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**WATER SECURITY AMONGST IMPOVERISHED HOUSEHOLDS IN THE
SUNDAYS RIVER VALLEY MUNICIPALITY:
COMMUNITY EXPERIENCES
AND PERSPECTIVES**

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ABSTRACT

Water security is influenced by the complex interplay between ecological, socio-political, governance and water management systems. Achieving water security is essential for ensuring sustainable development, and challenges with water security are closely linked to the overall experience of poverty that many countries throughout the world, including South Africa, confront. These problems can broadly be understood through three main factors: water availability, access and usage; water governance and management underpin these factors. Water insecurity can often be seen in townships within South Africa, where water service delivery and water access is precarious. This study provides a lens into the water security experiences of two poor township communities in the Sundays River Valley Municipality (SRVM) namely Nomathamsanqa in Addo and Aquapark in Kirkwood. The research assessed water security patterns amongst RDP, township and informal settlement households serviced by the SRVM and found that communities face severe water security problems. Specifically, it was found that all township households encounter frequent water shortages, cuts in municipal water supply and water quality concerns. Issues around the payment for water and dissatisfaction with water service delivery also emerged. The purpose of this research was to allow for community experiences and perspectives to be expressed in an academic space that has previously been dominated by water management and policy makers. The study concludes that these communities within the SRVM experience significant challenges in securing safe water and these are largely due to social water scarcity issues and the difficulties the municipality faces concerning water service delivery.

DECLARATION

I, Lara Molony hereby declare that this thesis is my own original work. It has not been submitted for any degree or examination at any other University, and that the sources I have used have been fully acknowledged and referenced. This thesis is submitted for the Degree of Masters in Social Science at Rhodes University, South Africa.

Signature

A handwritten signature in black ink, appearing to read 'Lara Molony', written in a cursive style.

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ABBREVIATIONS

CMA- Catchment management Agency

DWA- Department of Water Affairs

FBW- Free Basic Water

FBS- Free Basic Sanitation

MDG - Millennium Development Goals

LSRV- Lower Sundays River Valley

NWA- National Water Act

NWRS2- The second National Water Resources Strategy

RDP- Reconstruction and Development programme

SRVM- Sundays River Valley Municipality

WSA- Water Service Authority

WSP- Water Service Provider

WTWs- Water Treatment Works

WUA- Water User Associations

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CHAPTER ONE:

INTRODUCTION AND GLOBAL PERSPECTIVE

1.1 WATER AND DEVELOPMENT

Where there is water there is life: water is the most crucial resource upon which human survival and development depend. Whether for food security, poverty reduction, economic growth, energy production or human health – water is the nexus (Global Water Partnership, 2010). It is a key factor in the achievement of each of the Millennium Development Goals (MDGs) and achieving water security is one of the greatest developmental challenges confronting the world today (US AID, 2013). Water security reflects a country's ability to function productively in the face of water vulnerability and is a precondition for sustainability (World Bank, 2009). Water security is closely aligned to water service delivery, yet it goes further than this and can be seen as the outcome of the complex interplay between ecological, political, governance and water management systems. As a result, failure to achieve water security needs to be viewed within the context that these systems are not only intertwined, but are specific to each country and that any water-related problem cannot be solved independently of the multiple dimensions that affect it (GWP, 2010). Securing water access is an integral part of people's multi-faceted livelihoods. Manifestations of water security become more evident at the micro-levels of society; namely communities and households at the local level. Understanding the realities at the local level can provide a valuable contribution to policy makers and water managers in advancing water security for those facing poverty. Therefore, there is a need to not only understand the linkages between water security and the broader context in which it occurs, but to also understand and realise the value that local perspectives and community experiences hold.

“Security has now come to mean human security and its achievement through development. Water fits within this broader definition of security — embracing political, health, economic, personal, food, energy, environmental and other concerns — and acts as a central link between them.”

(Michel Jarraud, Chair of UN-Water, 2013).

The challenges with water security are part of the overall experience of poverty that many throughout the world including in South Africa face. These problems can broadly be

understood through three main factors: water availability, access and usage, and these factors are underpinned by water governance and management.

1.1.1 WATER AVAILABILITY

During the past century, water availability has become a prominent global concern, particularly as demands for fresh water have exceeded our capacity to meet them. Throughout the world, water use has been escalating at more than twice the rate of population increase. Numerous countries are reaching the limit at which their water services can cope with both demand and sustainable delivery (Food Agriculture Organisation, 2009). Essentially, geopolitical changes, growing population and rising consumption levels along with increasing urban areas are placing unprecedented pressure on industry, energy and food production resulting in an increase in competition and demand of water resources (UN-Water, 2013). Consequently, there is mounting pressure on finite water sources in order to sustain people's livelihoods and support social development (GWP, 2010). These factors, coupled with the effects of climate change, are placing tremendous pressure on the water cycle and are reducing water availability (Grey and Sadoff, 2007).

Indeed, climate change is likely to further aggravate water supplies and availability in more arid and semi-arid areas such as South Africa, resulting in physical water scarcity. It is estimated that by 2025, 1.8 billion people will live in countries with absolute water scarcity and the majority of these countries are in Sub-Saharan Africa (International Water Management Institute, 2000). However, despite this very real threat of future global water shortage, for the vast majority of people currently living without safe drinking water today's water crisis is not an issue of scarcity, but rather of access (Grey and Sadoff, 2007).

1.1.2 THE LINKAGES BETWEEN WATER AVAILABILITY, WATER ACCESS AND WATER SECURITY

“Water security is the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, the environment and economies”

(Grey and Sadoff, 2007:545) (Chapter 2).

The above definition of water security is firmly embedded in the concept of sustainable development, with its aim to ensure a triple bottom line of social, environmental, and economic development outcomes. Water security challenges are directly related to a shortage

of the natural resource and a shortage of the social adaptive capacity for the management of the resource (Allen, 1998). This concept has been further developed and expanded on to form “*first order and second order water scarcity*” which refers to a lack of availability of water (Ohlsson, 1999 and Ohlsson and Turton, 1999). Firstly, water has to be available, and secondly water has to be managed correctly. Existing research tends to have focussed on water as a scarce natural resource and on water scarcity in its simplistic form, i.e. the relationship between demand for water and its availability (Folke et al., 2005; Ohlsson and Turton, 1999). This can be understood as being a first-order analysis of water as a natural resource, which can be misleading as it implies that water scarcity is simply a function of physical scarcity and when demand for water outstrips supply (Ohlsson, 1999; Turton, 1999). Yet Ohlsson (1999) argues that there is a second-order scarcity. This focuses on the ability (or inability) of a social entity to cope with the increasing demands caused by physical water scarcity. This second-order scarcity, refers to a scarcity of social resources (referred to as social water scarcity) which occurs when insufficient investment, skills or political will exist to keep up with growing demands for water, preventing access to the resource and ultimately leading to water security challenges (Folke et al., 2005; Ohlsson, 1999). It is important to note that social water scarcity is derived from poor governance of water resources rather than absolute availability and livelihoods are not only affected by the nature of the resource, but also by how the resource is managed (WaterAid, 2012, Tapela, 2012). Therefore, by addressing social water scarcity, it provides us with a far better insight into the dynamics at work within the context of social-political stability and water governance in developing countries.

As mentioned, for many of the 768 million people worldwide who lack access to safe water, the primary problem is rarely one of physical scarcity, but rather of social water scarcity (WaterAid, 2012; UN-Water 2013; UNICEF 2012). WaterAid (2012) found that in many countries in Africa where social water scarcity exists, water is available but poor communities lack access to it. This becomes evident when looking at the regions in which water access is a major challenge; physical water scarcity is not the pivotal issue, on the contrary, it is the fact that those without access are locked out by poverty, inequality, lack of power and government failures. Improving access to water supply and sanitation services has failed to reach a substantial proportion of the world’s population (FAO, 2012; WaterAid, 2012). Overcoming these challenges holds the key to resolving what has been dubbed a “*global water crisis*” (UNDP, 2006; UNESCO-IHE, 2009).

1.1.3 POVERTY: THE FACE OF AFRICA AND THE RELATIONSHIP TO WATER

The current challenge facing many developing countries is access to sustainable sources of clean potable water and this will become more pronounced as the world population increases and the impacts of global warming begin to take effect (Schmandt and Ward, 2000; UNESCO-IHE, 2009). In Africa, particularly in rural, township and peri-urban areas, access to water is generally more problematic, more differentiated and less secure than urban areas and generally requires more time consuming activities (Crow and, 2010; Sultana and Loftus; 2012). Unsafe water and inadequate sanitation are two of the main drivers of poverty and inequality and providing the poor with better access to well-managed, water can contribute substantially to poverty eradication (World Water Assessment Programme, 2003). Sub-Saharan Africa faces some of the worst deficits. In 2010, 330 million people in the region lacked access to clean water and nearly 590 million lacked access to proper sanitation facilities (UNICIF, 2012). More than 3.4 million people die every year from water, sanitation, and hygiene-related causes, with 99% of these deaths occurring in the developing world (World Health Organisation, 2008). The African face of poverty can be seen as both a symptom and a cause of a lack of water security and the current water crisis is strongly linked to poverty, inequality and unequal power relations.

The focus on water is closely related to a vision of poverty as a multi-dimensional situation: a poor woman is poor not just because she has no money, but because she has limited access to education, or natural resources, or political representation. Those facing water security problems are not only poor, but also often lack the political voice and platform needed to assert their claims and rights to water (UNDP, 2006). In water research there is an increasing awareness of how water security is related to poverty and marginalisation. Securing sustainable water access is an issue of voice and power and those that are overlooked are without a platform to voice their experiences and challenges (WWAP, 2003; WHO, 2008).

1.1.4 WATER MANAGEMENT CHALLENGES

WaterAid (2012) found that in many African countries the reality is that poor communities cannot get access to sufficient quantities of good quality water locally, even though water itself may not be scarce on a national scale. This is because water supply services, which are required to access, store and convey available water to communities, are unequally distributed and face considerable water resource management challenges. Yet this is not a

technical problem that can be solved with a technical solution alone. As mentioned previously, numerous factors contribute to water security and these range from biophysical to infrastructural, institutional, political, social and financial – many of which lie outside the water realm (UN-Water, 2010,WHO 2011b). Therefore, the problem relates to the way that water resources and water supply services are governed. In regards to Sub-Saharan Africa, this is emphasised by Muller:

“The issue is very simple, the scarcity of water in much of Sub-Saharan Africa is not an issue of water scarcity it’s a maintenance issue...there are not enough resources available (financial, human and institutional) to use what is available to protect against the impact of uncertainty on livelihoods...” (Muller in Hope, et al., 2012: 433)

Statements such as the above and that made by the Global Water Partnership, *“the world water crisis is mainly a crisis of governance”* (GWP, 2000), reflect a recognition that the global crisis in access to water supply and sanitation services is predominantly rooted in aspects of inequitable access to water and not in physical availability (UNWWAP, 2006; UNDP, 2010).

Water problems have often been framed in too narrow a disciplinary way, despite the apparent emphasis on integrated management. Water resources management is complex, and it is fundamentally important that the government, public and private stakeholders recognise this complexity (GWP, 2012; UNWWAP, 2009). The political dimension of water resources development and management at all levels has been underplayed. There are no one-size-fits-all solutions and at a local level, communities need to build up their capacity to work out solutions that suit their local conditions. Despite the importance that water assumes in overall human development, it is among the most mismanaged of resources, especially in South Africa. Inefficient management regulations and policies, often combined with a lack of financial capital and a poor understanding of how local systems function, have perpetuated unsustainable water management practices (Padowski and Jawitz, 2009).

1.2 WATER AND POVERTY IN SOUTH AFRICA

1.2.1 WATER ACCESS IN SOUTH AFRICA

The post-apartheid government has broadened access to water to ‘historically disadvantaged individuals’ through economic and social development to meet a minimum set of ‘basic needs’ and to reconstruct the social base of the country (Goldblatt and Glynn Davies, 2002)

(Chapter 5). Furthermore, water is defined as a social good and is enshrined within the framework of constitutional rights to water and a national 'Free Basic Water' policy (Mokgope, et al., 2001). However, despite this, many people living in townships, peri-urban informal settlements and rural areas still lack adequate and safe drinking water and many of the current patterns of water use are still characterised by inequality, inefficiency, and inadequacy. There are still huge discrepancies between South Africa's water law and the reality on the ground. Free Basic Water (2002) and Free Basic Sanitation are not provided equally or evenly across South Africa and this become highly evident in townships and informal settlements (World Health Organisation, 2003).

The gap between the policy formulation of government and its implementation are current problems confronting the government, with paralysis and ineptitude extensive in water service delivery in the country (Hope and Gowing, 2003) (Chapter 5). This is evident in the Lower Sundays River Valley (LSRV) where this study takes place.

1.2.2 POVERTY AND SOCIAL WATER SCARCITY IN TOWNSHIPS IN SOUTH AFRICA

Inequality has a strong spatial form, and the geography of apartheid with its system of racial segregation across different geographical areas, is still evident in most South African cities and towns, despite the continued efforts by the post-apartheid state to address these inequalities. This is both as a result of the legacy of apartheid and the inability of the post-apartheid state to adequately address poverty and inequality (Leibbrandt et al., 2010). Townships are a growing characteristic of the South African urban landscape with an overwhelming amount of people living in townships and settlements on the outskirts of towns and cities. Townships in South Africa generally comprise of poor households that make up a "complex mosaic of rural and urban households that are characterised by fluidity and change" (Tapela, 2012). These residents are at the bottom of the 'water ladder', with only rudimentary water services and no progressive realisation of water related rights (Water Services Report, 2008). The poorest occupy one of the lowest rungs of this ladder and women are arguably a step below this. This is due to the fact that many women are the heads of households and are required to fulfil domestic duties with water being central in household needs. It is within townships that the reality of poor water access is seen at a local level, and where current failures to meet the demands for water and service delivery are evident.

“Increasing water security has become a development imperative. The stakes are raised and we need to question development paths and cut through the increasing complexity of water management with keys for success that move us forward.”

Dr Letitia A Obeng, GWP Chair, (GWP, 2010).

There are still discrepancies in water service delivery between the rural and townships areas and the urban, affluent parts of the country specifically in terms of the provision and accessibility of water (Biswas, 2008; Parnell, 2005). Those that live in townships areas often perceive social water scarcity to be the inadequacy of the quality and quantity of available water to meet their multiple-use requirements, which affects their capabilities to secure and enhance existing livelihoods assets against vulnerability to risks and hazards (Tapela, 2012).

Clearer understandings from a South African perspective of the social aspects of water scarcity and water access as well as the relationship between water security and water service delivery have been overlooked in water research. However, providing an understanding of local perspectives and experiences can illuminate the complex, multidimensional nature of water security.

Social water scarcity has become a common trend in townships and those affected are painfully aware of the power dynamics surrounding water access. This is evident in the Sundays River Valley Municipality (SRVM). The impoverished that live in the townships face great difficulties with regards to water security, which is underpinned by the socio-political conditions at play. Social water scarcity at this level has far-reaching impacts as many have turned to coping and adaptation strategies such as unsafe alternative supplies of water (Tapela, 2012). People simultaneously use multiple natural and human-made sources such as boreholes, rivers, irrigation canals and rainwater tanks, which have potential health consequences, irrespective of whether or not they have access to water through household connections or communal standpipes (van Koppen et al., 2006). This multiple use of water is arguably a ‘blind spot’ in water services and management and is often overlooked in water planning. Therefore, there is disjuncture between water services planning and patterns of water use by the end users in townships and rural areas in South Africa.

Following the concept that the foundation and cornerstone of water security is what happens at the household level, the focus of this research is to allow for the experiences and perspectives of two of the local communities within the SRVM to be expressed in a space that has previously been dominated by water management and policy makers. The realities of

water security can only be effectively represented by those that experience the day-to-day challenges of dealing with poor water quality, water shortages, dire water service delivery and a lack of voice and response to the problems. There needs to be a greater understanding of the linkages between social water scarcity and societal expectations for service delivery. Analysis of the gaps between policy and practice on the ground is lacking in water research and recently, there has been slow realisation of the importance of understanding these linkages at a local level, and the significant impact and contribution that this can provide to the water policy and development arena (Tapela, 2012). Therefore, to enhance water security there is a need to broaden the traditional focus of the top down planning approaches to include a focus on people at a local level for whom access to water is critical. Consequently, a local perspective needs to be emphasised and understood in order for water management to progress and meet the daily needs of the communities. This study aims to do this through the case of the SRVM, which has been facing particular problems regarding water delivery, social water scarcity and water insecurity (Chapter 2).

1.3 AIM AND OBJECTIVES

This study forms part of a broader ‘Water and Sustainability’ project, which embraces a transdisciplinarity approach in addressing the ‘wicked problem’ of water resource management (Chapter 2). The SRVM forms part of this project as a case study focusing on a catchment scale. The case study focusses specifically on the management of water resources by the municipality and other stakeholders. In recognising the complexity of water management at a municipal level, the goal of this study was to provide an in-depth analysis of local water security issues amongst poor households in the SRVM, with a focus on understanding the local context and community perspectives and experiences of the realities of water security.

1.3.1 Aim

The overall aim of this study was to provide a lens into the water security experiences of two poor township communities in the SRVM, Nomathamsanqa in Addo and Aquapark in Kirkwood. Water security patterns amongst RDP, township and informal households serviced by the SRVM in each of these townships were assessed and differential experiences amongst these three groups with regard to securing, accessing and negotiating the use of water were explored. This was done through assessing household water sources needs, uses, shortages, water quality concerns, coping strategies and experiences of service delivery.

With this aim in mind, closer analysis of the current water security context was addressed through six specific objectives, namely:

1. To undertake an analysis of the current water policy and governance context in South Africa and the SRVM, with particular reference to social water scarcity and water security for poor urban households, and how this shapes water service delivery and people's experiences on the ground (through an analysis of policy documents and other secondary sources).
2. To explore community members' social water scarcity in terms of water needs, use and their experiences of water shortages and as well as how they perceive access to safe water and water security.
3. To understand the factors that community members perceive contribute to water insecurity and assess if water security is declining within these communities.
4. Examine the coping and adaptive strategies employed to address water security problems, including alternative supplies and how community members manage and conserve their water resources in order to meet their daily needs, and explore the links between gender, time use and poverty with specific reference to household duties and water collection.
5. To explore and highlight the degree to which water security is an issue of voice and power and if this corresponds with poverty and political marginalisation.
6. To identify and understand the reasons behind failures in water service provision and water service delivery and explore the communities' perspectives and experiences of these failures.

