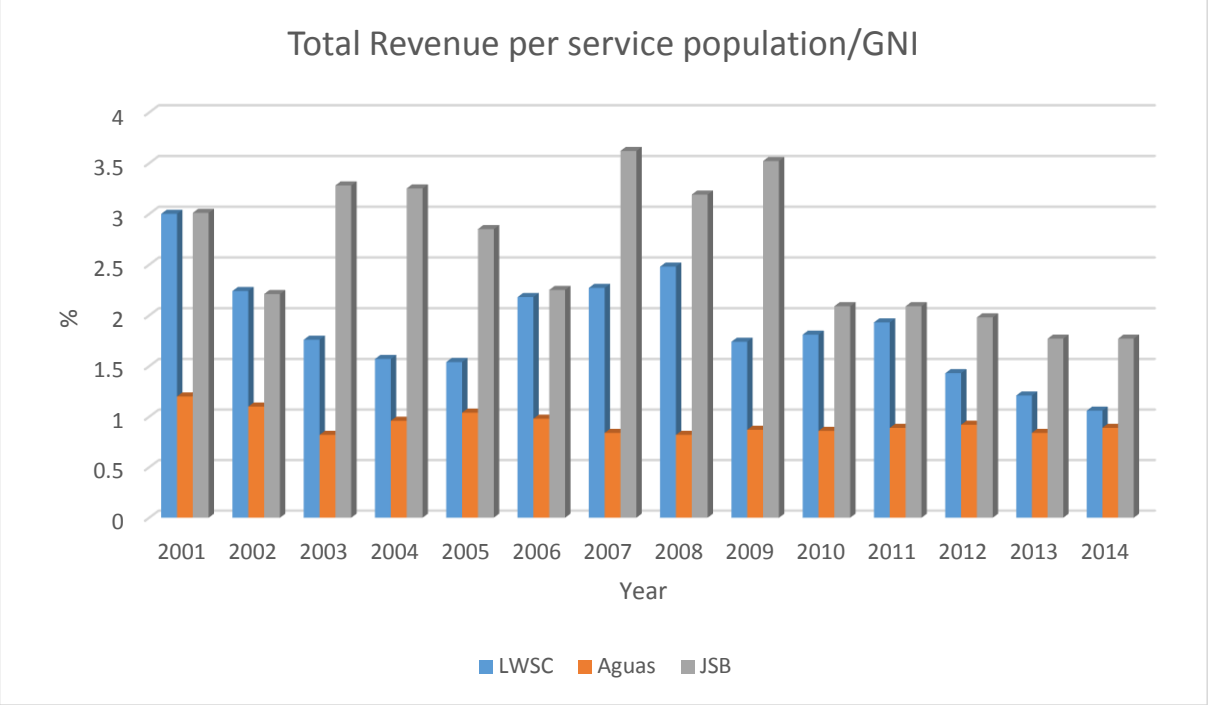
### 5.3.1 Total Revenue per service population/GNI

Figure 5-7: Total Revenue per service population/GNI




Form figure 5-7 above, Johannesburg Water had the highest average percentage of 2.6% GNI per capita followed by LWSC with an average of 1.9% GNI per capita for the period 2001 to 2014. Aguas Andinas had the lowest average per capital tariff of 0.93%. This means that Aguas Andinas had the most affordable tariff and Johannesburg had the highest tariff for the period 2001 to 2014. The favourable tariff by Aguas Andinas could be attributed to good tariff policy, active state involvement and subside system present in Chile.

The patterns show that the average per capital tariff for all the three CUs have reduced from 3.0% for LWSC, 1.2% for Aguas Andinas and 3.01% for Johannesburg Water in 2001 to 1.06%, 0.89% and 1.77% in 2014 respectively. Aguas Andinas charged the lowest tariff. Johannesburg Water pattern shows that the tariff fluctuates more than the other two CUs. From 2011, Johannesburg Water and LWSC trends are declining which indicates that the water service is becoming more affordable. For LWSC, this means that in 2001 the water bill took up 3% of the average monthly household expenditure/income and this has reduced to 1.06% in 2014.

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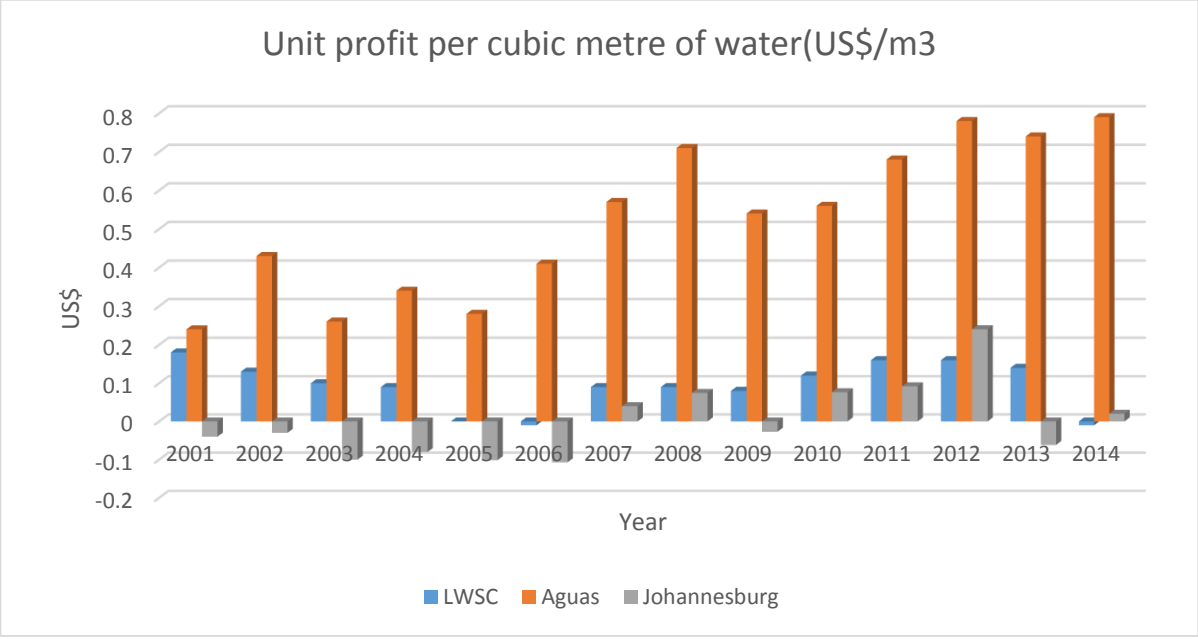
However, this could also be attributed to the steady increment in per capita income over the years which had diluted the significant increase in the water charges after commercialisation.

LWSC's total revenue per service population/GNI is lower than Johannesburg Water's , this means that water supply service is more affordable for LWSC customers than Johannesburg Water.

The performance for LWSC had improved in terms of affordability. In fact all the three CUs have recorded a reduction in percentage of total revenue per service population/GNI after commercialisation which is translated as improved service delivery in terms of affordability. There was also a notable reduction from 3.01% GNI per capita in 2001 to 2.25% GNI per capita at the end of management contract in 2006 for Johannesburg Water. This finding disapprove the claim that private service provision is more expensive than public provision. Contrary to the argument made by critics of privatisation, the affordability of water can potentially be fulfilled in a private system if the state has the capacity to regulate the water sector in the public interest.

### 5.3.2 Unit Profit

Figure 5-8: Unit Profit per cubic metre of water (US$/m3)



From the figure above, it is clear that Aguas Andinas had the highest unit profit across the period 2001 to 2014 with an average of U$0.52m/m3. This could be attributed to the cost reflective tariff system in Chile. The Chilean tariff setting process estimates the tariffs the model company would theoretically charge given the need to meet investment requirements, operation and maintenance costs, and a minimum annual return on assets of at least seven percent (Shirley et al. 2000: 32) LWSC's unit profit average of US$0.09/m3 was higher than Johannesburg Water whose average for the period 2001 to 2014 was a - US$0.01/m3. The free water policy could the main reason Johannesburg Water tariff is lower than the unit cost. The major findings on the losses recorded were that between 2003 and 2006, LWSC did not increase its tariff. Then, the 2013 and 2014 losses were as a result of the currency exchange losses and low water production which was experienced in 2013 and 2014 because of draught and power outages as a result of load shedding.