1.4 LAYOUT OF THESIS

This thesis consists of seven chapters. Chapter 1 presents an introduction and background context to the study and the aims and objectives. Chapter 2 presents the theoretical and conceptual frameworks used in this study, namely Political Ecology and complex social-ecological systems thinking. These are discussed with specific reference to water security and social water scarcity and within the broader framework of complexity. Chapter 3 presents the study area and provides a background to the SRVM and the household categories selected. Chapter 4 presents the methodological approach and the methods for data collection and analysis. In Chapter 5, secondary sources of information are drawn on and an analysis of the South African water context, history and water reforms and policies is presented. This is discussed with reference to water security and the impact on poor households at a local level. This leads into a description and discussion of the SRVM and the challenges the municipality is facing with regards to water supply and service delivery. Local reference to the impact of these water challenges is emphasised. Chapter 6 is the first of the chapters drawing on primary data. It specifically deals with the results from the household interviews and the responses gathered from in-depth interviews surrounding water sources and access, water use, gender dynamics and water collection, indigent household registration, water supply, water availability and water shortages. These are then discussed within the context of water security and social water scarcity and the governance system in the SRVM. Chapter 7 presents results related to water quality and perceptions of the safety of water sources, perceptions and experiences of water service delivery, and payment for water. Chapter 8 is the final chapter and provides a synthesis of the results and discussion with specific reference to water security and social water scarcity. This leads into the conclusion of the study with reference to the conceptual framework and concepts explored.

CHAPTER TWO:

THEORETICAL AND CONCEPTUAL APPROACHES

2.1 CHAPTER OVERVIEW AND INTRODUCTION

The purpose of this chapter is to set up a usable overarching framework for understanding the interrelationships between water security, social water scarcity and social-ecological environment in which water resource management occurs. The social-ecological environment embodies and reflects the power relations inscribed in the socio-ecological system through exploring who has control, ownership and access to water as well as the quality of water resources and their utilisation and distribution. This research study is embedded within a complex social-ecological systems paradigm, which forms the foundation for analysis of the broader ‘Water and Sustainability’ project, complemented by a Political Ecology approach to allow for a deeper understanding of the social dimension of water scarcity and social stability.

2.2 DEFINING CONCEPTS: WATER AVAILABILITY, WATER SECURITY AND SOCIAL WATER SCARCITY

2.2.1 WATER AVAILABILITY, WATER SOURCES AND WATER ACCESS

The concept of household water security encompasses issues of water availability, accessibility and usage and water quality. It has traditionally envisaged availability as the central focus (Ariyabandu, 2001; WaterAid 2012) although availability alone does not ensure household water security at a given point in time.

Water availability is discussed in reference to blue water (water in rivers, dams, groundwater, etc.) and green water (soil moisture). Green water is the rainwater directly used and evaporated by non-irrigated agriculture, pastures and forests, and is important to the functioning of ecosystems. Blue water availability refers to the availability of natural run-off (through groundwater and rivers) minus environmental flow requirements and is therefore the source of supply (FAO, 2003). Blue water, typically varies within the year and from year to year and not all blue water can be used due to economic, technological, and environmental limitations (FAO, 2003).

The ability to access to water is based upon the proximity of water sources. A water source refers to the point at which water can be accessed, and ‘improved’ sources are those that are protected from contamination (UN-Water, 2013; WaterAid 2012). Along with municipal supplied water to households, this includes rainwater tanks, communal standpipes, boreholes and protected springs. Within cities in South Africa, water is predominantly accessed through water sources within houses. However, in many township households in South Africa, due to poor water supply into households, water is accessed through multiple sources. Access to water is dependent upon aspects such as the distance between the dwelling and the community standpipe or tap as well as the presence of queues. Communities with fragile livelihoods, fragile coping strategies, limited financial resources, and limited technical and adaptive capacity are more vulnerable to stresses on their water supplies. Community in this sense refers to a group or network of persons who are connected (objectively) to one another (WaterAid, 2012). The local municipality divides and designates areas within townships and then puts up a community (essentially shared) standpipe. Water provision via standpipes requires residents to collect, transport and store water prior to use whilst rain water tanks themselves serve as a storage container (WaterAid, 2012).

The choice of a water source is largely dependent on the use of water as well as ease of accessibility, availability and water quality. Residents therefore have their primary source of water which is their main source; usually preferred because of easy availability and/or higher quality of water. The next preferred source of water is referred to as the secondary source, and the third source of water is the alternative source of water – this is generally used when either the primary or secondary source are not available and there the only option is to find an alternative source. As discussed in Chapter 6, water quality and availability will determine how water is used.

Along with the availability of adequate safe water, easy accessibility and reliability of water supplies contribute to meeting basic human needs (Ariyabandu, 1999; WaterAid, 2012). This implies that households are able to obtain the required quantity of suitable quality water for basic needs and other economic activities (Ratnaweera, 1999). A general definition of a water shortage is an excess of humans not having safe, potable water. Water shortages may be caused by climate change, such as altered weather patterns including droughts or floods, increased pollution, increased human demand and overuse and mismanagement of water resources (Ariyabandu, 1999). The extent to which these factors interact determines water security conditions of households and therefore the ability to access safe and reliable water sources.

Tapela (2012) argues that notions around ‘water scarcity and social stability’ are entrenched in the discussion about ‘water and security’ and ‘water and conflict’. This was the focus of the two opposing water and security arguments during the 1990s amongst peace and conflict researchers, governments and the public in general. The first hypothesized that water scarcity would potentially be the greatest future cause of inter-state conflict within Southern Africa, the converse argument was that problems of sharing water provided opportunities for cooperation within the region (Buzan, 1997; Rudengren et al., 1997). Although philosophies about regional ‘water wars’ have largely been dismissed as exaggerations, the prolonged indepth debate has drawn awareness to the problem of water and ‘security’ in the broader sense of the term; and the move away from the view that threats to security are strictly confined to statist, military challenges (Buzan, 1997)

2.2.2 GENDER AND WATER ACCESS

The gender related issue of water access and collection is highly relevant as women are primarily, but not solely, responsible for this household task. FAO, defines gender as:

‘the relations between men and women, both perceptual and material. Gender is not determined biologically, as a result of sexual characteristics of either women or men, but is constructed socially. It is a central organizing principle of societies, and often governs the processes of production and reproduction, consumption and distribution’ (FAO, 1997).

Despite this definition, gender is often misunderstood as being the promotion of women only. However, gender issues focus on women as well as the relationship between men and women, their roles, access to and control over resources, division of labour, interests and needs. Gender relations affect household security, family well-being, planning, production and many other aspects of life (Bravo-Baumann, 2000). Therefore gender roles are the ‘social definition’ of women and men; gender-specific roles and responsibilities are often conditioned by household structure, access to resources, specific impacts of the global economy, and other locally relevant factors such as ecological conditions (FAO, 1997). Water collection for domestic purposes is generally the responsibility of women and girls in almost all developing countries. It is estimated that women in many developing countries walk for an average of about 6 kilometers each day to collect water (UNFPA, 2002). Thus, if water supplies become scarce due to water shortages or water becomes contaminated, women and girls are the ones who must look for alternative sources of water. Therefore water access and gender are inextricably linked, and the availability of clean

water close to home reduces women's workloads, and the time saved in fetching water may be spent on other activities (see Chapter 6).

2.2.3 WATER SECURITY

Water security as a concept operates at all levels, from household and community, to local, national, regional and international settings. The concept of water security has received increased attention over the past decade in both policy and academic debates, and this has resulted in multiple definitions and debates of the concept. Previously academic and policy definitions of water security were narrow and focussed on the particular problem, in relation to a specific framework. This is evident as the concept of water security is used across fields, from water security assessment tools and measurements (i.e. index of water stress) to focussing primarily on water hazards and climate change as well as food security and the challenges of managing water across boundaries. The multiple uses and scope of the concept of water security led the UN-Water to design a water security framework that encapsulates these multiple definitions, rather than providing a strict definition of the concept.

The current UN working definition of water security is defined as:

“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.” (UN-Water, 2013:5).

The UN-Water security definition is a broad, integrative definition, which emphasises the need to integrate water quantity and quality, in addition to water governance and ecosystem and human health concerns. This implies the need for vigorous governance processes to mediate the trade-offs between different stakeholders, scales and uses of water. Essentially the definition provides a framework and a 'vision' (Cook and Bakker, 2012).

The UN framework of water security emphasises that sustainable management of water throughout the water cycle is crucial, and this is only achieved through an inter-sectorial approach, which encompasses multiple scales and levels of social and ecological systems (UN-Water, 2013). Essentially, the argument is that narrow and broad definitions of water security are complementary rather than mutually exclusive (Grey and Sadoff, 2007; UN-Water, 2013). Focussed definitions are necessary, as operationalising water security at a management level will

likely require specific, focussed framings of water security. This allows academic research and policy to focus on one specific area, whilst still recognising the importance and integrative role of the broader framework of water security (Cook and Bakker, 2012; UN-Water, 2013). (Figure 2.1).



FIGURE 2.1 WATER SECURITY FRAMEWORK. ADAPTED FROM THE UN WATER SECURITY NETWORK (2013)

Various factors contribute to water security, ranging from biophysical to infrastructural, institutional, political, social and financial – many of which lie outside the water realm. In this respect, water security lies at the centre of many development areas, each of which is intricately linked to water (UNWWAP, 2006; UN-Water, 2013). Therefore, water security encapsulates complex and interconnected challenges and highlights water's centrality for achieving a larger sense of security, sustainability, development and human well-being (UN-Water, 2013; WaterAid 2012).

Although water security is essential for multiple industries and agriculture, as well as the sustainably functioning of ecosystems, in this study the focus of water security is '*drinking water and human well-being*' (Figure 2.1). Water as a basic human right is recognised by the UN and

international law and is enshrined within the South Africa constitution (UN-Water 2013). Therefore, the focus and emphasis is on providing water to satisfy basic human needs that is accessible to all, and is set at an affordable cost to the user (UN-Water, 2013). At a household level, water is vital in attaining food security, health and sanitation, improving living conditions as well as providing opportunities for sustainable living.

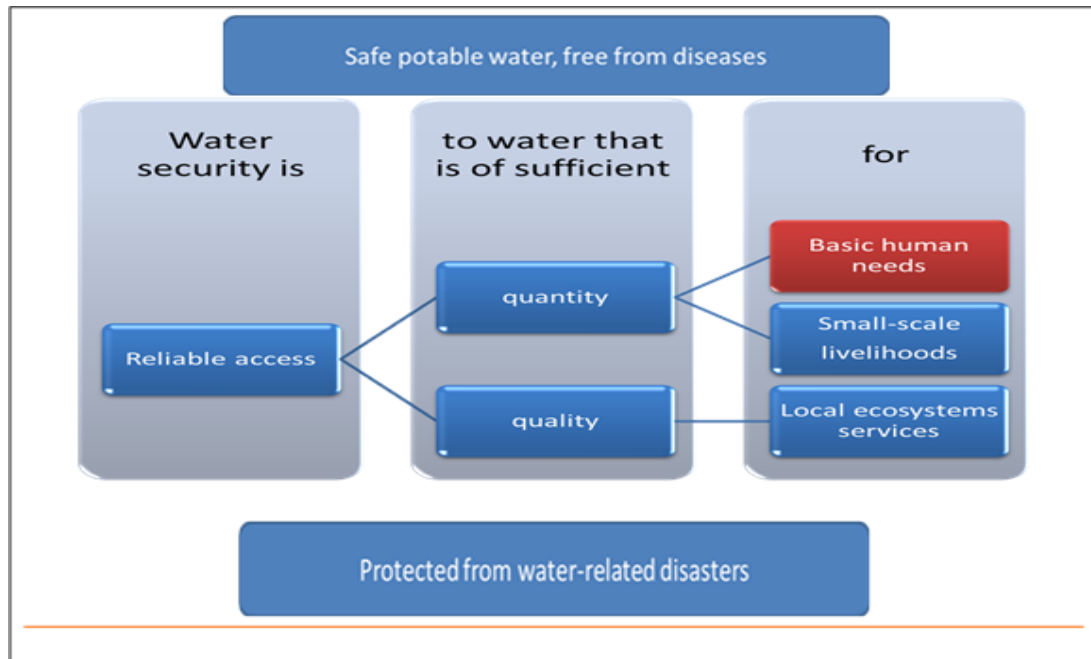


FIGURE 2.2 A DIAGRAM OF HOUSEHOLD WATER SECURITY (ADAPTED FROM WATERAID, 2013)

In Figure 2.2 below, water security is depicted and this essentially refers to having sufficient access to a sustainable, safe water source of adequate quality and quantity to ensure basic needs are met, as well as support small-scale livelihoods and local ecosystems services. Addressing this goal therefore requires interdisciplinary collaboration across sectors, stakeholders and communities. Although the latter are an essential aspect of water security, water for basic human needs is the primary focus for this study (Figure 2.2). For an individual, water security exists when she has access to sufficient safe and affordable water to satisfy her needs for drinking, washing and livelihood (Rijsberman, 2006).

2.2.4 PHYSICAL WATER SCARCITY

This term is used to describe the relationship between demand for water and its availability. There are two types of water scarcity. A physical scarcity exists when demand for water outstrips supply and this occurs when water resources are over-exploited (Applegren and Klohn, 1999). If the cause of scarcity is constructed as a lack of supply or an excess of demand; in order to equalise the imbalance either an increase in water availability (a supply-side response) or more efficient use of

the available resource (a demand-side response) is required (Ohlsson and Turton, 1999). Engineering and infrastructure play important roles in water resources management since increased access is in part linked with additional water infrastructure. The problem of securing water is too often perceived as a physical lack of water available for human consumption, and difficulties arise when solutions become merely concerned with the technical and economic aspects of scarcity.

Scarcity is a highly localised concept, subject to different interpretations by different actors, and is very much a political issue. Managing scarcity is dealt with either by increasing the supply of water, or by regulating the demand. This is standard solution from water institutions when dealing with water scarcity; such regulation in fact results in a new kind of conflicts, which Ohlsson and Appelgren (1998) refer to as second-order conflicts. Second order conflicts are the direct consequence of attempting to overcome the source of the potential first-order conflict (Ohlsson and Appelgren, 1998). Water scarcity, when dealt with by institutions and governments, thus very quickly surfaces as a scarcity of social adaptive capacity, which is delineated below as social water scarcity.

2.2.5 SOCIAL WATER SCARCITY

Social water scarcity is when insufficient investment, skills or political will exist to keep up with growing demands for water, preventing access to the resource (WaterAid, 2013). As discussed in Chapter 1, social water scarcity is the current challenge facing South Africa. Ohlsson and Turton, (1999) emphasise the importance of a social dimension to the conceptualisations of water scarcity, through developing the concept of second-order scarcity. This allowed researchers to focus on the social mechanisms that exist within a given social entity that allow for that social entity to adapt to the circumstances forced upon it by water scarcity. It is essential to understand the complexities surrounding social water scarcity as it can be a product of the interplay between resource availability, consumption patterns and the (mis)management of the resources (Goldin, 2008). Turton (1999) emphasises that the need to understand the social dynamics of water scarcity, and how various societies cope with this scarcity, is critical. Social water scarcity is therefore, linked to water governance and management.

“Water scarcity is a relative concept - it is partly a social construct in that it is determined by the availability of water and consumption patterns. Because of the large number of factors, which influence both availability and consumption, any definition of water scarcity will vary widely from country to country and from region to region within a

country...Because the concept of water scarcity is a social construct it is a matter of political and economic perception, and it may be more useful to view water scarcity as a particular mix of availability and demand.” (Applegren and Klohn, 1999:362)

The above quote emphasises that structurally induced social water scarcity relates to the political economy and ecology of resource allocation, and the institutional frameworks and structure of water governance and management. Social water scarcity therefore refers to a social construct of ‘resource management’ that is determined by political, economic and social power dynamics underpinning social institutions that provide structure to social relations, access to social power and social stability (Tapela, 2012; WaterAid, 2012).

For the underprivileged, social water scarcity is about an inadequacy of the quality and quantity of water. At the local level, water security is closely linked to ensuring fair and safe access to water resources that is essential in sustaining and improving their livelihoods (FAO, 2012). In townships within South Africa the availability of water and sanitation is not so much a problem of scarcity as it is a problem of access and control of resources (Marshall et al. 2009). Therefore, water may be available but poor communities lack access to it.

Communities are aware of the power dynamics and therefore in this light, social water scarcity can be seen predominantly, as the end product of dominance by overarching political, economic and social interests which determines and control the structure and nature of water resource allocation (Tapela, 2012). As discussed previously this is also evident within the power relations between communities, municipalities and institutional actors (Rogers and Hall, 2003).

2.3 CONCEPTUAL APPROACH: POLITICAL ECOLOGY AND SOCIAL ECOLOGICAL SYSTEMS

2.3.1 POLITICAL ECOLOGY

According to Greenberg and Park (1994), Political Ecology emerged during the 1970’s as a method of merging cultural ecology and political economy. Political Ecology developed as a new field of research bringing together human ecology’s focus on the interrelations between human societies and their respective biophysical environments and political economy’s analyses of the structural power relations occurring between these societies (Bryant, 1998; Little, 2007). Anthropological empirical studies of local environmental practice are combined with a cross-scale analysis of political economy (Escobar, 1999; Greenberg and Park, 1994). The main concept of

political economy is that power, productive activities and ecological analysis needs to be situated in the broader bio-environmental relationships (Greenberg and Park, 1994). Therefore, Political Ecology deals with the interrelationships between ecological impacts and socio-economic power relations.

This field is the result of an intensive dialogue between the disciplines of biology, anthropology, geography, history and political science, creating a unique transdisciplinary space within the natural and social sciences (Bryant, 1998; Little, 2007). Therefore, perspectives have broadened throughout the social sciences to include the role of human activity in transforming and even defining ecosystems such as urban ecosystems, agricultural and water ecosystems, etc. (Escobar, 1999; Greenberg and Park, 1994).

Political Ecology goes further than analysing the relations between the social and the natural processes, arguing that social and environmental conditions are deeply and inextricably linked (Adams and Hutton, 2007; Robbins, 2004). One of the strengths of Political Ecology is its focus on the mutual constitution of social and environmental change and problems arising over access to resources have been a key focus in many Political Ecology studies. Therefore, through focusing on water security from the perspectives of Political Ecology a holistic analysis of the current challenges faced by water insecure communities can be obtained.

POLITICAL ECOLOGY AND WATER MANAGEMENT

Political Ecology provides the foundation for analysing the way in which water and politics interact, influence and shape water reforms and policies as this approach is based upon concept that environmental change and ecological conditions are the product of political process (Adams and Hutton, 2007). Furthermore, it provides insight into the powerful influence the role of the state has as a governing body in shaping the political and economic environment in which water resources are managed within South Africa. The type and character of physical and environmental change, and the resulting environmental conditions are not independent from the specific historical social, cultural, political, or economic conditions and the institutions that accompany them (Swyngedouw 2004). Therefore, through situating water resource management as a social-ecological system within the wider political economy, an analysis of the power dynamics and power structures at multiple scales of influence of institutions is attained (Robbins, 2004; Tapela, 2012).