A negative figure signifies that an institution is not profitable and thus Johannesburg Water had not been profitable from 2001 to 2006. Though the trend has been positive which implies improvement from 2001 to 2014. Therefore, Johannesburg Water has marginally improved performance in terms of unit profit after commercialisation.

Aguas Andinas had a positive trend and is by far the best performing amongst the three CUs in terms of unit profit. Aguas Andinas had improved the performance in terms of unit profit after commercialisation.

LWSC's unit profit declining from 2001 to 2006 and increasing from 2007 to 2013 before it decline sharply in 2014. Period 2008 to 2011, the Zambian economy was generally doing well and the local currency, Zambian Kwacha appreciated against major currencies, particularly the US dollar. LWSC's unit profit was better than Johannesburg Water's across the period 2001 to 2014. LWSC performance in unit profit did not improve after commercialisation. This supports the research hypothesis that privatised CUs outperform corporatised CUs.

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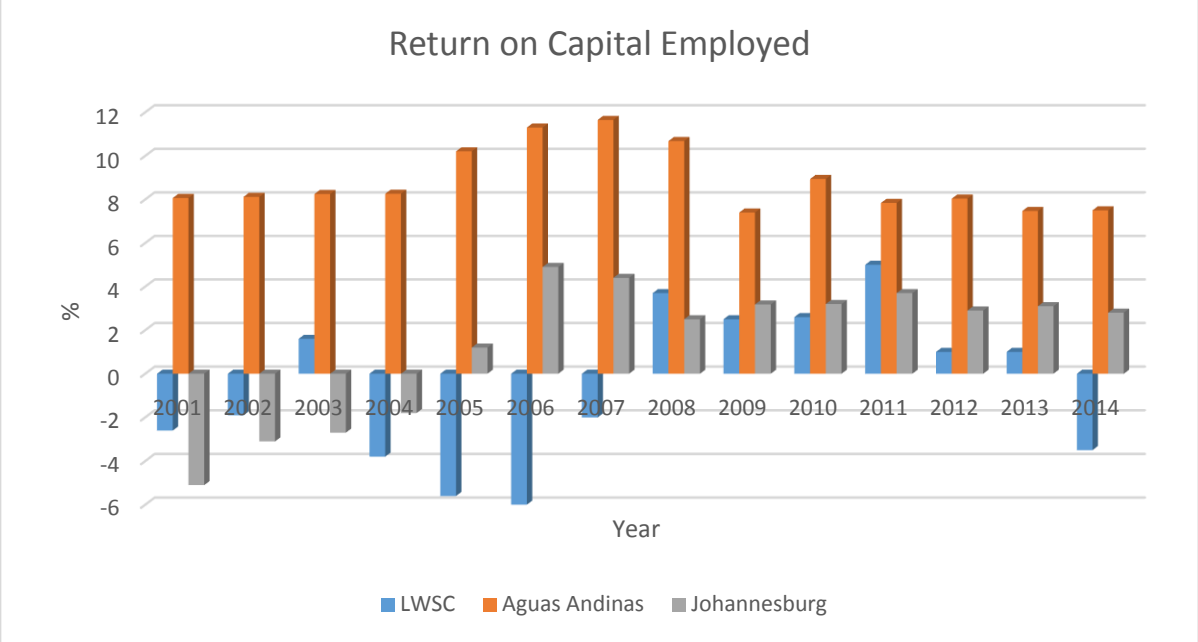
### 5.3.3 Return on Capital Employed (ROCE)

Figure 5-9: Return on Capital Employed




From figure 5-9 above, it is clear that Aguas Andinas had the highest ROCE across all the years 2001 to 2014. There was mixed performance for LWSC and Johannesburg Water, but generally Johannesburg Water performed better than LWSC from 2004 to 2014 as shown above. The negative ROCE recorded from 2001 to 2007 by LWSC could be attributable to low tariff which was only increased in 2007. It was also established that the draught experienced in 2013 and 2014 affected water production and this resuted in low revenue generation. The Zambian Kwacha, local currency, volatility also adversely affected profitability performance for the period 2013 and 2014. Johannesburg Water was essentially bankrupt in 2000, so the reduction in loss amounts during management contract period from -5.1% in 2001 to -1.8% in 2004 followed by years of profit making translate to improved performance.

The return on capital employed (ROCE) for Aguas Andinas is higher than both Johannesburg Water and LWSC mainly because of sound corporate practices and regulatory system to allow the CU to charge an economical tariff. The government of Chile spends approximately $46 million/year on subsidies to help pay the water bills for approximately 680,000 households,

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about 17.4 % of the total clients (SISS, 2007). At the time of privatisation, the ROCE was 8% in 2001, it maintained the positive trend until 2008 when it declined from 12% in 2007 to 10% in 2008. From 2008, ROCE generally decline to 7.5% in 2014. The average ROCE for the period under review was 8.8% for Aguas Andinas. This implies that generally the profitability performance for Aguas Andinas improved after privatisation.

Johannesburg Water had a positive trend from the time of management contract in 2001 through to 2014. ROCE was -5.1% in 2001 before the start of management contract and improved to 4.9% in 2006 at the end of management contract. This positive trend continued even after management contract. ROCE improved from -5.1% in 2001 to 2.8% in 20014 with an average of 1.37% for the period under review. This could be interpreted as improved performances in profitability and efficiency indicators after commercialisation.

LWSC had a mixed performance, ROCE was -2.6% in 2001, it improved to 1.6% in 2003 before it declined to -6% in 2006. Then enjoyed positive growth of 5% in 2011 before declining to -3.5% in 2014. The average ROCE for the period 2001 to 2014 was -0.57%. This is a positive trend. The recent climate change had affected the ground water production and this resulted in low revenue generation in 2013 and 2014. The situation is worsened by currency exchange losses recorded in 2013 and 2014 due to high volatility of the local currency, the Zambian kwacha. A higher ROCE indicates more efficiency and profitability which translate to improved performance of the company. Therefore LWSC, Aguas Andinas and Johannesburg Water had improved their efficiency and profitability performance after commercialisation.

Generally, the affordability and profitability indicators have recorded positive trends after commercialisation for all the three CUs, except LWSC which recorded a negative trend in unit profit. The negative trend in unit profit for LWSC could be attributed to the weakening local currency, Kwacha, which resulted in the company recording huge exchanges losses in 2014. Aguas Andinas was the best performing amongst the three CUs in terms of affordability and profitability. Generally Johannesburg Water performed better in ROCE than LWSC in the period 2001 to 2014.

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For profitability, ROCE is a more common measure of company profitability and efficiency. The unit profit compares average tariff against unit cost. Tariff control is very common in water sector and making this measure difficult to compare across CUs in different environments. The other measure, total revenue per capita uses the entire country's GNI which might distort the CU's performance. Therefore, since all the CUs show positive trends generally, the research interpreted that service delivery had improved after commercialisation for all the three CUs in terms of ROCE and affordability. LWSC performed better than Johannesburg Water across the period under review in affordability.