Water problems cross all sectors of governance and are becoming increasingly more interconnected and intertwined with social, economic and environmental development-related

issues (Rogers and Hall, 2003). Political considerations, at local and national levels are highly significant in the way in which water is managed and allocated within a country (Tapela, 2012). This is evident in South Africa as the decentralisation of water governance to the municipal level in 2001 through the Water Services Act (WSA), which shifted water management, roles and responsibilities to a local management scale (Muller, 2008) (Chapter 5). Political Ecology offers productive possibilities for developing an understanding of political dimensions of water allocation and access.

This approach facilitates an examination of the relationship between water use and political and economic forces. This allows for an investigation of the issues of class and power in society at different scales and how they interact with the management of water resources, with a specific focus on the role of institutions (Neefjes, 2000; Robbins, 2004). In water resources management, the utility of this theory lies in that it connects the conditions of people not only to the state of the physical resource, but situates it in the wider context of how the field of resource management becomes an arena where different parties wielding different powers converge and the consequent impacts on livelihoods (Tapela, 2012). Livelihoods are not only affected by the nature of the resources available, but also by how the resource is managed.

Political Ecology places an *“emphasis on social difference and the acknowledgement of the centrality of poverty and inequality as key factors which affect the social-ecological environment”* (Jones, 2008 in Kepe et. al, 2008). Political Ecologists argue that the costs and benefits associated with water allocation and access are for the most part distributed among actors unequally (which inevitably) reinforces or diminishes existing social and economic inequalities (Chapter 5). This results in political implications in terms of the power relations between those that control and manage the resource (from DWA to municipalities) and those that rely on the resource (citizens and consumers) (Bryant and Bailey, 1997) (Chapter 5). Through analysing the role and history of the water institutions in South Africa, insight is gained into how local (municipal) decisions are influenced by national policies (Chapter 5).

Jones (2008 in Kepe et. al, 2008) stated that Political Ecology is a useful approach for understanding the complex interactions between an environment and a society within the context of their specific local histories and ecologies. Therefore, this approach is utilised as a tool for understanding the relationships between political, economic and social factors of water security for the impoverished households within the SRVM. It also provides a platform for assessing and analysing the causes of water insecurity at the local context, whilst taking into consideration the

national context of water policies and management. Consequently, examining local water security challenges in their social context arguably represents the foundation of Political Ecology.

2.3.2 KEY CONCEPTS IN POLITICAL ECOLOGY: INSTITUTIONS AND POWER

INSTITUTIONS

“Political Ecology expands ecological concerns to respond to the inclusion of cultural and political activity within an analysis of institutions that are significantly but not always socially constructed” (Greenberg and Park, 1994:1).

Ostrom et al., (1993) define institutional arrangements as the specific rules that individuals use to relate to each other. Institutions therefore provide structure and establish meaning to social relations. They operate at multiple levels and scales, and determine access to social power and wealth, and in doing so determine the endowments and capabilities of local communities and households (Folke et al., 2005; Ostrom, 2011). The interaction between economics and the environment through institutions is important to water resource management and governance because in presiding over the establishment of economic institutions, governments and water agencies have direct influence over the management use and allocation of the resource (Saleth and Dinar, 2000; Adler, 2005). Therefore, in water resource management institutions play a vital role in determining, among other things, use, access, sharing and conservation of water resources.

Institutions can be formal, explicit rules such as constitutions and from a water services planning perspective, formal institutional structures include governmental and national departments (Department of Water Affairs) as well as local organisations such as Catchment Management Agencies (CMA), municipalities and Water User Associations (WUA) (Chapter 5). These water institutions operate at multiple levels of jurisdictions and function separately but in relation to one another and are governed by and controlled by the National Water Act (1997) amongst others.

Institutions can also be informal, and often function through implicit rules such as social conventions, norms and traditions (Jepperson, 1991). Informal rules often arise gradually as individuals react and respond to current circumstances (ecological, economic, political or social). These informal institutions can also be entrenched in the goals, beliefs and choices of individual actors, and the collective aspirations of society (Bryant and Bailey, 1997). Informal institutions can take place at a community level and refer to the social processes through conscious and unconscious acts that are dynamic and changeable as providing a governing structure and stability (Bryant and Bailey, 1997).

When addressing water security, informal institutions become evident at the local level as communities are not complacent, and households and individuals exercise their agency in determining and adopting a variety of livelihood strategies to protect themselves against vulnerability to risks (Akhmouch, 2012). Individuals mobilise assets either collectively or individually, such as financial resources and human labour in order to improve their circumstances. Furthermore, social networks and social capital are highly effective and important during water security challenges (WaterAid, 2012, UN-Water, 2013). Therefore, whilst water institutions and the governance and management of water sources strongly determine the effectiveness of water service delivery, the ability of a community, specifically households adaptation and coping strategies along with social engagement, can greatly shift not only power dynamics but determines one's level of water security (Hemson, 2008). Therefore, assessing the roles, function and power of institutions is highly valuable in an analysis of water security as it allows for understanding both informal and formal institutional domains.

POWER

According to Rorty (1992), power is the ability to define and control circumstances and events so that one can influence things to go in the direction of one's interests. Essentially power refers to the ability to bring about and enforce change. All forms of power reside in, and are exercised by human beings. It is relational in that it expresses the way social institutions or individuals affect the attitudes or behaviour of another (Terrence, 1992). Power can be exercised overtly, or it can be concealed, but it operates within the constraints of social, economic and political structures, which direct the behaviour of individuals. Power relations in water resources management are important in that they determine the way different stakeholders relate to each other and how institutions and those served by them relate (Tapela, 2012). Water resource access, use, control, ownership and conflict are mediated through social relations of power. Water is likely to be a source of strategic rivalry depending on its degree of scarcity, the extent to which its supply is shared amongst institutions or individuals and the relative power relationship of the sharing bodies as well as the accessibility to alternative fresh water resources (Gleick, 1993).

Water security and sustainability is not just about achieving sound ecological and environmental conditions, but first and foremost about a social struggle for access and control. Power relations, to an extent, determine the success or failure of the management approaches on which institutions may embark. Such relations are particularly important in the cases of South Africa where, due to the legacy of Apartheid, power was concentrated in the hands of the privileged racial groups. This

in turn provided the structure and basis for water allocation and water rights, which has implications for how water is currently distributed today (Hemson, 2008) (Chapter 5).

Power relations affect the way, among other things, stakeholders relate to each other. The way in which water resources are allocated and managed impacts on the livelihoods of community households determining their level of water security. Unequal power relations are seen as being partly a construct of the structure of society. Therefore, it allows one to address the ‘everyday politics’ such as contestation of day-to-day water use and management, as well as comprehending that within the South African context, politics play a major role not only during the implementation of policy making but also in the proper management of the resource (Greenberg and Park, 1994). Therefore, how a community gains, maintains, and controls conflicts over access to water can be expressed through an analysis of the ‘mechanisms’ that facilitate access (Ribot and Peluso, 2003), as these are embedded in the social and environmental context of the area. Access here, refers the ability of a community to practically benefit from a resource and, including a wider range of relations than those derived from property rights alone (Ribot and Peluso, 2003).

The utility of this theory in water resource management is that it connects the conditions of people not only to the state of the water resource, but situates it in the wider context of how water management becomes an arena where different parties exercising different powers converge and the consequential impacts on livelihoods (Bryant, 1998).

2.3.3 SOCIAL-ECOLOGICAL SYSTEMS AND THE ‘WATER SUSTAINABILITY’ PROJECT

As discussed in Chapter 1, this study forms part of a ‘Water and Sustainability’ project that aimed to be involved in addressing complex problems in water management in South Africa through transdisciplinary methods and techniques in three case studies. The SRVM forms part of this study at sub-catchment scale (the Lower Sundays River Valley), by addressing the challenges the local municipality face in regards to water management, allocation and service delivery. The project aims to create a *“knowledge and practice-based guide which clearly and practically demonstrates ways to engage in water resource development that are most likely to lead to effective uptake of investment, technology and sustainable practices”* (SANPAD proposal, 2010). Therefore, the project is based upon complex social-ecological systems and utilises transdisciplinarity in understanding complexity in water resource management.

Transdisciplinarity is an emerging practice and research approach, which refers to research that cross-cuts disciplines and involves researchers from different academic and research disciplines contributing and working towards their own conceptual frameworks and research methods

(Brown, Harris and Russell, 2010). The motivation for engaging in transdisciplinarity research is that it allows for a more holistic perspective to be obtained and takes into consideration the social, economic and ecological aspects of our environment. In doing so, transdisciplinary research does not view these as separate entities, but rather as interlinked in a complex social-ecological system (SANPAD proposal, 2010). On the other hand, discipline-bound research is inherently limited in arguing and analysing complex ‘wicked problems.’ This approach is therefore, highly useful in analysing and engaging complex problems such as water management and water security (Brown, Harris and Russell, 2010).

This research study forms part of the broader project as an analysis of water security challenges at the local level, yet through the transdisciplinary research approach, it takes into consideration the broader socio-ecological system as well as water management and institutions as being inextricably linked to water security. Through addressing water security as a challenge situated within the complex interaction of a changing environment and changing society, it allows for a far more in depth and all-inclusive picture.

SOCIAL-ECOLOGICAL SYSTEMS

Social-ecological systems aims to:

“understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods.” (Watts 2000:257).

Social-ecological systems expanded out of the necessity to cross the nature-culture divide, and central to this approach is the principle that society and the environment cannot be treated in isolation from each other (Jahn et al., 2009). Social-ecological systems theory is founded on systems theory, and emerged as set of tools and concepts in which to analyse and understand complex systems that are multi-dimensional and multi-layered (Ostrom, 2009). This conception of social-ecological systems allows one to distinguish three possible types of system elements: the natural sciences, the social sciences and the field of research of human ecology (Jahn et al., 2009; Ostrom, 2009). These system elements are interacting at multiple temporal and spatial scales, and the nature of both social and ecological are evolving and changing (Ostrom, 2009). The objective is to move towards sustainability and therefore find a balance in managing social and ecological resources.

A close conceptual and methodological relation exists between the analysis of socio-ecological systems, complexity research, and transdisciplinarity. These three research concepts are based on similar ideas and models of reasoning. Furthermore, the research on social-ecological systems often utilises a transdisciplinary approach in order to achieve a holistic picture and ensure integrative results (Jahn et al., 2009).

2.4 CONVERGENCE OF THE CONCEPTUAL APPROACHES

According to Pallett (1997), the aim of water management should be to supply people with essential water supplies whilst ensuring that water continues to be shared amongst all the components of the human and the natural environment in a river basin. Therefore, in order to understand the complexities of the water security, one needs to address the multi-dimensional nature of the social-ecological system and the management of the resource.

Vayda and Walters (1999:167) criticise Political Ecologists for pre-supposing “*the importance...of certain kinds of political factors in the explanation of environmental changes*”. Political Ecologists are critiqued for concentrating on human responses to environmental events with heavy emphasis placed upon the political reactions to the events rather than presupposing the impact of political processes on environmental events.

By using both Political Ecology and social-ecological system approaches, it is possible to address some of the weaknesses, thereby creating a stronger foundation in which to address and conceptualise water security and social water scarcity. Social-ecological systems allows us to understand water resources as a system, of both social and ecological controls and Political Ecology is a useful theoretical and methodological approach for the study of socio-ecological systems by focussing on conflict, power and the uneven distribution of environmental costs and benefits (Bryant, 1997; Greenberg and Park, 1994). This is achieved by locating this study within the broader project, and the combination of both approaches can contribute to greater understanding of the water security at a local level.

2.5 CONCLUSION

Water resources management is inherently political and imbued with power dynamics underlying the structure of institutions. Water security challenges that countries face are neither homogenous nor consistent over time, rather they vary significantly from one country to the next, each with

their own specific set of problems (Biswas, 2004). Therefore, solutions to water problems depend not only on water availability, but also on a variety of other factors, among which are the processes through which water is managed, institutional competence, prevailing socio-political conditions and expectations that affect water planning, development and management processes (Tapela, 2012). The degree of water security is highly dependent on the efficiency and effectiveness water governance at an institutional and local level (Chapter 5).

CHAPTER THREE:

STUDY AREA - SUNDAYS RIVER VALLEY MUNICIPALITY (SRVM)

3.1 CHAPTER OVERVIEW

This chapter provides a general introduction to the Sundays River Valley Municipality where the study took place. The two study sites are discussed in terms of their socio-economic status and water supply systems, which provide motivation and rationale for the study site selection.

3.2 INTRODUCTION TO STUDY SITE

3.2.1 LOCATION

The Sundays River Valley Municipality (SRVM) is one of the developing local municipalities within the Cacadu District Municipality (Figure 3.1). It is located within the Lower Sundays River Valley (LSRV) sub-catchment, which forms part of the greater Sundays River Valley (SRV) in the Eastern Cape approximately 80km northeast of the Nelson Mandela Bay Municipality (SRVM Integrated Development Plan, 2011). The LSRV area contains the Addo Elephant National Park, the Woody Cape Nature Conservation area along the coast, and the Lower Sundays River Valley irrigation and citrus farming region (SRVM IDP, 2011).

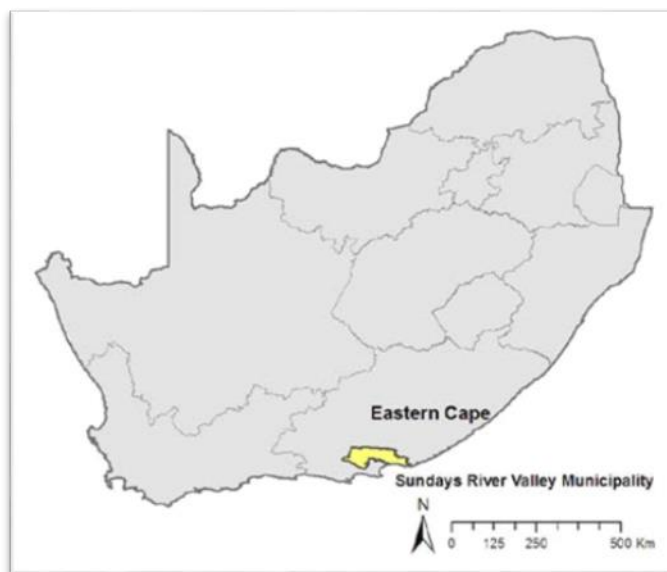


FIGURE 3.1 LOCATION OF SUNDAYS RIVER MUNICIPALITY

3.2.2 BIOPHYSICAL CHARACTERISTICS

The region north and east of the LSRV consists of mountainous areas with steep valleys and drainage features. The LSRV has wide, fertile flood plains associated with low-lying land, with steep less-fertile slopes surrounding the Valley. Kirkwood is situated on the banks of the Sunday River, which is the centre of one of the largest citrus-growing regions in South Africa with approximately 120 square kilometres (30,000 acres) of citrus orchards (SRVM IDP, 2011). Natural vegetation occurs on the higher lying areas, which is commonly referred to as Valley Bushveld or Albany thicket. The Valley is characterised by harsh climatic conditions with summer temperatures rising in excess of 40°C and rainfall is 250 – 500 mm per annum (SRVM 2010).

3.2.3 SOCIO ECONOMIC CHARACTERISTICS

The SRVM has a population of 54 500 people living in 14 700 households and has had a 2.2% increase in population from 1996-2011, which is the highest in the Cacadu District (Stats SA, 2012). This upsurge is evident in the growing townships and ever-expanding informal settlements¹ on the outskirts of the main towns of Addo, Kirkwood (the capital town of the LSRV) and Paterson (SRVM IDP, 2011). This reflects the situation for the province as a whole, where 63% of the population live in informal dwellings, which are situated in informal settlements (HDA, 2012). Typical of most of the country, the township are characterised by a combination of housing categories: RDP houses that the SRVM continues to build, houses constructed by residents' or built privately especially in the past and informal houses which consist of shacks.

With no large urban settlement, and a combination of multiple small towns and commercial farming, agriculture provides 48% of the employment in the area, with tourism and community services accounting for a significant portion of the remaining 52% of the employment (SRVM WSDP, 2010). The Addo Elephant National Park (AENP) and citrus production are two important economic drivers in the SRVM. The AENP has given rise to a number of Bed & Breakfasts and private lodges (SRVM IDP, 2011). Other than the seasonal work in the citrus industry, tourism through the Addo Elephant Park and small businesses there is no large industry that demands a high number of labourers, which makes employment opportunities scarce

¹ Historically a 'township' in South Africa refers to a urban residential area created for black migrant labour, usually beyond the town or city limits yet they are still apparent today and generally, every town and city has one or several townships associated with it (Housing Development Agency, 2012). The South African census 2011, defines an informal settlement as '*an unplanned settlement on land which has not been surveyed or proclaimed as residential, consisting mainly of informal dwellings (shacks)*' (HDA, 2012). In turn, the census defines an 'informal dwelling' as '*a makeshift structure not erected according to approved architectural plans*' (HDA, 2012).

(Clifford-Holmes et al., 2012). The local employment opportunities within the townships are at the local schools, crèches, 'shebeens' or local bars and clinics. That being said from interviews it was found that many of the nurses, social workers and teachers at the high schools' are from Port Elizabeth or other towns in the Nelson Mandela Metropolitan area.

Unemployment and dependency on social grants are widespread within SRVM and this becomes clear when looking at the fact that unemployment estimated to be as high as 44% with many people living without basic infrastructure and services (SRVM IDP, 2011). The unemployment rate is perpetuated by the lack of entrepreneurship and small business ownership within the townships. It was found through participant observation and discussion with residents that the majority of the 'spaza' shops in both Aquapark and Nomathamsanqa are no longer run by local residents but by Somalian migrants. Furthermore, the SRV has the second highest poverty levels in the country with 47% of the population living below the poverty line and 45.7 % living off R800 or less per month. This is typical of the country as a whole as 44% of the population live in poverty whilst, 57% of the population of the Eastern Cape are faced with absolute poverty and are reliant upon social grants (Eastern Cape Development Report, 2012). Rogerson (2003: 131) argued, *"Urban poverty is greatest in South Africa's small towns"* and this is reflected in the unemployment statistics within the SRVM.

3.2.4 BACKGROUND TO THE WATER SUPPLY SYSTEMS

The SRV is part of an interbasin transfer scheme known as the Fish River-Sundays River Canal. It consists of a canal and tunnel system, which supplies water from the Orange River to the Great Fish River Valley and subsequently to the Sundays River Valley in order to supplement the existing water supply of the Eastern Cape.

The Sundays River below the Darlington Dam is fed by six main tributaries, from the north by four (Kabouga River, Uye River, Witte River and Krom-Coerney River) and from the south-west by two (Kariega River and Bezuidenhouts River). Downstream of the Darlington Dam, the Lower Sundays River Water User Association (WUA) manages the bulk water supply system, which delivers untreated water to a range of distributors and users (as seen under users in Figure 3.1). As depicted in second section of Figure 3.1, water is released from Darlington dam and diverted to the Sundays River; this is then abstracted into the Water Users Association (WUA) canal system at the Korhaans Weir (SRVM, 2010b). Raw water is supplied from the WUA irrigation canal and the SRVM receives untreated water from the WUA to three supply systems (Enon-Bersheba, Addo and Greater Kirkwood).

The SRVM's system is depicted in the third section of Figure 3.1. There are two Water Treatment Works (WTWs), one in Addo, which supplies the township of Nomathamsanqa (amongst others) and then one Kirkwood, which supplies Aquapark with treated potable water. Firstly, the source and supply of the water for Aquapark is the same source supplying the main town of Kirkwood. Kirkwood receives raw water from the WUA; a raw water canal system leads to concrete lined earth storage dams from which the water is pumped for purification to the Kirkwood WTW and distributed into the municipal system (SRVM, 2010b). Reservoirs at the Kirkwood WTW distribute to certain parts of the town and surrounding townships (such as Aquapark) and some of the treated water is also pumped into other reservoirs for distribution to other parts of the town. In regards to Addo, the raw water is purchased from the WUA, and is then used to supply the Caesar's Dam. The water is then treated and distributed into the municipal system.

The canal system is managed by the WUA and is run in a network fashion with no major storage points within the system: water orders are calculated on a weekly basis, with releases from Darlington dam planned according to demand (D'Hont et al., 2013). Therefore, the SRVM as well as the farmers in the area have to place water orders on a regular basis in order to receive an adequate supply of water. According to the SRVM (2010a), the only external source of water purchased by the Water Service Authority is from the WUA, and over a five-year period, it aims to increase its current water supply by 32.6 %. Although the main purpose is not to rectify the water security problems faced by the townships but rather to supply Paterson (neighbouring town) via the new bulk water supply scheme which is currently under construction.

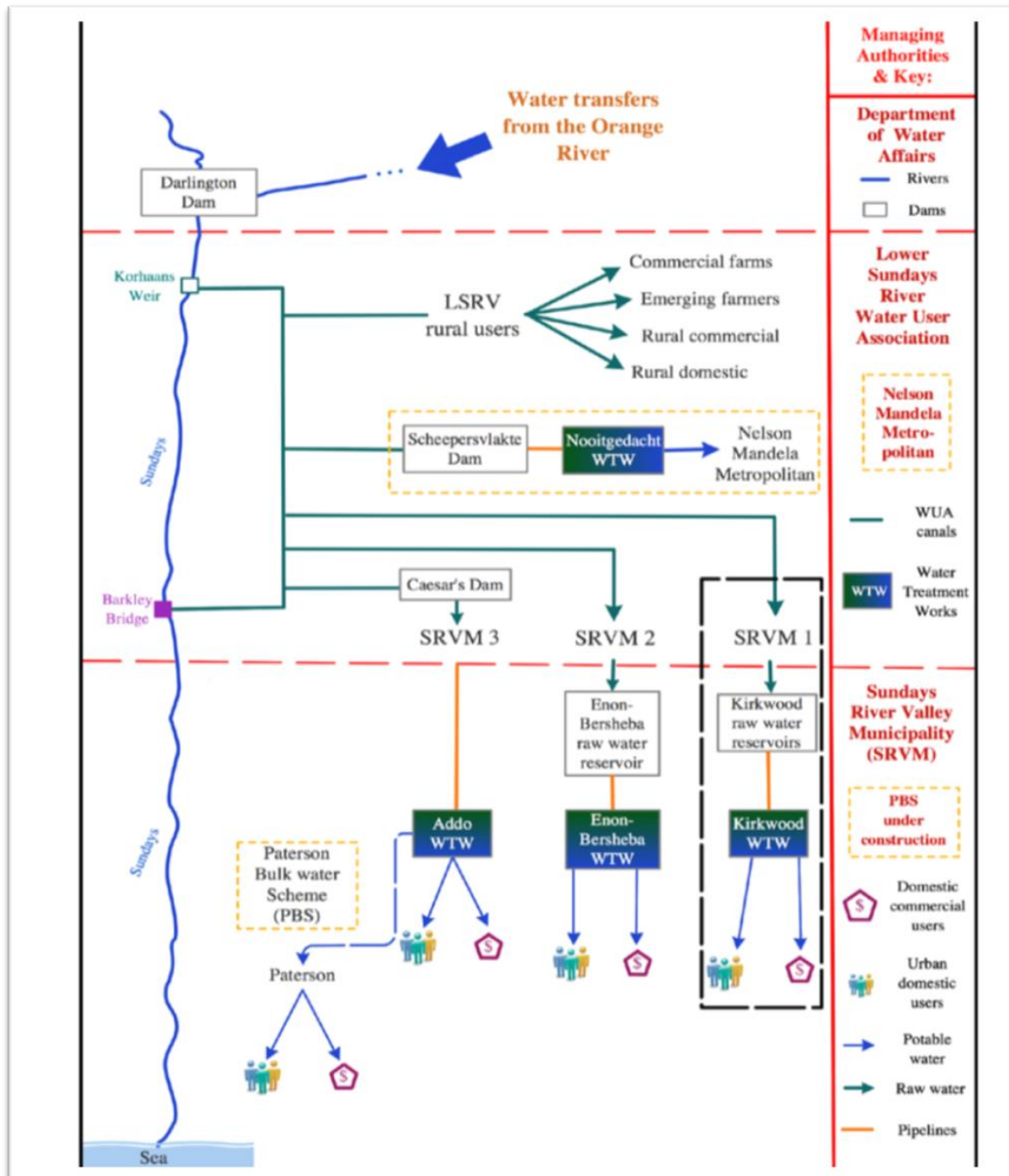


FIGURE 3.1 SCHEMATIC OF THE WATER SUPPLY SYSTEM IN THE LOWER SUNDAYS SUB-CATCHMENT (CLIFFORD-HOLMES, 2013)

3.3 STUDY SITES

3.3.1 SELECTION OF STUDY SITES

Two townships within the towns of Kirkwood and Addo were selected to reflect the population of township communities within the SRVM, based upon their socio-economic status and their

geographical placement. The study site selections were narrowed down to these towns because both towns are where the two Water Treatment Works (WTW) in the LSRV are situated. A scoping trip was undertaken which involved a short questionnaire covering general questions surrounding water access, shortages, quality and service delivery with twenty residents from 6 different townships that surrounded Kirkwood and Addo. From this it was found that the current status of water security and water quality within the townships surrounding Kirkwood and Addo is low, with many of the households within the communities of Aquapark and Nomathamsanqa facing severe water access issues and water shortages (Chapter 6 and 7). Due to the fact that the study sites are townships, there is not a lot of information and statistics about these sites.

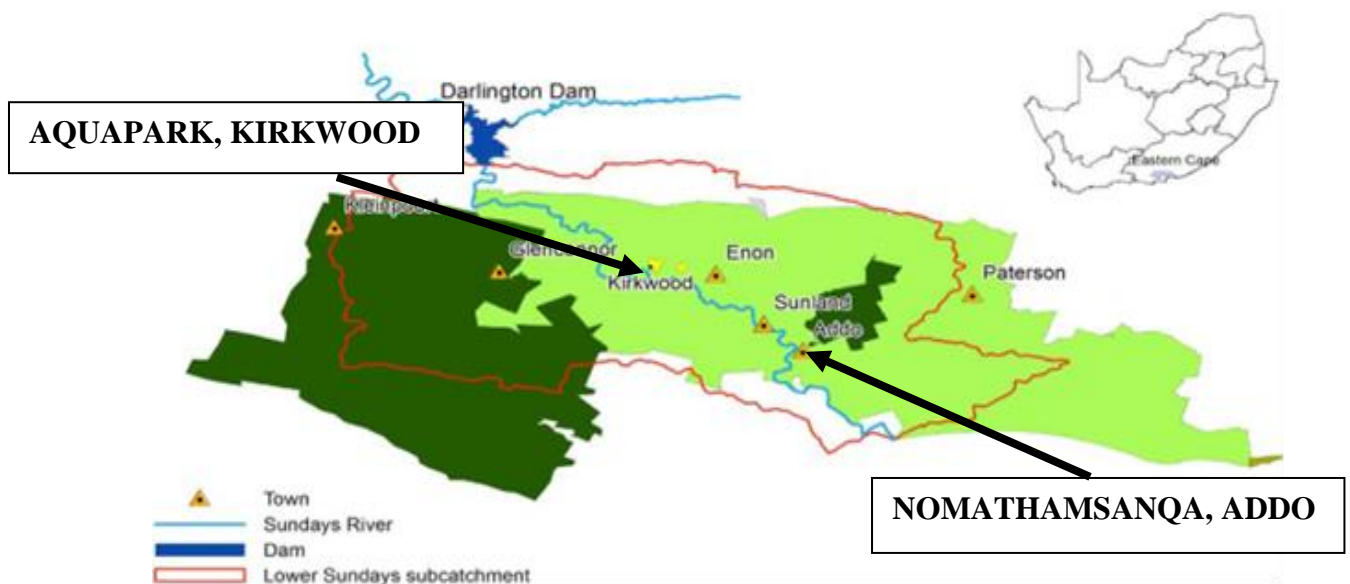


FIGURE 3.3 STUDY SITES IN SRVM

AQUAPARK, KIRKWOOD

In regards to water security, the Kirkwood area has experienced severe water shortages from 2009-2012 (which is arguably still on-going). This is due to a variety of factors, which include poor management of the Kirkwood WTW and a lack of referral to the infrastructure plan when implementing new RDP housing projects (Chapter 5). This increase in development and the expanding population has placed tremendous pressure on the already over worked Kirkwood WTW and resulted in water demand outweighing supply and inadequate storage capacity in the water reservoirs (SRVM IDP, 2011). The reoccurrence water shortages came through strongly in initial conversations with residents, which also prompted interest for the selection of the study sites (water shortages are expanded on in detail in Chapter 5).

The research took place in Aquapark, which is a township on the outskirts of the main town of Kirkwood (Figure 3.3 above). According to the Stats SA Census, 2011 there are 1841 residents that reside in Aquapark.

As seen in Table 3.1 below, the majority of the residents living in Aquapark are coloured (66%) followed by Black African (33%), with Afrikaans (70%) and isiXhosa (27%) being the main languages spoken (Table 3.2). There are also more females (53%) in Aquapark than males (47%) which according to Stats SA Census, 2011 are a characteristic common within the Eastern Cape.

TABLE 3.1: AQUAPARK POPULATION AND GENDER STATISTICS IN SRVM (STATS SA CENSUS, 2011)

Population group	People	Percentage
Coloured	1206	66%
African (Black)	603	33%
Other	18	1%
White	12	1%
Indian/ Asian	2	0%
Gender	People	Percentage
Female	976	53%
Male	856	47%

TABLE 3.2: AQUAPARK FIRST LANGUAGE STATISTICS IN SRVM (STATS SA CENSUS, 2011)

First language	People	Percentage
Afrikaans	1286	70%
isiXhosa	494	27%
English	18	1%

Aquapark residents are faced with poverty, unemployment, and the challenges that follow with living in such circumstances. From initial discussions with residents, it became apparent that for those that have found employment this is predominantly as labourers on citrus farms or working in the citrus packinghouses. This is supported by the fact that 46% of employment in the SRVM is provided by agricultural activities such as citrus farming in the area (SRVM IDP, 2011).

Furthermore, many of the farm labourers previously lived on the surrounding farms, but since the eviction of farm labourers off farming land they were forced to find housing elsewhere. This became evident through my scoping study as I found that many of the informal dwellings belong to farm workers who are viewed as ‘temporary residents’ as they reside in Aquapark during the citrus harvesting season and then return ‘home’, which is often rural areas in the Eastern Cape where their families reside, during the off season (Chapter 5). The seasonal nature of the citrus work has great effects within the community of Aquapark as residents have noted a rise in drinking at local taverns, crime and assault during the off-season. The lack of security in the job market and the rise of labour-brokers in the area has made it difficult for local residents to get consistent work (SRVM IDP, 2011).

NOMATHAMSANQA, ADDO

Nomathamsanqa is one of the largest and oldest townships in SRVM, with many generations of families continuing to live in the area (Clifford- Holmes et al., 2012). The township began as an unplanned settlement, with residents who worked on nearby farms building houses for their families. From 1994, RDP houses were quickly constructed and built in the township by the SRVM, yet there are discrepancies between the older RDP houses and the newer houses that continue to be built. This is mainly in terms of water access and sanitation, as well as electricity. The older RDP houses have access to a tap in the garden and outside toilet (VIP’s) and no electricity access, whilst the newer houses have a tap and toilet within the house and access to electricity. The SRVM have been made aware of these discrepancies, and in some cases have taken action and upgraded older RDP houses, but they continue to build new houses within the township. The significant (initially unplanned) population has overloaded the infrastructure such that water pressures are low and sewers frequently block and overflow. Furthermore, maintenance of such systems is very difficult because of the high densities and congested nature of the township. The current water problems that face residents include water shortages (as in Aquapark) as well as frequent complaints surrounding the water quality of municipal water sources, which are supplied by the Addo WTW (Chapter 6). Many residents question the health and safety of these water sources (Chapter 6).

Nomathamsanqa is a far larger township than Aquapark, with predominantly black Africans living in the area (97%) followed by white and coloured (1%) (Table 3.3). As seen in Table 3.4 the main first language spoken is isiXhosa (92%) followed by English at 3% and then Afrikaans (2%).

TABLE 3.3: NOMATHAMSANQA POPULATION AND GENDER STATISTICS IN SRVM (STATS SA CENSUS, 2011)

Population group	People	Percentage
Coloured	129	1%
African (Black)	10346	97%
Other	83	1%
White	131	1%
Indian/ Asian	8	0%
Gender	People	Percentage
Female	5416	51%
Male	5280	49%

TABLE 3.4: NOMATHAMSANQA FIRST LANGUAGE STATISTICS IN SRVM (STATS SA CENSUS, 2011)

First Language	People	Percentage
Afrikaans	9640	92%
isiXhosa	282	3%
English	200	2%

From the scoping trip, Nomathamsanqa was selected as the study site in Addo because in comparison with the neighbouring township (Valencia) it provided a wider range of the three household categories of RDP, township and informal (Chapter 6 and 7). The surrounding townships in Addo consist of predominantly newly built RDP houses, which not only means that these townships do not meet the household category criteria, but the residents do not face as many water security challenges as Nomathamsanqa residents (Chapter 6). As with Aquapark, many of the residents find employment through the citrus industry. Yet this has proved difficult, as there has been major influx of migrants from surrounding areas in the Eastern Cape to SRVM in search of work during the citrus season (SRVM IDP, 2011).

CHAPTER FOUR:

METHODOLOGY AND APPROACH

4.1 CHAPTER OVERVIEW

This chapter discusses the research methodology and study design used within this study. The mixed-methods research approach is used as it incorporates qualitative and quantitative approaches. These methods are expanded on, and discussed in reference to secondary and primary sources.

4.2 RESEARCH METHODOLOGY AND STUDY DESIGN

The purpose of the research was to explore selected communities' perspectives and experiences of living in townships faced with water shortages and service delivery problems. This required a baseline study of the nature of water problems residents were facing and from there a further in-depth study of the experiences of living with water problems. Jakob (2001:49) states that:

"By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single-method, single-observer, single-theory studies. Often the purpose of triangulation in specific contexts is to obtain confirmation of findings through convergence of different perspectives. The point at which the perspectives converge is seen to represent reality."

In recent years, the use of qualitative and quantitative methods in studying the same phenomenon has received significant attention among the scholars and researchers. A mixed-methods research approach was used which is based on the collection and analysis of data through a mix of qualitative and quantitative approaches (Creswell and Plano Clark, 2007). A mixed methods approach was chosen because it offered the most viable way to research the subject matter of the study. A central premise for a mixed methods approach is that the use of quantitative and qualitative methods can together provide a better basis for socially situated research (Creswell and Plano Clark, 2007). Therefore, mixed methods provide a useful and relevant way to communicate meaning and knowledge of issues that are explored through the combination of different methods and techniques (Teddlie and Tashakkori, 2009). The convergence of the two research methods for this research study not only allows for a more comprehensive picture of water security and deeper understanding of social water scarcity at the local level to be attained, but also allows for

validation and confirmation of the data gathered through combining the quantitative questionnaire data with the 'lived experience' of residents (Creswell and Plano Clark, 2007) (Appendix). As a result, it has become an accepted practice to use some form of 'triangulation' in social research. Triangulation refers to the concept of combining methods and thus cross-checking one result against another, and increasing the reliability of the result. Therefore it is a useful verification procedure whereby researchers search for convergence among multiple and different sources of information to form themes or categories in a study.

The three data sources used in this study, namely: literature review, questionnaires, and interviews. The literature review was used to provide secondary data which assisted with formulating the questionnaires as well as the questions for the interviews. The findings from the analysed questionnaires informed the types of questions which were included in the interview schedule. In analysing the questionnaires and interviews data triangulation and methodological triangulation were made use of (Denzin and Lincoln, 1994). Methodological triangulation concerns itself with the use of both qualitative and quantitative methods in the same study. Several qualitative methods were chosen to support the quantitative data, as described below, as well as analysis of secondary sources of information to help contextualise study findings. The purpose of quantitative research is to predict, explain and generalise the outcomes of the research, whereas the purpose of qualitative research is to contextualise, interpret and understand the perspective of the actors (Creswell and Plano Clark, 2007).

Triangulation offered the following benefits for this study: it provided additional sources of valuable insight that could not be obtained from the literature review alone; it minimised the inadequacies of single-source research by engaging three data sources which complemented and verified each other, and it also provided richer and more comprehensive information in the sense that the researcher was able to draw information from various sources including the face-to-face interviews which provided first hand experiences of the residents.

4.3 METHODS AND SOURCES OF DATA

4.3.1 SECONDARY SOURCES

ANALYSIS OF WATER POLICY

A literature review was conducted which formed the foundation for the study. The concepts of water security and social water scarcity were explored in reference to the international, national and local context. This was done through documents obtained from the research conducted by UN-water, WaterAid UK, and the Global Water Partnership amongst others (Chapter 5). These provided research studies based in Africa and focused on case studies that were linked to water security.

A closer analysis of South African research relating to the local context of water security was conducted and this provided the platform for an analysis of South African water policy and law (Chapter 5). This analysis considered the history of South African water allocation and the access and nature of water policy through a review of the reformation of water management in reference to water governance, as well as the policies surrounding and supporting the Free Basic Services policy. This analysis drew on the Water Act 1956 (Act 54 of 1956), the National Water Act 1998 and Water Services Act 1997, Free Basic Water Policy 2002 and the framework legislation surrounding the decentralisation of governance through The Municipal Structure Act 2001 and the decentralisation within Department of Water Affairs, all of which is discussed in detail in Chapter 5.

Through utilising the information and data gathered through the broader project as well as access to the *Integrative Development Plans* and *Water Services Development Plan* of the SRVM, a more nuanced comprehension of the water context of the SRVM was achieved (Chapter 5).