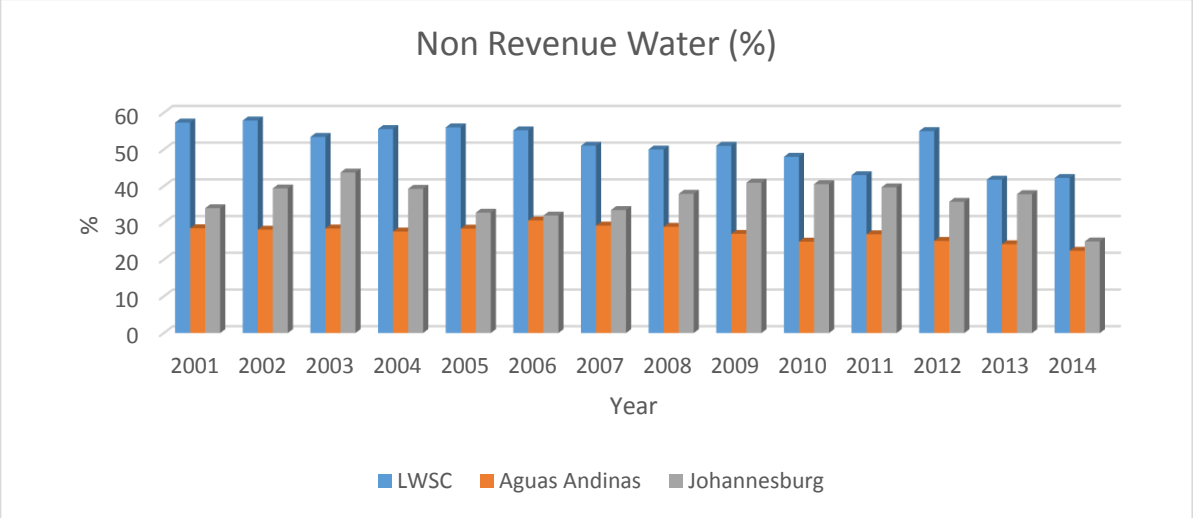
## 5.4 Efficiency indicators

The guiding principle of commercialisation is the desire to accrue the benefits of market based principles like a privately run company which includes efficiency, productivity, and financial sustainability. The key indicator for CU operational efficiency under this research are Non-revenue water, collection efficiency and staff productivity. The figures below summarises the key statistics for the three CUs covering from 2001 to 2014.

### 5.4.1 Non Revenue Water (NRW)

**NRW (%)**

Figure 5-10: Non-Revenue Water (%)

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The figure above shows that LWSC had the highest NRW with an average of 51% followed by Johannesburg Water with an average of 36.6% and Aguas Andinas had the lowest NRW with an average of 27% for the period 2001 to 2014. LWSC's NRW is very high compared to the other two CUs. A high NRW figure imply high level of technical inefficiency. Aguas Andinas's strong performance is as a result of good corporate practices and strong regulatory system. LWSC poor performance is partly attributed to aged water network system, weak regulatory system and poor corporate governance.

There had been improvement; the amount of water lost for LWSC declined from an average of 57.33% in 2001 to 42.24% in 2014, 28.54% in 2001 to 22.4% for Aguas Andinas and from 34% to 24.95% for Johannesburg Water. But, LWSC's NRW remains very high and had in some cases increased from 43% in 2011 to 55% in 2012. It is worth noting that all the three CUs did not meet the NWASCO benchmark of 25% NRW and international benchmark of 20% NRW.

The average NRW for LWSC of 51% translates into a loss in revenue of 51% of the water produced by CUs. This means that on average, LWSC is not able to bill 51% of the water produced. This adversely affects the availability of the commodity to other needy areas. The high levels of NRW also have severe repercussions for the CUs in terms of cost recovery (Komives et al, 2005) and makes it problematic to realise equity objectives or some semblance of sustainability (Foster, 2005).

LWSC had marginally reduced the NRW which means that there has been marginal reduction in their NRW after commercialisation. Compared to Johannesburg Water and Aguas Andinas, LWSC's performance was the lowest across the period 2001 to 2014. Aguas Andinas recorded the lowest NRW for the period under study. This findings support the preposition that privatised CUs are more efficient than corporatised CUs.

**Water loss per length of network per day**

As shown in figure 5-11 below, using volume of water "lost" per km of water distribution network per day also shows that Aguas Andinas's NRW was the lowest with the average of 41.2m3/km/day. The highest NRW was again LWSC with an average of 55.5 m3/km/day for the period 2001 to 2014. Johannesburg Water had an average of 43.2m3/km/day.

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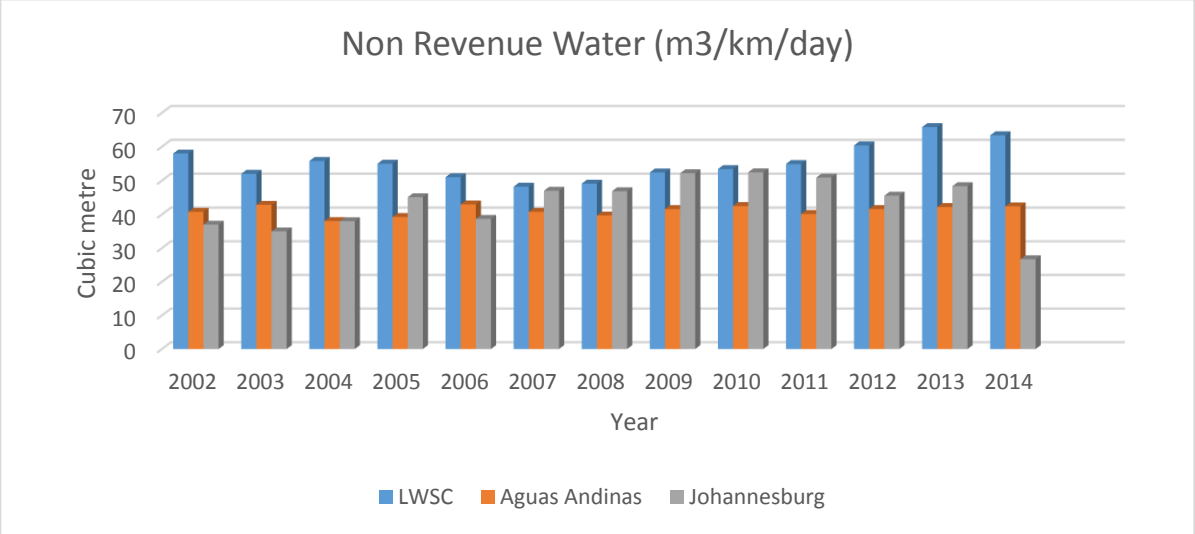
Figure 5-11: NRW (m3/Km/day)




Even if Johannesburg Water reduced its NRW per kilometer from 42m3/km/day in 2001 to 26.71m3/km/day in 2014, the trend has shown that NRW increased generally. The average for the period under review was 43.3m3/km/day which was higher than the 2001 NRW figure of 42m3/km/day. The NRW for LWSC had increased from 58m3/km/day in 2001 to 63.37m3/km/day in 2014. The average from 2001 to 2014 is 55.5 m3/km/day which was lower than the 2001 NRW of 58m3/km/day. This implies that there had been marginal reduction in NRW for the period under review. The amount of water been lost for the CUs through physical leakages and commercial losses are very significant and affects the revenue generation for the CUs.

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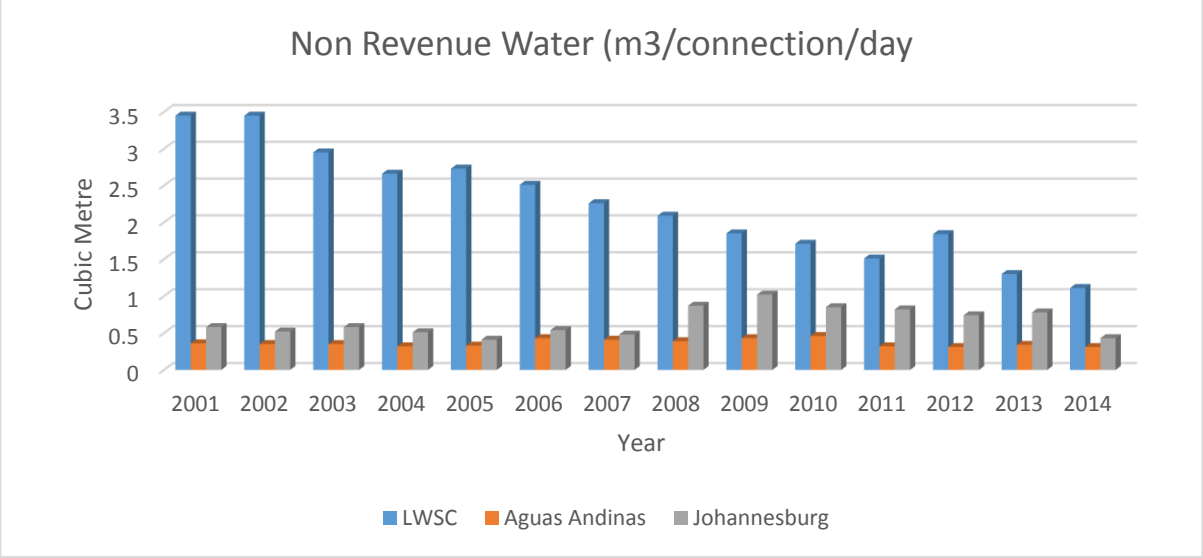
**Water loss per water connection per day**

Figure 5-12: NRW (m3/connection/day)




The NRW measured in m3/connection/day presents interesting trends and almost similar to NRW measured in percentage terms. LWSC had the highest NRW with an average of 2.24m3 per connection per day, followed by Johannesburg Water which recorded as average of 0.65m3 per connection per day and Aguas Andinas had the lowest NRW with an average of 0.37m3 per connection per day.

It is clear that LWSC had the highest NRW but shows a negative trend. NRW reduced from 3.45m3 per connection per day in 2001 to 1.11m3/connection/day in 2014. This implies that NRW had reduced from 2001 to 2014. Johannesburg Water's NRW had also reduced from 0.58m3/connection/day in 2001 to 0.43m3/connection/day in 2014.

The pattern for Aguas Andinas is almost flat which implies that Aguas Andinas has maintained its low NRW of around 0.36m3/connection/day. The NRW reduced from 0.36m3 per connection per day in 2001 to 0.31m3 per connection per day in 2014

The CU with lower NRW is more efficient, therefore Aguas Andinas and Johannesburg Water are more efficient than LWSC in terms of NRW. LWSC old network and lack of regular network maintenance contributed to high NRW. All the three different measures of NRW has

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given us same conclusion that Aguas Andinas had the lowest NRW and that LWSC recorded the highest NRW. From the figure 5-12, LWSC and Aguas Andinas had reduced the NRW after commercialisation which is interpreted as improved performance. Johannesburg Water's NRW has generally increased after commercialisation until 2014 when it recorded significant reduction. It is also worth noting that under management contract, Johannesburg Water reduced its NRW in all the three different measures, therefore, the performance in terms of NRW improved at the end of management contract.

### 5.4.2 Revenue Collection Efficiency.

Figure 5-13: Collection Efficiency

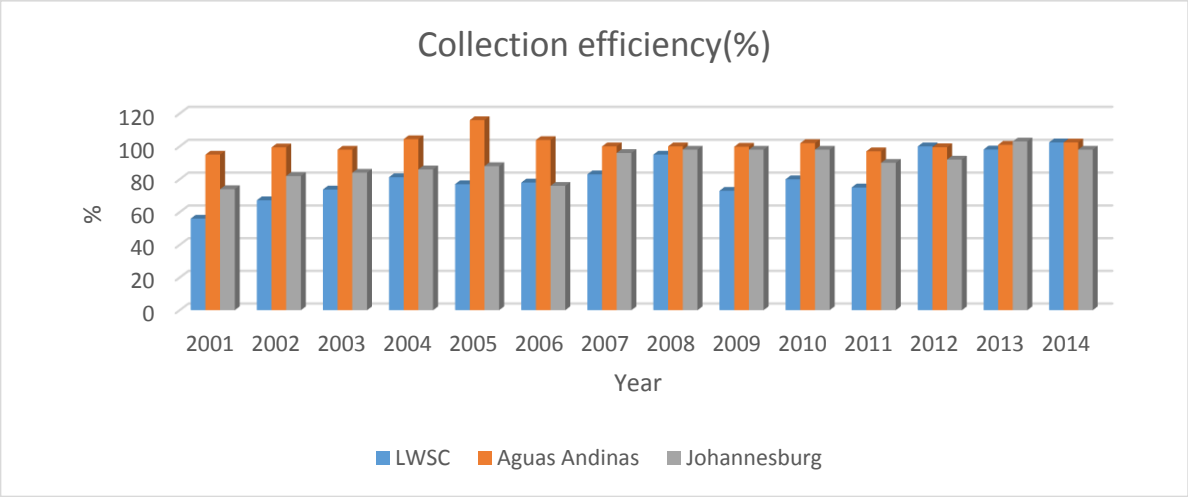


Figure 5-13 above shows that Aguas Andinas recorded the highest collection efficiency with an average of 101% for the period under review. Johannesburg Water collected an average of 90% and LWSC was the lowest with an average of 81%. Aguas Andinas has a robust revenue collection strategy. This indicator is very important for a CU to meet its liquidity obligations like paying suppliers, employees' salaries and statutory remittances (operating license fees, Tax and pension contributions).

All the three CUs show positive trend in revenue collection efficiency. The collection efficiencies improved from 95% in 2001 to 102% in 2014 for Aguas Andinas, 74% in 2001 to 98% for Johannesburg Water and 56% to 102% for LWSC. It is worth noting that LWSC and

Johannesburg Water had improved their efficiency in revenue collection from 2012 to 2014. For Johannesburg Water improvement is also noted from 74% in 2001 to 82% in 2002, 84% in 2003, 86% in 2004, 88% in 2005 and 76% in 2006 when the CU was under management contract. The average collection efficiency during management contract was 83%.

LWSC exhibited the lowest collection efficiency compared to Aguas Andinas and Johannesburg Water for the period 2001 to 2014. The CU with highest collection efficiency is Aguas Andina. This finding is in line with the research hypothesis that privatised CUs outperform corporatised CUs in terms of efficiency. The other finding is that LWSC had improved revenue collection efficiency after commercialisation.

**Collection period**

Figure 5-14: Collection days

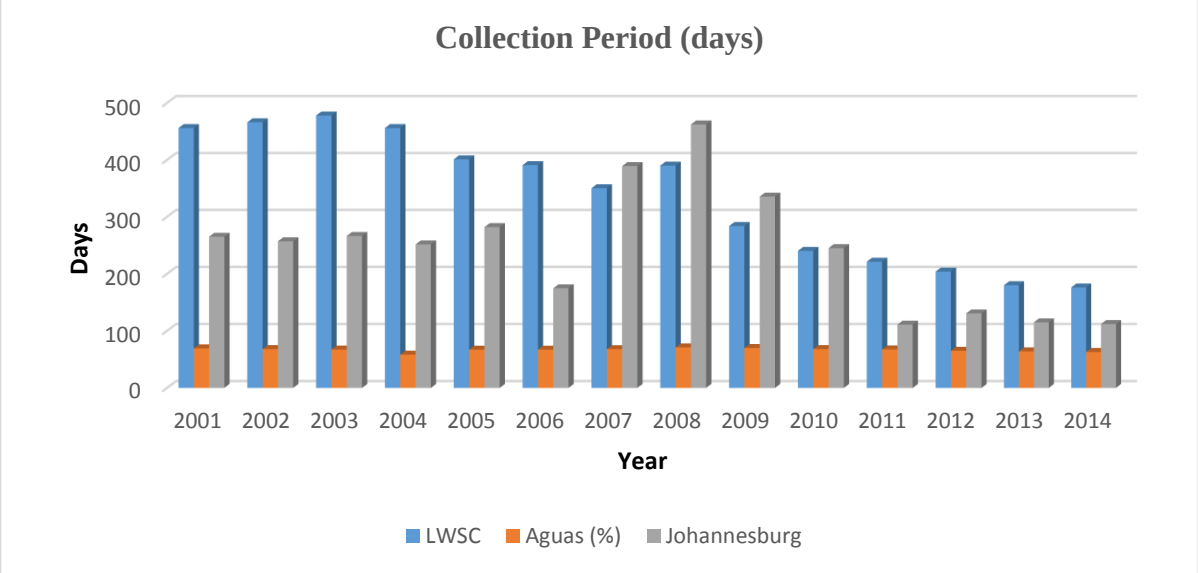


Figure 5-14 above, shows that Aguas Andinas had the lowest collection days averaging around 67days which implies high efficiency in revenue collection process. Johannesburg Water had an average collection days of 243 days from 2001 to 2014 and an average of 246 days during management contract period (2002 -2006). LWSC had the highest average collection days of 355 days for the period 2001-2014. This is implies that LWSC is taking almost a year to collect

its receivables. LWSC had improved the collection days, partly because of introduction of pre -paid meters in some parts of operational areas.