BROADER “WATER SUSTAINABILITY AND SOCIETY” PROJECT

As previously discussed, this study forms part of a broader project implemented by the Institute of Water Research at Rhodes University. Due to the transdisciplinary nature of the project, students and researchers from different academic backgrounds form part of a *Water, Sustainability and Society* project. Through monthly meetings and the sharing of research outputs from Masters and Doctoral students, a broad understanding of the current water challenges facing the SRVM were gathered which are used as supporting data in this study. These contributions have provided greater contextualisation for the reasons behind the water security challenges, and allowed this study to go beyond simply providing a baseline of water security issues. The knowledge exchange

provided through regular meetings provided exposure to different conceptual frameworks as well as research data that a solo study would not have enabled. Furthermore, the project allowed for interactions with municipal representatives and stakeholders through workshops and forums.

4.3.2 PARTICIPANT OBSERVATION

Participant observation is the process enabling researchers to learn about the activities of the people under study in their natural setting through observing and participating in those activities (DeWalt and DeWalt, 2010). The aim is to understand the social world from the subject's point-of-view. This means you put yourself 'in the shoes' of the people you're studying in an attempt to experience events in the way they experience them. This is achieved through exploiting the ability to empathise - the main objective being to participate in a social group while, at the same time, employing the insights and understanding of an analytical observer (Atkinson and Hammersley, 1994).

Using participant observation as a method helped me to develop a holistic understanding of the current water challenges facing the communities in the study. With this in mind, I acknowledge the limitations of the research methods employed to 'give a voice' to the participants. As a researcher, I cannot separate myself from my theoretical position and values in relation to qualitative research. As Fine (2002: 218) argues, even a "*giving voice*" approach "*involves carving out unacknowledged pieces of narrative evidence that we select, edit, and deploy to border our arguments*". Therefore, the objective is to observe and experience the world as a participant, whilst retaining an observer's eye for understanding, analysis and explanation (Braun and Clarke, 2006). Participant observation was highly useful during the scoping trip and then the initial piloting of the questionnaire, as it helped to build the theoretical framework and generate the hypotheses, research questions and questionnaire design. The participant observation took place through the discussions with questionnaire respondents and walks with them through the townships. The respondents would show me the daily challenges they face, such as broken community standpipes and overflowing drains. Observations of the way in which the respondents used water (washing and cleaning) were also useful and highlighted the time consuming daily activities. Overall, these observations were useful in providing the context for developing the sampling guidelines and questionnaire and interview questions. Furthermore, participant observation was a useful method as the observations contributed to a greater understanding of the socio-political context in which the research is based.

4.3.3 HOUSEHOLD SURVEY

HOUSING CATEGORIES

Linking basic services such as water and sanitation to housing was recognised through RDP policy (1994) as well as DWAF (2002) as water access and supply are viewed historically as being “*intimately related to housing*” (DWAF, 2002). Therefore, the premise provided by the literature and the history of water access in South Africa, was that one’s household category would determine one’s access to water supply (Chapter 5).

Through participant observation during the initial scoping trip, it became apparent that there are three definite categories of households within Aquapark and Nomathamsanqa, namely RDP, township and informal settlement houses and this corresponds with the structure of most townships found in South Africa (Stats SA, 2012). Firstly, RDP houses are based upon state policy; the housing allocation is based upon income scale and is linked to the indigent policy, which ensures access to basic services (Eastern Cape Development Report, 2012). An RDP house refers to the basic house structure provided by the government that includes basic services (e.g., running water, sewerage and electricity) and access to necessary amenities (e.g., schools and clinics) (HDA, 2012).

Secondly, a township house refers to a house that the occupants own (Bond, 2000). However, over the years with an increase of industry, companies would build houses and set up basic services for workers in order for them to be close to work. Therefore, these houses were built either by employers or by individuals ‘illegally, as they did not gain permission from the Apartheid government to construct houses (Bond, 2000). In the case of SRVM, many built the homes themselves or purchased from a previous owner as many of these houses existed prior to the democratic transition. In many cases, these township houses are basic houses that have access to basic services.

Lastly, an informal dwelling are illegal housing structures and these informal dwellings (commonly known as shacks) generally lack proper indoor infrastructures, such as water supply, sanitation, drainage, waste disposal and road access (HDA, 2012).

These three household categories make the housing settlement known as a township, which is usually a town or part of a town. These categories were selected because it was found the different housing structures had different water security challenges. Through addressing the three household categories as separate entities, a structure was provided from which comparisons

between (RDP vs Township vs Informal) and within the study sites might be drawn (i.e. RDP in Aquapark vs. RDP in Nomathamsanqa as seen in Figure 4.2). This was important for the structure and design of the household questionnaires as well as the broader contextualisation of the study.

SAMPLING

Stratified sampling was utilised to select a mix of RDP, township houses and informal dwellings within Aquapark and Nomathamsanqa (Figure 4.1). Stratified sampling is useful when there are smaller sub-groups that are to be investigated, such as the different categories of households. Overall, ninety households in each study site were sampled; this comprised of thirty in each household category as seen below in Figure 4.1. This allowed for a valid representation of each household category (RDP, township and informal dwelling).

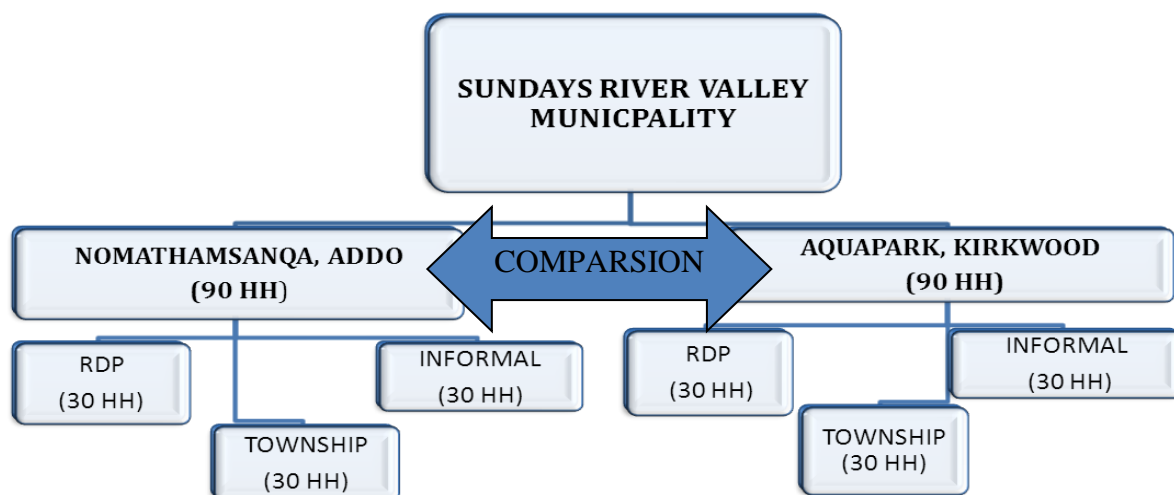


FIGURE 4.1 THE SAMPLING STRUCTURE FOR QUESTIONNAIRES

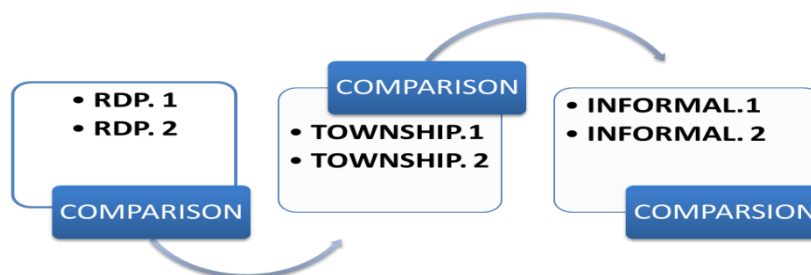


FIGURE 4.2 DRAWING COMPARISONS BETWEEN HOUSEHOLD CATEGORIES

As depicted in Figure 4.1 and Figure 4.2 through selecting different household categories, comparisons could be drawn between housing categories in terms of water access, water quality

and water service delivery (Chapter 6 and 7). These comparisons (as depicted by the arrows) were drawn between the three household categories within the each study site (Figure 4.1) and then between corresponding household categories of each study sites (Figure 4.2 where 1 refers to Nomathamsanqa and 2 refers to Aquapark) and lastly overall comparison of the 2 study sites. This allowed me to assess similarities and differences between the study sites and housing types, as well provide a greater understanding of water service delivery and access within the SRVM.

The sampling was structured by interviewing every 10th house in each category; this sampling strategy was employed in order to cover a significant portion of each township. After the scoping trip, it was realised that despite the fact that the three different household/homestead categories are integrated amongst one another within the township, they are indeed three distinctive categories that were clearly distinguishable. These three household categories do not only appear different, but they are differ in terms of water acesss and water availblity and sanitation. This was the rationale for comparing and contrasting these three distinctive houeshold categories.



FIGURE 4.3 THE SIDE BY SIDE LOCATION OF HOUSING TYPES IN NOMATHAMSANQA (1) AND AQUAPARK (2)

As seen in Photo 1 and 2, the different household categories are interspersed and in close proximity to one another. From interactions with residents through the interviews it was found that in many cases people have informal dwellings in their backyards that either family members use or they rent out (As seen in Photo 1). Despite the close proximity of the different household categories, each faces different challenges in regards to water security.

QUESTIONNAIRE DESIGN

Before research was conducted in the area, the local ward councillors were informed and made aware of the current research project and what it entailed. Meetings with ward councillors were arranged, during which any concerns and queries surrounding the nature and purpose of the research were addressed.

The questionnaires were targeted at the head of the household (male or female), and when they were not present the oldest member (generally being a mother or grandmother) was interviewed. Due to the nature of water use and gender roles within the household, when men were present they preferred to oversee and contribute whilst the women (mother or grandmother) answered the questions.

After the scoping trip and selection of the study sites, the findings from informed the reformulation of the objectives of the study; consideration of the research population; elimination and/or revision of ambiguous questions; and planning for the main research study. I conducted a pilot of the questionnaire in both Aquapark and Nomathamsanqa was conducted with the help a translator. The use of the translator was necessary, as the main languages are Afrikaans and isiXhosa. Miss Ziyanda Danster is 21 years old, and is from Nomathamsanqa. It was decided that a local translator would help provide insight into the livelihoods and hardships facing the residents in the study sites. The translator would assist (where necessary) in translating the questions into either into Afrikaans or isiXhosa. I ensured that the translator had a very good idea of what the questionnaire was covering and what the objectives of the research were. This allowed for further clarification to be made and for further questions to be asked. The transcribing took place with both Ziyanda and myself and we would discuss the responses that we had at the end of each day. This allowed me to get a better overview of the data that we were gathering.

The content of the questionnaire was informed from participant observation during the initial scoping trip, along with the responses gathered as well as other research surrounding water security challenges. After the questionnaire was piloted, clarifications and adjustments were made and finalised. The questionnaire was then administered over July and August 2012.

The information gathered from the questionnaires allowed for the baseline of water security of the study sites to be established (Appendix). The household questionnaire comprised of six sections with closed questions (with the exception of one; regarding illnesses). The first section of the questionnaire was based on water access, water collection patterns, safety of water sources, disputes over water, water metres and payment for water. In regards to water access, eight different options were provided as to where residents access their primary source of water as well as their secondary source of water. The options of water sources were drawn from the initial scoping study and the most common sources were listed. These questions were asked in order to firstly determine a baseline of where water is accessed and how frequently it is collected. These questions were two-option responses; yes or no, and agree or disagree.

The second section of the questionnaire covered water use. Questions enquired what exactly water is used for, how much water is used, how much water is satisfactory to meet the needs of residents and if the current supply of water meets their needs. This section mainly comprised of two-option and multiple option responses. The third section was directed at water service delivery and reliability whereby questions were based on problems with water shortages; how frequently these occur and the effects of these shortages on daily life. Respondents were then asked about interactions and responses from the Municipality and Ward Councillors concerning water problems. Likert scale statements were used because this is recommended as a valuable approach in measuring beliefs, attitudes and values (Creswell, 2003).

The fifth section was related to water quality, these questions were based upon the perceived safety of water sources and home water treatments to ensure health and safety of the water. The respondents were questioned about whether or not they were satisfied with the current level of service delivery and if formal complaints were made, and whether respondents attended ward council meetings. These questions related to the third section of the questionnaire, but by placing them at the end of the questionnaire it was hoped that they would be answered more honestly as a rapport would be established.

Lastly, the sixth section dealt with demographic details including gender, age and information about the household. Questions about illnesses and water related illnesses were also asked. Due to the sensitive nature of these questions, it was felt that these questions should be asked at the end of the questionnaire after a rapport has been established between the respondent and me.

ETHICS

Consent forms were presented to interviewees and participants and were read out where necessary. The consent forms contained details about the research aims of the project as a whole and of this study, precise details of what was expected of the participant as well as a confidentiality agreement (Appendix). Interviewees and participants were made aware that findings would be published, but that publication will respect confidentiality and anonymity. Confidentiality refers to handling the information concerning the respondents in a confidential manner. Respondents were assured that their names and the names of their schools would be dealt with in the strictest confidence. This aspect includes the principle of trust in which I assured the participants that their trust would not be exploited for personal gain or benefit, by deceiving or betraying them in the research route or its published outcomes. Interviewees and participants were also be given the contact details of key researchers in the project, and the principle of voluntary

participation was explained to the respondents and they were also informed that they had the right to withdraw from the study at any time. The principle of informed consent was attached to the questionnaires and verbally explained to the interviewees. Both principles entailed explaining the research process and its purposes to the participants.

DATA ANALYSIS

Three sources of data were identified for this study, namely interviews and a questionnaire which are referred to as primary sources of data, and a literature review as secondary data. The questionnaires were used to collect quantitative data that provided opportunity for statistical descriptions, relationships and analysis. The data gathered from the 180 questionnaires were captured using Microsoft (MS) Excel (2007) and analysed in Excel and using cross tabulations in Statistica 2011. The results from the cross tabulations allowed for an examination of the relationships and differential experiences between the three household categories. Chi-square (χ^2) tests were used to explore whether differences were significant. The *p*-value (at either 1% or 5% level) helped determine the significance of the differences between the different household categories and this indicated either weak or strong evidence as detailed in the tables through chapter 6 and 7. The *p*-value was then used alongside the interviews to discuss the comparisons and contrasts between the two study sites. This allowed for analysis of the specific water security challenges to be explored further through the in-depth interviews.

4.3.4 IN-DEPTH INTERVIEWS

After the questionnaires were completed and data had been captured, 20 in-depth interviews of selected respondents were conducted. The objective of doing these interviews was to delve deeper into areas of interest revealed in the household survey such as the access to water at a community level, the dynamics and conflicts surrounding the 'right of use' of water, the consequences of water shortage and the conservation measures people have put in place.

SAMPLING

This was achieved through purposefully selecting households that were considered inherently vulnerable. Inherent vulnerability was determined by the socio-economic characteristics of a family or household, in particular, being a woman of childbearing age, having many dependents, lack of regular income and not owning property (FAO, 2011). These criteria along with a lack of access to water supply and sanitation allowed for the more vulnerable interviewees to be selected. Respondents were also selected if they were addressing their water scarcity problems in innovative ways, such as using rainwater tanks, storage containers and rationing and sharing

stored water within a network of neighbours.

DESIGN OF INTERVIEWS

The main aim of these interviews was to provide a personal, local voice to the data gathered portraying the problems and experiences of living with water challenges and the reality of the water service delivery situation through perspectives of the residents. For the purpose of this study, the interviews provided a richer understanding into the challenges the communities faced in regards to water security. The interviews were conducted 10 at a time, such that the responses of the first set of interviews informed the process and questions asked in the next set of 10. It also allowed for reflexivity and clarifications of details from the respondents from the first set of interviews.

For the first half of the interviews narrative interviewing was used. This involves the generation of detailed 'stories' of experience rather than generalised descriptions and comprises a setting that encourages and stimulates an interviewee to tell a story about some significant event in their life and social context (Bauer and Gaskell, 2000). Furthermore, these narratives are social products and hold a detailed context of social, historical and cultural locations (Bauer and Gaskell, 2000). The narrative interviewing was done by firstly inviting the respondents to tell me a story about their backgrounds and how they came to live in Nomathamsanqa or Aquapark. From this initial engagement, a rapport was built and the respondents became more comfortable in my presence. The respondents were then asked to provide a detailed story of when they had no water access due to water cuts and shortages.

The personal stories gathered from the respondents are expressive of larger societal and historical contexts and highlight the realities of the water challenges facing communities, as well as providing insight into political dimensions of water service delivery.

The narrative interviews then led into a semi-structured interview as more specific questions surrounding water security were asked. The topics of water access and gender roles and dynamics in relation to water use and collection were explored. The current rate of water shortages and the impact and constraints that this has had on the family and daily life were also discussed. In addition, water quality and safety issues and the use of the irrigation canal were discussed. Lastly, water service delivery and the real problems that the residents face with the Municipality not meeting the service delivery standards were discussed.

These interviews enabled the last objective of the study to be met by exploring and highlighting the degree to which water security is an issue of voice and power and assessing if this corresponds with poverty and political marginalisation.

4.3.5 KEY INFORMANT INTERVIEWS

SAMPLING

Key informant interviews were held with community leaders, ward councillors and key organisations such as schools and local clinics. Overall 10 interview were conducted. These informants were selected based upon the responses gathered from the questionnaires. Through the initial scoping trip and the questionnaires, I was made aware of problems surrounding water quality and illness, which then prompted the interviews with the clinic. Respondents had also stated that the schools faced many water security challenges and during water shortages were forced to send children home due to hygiene and sanitation problems. This then lead to interviews with the local headmasters.

DESIGN OF INTERVIEWS

These key informant interviews were conducted after the questionnaires and were semi structured. The interviews provided greater insight into the challenges facing the communities and helped to further build the picture of water insecurity at a higher level. The informants highlighted the broader impact that the water security problems had on the community, as well as specific issues that affected the functioning of their organisation, such as the frequency of water shortages necessitating rainwater tanks in both the clinics and schools.

4.3.6 ANALYSIS OF QUALITATIVE DATA: INTERVIEWS

The interviews were recorded and then transcribed in Microsoft Word (2010) and analysed in Nvivo 2010 using narrative and thematic analysis. The narrative interviews along with participant observation lead to the thematic analysis of the data. Essentially, this process provided me with a way to analyse the interviews by organising and gathering the most important information in regards to the research objectives. Nvivo provided the tools for thematic analysis by restructuring the answers, which were then gathered into themes and this assisted in drawing comparisons between the two townships as well as between the household categories. Thematic analysis is a qualitative analytic method for *“identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail. However, frequently it*

goes further than this, and interprets various aspects of the research topic” (Braun and Clarke, 2006:79).