Figure 5-14 reveals that all CUs had reduced the number of collection days with Aguas Andinas recording a reduction from 69 days in 2001 to 63 days in 2014, Johannesburg Water's collection days reduced from 265 days in 2001 to 112 days in 2014 and LWSC had the highest improvement and reduced the collection days from 456 days in 2001 to 176 days in 2014.

Since all the CUs improved their collection efficiency and collection days after commercialisation, this is interpreted as improved performance. High collection ratio and low collection days implies the CU is more efficient in liquidity management. LWSC performance was the lowest generally across the period under review. LWSC had improved performance in terms of liquidity management after commercialisation. Again Aguas Andinas exhibited the highest level of performance to support the belief that private service provision perform better than public service provision in term of efficiency.

### 5.4.3 Operating Cost Coverage.

An efficiently operating provider will keep costs as frugal as reasonably possible in order to cover them from revenue generated at a certain level of tariff. This shows the extent by which a company covers its cost of operations from billed revenue. It shows whether operating revenues exceed operating costs.

From figure 5-15 below, Aguas Andinas had the highest operating cost coverage ratios from 2001 to 2014 with the average ratio of 2.5. LWSC have an average of 1.42. Johannesburg Water was the lowest with an average of 0.99 for the period 2001 to 2014 and 0.94 for the period under management contract from 2002 to 2006. This is again as a result of water regulatory and tariff systems that allows cost reflective tariffs in Chile. This enables the water companies under both public and private ownership to raise the water tariffs to levels that allowed for self-financing.

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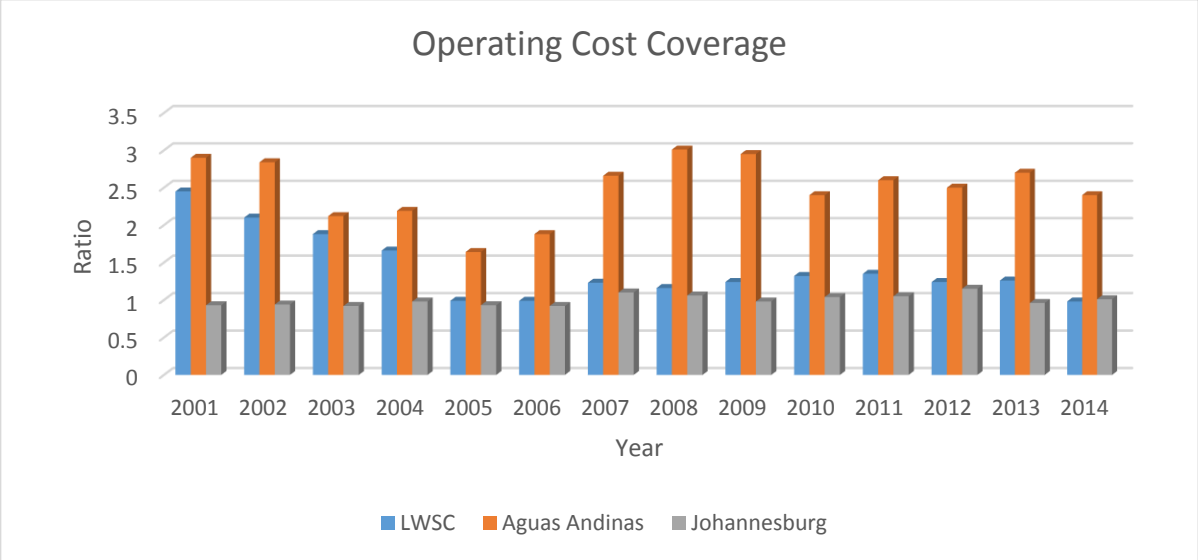
Figure 5-15: Operating Cost Coverage




Only Johannesburg Water recorded a positive trend from 0.93 in 2001 to 1.01 in 2014. Under management contract Johannesburg Water's performance marginally improved from 0.93 in 2001 to 0.94 in 2002, 0.92 in 2003, 0.98 in 2004, 0.93 in 2005 and 0.92 in 2006. This gives an average of 0.94 which is a slight improvement during management contract compared to 2001 ratio of 0.93 before commercialisation. A ratio lower than 1 implies that the operating revenue is lower than the operating cost which means that the CUs might struggle to meet its financial obligations when they fall due.

Both LWSC and Aguas Andinas recorded negative trends form 2.45 and 2.9 in 2001 to 1.14 and 2.5 in 2014. However, both LWSC and Aguas Andinas had above 1 ratios which implies that their revenue is good enough to cover the operating costs. A high percentage implies that the CU is able to meet its financial obligations which could be interpreted as a good performance.

The research finding is that both LWSC and Aguas Andinas did not improve performance after commercialisation and that LWSC was outperformed by Aguas Andinas but performed better than Johannesburg Water under cost coverage for the period 2001 to 2014.

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### 5.4.4 Staff per 1000 water connections.

Figure 5-16: Staff per 1000 connections

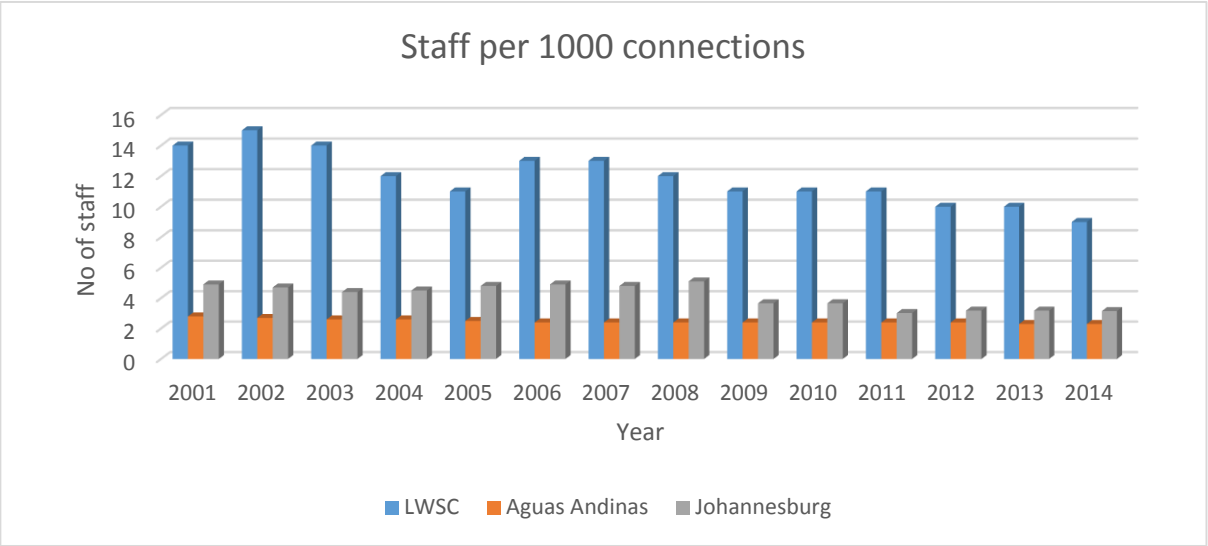


Figure 5-16 above reveals that LWSC had the highest number of staff per 1,000 connections with an average of 12 employees per 1000 connections followed by Johannesburg Water with average of 4 employees per 1000 connections for the period 2001 to 2014. Aguas Andinas of Chile had the lowest number of staff per 1,000 connection with an average of 2 employees per 1,000 connections from 2001 to 2014.