Thematic analysis was useful for finding common themes across research participants’ responses and the events they reported, which was useful in structuring the reporting of results. Through using thematic analysis, underlying themes were exposed, revealing the power inequalities and social equity concerning who has access to water and formal and informal rights to access. These political aspects of water became highly evident through interactions with the community members and the ward councillors. Furthermore, grey areas of discussion were revealed such as non-commercial water use beyond domestic levels, challenges and competition over formal and informal systems of authority, illegal connections to municipal water supplies, as well quotes that indicated the hardships faced by the communities were extracted and interspersed in the results chapters to support the statistical data. This was done in order to create a richer picture of the current situation and highlight some of the important challenges that the data gathered from the questionnaire touched on.

CHAPTER FIVE:

SOUTH AFRICAN WATER POLICY, LEGISLATION AND LOCAL WATER MANAGEMENT ISSUES

5.1 CHAPTER OVERVIEW

This chapter has the purpose of providing an understanding of the policy and legislation developments that water supply and access to water services have undergone through the last decades in South Africa. The historical context of service delivery is analysed in terms of water laws, policies and changes in political priorities, which provides the rationale for initiating the National Water Act (No 36 of 1998) and the Free Basic Water policy (Gowlland-Gualtieri, 2007). The history of water legislation will be discussed in relation to water security and social water scarcity in South Africa. Through doing so, a better understanding of how legislation and policies play out on the ground and the gaps between policies and implementation can be gathered. This allows for a better comprehension of the multitude of challenges that municipalities face, which has resulted in a backlog of water service delivery. This will be discussed in detail through analysing the case of SRVM.

5.2 SOUTH AFRICAN CONTEXT

5.2.1 INTRODUCTION

This chapter has the purpose of providing an understanding of the policy and legislation developments that water supply and access to water services have undergone through the last decades in South Africa. The historical context of service delivery is analysed in terms of water laws, policies and changes in political priorities, which provides the rationale for initiating the National Water Act (No 36 of 1998) and the Free Basic Water policy (Gowlland-Gualtieri, 2007). The history of water legislation will be discussed in relation to water security and social water scarcity in South Africa. Through doing so, a better understanding of how legislation and policies play out on the ground and the gaps between policies and implementation can be gathered. This allows for a better comprehension of the multitude of challenges that municipalities face, which has resulted in a backlog of water service delivery. This will be discussed in detail through analysing the case of SRVM.

Since 1994, the South African government has undertaken massive reforms aimed at addressing poverty and inequalities inherited from the past regime. Out of the many changes that occurred

following the dissolution of the Apartheid state and the establishment of the inaugural democratic government in 1994, two are particularly relevant to introduce here. Firstly, the water regulations, law and policy reform process and secondly the decentralisation of service delivery to a local level, placing municipalities at the forefront for water service delivery.

South Africa has been internationally acknowledged for its recognition of water as a basic human right, adoption of a free basic water policy, and improving and expanding water service delivery (Gowlland-Gualtieri, 2007). Progressive laws and a policy framework for water, which is based upon the constitutional recognition of the right of access to water, have been accompanied by massive economic support to speed up the delivery of basic services throughout the country (Gowlland-Gualtieri, 2007). While there has been satisfactory progress with regard to improving access to water supply in urban and rural areas (over the last two decades the population with access increased from 66% to 79% from 1990 to 2010) (WHO, 2010), maintaining and expanding water and sanitation, in order to address service backlogs and the demands of the growing economy, continues to prove challenging. In South Africa, the challenge is complex especially given semi-arid conditions, low rainfall and a reliance on significant water transfers (within South Africa and from neighbouring nations) and limited governance capacity (Ashton and Turton, 2005).

5.2.2 HISTORICAL OVERVIEW OF SOUTH AFRICAN WATER REGULATIONS

The development of water law in South Africa is intertwined with economic and political policies and agendas, and therefore needs to be understood within the historical context (Tewari, 2009). The water allocation system in South Africa, both in terms of water services and water resources management, largely owes its present configuration to the history of the country and, in particular, the colonial and apartheid political economies of resource allocation that prevailed mainly from 1913 to 1993 (Cottle, 2004; Nnadozie, 2013).

The impact of the water rights and legislation needs to be viewed within the context of the historical and political processes that were taking place in South Africa over that time (Tewari, 2009). According to DWAF (1994), the development of South Africa's water resources was linked with supporting the progress of the country's wealthy sector rather than with alleviating the position of the poor, particularly in rural areas. The systematic entrenchment of segregation and ownership of land began through the Natives Land Act 1913. This was the first legislated implementation of segregation in the rural areas, and it established a clear distinction between African Reserves and white farming areas (Gowlland-Gualtieri, 2007; Tewari, 2009). Under the

Natives Land Act, there were strict regulations of ownership that meant that no black residents were allowed to purchase land within white areas. The fact that the majority of South Africans were stripped of their land rights and restricted to 13% of the land meant the majority of the people were also deprived of effective control of and access to water (Earle et al., 2005). Through a series of other land related pieces of legislation, 87 % of the country's land was set aside for white residents (Turton et al., 2004).

The first legal codification of water law in the Union of South Africa was Act 8 of 1912 and its main emphasis was irrigation (DWAF, 1994). By the 1950s Act 8 of 1912 "*had outlived its usefulness*" (Barnard, 1999 in Earle et al., 2005) with the emphasis on irrigation proving to be inadequate for the new water requirements of an expanding industrial base into mining. This led to the subsequent passing of a new Water Act in 1956 (Act 54 of 1956). This Act placed a major emphasis on irrigation, and intended to ensure an equitable distribution of water for industrial and other competing users, as well as authorise strict control over the abstraction, use, supply, distribution and pollution of water, artificial atmospheric precipitation and the treatment and discharge of effluent (DWAF, 1994).

A fundamental principle of the 1956 Act was that ownership of riparian properties conferred water rights. Jurisdiction over water followed the geographical segregation of the apartheid regime, which was politically and racially controlled. Furthermore, the 'riparian principle' inextricably linked the ownership and control of access to water, in which access to water was dependant on land ownership (Gowlland-Gualtieri, 2007, Tewari, 2009). Land owners (white farmers) who, as a result of the previous land acts, owned the majority of land adjacent to watercourses had the sole right, without restrictions, to use water sources that fell on their land as well as streams that arose on their land and groundwater (e.g. from a dam or borehole). This method of water allocation, afforded unfair privileges to a small category of persons, mostly white, to control the country's water resources (Tewari, 2009).

Alongside the 'riparian principle', the allocation and management of water was controlled by the state and water policies were strongly influenced and guided by agricultural uses for water (Earle et al., 2005). National water laws and laws that applied to water service providers continued to be treated as separate entities (rather than integrated) in the democratic era (Pietersen et al, 2011). DWAF primarily had the role of overseeing water allocation, whilst amongst (white) water users, a significant degree of self-management had already formed, with weirs constructed by farmers

being governed collectively. This was achieved through ‘democratically’ elected Irrigation Boards, which managed large-scale irrigation schemes and participated in the national farmer organisation (Van Koppen and Jha, 2005).

In regards to urban centres and cities, water and sanitation service delivery was managed by local municipalities, with water supplies and water-borne sewage services being provided to cities and towns along clearly designated racial lines (Marais 2001, *in* Goldin, 2005). This past resulted in different levels and quality of services between the white and black areas and in 1994. It was estimated that 30% of the South African population lacked access to adequate water supply services and that 50% were without adequate sanitation (DWAF, 2004). Therefore, segregation resulted in clear demarcations between those communities that had experienced access to land and water and those that had not. In the case of the Lower Sundays River Valley (as in many other farming communities), this meant that there were – and are - unserved communities living right next to irrigated crops.

Therefore, prior to 1994, water related policy and functions were limited exclusively to industry, irrigation and forestry and this had far reaching consequences for the water sector and the environment in general (Muller and Lane 2002; Pietersen et al., 2011). Furthermore, water supply responsibility was fragmented, with no single national and local government department responsible for its management there was also a lack of any coherent national water legislation or support structure at governance level (Muller and Lane 2002; Pietersen et al., 2011).

5.2.3 POST 1994: NEW WATER POLICIES, LAWS AND WATER RIGHTS FOR ALL

The end of apartheid and the first democratic elections of 1994 marked a turning point in the socioeconomic and political landscape of South Africa. The Constitution of South Africa provides the basis of the country’s progressive environmental legislation by guaranteeing South Africans the right to a safe environment (Funke, et al., 2007) and states that “*everyone has the right to have access to sufficient... water*” (Republic of South Africa (RSA), 1996). South Africa, in fact, is the first country in the world to have adopted national water legislation that serves as a tool in the transformation of society based on social and environmental justice (Schreiner, et al., 2002).

South Africa's service backlog has greatly affected the African population, both rural and urban. This was evident in 1994 as approximately 45% of the urban black population had access to piped water, while coverage for other urban groups was close to one 100%.

“It was the systemic function of the apartheid cities to ensure that white residents had all the social benefits of living in the city, and to deny black residents equal access to urban social goods and opportunities. The result is cities where very large proportions of the population are not included – materially or psychologically in urban life” (South African Cities Network, 2004: 77-78).

The evolution of water law and subsequent development change in the nature and structure of water rights in South Africa are intricately related to the growing demand for water within the context of the political processes that have taken place within the country (Tewari, 2009). Since 1994, the South African Government has undertaken massive reforms aiming to address rural poverty and inequalities inherited from the past apartheid regime (Schreiner, et al., 2002). The government brought in policy, institutional and legal changes for better management of water resources. According to DWAF (1994:03), the fundamental issue that needed to be addressed by the new government was that of equity, arguing that:

“The line which divides those with adequate access to water from those without is the same dividing the rich from the poor, the hungry from the well fed, the line of race and privilege”.

Amongst other programmes, the government adopted an ambitious new water legislation that promotes equity, sustainability and efficiency through water management decentralisation, new local and regional institutions, water users' registration and licensing, and the emergence of water rights markets (DWAF, 1994; Perret, 2002). Therefore, the goal was to ensure that all South Africans have access to essential basic water supply and sanitation services at a cost, which is affordable to both the household and to the country as a whole.

TRANSFORMATION THROUGH SOCIAL POLICY, WATER RIGHTS AND POLICIES

The Apartheid regime has, as previously mentioned, left a legacy of high levels of inequality in the delivery of services, which is unique to South Africa (Smith and Hanson, 2003). One of the central aims of the African National Congress (ANC) was to redress the impacts caused by Apartheid, in part by integrating historically marginalised areas through a more equitable distribution of public services (Hemson, 2004). During the time of major water reforms, the government ushered in a new era of institutionalised neo-liberalism and cost-recovery through the

Growth, Employment and Redistribution Strategy (GEAR), which was introduced in 1996 (Khosa, 2000). This substantially altered the shape and direction of certain infrastructure policies. The national government focus on eradicating poverty through developing human resources and meeting the 'basic needs' of the people was exemplified in the Reconstruction and Development Programme (RDP, 1994). An integral aspect of meeting these 'basic needs' was water service delivery and ensuring 'water security for all' (RDP, 1994).

TABLE 5.1 WATER POLICIES AND LEGISLATION

THE 1994 WHITE PAPER ON WATER SUPPLY AND SANITATION POLICY	ROLES AND RESPONSIBILITIES
	<ul style="list-style-type: none"> Formed the basis for the RDP water regulations, with an emphasis being placed on “water security for all”
	PURPOSE AND FUNCTION
	<ul style="list-style-type: none"> This created a “prescribed minimum standard” of water supply services necessary for the reliable supply of a sufficient quantity and quality of water to households to support life and personal hygiene (RSA, 1997) and refers to the minimum quantity of potable water of “25 ℓ per person per day or 6 kℓ per household per month . . . within 200 m of a household” (RSA, 1997)
	ROLES AND RESPONSIBILITIES
	<ul style="list-style-type: none"> The main role is to “provide for the rights of access to basic water supply and basic sanitation” (RSA, 1997).
WATER SERVICES ACT (ACT 108 OF 1997) (WSA)	<ul style="list-style-type: none"> The WSA is complementary to the NWA and provides a framework for sustainable water resource management while enabling improved and broadened service delivery. This act aims to establish and clarify the institutional arrangements for water services provision and sanitation services (De Coning, and Sherwill, 2004; De Visser, et al., 2003).
	PURPOSE AND FUNCTION
	<ul style="list-style-type: none"> Sets out the rights and duties of consumers and places emphasis on ensuring the financial viability of water service providers. The concept of “cost recovery” of providing water and private sector involvement in the provision of water is entrenched (De Visser, et al., 2003).
	ROLES AND RESPONSIBILITIES
	<ul style="list-style-type: none"> States that obligations are placed on all 3spheres of government: National, Provincial and Local to promote the right of access to basic water services.
THE 1997 WHITE PAPER ON A NATIONAL WATER POLICY	PURPOSE AND FUNCTION
	<ul style="list-style-type: none"> Inter-governmental co-operation is envisaged as the mechanism for water resource management across spheres of government, from National to Local, and between government departments at the National level.
NATIONAL WATER ACT (ACT 36 OF 1998) (NWA).	ROLES AND RESPONSIBILITIES
	<ul style="list-style-type: none"> The NWA repealed the 1956 Water Act and all related legislation The NWA placed Water resource management under public trusteeship of the national government, acting through the Minister.
	PURPOSE AND FUNCTION
	<ul style="list-style-type: none"> Ensuring that water is “protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate” (NWA, 1998: 10). All other water regulations and policies are regulated and designed with the NWA in mind
FREE BASIC WATER POLICY 2001	ROLES AND RESPONSIBILITIES
	<ul style="list-style-type: none"> The overall role of Free Basic Water (FBW) is to provide the low-income households with free water as a part of the national effort to tackle poverty and ensure development of the country.
	PURPOSE AND FUNCTION
	<ul style="list-style-type: none"> The FBW policy formed part of the Free Basic Services (FBS) which include water, electricity and solid waste collection. FBW allocation is linked to the ‘indigent policy’.

SIGNIFICANCE AND OBJECTIVES OF THE NATIONAL WATER ACT AND WATER SERVICES ACT

Three common themes can be seen emerging from Table 5.1. Equity, sustainability and efficiency were fundamental underpinning principles of the NWA, which supported by a wider range of principles (DWAF, 1997; Muller et al., 2009). Firstly, with regards to equity, the NWA incorporates the social component of water use where water is an instrument of social development; the objective here is to redress past social inequalities and provide compensation for the past differences between communities in service delivery and access to safe potable water (Earle, et al., 2005). Secondly, the element of sustainability was introduced; this recognises the unity of the water cycle and emphasises the importance to protect ecosystems, as human development is dependent upon water resources and equity for future generations. Thirdly, elements of efficiency, charges for water provision, cost recovery and private sector involvement were introduced. In this regard, water is seen as an economic good, to be used in the most efficient setting possible to promote the overall economic development of the country (Earle, et al., 2005). The interaction of these three critical factors; the value of water, the use cost of water, and the opportunity cost of the resource all contribute towards water being viewed as an economic good (Tewari, 2009).

The triple principles of efficiency, equity and sustainability can at times compete with one another and each individual objective can take preference in certain sectors, whilst the others fall by the wayside (Earle, et al., 2005). This becomes evident as allocation of the shares of a finite resource imply that there will need to be compromises reached between the various sectors and that not all needs can be met. Yet these triple principles also emphasise the inherent complexity of the nature of water- as encompassing social, physical and economic realms (Tewari, 2009).

The Water Services Act of 1997 (No. 108 of 1997), was drawn upon to support the NWA. The 1997 Act sets out the rights and duties of consumers and places emphasis on ensuring the financial viability of water service providers. The concept of “cost recovery” (of providing water) and private sector involvement in the provision of water is entrenched (WSA, 1997). One of the most important elements of the WSA is that it establishes and clarifies the institutional arrangements for water services provision, with local government at the centre. The purpose of the WSA is to assist municipalities to undertake their role as water services authorities and to look after the interests of the consumer. It also clarifies the role of other water services institutions, especially water services providers and water boards.

The WSA, as a measure of policy reform, recognises that secure access to water for basic needs is a human right; the WSA states “*everyone has a right of access to basic water supply and basic sanitation*”. According to De Visser, Cottle and Mettler (2003) “*basic water supply*” is the “*prescribed minimum standard of water supply services necessary for the reliable supply of a sufficient quantity and quality of water to households, including informal households, to support life and personal hygiene*”. Therefore the aim was to redress previous inequitable access to water services.

The inability of the post-apartheid state to adequately address poverty and inequality has resulted in unparalleled social challenges associated with societies in transition (Leibbrandt et al., 2010). For example, as Tapela (2014) argues that formal institutional responses to ever-expanding urban informal settlements have often failed to keep up with urban social change and expectations for service delivery and many are faced with insecure access to water. Local municipalities are faced with the challenge of expanding access to water services to marginalised informal settlements, and this is compounded by the need to maintain existing levels of service provision whilst facing the uncertainties of climatic change and economic decline. Therefore the successful implementation and purpose of the WSA is questionable as a key underlying principle of Act is to ensure water security. Furthermore, as discussed in Chapter 6, there is a disjuncture between the multiple-uses of water, water needs and water services planning, which has ultimately contributed to water insecurity within communities.

As Tapela (2014) argues that there is a need for a re-examination of institutional frameworks and policy regulations - ideally the NWA and WSA should be amalgamated under a single act and there is currently an initiative to do so (See section 5.1.7). Currently institutions and policy planners often rely primarily on either the NWA or the WSA instead of both, and this has enormous consequences, diminishing the likelihood on integration in water resource management.

5.2.4 DECENTRALISATION OF WATER GOVERNANCE AND NEW INSTITUTIONS FOR WATER MANAGEMENT AND DELIVERY

The application of the principles underlying the new water legislation makes South Africa one of the few countries in which water is seen as an essential tool for achieving social justice and pro-poor economic growth (Van Koppen et al., 2003), and where decentralised management is seen as essential to integrated resource management more generally. South Africa’s commitment to re-allocation through decentralisation derives from both the principle of subsidiarity in new water management thinking and optimism about grassroots political authority.

Therefore, Integrated Water Resource Management (IWRM) of water, land and related resources was recommended in order to “*maximise the economic and social welfare in an equitable manner without compromising the sustainability of ecosystems*” (GWP, 2000: 22), which is supported by the 1997 White Paper on a National Water Policy. This is further supported by the principle of subsidiarity, through which water management, service delivery and water supply is devolved to local government. The principle was implemented for several reasons. Firstly, because local governance level can be reduced to reflect environmental characteristics. Secondly, decentralisation promotes stakeholder engagement by ensuring that decision-making is localised. Thirdly, inefficiencies are reduced by eliminating the reliance on national government and DWA budgetary constraints. Lastly, policies and institutions can be adapted to reflect localised conditions at a scale where IWRM is more focused.