There had been a marginal decrease in the number of staff per 1000 connections for all the three CUs over the period 2001-2014. The trend lines show that all the CUs had reduced the number of staff per 1,000 connections. LWSC reduced from 14 staff per 1000 connections in 2001 to 9 staff per 10000 connections in 2014. Johannesburg Water had recorded an improvement in the number of staff per 1,000 connections after the management contract period from 5 employees per 1000 connections in 2001 and 2006 to 2 employees per 1000 connections in 2014. Aguas Andinas reduced the staff per 1,000 connections from 3 employees in 2001 to 2 employees in 2014. Since all the CUs reduced the number of staff per 1000 connection after commercialisation, there has been improvement in staff efficiency after commercialisation for all the three CUs. there has been improvement in staff efficiency after commercialisation for all

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the three CUs. The reason for this improvement could be that CUs have increased the number of water connections over the period.

LWSC staff per 1,000 connections is still very high compared to privatised Aguas Andinas and corporatised Johannesburg Water. This level of performance is not good as one of the reasons for establishing CUs was to ensure leaner and consequently more efficient utilities (Kabinga, 2012). However, LWSC had improved staff efficiency after commercialisation from 14 staff per 100 connections in 2001 to 9 staff per 1000 connections in 2014.

Generally all the CUs showed positive trends in efficiency indicators which implies that operational efficiencies improved after commercialisation. Aguas Andinas was generally the best performing CUs for the period 2001 to 2014 in all efficiency indicators. LWSC was the lowest in Staff efficiency, NRW and Collection efficiency. LWSC had not performed better than Aguas Andinas and Johannesburg Water across the period 2001 to 2014 largely because of lack of investment, weak regulatory policy and the poor state the organization was in before corporatisation. LWSC performed better than Johannesburg Water in operation cost coverage. These findings support the research hypothesis that private water provision is more efficient than public water provision.

## 5.5 Good practices Adopted by Aguas Andinas of Chile

### 5.5.1 Corporate Governance

At a national level, Chile has made considerable progress in improving its corporate governance practices, through laws adopted in 2000 on Public Tender Offers and on Corporate Governance and a significant Corporate Governance law approved by Congress in 2009. The law enhanced transparency standards and conflicts of interest to protect minority shareholders (OECD, 2011). There is a shareholders agreement contract which with agreed obligations of each party, the reporting and monitoring requirements, and any incentives or penalties. Aguas Andinas' Board of Directors is composed of seven titular members, each of whom has a respective substitute that can potentially replace the titular member permanently in the case of vacancy, and temporarily in the case of absence or impediment. The directors do not have to be shareholders

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of the Company but they can chose to have Company shares. Directors are chosen for a three year period and after this period, the board must be completely renewed.

### 5.5.2 Customer Orientation

Aguas Andinas values customers as a source of revenue. They consult and communicate with the customers to establish demand response service and monitor customer satisfaction. It was established that Aguas Andinas had adopted the customer orientation practices which include friendliness of the customer billing and collection system, orientation toward seeking customers' opinions and views, availability of options for service delivery, timely information to customers on developments in relation to water services, and response to customers' complaints. During 2014, Aguas Andinas elaborated its "Customer Strategy 2015-2020" plan, which seeks to strengthen the link that the Company maintains with its clients and thus strengthen its presence in the territory where it operates. The first step in this task was listening to customers. Work groups were conducted with customers of different ages and socio-economic backgrounds with the objective of identifying the connections and links of water with people, as well as their main interests and concerns in relation to service (Aguas Andinas, 2014).

## 5.6 Good practices by Johannesburg Water of South Africa

### 5.6.1 Corporate governance

South Africa commit to good corporate governance through the King's Report on Corporate Governance 2002 which set out a Code of Corporate Conduct and was widely adopted among government-owned companies. The City of Johannesburg developed a service delivery agreement with Johannesburg Water which reflects overall municipal goals. The service delivery agreement includes: Key Performance Indicators (KPIs) including quantifiable targets for UFW, revenue collection, and training targets. On an annual basis, Johannesburg Water's performance against plan is published in the form of a scorecard. Johannesburg Water has a single-tier Board of 11 members. The Board is selected by a committee of City Councilors from applicants responding to a public advertisement and includes a specified range of sector professionals and community representation including legal, financial, community,

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environmental, commercial, and human resource skills. The Chair is appointed from a short list of two people identified by the Board itself.

### 5.6.2 Customer Orientation

Johannesburg Water is customer centric and has well defined communication channels with its customer to establish demand responsive service through a customer charter. Customer satisfaction is measured and monitored yearly. There is regular monitoring and reporting on clear targets for improving customer satisfaction. It is worth noting that Johannesburg Water does not abstract water but rather buy in bulk from Rand Water. This helps the CU to focus on customer needs.

## 5.7 Good practices by LWSC

### 5.7.1 Corporate governance

It was established that at national level there is no known established commitment to corporate governance though the national sector regulator, NWASCO monitors corporate governance and management indicators for all the CUs. LWSC has a non–executive Board of Directors which provides guidance to the Company in terms of policy making. All the board members are appointed by the shareholders. The board consists of members from both the Government and Private Sector.

### 5.7.2 Customer orientation

LWSC has a formal statement of its service obligations to customers in form of service level guarantee. There is a developed customer service charter which spell LWSC commitment to customers. The billing and payment systems are very friendly with electronic payment method. Customer satisfaction is measured and evaluated although not at regularly. It was stablished that only one customer satisfaction survey has been conducted from 2008 to 2014. LWSC is able to seek customers' opinions and views through suggestion box, TV and radio phoning programmes (LWSC,2015).

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## 5.8 Limitation

The the study is limited to commercialised utilities in developing economies, and consequently, unable to speak authoritative to water supply utilities in other contexts.

The study was only limited to three commercialisation models privatisation, corporatisation and management contract, it does not compare with a well performing municipal water department, and hence cannot conclude that only these three forms of commercialisation models pave way for improved performance in the sector.

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# Chapter Six: Summary of the Findings and Conclusion

## 6.0 Summary of the Findings

It is apparent from the previous section that generally all the three CUs have improved their service delivery after commercialisation. Yet overall, it seems that Aguas Andinas is the best performing CU. Johannesburg Water outperformed LWSC in terms of service accessibility, reliability and efficient. Zambia's LWSC performed better than Johannesburg Water in profitability and affordability indicators across period 2001 to 2014.

The primary objective of this study was to assess how different commercialisation models implemented in developing economies have improved water supply service delivery. The statistical analysis in this research was made possible by using selected international benchmark performance indicators from IBNET. Performance improvement in water service delivery was looked at in terms of accessibility, reliability, profitability, affordability and efficiency for three different CUs; LWSC, Aguas Andinas and Johannesburg Water. An analysis of the water commercialised CUs operating in developing economies from 2001 to 2014 revealed the following findings and conclusions:

There had been improvement in all operational efficiency indicators for the three CUs after commercialisation. Aguas Andinas exhibited the highest level of efficiency in pre- and post-commercialisation performance. This strong performance could be attributed to strong government involvement through regulation, tariff and subside systems; and adoption of best practices in service provision. LWSC was the lowest in Staff Efficiency, NRW and Collection Efficiency for the period 2001 to 2014. This poor performance could stem from aged water network system, lack of strong corporate governance and little government support. Zambia and other developing countries can learn from Chile and South Africa, where the Chilean government funds a massive subsidy system to assist poor clients and the South Africa's indigenous policy that allow for provision of free water per month. However, the study concludes that LWSC improved performance in terms of efficiency after commercialisation. This study therefore, supports the claim that private delivery of water service is more efficient than public delivery of water service. It disapproves the findings that claimed that private and

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public delivery of water service do not show systematic differences in terms of efficiency (Bel, Fageda, & Warner, 2010; Bel & Warner, 2008; Gonza´lez-Go´mez & Garcı´a-Rubio, 2008). This implies that private delivery of water is able to offer greater efficiency provided there is strong government involvement to regulate and support the sector.

All the three CUs had improved service delivery in terms of accessibility and reliability after commercialisation. Despite the improvement, this study validates Kabinga's (2012) findings that Zambian CUs had recorded marginal improvement in service coverage which was attributed to both the rising population pressure and low investments for infrastructural development in the water sector. Johannesburg Water and Aguas Andinas maintained their strong performance of 24 hours of water supply, 100% service coverage and above 98% water compliance percentage. Aguas Andinas was the best performing CU and LWSC exhibited the lowest level of performance for the period 2001 to 2014. LWSC had improved performance after commercialisation in terms of access and quality of the service. Contrary to Kaufman and Nelson's (2004), findings that that privatisation posed a challenge for protecting access to quality services for the poor in other social service sectors such as health and education, this study supports the theory that private service provision outperform public service provision of water in terms of accessibility and reliability.

Generally, the affordability indicator recorded positive trend after commercialisation for all the three CUs. Several studies found that privatisation poses a problem for equitable access to the poor, particularly in monopoly sectors (Birch and Haar, 2000; Manzetti, 1999; Teichman, 2001; Ramamurti, 1996). However, this study established that water is more affordable under Aguas Andinas' full privatisation system. In fact, the finding show that the affordability percentage reduced from 1.2% GNI per capita in 2001 to 0.89% GNI per capita in 2014. It was established that Johannesburg Water, privately managed between 2002 to 2006, had the highest average of 2.63% GNI per capita and LWSC had an average of 1.87% GNI per capita. Therefore, based on LWSC and Johannesburg comparison, this research established that public or private delivery of water does not show systematic difference in terms of service affordability. Affordability is influenced more by other factors like state of economy, regulatory system, and government tariff and subside policies.

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All the three CUs showed a positive trend on ROCE indicator. Aguas Andinas and Johannesburg Water showed positive trend in unit profit after commercialisation, except LWSC which recorded a negative trend in unit profit. The negative trend in unit profit for LWSC could be attributed to the weakening local currency, Kwacha, which resulted in the company recording huge exchange losses in 2014. Aguas Andinas was the best performing pre- and post-commercialisation in terms of affordability and profitability. LWSC outperformed Johannesburg Water in unit profit while Johannesburg Water outperformed LWSC in ROCE. The study concluded that LWSC did not improve profitability performance after commercialisation and supports Estrin's (2009) findings that the relationship between ownership and profitability is more complex than initially considered, and issues such as state of economy, corporate governance, customer orientation, management style and skills also influence profitability.

**Lessons from different reforms. (How should water utilities be managed in developing market economies?)**

The study established that Zambia was rushed into reforms because of pressure from the multinational institutions for debt relief and internal factors such as the disarray in the water sector, the inability of councils to meet water demand, ageing infrastructure. The Chilean government carried out a series of gradually and internally driven reforms to the water sector that prepared the sector for privatisation (Valenzuela & Jouravlev, 2007). This helped in putting regulatory and tariff systems in place before privatisation started. It was also established that the municipality of Johannesburg followed a radically different logic of corporatizing and engaging a private operator. It made the strategic decision after recognising the need to contract outside professional help. Contrary to the Zambian water reform where the Regulator, NWASCO, started operating in June 2000 by then some CUs like LWSC and Chipata Water were already formed, the Chilean government created a regulatory framework and an effective regulator that was in place prior to privatisation. I recommend that developing governments considering reforms should strategically plan and put the systems in place before embarking on water reforms.

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It was established that the Chilean government funds a massive subsidy system to assist poor clients and that Johannesburg Water provide between 6 and 15 cubic meters of water per month for free, depending on the poverty level of residents. There was no established subside system in Zambia at the time of this research. This finding is in support of Chitonge's (2006:19) study which concluded that there had been a "subtle disappearance of the state from being the guarantor and protector of people's right of access to water in Zambian water sector. For commercialisation to achieve the desired goals, there is need for a strong state capacity to govern the water sector in the public interest by strong regulation and protection of the poor.

It was also established that public companies, such as EMOS in Santiago, were already efficient and successful as opposed to Zambian and South Africa's experience. There was "limited need, if any at all, for organisational restructuring," and a strong regulatory framework set up by the government had been in place for years (Lobina and Hall 2007: 34). At the time of corporatisation, City of Johannesburg was essentially bankrupt and water service provision in Zambia was highly inefficient with old networks and poor water quality. These findings support the argument that a strong state role is necessary to accessibility, reliability and affordability of water supply service. The other lesson learnt is that an efficient public company is likely to perform more efficient after commercialisation as opposed to commercializing an underperforming public company. The EMOS in Santiago, was built with public investment, the government established a strong regulatory framework prior to privatisation, and the government heavily subsidizes the water bills to allow the private companies to charge a price that is high enough to maintain the system and make a profit. Therefore, I argue governments of developing nations to use the Chilean experience as a model for building a strong public water sector with sound state interventions.

The research established that management contract could be ideal where private and outside professional help is needed. Johannesburg Water entered into Management contract to leverage the expertise of an experienced operator for a few years in order to establish a viable, corporatised public water utility and turn around an essentially bankrupt CU (Marin, Mas, & Palmer, 2009). As shown by the research findings and other stakeholders, the five-year management contract in Johannesburg recorded notable successes in key performance indicators. Besides achieving a complete financial turnaround, taking the utility from



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bankruptcy to a small profit with a tariff increase of only 6 percent in real terms, the private operator played an essential role as a change agent.. (Marin, Mas, & Palmer, 2009). The culture has continued as evidenced by stable performance beyond management contract. I recommend using of professional help through PPPs to improve efficiency from experienced private operators for governments who are unwilling to transfer the ownership of water provision to private hands.

It was established that national commitment to corporate governance in terms of law and regulation is a key driver of sound corporate governance. CUs operating in countries with national commitment showed high compliance to corporate governance practices. South Africa has Kings Report and Chile has a law on corporate governance. For any form of water provision, I recommend strong corporate governance commitment at national level through a national policy or law. It was also established that Aguas Andinas encourages innovation and has sound draught and hydraulic management systems.

In conclusion, this research established that private service delivery with strong state involvement outperformed public service delivery in terms of efficiency, accessibility, reliability and affordability. The study conclude that privatisation, corporatisation and management contract are all suitable models for developing nations, provided there is an established independent regulator, strong government involvement, sound corporate governance, customer orientation and good institutional system.

It was also clearly established that all CUs improved performance after commercialisation because of application of market principles and adoption of good corporate practices. LWSC had not performed better than Aguas Andinas and Johannesburg Water across the period 2001 to 2014 largely because of lack of investment and weak regulatory policy Therefore, there is need for LWSC, other CUs and governments in developing market economies to emulate Aguas Andinas' and Johannesburg Water's good corporate practices.

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## 6.7 Future research

As future research, It would also be important to pursue qualitative approaches to understanding the specific reform experiences in each of the three countries to capture other factors to influence performance. Future researches should compare the organizational and operational arrangements of different models of commercialisation to gain an insight on what triggers efficiency in an organisation providing water service. It would also be important to research on how different reforms have attracted investment in water and sanitation sector.