Integral to the concept of participation is the redress of imbalances of power in society. Therefore, many municipalities committed to decentralised governance and IWRM, and welcomed the principle of subsidiarity. However, applications of decentralisation have not been uniform as successful decentralisation strategies are heavily dependent on dedicated financial resources and human resource capacity.

As seen in Figure 5.1 below there are a variety of institutions that are involved in the implementation of the IWRM approach. The roles and responsibilities are summarised in Table 5.2 below, which provides insight into the decentralisation of water governance, as each tier has delineated roles and functions and operate independently but within correspondence of one another.

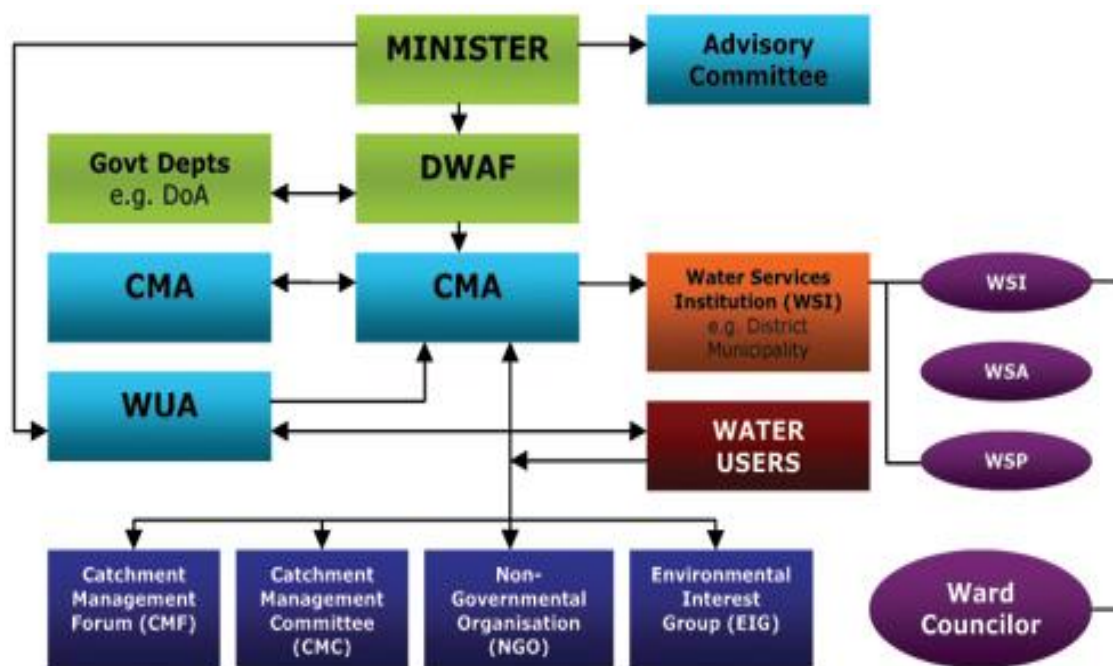


FIGURE 5.1 OVERVIEW OF THE WATER INSTITUTIONS (ADAPTED FROM DWAF, 2002)

DISCUSSION OF CATCHMENT MANAGEMENT AGENCIES AND WATER USER ASSOCIATIONS

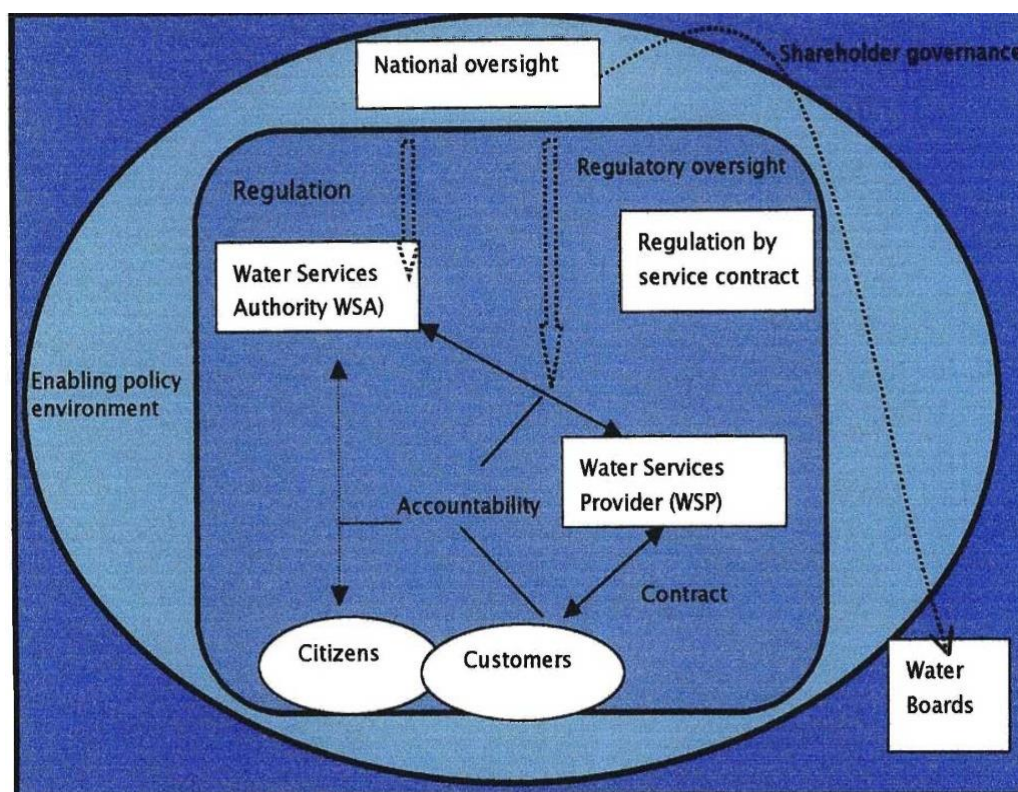
Forming part of the concept of IWRM was the promotion of local governance and the transfer of water management responsibilities to Water User Associations (WUAs). This has been central in water reform processes throughout the world, including in the reforms that took place in post-apartheid South Africa.

Dealing with diversity is one of the main issues at stake in the establishment of WUAs in South Africa, as the transformation from the Irrigation Boards to the WUA's has not been very effective in catalysing transformation and accelerating equity of access to water in rural areas. In many provinces, WUAs are still dominated by white male farmers, as is the case in the LSRV. After the Apartheid, the WUA's took on some water supply responsibilities as they had infrastructure to do so, and they are constituted in terms of the NWA. However, the demarcation of responsibility for water supply and water management was never clearly clarified or enforced. For example, there needs to be a service level agreement between them and clear demarcation of Water Service Authorities (WSA) and Water Service Providers (WSP) (Muller, 2012). Furthermore, the lack of transformation in water administration is also reflective of the slow transformation in land ownership, as the WUA reflect the demographics of the more privileged water users in the country.

TABLE 5.2 ROLES AND RESPONSIBILITIES OF WATER INSTITUTIONS

<p><u>FIRST TIER</u></p> <p>THE DEPARTMENT OF WATER AFFAIRS (DWA) PREVIOUSLY DWAF</p>	<p><u>ROLES AND RESPONSIBILITIES</u></p> <ul style="list-style-type: none"> • The DWA in the Ministry of Water and Environmental Affairs is primarily responsible for the formulation and implementation of policy governing water resources management as well as drinking water supply. • Primarily functions as a governing body, overseeing the demarcated water management structures and agencies • The DWA is responsible for implementing the two major legal instruments relating to water: the Water Services Act No. 108 of 1997, and the NWA No. 36 of 1998.
<p><u>SECOND TIER:</u></p> <p>CATCHMENT MANAGEMENT AGENCIES</p>	<p><u>ROLES AND RESPONSIBILITIES</u></p> <ul style="list-style-type: none"> • Investigate and advise on the protection, use, development, conservation, management and control of water resources in its water management area • To implement cooperative governance with district and local municipalities in its water management area, and co-ordinate the activities of water users and water management institutions in its water management area • Develop Catchment Management Strategy and its own financial and business plans. • Stakeholder involvement and ensure that this has appropriate community, racial and gender representation.
<p><u>THIRD TIER</u></p> <p>WATER USER ASSOCIATIONS</p>	<p><u>PURPOSE AND FUNCTION</u></p> <ul style="list-style-type: none"> • The WUAs are an organisation that functions at a more local level than the CMAs, in order to coordinate different users in the day-to-day management of an irrigation scheme, a river or a catchment. • Transformed from existing irrigation boards
<p>WATER SERVICE AUTHORITIES</p>	<p><u>ROLES AND RESPONSIBILITIES</u></p> <p>WSA have the role of ensuring:</p> <ul style="list-style-type: none"> • The realisation of the right to access to basic water services • Regulation of water service provision and water services providers • Preparing water services development plans • Selection of water services providers: selection, procurement and contracting water services providers (including itself). • Consumer education and communication • A water services authority may either provide water services itself (internal mechanism), or contract a water services provider to provide water services (external mechanism).
<p>WATER SERVICE PROVIDERS</p>	<p><u>ROLES AND RESPONSIBILITIES</u></p> <ul style="list-style-type: none"> • Provide water services in accordance with the Constitution, the Water Services Act and the by-laws of the water services authority • Publish a consumer charter which is consistent with by-laws and other regulations, includes the duties and responsibilities of both the WSP and the consumer • WSP are approved by the water services authority
<p>MUNICIPALITIES</p>	<ul style="list-style-type: none"> • Municipalities - a water services authority can also be a water services provider, both within its own area as well as by contract with another water services authority or water services provider

The decentralisation of service provision and hence the allocation of responsibility for water services to local government, as well as the separation of the role of the Water Service Authority from the function of Water Service Provision, indicates that a two part regulatory system is necessary (DWAF, 2002).



The regulatory system framework, presented above in Figure 5.2 as ‘regulation’, appears to be sufficient in regulating the provision of water services. Within this framework, the Water Services Authority (WSA) is essentially the regulator of the service and is responsible for ensuring that services are provided effectively, efficiently, sustainably and affordably. The Water Services Provider (WSP) is responsible for the physical delivery of water to consumers. In cases where a single institutional entity are both WSA and WSP, the division responsibility and accountability needs to be clearly defined. In some cases, WUA’s provide bulk water to the local authority – as is the case in the LSRV. While the Water Services Act provides for a conceptual distinction between these two roles, and requires municipalities to separately account for the provision function in practice, most municipalities carry out both of these functions (as authority and as provider) without making this distinction. In other words, the same manager may

undertake both the planning for the function (through the preparation of a Water Services Development Plan, considered to be part of the authority function) and be responsible for the operation of the function (the provider function). However, implementation efficiency concerning the experiences of citizens of water service provision and the mechanisms implemented to support water service delivery has proved questionable. Together, these legislative and policy imperatives suggest a dignified, equitable and administratively just approach to water services, in which everyone has access to safe, affordable water and sanitation (Atkinson, 2007). However, as explored below, the reality on the ground is far more complex and problematic (section 5.2).

MUNICIPAL REFORMS AND CHALLENGES TO WATER SERVICE DELIVERY

As described above, municipalities were the vehicle selected by national government to address the dual water service delivery challenge: to reduce the apartheid backlog whilst concurrently raising the level of service delivered (Hemson, 2004). The 1998, 'White Paper on Local Government' envisioned a transformation of local government: to one that was 'developmental' and accountable and facilitated the provision of services at the local level. Therefore, from the mid-1990s municipalities were undergoing the process of re-demarcation (amalgamating racially defined jurisdictions, urban and rural, rich and poor municipalities) together and facing the major capacity problems due to the expansion of service mandates and infrastructure (Smith and Green, 2005).

For most municipalities, the municipality is both the water services authority (the municipality responsible to ensure provision) as well as the water services provider (the organization actually providing the services). Municipalities, traditionally managed by white interests and serving relatively small white populations, now had to transform rapidly to serve extensive black populations, without the necessary proportional increase in capacity, skills and staff to support such population growth and service demands (Atkinson, 2002). Furthermore, the role of local government has enlarged from delivering limited services (refuse removal, street cleaning, verge cutting etc.) to providing a full developmental function without the necessary national government support (Atkinson, 2007). Municipalities had a limited tax base and few alternative sources of income because they were expected to implement "unfunded mandates" and transferred the pressures of payment onto their citizens (McDonald and Pape, 2002). Despite the advancements made in the roll out of water infrastructure and the connection of increasing numbers of households to a water reticulation system, it became apparent that the access to

infrastructure did not guarantee household water security and concerns were raised about access (Muller, 2008).

5.2.5 THE BASIS FOR IMPLEMENTING 'FREE BASIC WATER' AND ENSURING WATER SECURITY

The initial policy on water supply financing was outlined in the RDP and ANC manifesto, which stated that all citizens had to pay for their services (Smith and Green, 2005). This resulted in low-income households that were now connected to water systems facing a massive economic constraint to water access (Smith and Green, 2005). Therefore, the cost of water deterred poor people from using it and thus limited the benefits of the RDP. This was first demonstrated in rural programmes, when attempts were made to implement the 'payment for operations' policy (Muller, 2008). An example of this was the Shemula water project in an impoverished region of KwaZulu-Natal province. In this instance, a water project run by the local public utility established 'water kiosks' where people could buy water at prices that, while highly subsidized, were, at R5/kilolitre, high in relation to local incomes (Muller, 2008). Consequently, low-income households faced an often-desperate situation; the non-payment for water means facing the uncertainty of disconnection, or they could purchase water from these 'water kiosks' or look for alternative supplies of water (often rivers or streams) which generally meant reduced and/or unsafe water (Smith and Green, 2005).

This crisis of water security was exemplified in August 2000 when communities in KwaZulu-Natal, unable to pay for the water supplied by the municipality, began using polluted river water, which resulted in a cholera epidemic and the loss of hundreds of lives (Atkinson, 2007; Muller, 2008; Smith and Green, 2005). In 2001, DWA's Director General confessed that the government's strategy might have been too market oriented and thereby caused the cholera outbreaks (Smith and Green, 2005). These experiences by poor communities coupled with an attempt to stop citizen resistance to payment for water resulted in the review of the water pricing policy in an attempt to ensure water security for all (Bond, 2011). Furthermore, by the year 2000, experience had shown that the initial policy assumptions were flawed, and that elements of the policy needed to be reviewed if the objective of meeting the water needs of all South Africans was to be achieved. A free basic water policy founded on an approach pioneered by the eThekweni municipality, Durban was proposed.

The Free Basic Water Policy was officially announced in 2001, although it is based on the standards and principles of the NWA and the Constitution. Both of these documents declare that all South Africans have the right to access clean, safe and reliable water close to their home. The introduction of Free Basic Water (FBW) around 2001 brought to an end, at least on paper, the challenges of providing water and sanitation to poor communities. This signifies the importance that access to safe water has been given by the government. *“Our country cannot progress under such circumstances. It is therefore crucial that this policy (Free Basic Water) is implemented. The eradication of poverty, including equal access to basic services, is one of the highest priorities of the government”* (DWAF, 2002a). The FBW formed part of the Free Basic Services policy was formally included as part of the election programme by President Thabo Mbeki at the launch of the ANC’s manifesto for local government elections, and was therefore arguably largely politically motivated (Muller, 2008; Smith and Green, 2005). The Free Basic Sanitation (FBS) provided the basis for a more progressive approach towards water services provision, in which the right of access to adequate and sufficient water and sanitation was acknowledged. However, in reality municipalities have faced difficulties with implementation.

THE IMPLEMENTATION OF FREE BASIC WATER

It should be noted that the 6 kilolitres of free water per household per month is only a recommended amount from the national government, which means that the local authorities can decide how large an amount should be provided free (DWAF, 2002a). Furthermore, implementation and interpretation of the FBW policy is the local municipality responsibility and this results in significant variability of levels of provision across municipalities (Smith and Green, 2005). This is evident as FBW could be implemented and funded in a variety of ways:

- By providing free water to all using cross-subsidies, as in the case of EThekweni municipality.
- By supplying free water only to “indigent” households, as identified by the local municipality.
- By providing free water only at certain “service levels”, recognizing that households that obtained their water through public standpipes invariably used less than the basic amount (DWAF, 2002c., Muller, 2008).

RECOVERING COSTS FOR ‘FREE BASIC WATER’

According to the Municipal Services Act (2000) it is the local district municipalities that are responsible for the setting of tariffs, but these must comply with the norms set by the WSA and

DWAF (now DWA). Furthermore, the WSA declares that “*a water service provider may not deny a person access to basic water services for non-payment, where that person proves, to the satisfaction of the relevant water services authority, that he or she is unable to pay for basic services*” (WSA, 1997: 10(1)).

Therefore, the WSA is responsible of setting the tariffs as long they remain in accordance with the NWA framework (DWAF, 2002a). The tariffs that the municipalities charge, need to consider the poor and vulnerable households by developing special tariffs or zero tariff, while on the other hand financial sustainability of the service must be ensured (DWAF, 2002a). Nevertheless, the major challenge that municipalities are facing is to take into consideration the unique features of the areas they service, which they probably are better suited to do compared to the central government.

Municipalities were provided with a range of options for implementing tariffs for recovering costs of FBW services, depending on their specific conditions. The introduction of ‘stepped tariffs’ was promoted in metropolitan areas where it was possible for high-volume users to cross-subsidize low volume users, and also encourage conservation. Service levels such as communal taps would serve as ‘rationing’ mechanisms in rural areas where the vast majority of people are poor.

Finally, ‘indigency policy’ mechanisms to identify free basic water beneficiaries were suggested for poorer towns where cross subsidisation was not feasible but where households already had individual connections (DWAF, 2002a). The advantage of the first two approaches is that they are administratively, relatively straight forward to implement. The last approach addresses the financial challenge by allowing closer targeting and makes the most of available subsidies (indigent policy discussed in section 5.5.1.2).

FREE BASIC WATER AND SOCIAL POLICY

The FBW policy coincided with the development of an approach to social welfare, which entailed evaluating the level of support to the poor and indigent. Although it was only formally announced in 2003, the concept of a ‘social wage’ had been discussed politically within the ANC since at least 1998, and free basic services, including water, were very much part of the concept (Smith and Green, 2005). As Barbara Schreiner, for DWAF (2007) explains:

“It should be stressed that the FBW policy is but one element of a broader approach to the development of a comprehensive social security framework for South Africa. In terms of

this, there are a number of pillars in the system established to ensure that all South Africans enjoy protection against social contingencies. The first pillar, of basic universal protection for all citizens, comprises conventional social grants as well as the 'social wage', the package of essential social services provided by government. FBW should be seen as an element of this social wage."

With this in mind, most municipalities implement FBW and FBS through an indigent policy (Muller, 2008). The 'indigent policy' is aimed at including those currently excluded from access to basic services, through the provision of a social safety net and provides a framework for providing affordable access to basic services at the local level (DWAF, 2002a). Therefore, by implementing the 'indigent policy' municipalities were able to address the huge service backlogs inherited from the previous government.