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# APENDICES

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# Appendix 1: Summary of performance Status (extract)

| | | | KEY STATISTICS FROM 2001 TO 2014 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CONNECTIONS | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | 2004...09 | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 34,814 | 35,014 | 36,263 | ,,,,,,, | 76,749 | 78,394 | 79,475 | 85,832 | 92,440 | 2.66 |
| Aguas | 1,303,880 | 1,401,325 | 1,435,723 | ,,,,,,, | 1,908,816 | 1,966,639 | 1,984,132 | 2,039,298 | 2,096,999 | 1.61 |
| Johannesburg | 471,776 | 519,621 | 521,453 | ,,,,,,, | 597,451 | 615,645 | 629,987 | 641,200 | 654654 | 1.39 |
| Water Coverage | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 80 | 81 | 81 | ,,,,,,, | 70.23 | 75.29 | 85.27 | 86.48 | 86.16 | 76.40 |
| Aguas | 99.95 | 99.95 | 100 | ,,,,,,, | 100 | 100 | 100 | 100 | 100 | 99.99 |
| Johannesburg | 85 | 89 | 97.2 | ,,,,,,, | 100 | 100 | 100 | 100 | 100 | 97.24 |
| | | | | | | | | | | |
| Sanitation Coverage | YEAR | | | ,,,,,,, | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 11.08 | 10.36 | 9.73 | ,,,,,,, | 18.6 | 19.9 | 19.1 | 19.4 | 20.11 | 13.63 |
| Aguas (%) | 98 | 98.1 | 98.15 | ,,,,,,, | 99.8 | 99.8 | 99.85 | 99.85 | 99.85 | 98.94 |
| Johannesburg | 80.2 | 81.5 | 81.5 | ,,,,,,, | 86.7 | 87 | 87.07 | 87.07 | 87.07 | 84.19 |
| Water Production (Litres/Pe | YEAR | | | ,,,,,,, | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 195.14 | 183.61 | 164.61 | ,,,,,,, | 202.88 | 185.15 | 153.5 | 146.92 | 128.81 | 178.96 |
| Aguas | 269.3 | 277.51 | 275.9 | ,,,,,,, | 308.54 | 312.41 | 304.5 | 301.8 | 303.12 | 298.29 |
| JSB | 376.1 | 373.87 | 379.19 | ,,,,,,, | 331.37 | 328.41 | 334.71 | 334.11 | 272.86 | 396.11 |
| Hours of supply | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 12 | 12 | 14 | ,,,,,,, | 18 | 20 | 20 | 20 | 18 | 16.29 |
| Aguas (%) | 24 | 24 | 24 | ,,,,,,, | 24 | 24 | 24 | 24 | 24 | 24.00 |
| Johannesburg | 24 | 24 | 24 | ,,,,,,, | 24 | 24 | 24 | 24 | 24 | 24.00 |
| Water quality | YEAR | | | ,,,,,,, | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 76 | 70 | 74 | ,,,,,,, | 89 | 90 | 91 | 95 | 98 | 83.29 |
| Aguas (%) | 99.78 | 99.78 | 99.78 | ,,,,,,, | 99.8 | 99.8 | 99.85 | 99.85 | 99.85 | 99.80 |
| Johannesburg | 98.01 | 98.8 | 98.6 | ,,,,,,, | 98.8 | 98.7 | 98.6 | 98.9 | 98.1 | 98.57 |
| Rev/ service population/GN | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 3 | 2.24 | 1.76 | ,,,,,,, | 1.81 | 1.93 | 1.43 | 1.21 | 1.06 | 1.87 |
| Aguas | 1.2 | 1.1 | 0.82 | ,,,,,,, | 0.86 | 0.89 | 0.92 | 0.84 | 0.89 | 0.93 |
| JSB | 3.01 | 2.21 | 3.28 | ,,,,,,, | 2.09 | 2.09 | 1.98 | 1.77 | 1.77 | 2.63 |
| Unit profit | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 0.18 | 0.13 | 0.1 | ,,,,,,, | 0.12 | 0.16 | 0.16 | 0.14 | -0.01 | 0.09 |
| Aguas | 0.24 | 0.43 | 0.26 | ,,,,,,, | 0.56 | 0.68 | 0.78 | 0.74 | 0.79 | 0.52 |
| Johannesburg | -0.04 | -0.03 | -0.1 | ,,,,,,, | 0.0764481 | 0.0918942 | 0.2401071 | -0.0617379 | 0.02 | 0.00 |
| ROCE | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | -2.6 | -1.9 | 1.6 | ,,,,,,, | 2.6 | 5 | 1 | 1 | -3.5 | -0.57 |
| Aguas Andinas | 8.07 | 8.12 | 8.25 | ,,,,,,, | 8.94 | 7.84 | 8.04 | 7.47 | 7.5 | 8.84 |
| Johannesburg | -5.1 | -3.1 | -2.7 | ,,,,,,, | 3.2 | 3.7 | 2.9 | 3.1 | 2.8 | 1.37 |
| NRW | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 57.33 | 57.89 | 53.42 | ,,,,,,, | 48 | 43 | 55 | 41.77 | 42.24 | 51.24 |
| Aguas Andinas | 28.54 | 28.17 | 28.47 | ,,,,,,, | 24.9 | 26.9 | 25.1 | 24.2 | 22.4 | 27.19 |
| Johannesburg | 34 | 39.39 | 43.72 | ,,,,,,, | 40.55 | 39.69 | 35.74 | 37.83 | 24.95 | 36.59 |
| NRW(m3/km/day) | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 58 | 58 | 52 | ,,,,,,, | 53.4 | 54.9 | 60.4 | 65.82 | 63.37 | 55.53 |
| Aguas Andinas | 42.41 | 40.78 | 42.84 | ,,,,,,, | 42.5 | 40.14 | 41.6 | 42.2 | 42.4 | 41.23 |
| Johannesburg | 42 | 37 | 35 | ,,,,,,, | 52.45 | 50.89 | 45.56 | 48.35 | 26.71 | 43.27 |
| NRW (m3/conn/day) | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 3.45 | 3.45 | 2.95 | ,,,,,,, | 1.71 | 1.51 | 1.84 | 1.3 | 1.11 | 2.24 |
| Aguas Andinas | 0.36 | 0.35 | 0.35 | ,,,,,,, | 0.46 | 0.32 | 0.31 | 0.34 | 0.31 | 0.37 |
| Johannesburg | 0.58 | 0.52 | 0.58 | ,,,,,,, | 0.85 | 0.82 | 0.74 | 0.78 | 0.43 | 0.65 |
| Collection Efficiency | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 56.02 | 67.21 | 73.74 | ,,,,,,, | 80 | 75 | 100 | 98.12 | 102.45 | 81.41 |
| Aguas Andinas | 95 | 99.4 | 98 | ,,,,,,, | 102 | 97 | 99.5 | 101 | 102.4 | 101.31 |
| Johannesburg | 74 | 82 | 84 | ,,,,,,, | 98 | 90 | 92 | 103 | 98 | 90.21 |
| Collection Period (days) | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 456 | 466 | 478 | ,,,,,,, | 240.2 | 221.2 | 204 | 180 | 176 | 335.24 |
| Aguas Andinas | 69.4 | 68.1 | 67.2 | ,,,,,,, | 68.1 | 67.4 | 65.2 | 64 | 63 | 66.71 |
| Johannesburg | 265 | 257 | 266.42 | ,,,,,,, | 245 | 110.85 | 130.6 | 114.94 | 112 | 242.63 |
| O +M Cost coverage | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 2.45 | 2.1 | 1.88 | ,,,,,,, | 1.32 | 1.35 | 1.24 | 1.26 | 0.98 | 1.42 |
| Aguas Andinas | 2.9 | 2.84 | 2.12 | ,,,,,,, | 2.4 | 2.6 | 2.5 | 2.7 | 2.4 | 2.49 |
| Johannesburg | 0.93 | 0.94 | 0.92 | ,,,,,,, | 1.04 | 1.05 | 1.15 | 0.96 | 1.01 | 1.00 |
| staff per 1000 connections | YEAR | | | | | | | | | |
| | 2001 | 2002 | 2003 | ,,,,,,, | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
| LWSC | 14 | 15 | 14 | ,,,,,,, | 11 | 11 | 10 | 10 | 9 | 11.86 |
| Aguas Andinas | 2.8 | 2.7 | 2.6 | ,,,,,,, | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.47 |
| Johannesburg | 4.9 | 4.7 | 4.4 | ,,,,,,, | 3.66 | 3.02 | 3.18 | 3.18 | 3.15 | 4.14 |

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