Although the indigent register is useful, using an indigent register to allocate FBS leaves a potentially very large gap comprising those who are poor but do not qualify as indigents or those who for whatever reason do not register for indigent status (Atkinson, 2007; Smith and Green, 2005). Furthermore, the application process for indigent status and the requirements for indigent qualification are generally very onerous and only apply to a municipal account-holder (Smith and Green, 2005). Therefore, the objectives outlined in the indigent policy as well as the need for public acknowledgement of poverty are anomalous with the notion of dignity that FBS should enable.

CHALLENGES TO IMPLEMENTING 'FREE BASIC WATER' AND LINKS TO WATER SECURITY

The DWA recognised that in order for the implementation of 'Free Basic Water' to become a success it would be required to have a broad understanding of the issues that may appear (DWAF 2002a). In some municipalities, it seems easier to implement the policy than for others, as they do not have the capacity. There is evidence in the urban cities that FBW has been relatively successful, whereas rural areas and small towns it lags behind.

A review of the FBW policy found that there were barriers to successful implementation. The following areas were identified as the current challenges facing municipalities in regards to the successful implementation of the FBW policy (DWAF 2002d, Funke et al., 2007). These are namely, the financing of FBW and problems with cost recovery, determining and linking FBW target group to indigent policies, technical problems of providing the free water and lastly, issues

with regards to the institutional capacity and how communication and cooperation are secured between the diverse stakeholders that are involved (DWAF 2002d, Funke et al., 2007).

‘...from the reality that exists on the ground where many of the poorest of the poor ‘cannot pay’ rather than ‘won’t pay’ for basic water. In many areas, particularly in rural areas, the poor do not pay at present. The problem is that when we try to implement cost-recovery, many of the poor cannot pay. The consequence, they are excluded from the tap, has been seen with the cholera outbreak in KwaZulu-Natal.’ Ronnie Kasrils, Media Release, 13 October 2000, in Cottle, 2004.

CRITIQUES OF ‘FREE BASIC WATER’

The FBW policy has been criticised as an inefficient mechanism to achieve the social goals of redistribution in South Africa. Mosdell and Leatt (2005) concluded that, “... *on average, the free basic water service is more likely to reach the non-poor than the poor and this is the result of the poor being less likely to receive water services at all.*” This refers to the fact that many of those that need to receive the FBW service are in communities that face the greatest challenges to service delivery and water security (Mosdell and Leatt, 2005).

Furthermore, the FBW policy has created some controversy over how much is enough free basic water. The 6 kl provision is an extrapolation of the basic amount of 25 litres per person per day. This is just above the amount considered by the World Health Organisation (WHO) to be “basic access” (Howard and Bartram, 2003). It should be noted, however, that this level of access from a communal standpipe less than one kilometre from the home is considered by the WHO to pose a “high” level of health concern and thereby raise concerns around water security (Howard and Bartram, 2003). The area of concern is the allocation of FBW on a per household basis; in poor areas, there are often more than eight people living in the main house. Typically there are backyard dwellers living on the property, thus it is often the case that many residents are excluded in the determination of the 6 kl per household per month allocation (Howard and Bartram, 2003).

The FBW policy was perceived as a measure to ensure all South Africans access to sufficient safe water, but it needs to be assessed as both a tariff policy and a social policy (Muller, 2008). Essentially Free Basic Water is “*designed to strike a balance between reducing the time and effort people have to spend collecting water, whilst still recognising that shorter walking distances and high flow rates have cost implications*” (DWAF, 2002a: 13). Therefore, there is an uneasy relationship between the need for equity and the need for economic efficiency and the above

emphasises that the the objective of cost-recovery is just as important as the one of provision, which in some municipalities may cause serious financing problems (Cottle, 2004). Water and its provision has become “*a pawn in the battleground between goals of social equity and the interests of government and private business, and it is up to DWA and government to manage this tension*” (Earle et al., 2005). Cottle, 2004 further emphasises this critique by stating that the cost- recovery model, is essentially at the expense of the working class and is only in the interest of capital accumulation. Therefore, the appeal of FBW lies in its professed pretence in offering water security to poor citizens, whilst simultaneously strengthening the municipal cost-recovery regime (Smith and Green, 2005).

MUNICIPAL CHALLENGES TO IMPLEMENTING FREE BASIC WATER POLICY

The problem is how to implement these world-acclaimed policies successfully when the current basic service provision in South Africa is characterised by municipalities’ incapacity to deliver, the lack of maintenance of existing infrastructure and institutional problems of corruption and mismanagement (Howard and Bartram, 2003; Mackay, 2004). The onerous task placed on municipalities has resulted in backlog targets not being met. Decentralisation of water services to local governments comes at a time when service delivery challenges are at their greatest: municipalities are expected to provide more services with less, whilst DWA takes on a regulatory and overseeing role (Nnadozie, 2013). Furthermore, the introduction of FBW policy has substantially shifted the nature of the water service delivery mechanism; the relationship between the citizens and the municipalities; and the conscious public reaffirmation of ‘right to access water’ and service delivery have resulted in great contestation between the municipalities and the people (Nnadozie, 2013; Tapela, 2012).

The municipalities are brought to the foreground as the deliverers of the promise of the ‘right to access water’ and a ‘better life for all’ under democracy. This shift has also resulted in citizens being placed in an optimal position to make (justified) demands for these promises to be realised in their lifetime (Nnadozie, 2013; Tapela, 2012). This is emphasised in the increase of social protests rising out of dissatisfaction with service delivery. A large proportion of urban poor people live in informal settlements with limited access to housing, water and sanitation, among other essential services (Tapela, 2012). The improvement of housing, water services and other forms of service delivery has lagged behind the growth of under-serviced informal settlements, the site of many service delivery protests.

PROGRESS AND ACHIEVEMENTS OF FREE BASIC WATER POLICY

Despite these problems, by 2007, 75 % South Africa's population were served by FBW and 17% of South Africans do have access to water supply considered as adequate (DWAF, 2007). Furthermore, of the 169 municipalities with water provision responsibilities, only five did not provide any free water, but 154 did not provide it formally to all households in the area (DWAF, 2007). There has been significant improvement in access to piped household water in South Africa, with the number of households with no access dropping to 8.8% in 2011 from 15.6% in 2001 (Stats SA, 2011). These outcomes need to be understood within the context of the overall tariff policy and indeed the overall water policy, recognising that it was also part of a process to establish democratic local government. The FBW forms part of greater social, environmental and economic objectives to improve the livelihoods of the poor.

5.2.6 NEW POLICIES AND APPROACHES

The DWA realised that many municipalities were struggling to meet the requirements of supplying and treating potable water, and controlling the disposal of domestic waste. Therefore, they initiated the Blue Drop and Green Drop programmes in 2008, which are an initiative based programmes, to facilitate the improvement of the wastewater and potable water sectors respectively (DWA, 2011). They achieve this through creating incentives and certifications in reaching targets for municipalities. A Blue Drop programme facilitates the improvement of the status of drinking water quality and the management of supply systems (DWA, 2011) and any municipality that scores below 30% for Green or Blue Drop becomes the immediate attention of DWA and has access to the DWA's Rapid Response Unit (RRU) which runs an intervention workshop (Muller, 2012).

THE SECOND NATIONAL WATER RESOURCES STRATEGY

There is a crucial 'window of opportunity' (Olsson et al., 2004) in the current South African water policy arena. The second National Water Resources Strategy (NWRS2) has been reviewed and accepted as of September 2014, and builds on the first NWRS published in 2004. This Strategy responds to priorities set by Government within the National Development Plan (NDP) and NWA imperatives that support sustainable development. The goal of the NWRS2 was to determine any unintended oversight and gaps in the current water policies and to provide amendments (DWA, 2013). This strategy aimed to give full effect to the three fundamental principles of the National Water Act (efficiency, sustainability and equity) by meeting the gaps that have been identified through years of implementation of both the Act and the policy.

Alongside this, the DWA has re-constituted the National Water Advisory Council, and there are water specialists in the National Planning Commission.

“If the achievement of effective and sustainable social organisation is a key objective of politics, the way water is managed can be an important indicator of success” (Muller, 2007: 35).

The major focus of the NWRS2 is equitable and sustainable access and use of water by all South Africans while sustaining our water resource. NWRS2 Implementation Framework would guide development of implementation plans to operationalize the Strategy. These are to be developed in a collaborative manner with sector stakeholders and water users per water use type and group. The NWRS2 five priorities for the next five years and the implementation plans that correspond to these have been identified as:

- Achieving Equity including water allocation reform;
- Water Conservation and Water Demand Management;
- Institutional establishment and Good Governance;
- Compliance Monitoring and Enforcement; and
- Adequate Funding, Operation and Maintenance of water resources infrastructure.

With regards to water security and water demand the NWRS2 states that:

“Many parts of the country are fast approaching the point at which all of the easily accessible freshwater resources are fully utilised. It is imperative that all South Africans recognise this situation so that the necessary steps are taken to assess current and future demand for water.” (NWRS, 2013:8).

The focus of the NWRS2 is not to increase water supply from the source, but rather to reduce demand through loss and leak detection as well as encourage and support the recycling of wastewater. Furthermore the NWRS2 recognises that the planning and the provisioning of water is not just a resource issue but rather a supply and delivery issue which requires holistic and integrated management and governance (NWRS, 2013). This could facilitate a new era of water management towards the development and implementation of an integrated, shared and co-owned water sector strategy. Essentially this is a step towards an integrated country strategy which is not only lead by the government, but involves business sectors and citizens which is supported and facilitated by the NWA (NWRS, 2013).

5.2.7 WATER GOVERNANCE CONCLUDING REMARKS

South Africa is characterised by present water resource management and service delivery problems. Future challenges of supplying safe domestic water and sanitation are mainly related to limited financial resources and institutional capabilities, rather than to limitations of the resource (Ashton and Turton, 2005; Tapela, 2012) (Chapter 2).

These water management challenges become evident as municipalities across the country are struggling to respond to numerous localised crises of delivery relating to failed infrastructure, poor management, oversight and regulation. This situation has resulted in increased social protests due to citizen frustration with ineffective service delivery, payment for water, and poor and diminishing water quality (Nnadozie, 2013; Tapela, 2012). The fact that many municipalities are struggling to manage water resources effectively and efficiently has resulted in constant debates around issues related to cost recovery, service delivery levels and indigent policies, which have escalated to litigation reaching the Constitutional Court (Tapela, 2012).

In regards to municipal reforms and service delivery, significant progress has been achieved, especially in relatively well capacitated municipalities. Yet, slow progress and contested gains in other areas, especially smaller rural municipalities, have led some observers to conclude that decentralisation in the water sector has not been the most effective means to redress past inequalities or to deal with the technological complexity associated with major country-wide systemic upgrades and reform (Muller, 2007; Nnadozie, 2013; Tapela, 2012). Nevertheless, South Africa has made considerable progress in terms of water governance reform in a relatively short time, and under huge inherited constraints. However, processes have been fraught with challenges and in many instances yielded only partially satisfactory outcomes.

5.3 LOCAL CONTEXT: WATER SERVICE DELIVERY IN THE SUNDAYS RIVER VALLEY MUNICIPALITY

5.3.1 BACKGROUND: MUNICIPAL TRANSFORMATION

A range of local government legislation was promulgated between 1998 and 2000, with the first local government elections held in December 2000, following which, the Sundays River Valley Municipality (SRVM) came into being. The SRVM replaced the Kirkwood Municipality – based in the small rural town of Kirkwood. This previously only provided water services to the area of Greater Kirkwood (Clifford-Homes et al., 2013). The SRVM was to play an expanded role under the prerogative of ‘developmental local government’ – overseeing local economic development and the provision of a diverse array of community services, in addition to the core function of water services (Clifford-Homes et al., 2013).

Economic transformation was also sought through attempts to expand agricultural development from a focus on the commercial sector driven by a small number of white farmers, to the incorporation of a larger number of emerging farmers. This was achieved through various mechanisms, including land redistribution through land claims, and institutional shifts in relations between water and agriculture. As discussed previously, Water User Associations replaced Irrigation Boards and in 2003, the Sundays River Irrigation Board converted to the Lower Sundays River Water User Association (WUA) (Clifford-Homes et al., 2013).

Municipalities currently have to deal with a backlog of service delivery and this is especially in the case of smaller towns within the Eastern Cape, where water service delivery and implementation at the local government level, still remains a major challenge. This is evident in the high 22.2% of households that are reported to have no access to piped water in the Eastern Cape, which is the highest across the provinces (Stats SA, 2011). The SRVM has been faced with major problems in regards to providing sustainable and sufficient water resources. This, coupled with the apparent peri-urban poverty (unemployment and dependency on social grants are widespread as discussed in Chapter 3) has led to water security issues being linked to poverty as well as a lack of service delivery (SRVM, 2010a).

The SRVM is regarded as primarily rural or prototypical ‘Category B3’ municipality (D’Hont, et al., 2013). Furthermore, 111 of the 278 municipalities in South Africa are classified in this

category as of 2009 (D'Hont et al., 2013; World Bank, 2009). Therefore, the SRVM is not alone in the current predicaments it faces concerning the provision of water and sanitation services to citizens as well as dealing with contentious issues with stakeholders in reference to the operation of the water supply system (D'Hont et al., 2013).

The Department of Local Government and Traditional Affairs has implemented financial and administrative interventions within the SRVM, and these were subsequently enhanced by an initiative in which the SRV Municipality requested the National Treasury (NT) to provide it with technical assistance in the development of a financial recovery plan (SRVM, 2011). The SRVM initiated a Turnaround Strategy 2010 in order to address these financial and service delivery issues (SRVM, 2010b; SRVM, 2011). This strategy identified many of the challenges facing local government and suggested focal areas for intervention. In early 2010, the SRVM was placed under Provincial Administration and consequently the Eastern Cape provincial government appointed an administrator as Acting Municipal Manager. One of her interventions was to request Amatola Water, the regional water board to assist the municipality in water service provision. Amatola Water's engagement in the SRVM was supported by DWA: one of the symptoms of the SRVM's financial problems was the misspending of an infrastructure grant from the DWA (finances allocated to the SRVM for a bulk water pipeline between Addo and Paterson were spent on operational rather than capital costs) (Clifford-Homes et al., 2013). Further assistance was provided by DWA 'Rapid Response Unit' (RRU) which began working with the SRVM in September 2011, following its selection as one of 6 municipalities in the Eastern Cape to receive support (Clifford-Homes et al., 2013).

Consequently, the challenges facing the SRVM have greatly affected the current status of water security and water quality within the informal settlements surrounding Kirkwood and Addo, as many of the households within the communities of Aquapark and Nomathamsanqa faced with water access issues and water shortages (Chapter 6 and 7). In order to understand the current perspectives and experiences of the residents, it was necessary to consider the SRVM challenges in respect of water service delivery.

5.3.2 CHALLENGES WITH AND BARRIERS TO WATER SERVICE DELIVERY IN SRVM

The SRVM currently faces problems with the operation and interruption of the water supply system. This has led to perceptions in the local township communities being one of frustration due to the water security challenges and systemic social injustice they face. Furthermore, there

has been contention between the SRVM, whose responsibility is to supply the water to the citizens and the WUA that is responsible for delivering untreated water to the municipality and supplying farmers with irrigation water (D'Hont et al., 2013).

In order to understand the water security challenges faced by the communities of Aquapark and Nomathamsanqa, the problems with the water supply system and water treatment works in Addo and Kirkwood need to be taken into consideration. The institutional dynamic at the centre of these water shortages lies between the Lower Sundays River WUA, as the bulk water supplier and the SRVM as the WSA and WSP. The WUA, since 1997, had repeatedly warned the Kirkwood Municipality that it lacked sufficient off-channel storage facilities to store water for supplying the Greater Kirkwood area (SRVM, 2010b). Several interventions attempted to negotiate coping strategies for dealing with water shortages – including one led by the Kirkwood residents and business people to construct a larger, additional off-take from the WUA canal to the town water treatment works. The construction of this sluice helped alleviate inadequate supply, but weekends of disrupted water supply to the supply zones of Greater Kirkwood still occur (Clifford-Homes et al., 2013).

SUNDAYS RIVER MUNICIPAL CHALLENGES TO SUPPLYING WATER

The SRVM faces a variety of challenges in regards to service delivery, namely: WTW problems, water shortages in many communities, unaccounted for water loss and leakages and poor water quality. These problems have been aggravated by the contentious relationship between the WUA and the municipality.

CONTENTION BETWEEN THE WATER USERS ASSOCIATION AND THE SUNDAYS RIVER MUNICIPALITY

There are various points in the water supply process in the SRVM where a lack of communication exists, but a pivotal one is between the WUA and the municipality. The WUA is responsible for providing raw water to the municipality: the first point in the water supply process. The municipality orders water from the WUA and is then responsible for the treatment and subsequent distribution of safe drinking water (SRVMa, 2010). There are break-downs in communication around water supply and storage, which need to be communicated in advance to ensure adequate water supply. The current challenge resulting from this breakdown in communication is that the municipality fails to communicate and make a request in time to the WUA, for the amount of water required, especially before the weekend, and this leads interrupted

supply, and possible pump damage. The WUA usually only receives the request for weekend water after 14:00 on a Friday, when they have closed for the weekend (Bodlani and Khene, 2012). The WUA therefore supplies the municipality with insufficient water to sustain the community for an entire weekend, which causes water supply failures.

Furthermore, the municipality does not have accurate estimates of how much water is required due to insufficient water consumption monitoring. According to the municipality there are too few process controllers to read residential and business water meters. These process controllers are required to check each resident's water meter to establish how much water is being consumed in order to determine how much water should be supplied (Bodlani and Khene, 2012). Therefore, the municipality orders insufficient water for service delivery based on incorrect estimates, which further results in incorrect charges for household water use. This leads to escalating problems as some households are over charged while others are undercharged, and the revenue meant to be generated in the municipality for service delivery becomes insufficient to support its operations.

There has been a history of inadequate and irregular performance in respect of the treatment and management of water supply in the WTW. Due to a recognised tangle of problems related to finance, budget, and expenditure the SRVM cannot afford to pay a WTW employee overtime to work over the weekend (SRVM, 2010a). This has resulted in the WTW in Kirkwood not being monitored over the period of Saturday through to Monday morning. Although this predicament may explain water shortages occurring over the weekend in Aquapark, it does not provide acceptable reasons for the current rate of water shortages occurring four-six times a week as reported by the residents (Chapter 6). The problem of insufficient storage may be exacerbated by unaccounted losses of water due to leakages and breaks in infrastructure that are not monitored.

UNACCOUNTED FOR WATER

Unaccounted for water (UAW) is defined as the difference between the measured volume of water put into the supply system and the total volume of water measured to authorised consumers (WSDP, 2010). A major source of water loss is ageing infrastructure, exacerbated by poor operations and maintenance at a municipal level. Analysis shows that this state of affairs is a multi-faceted problem; including a lack of managerial and technical skills and funding (WSDP, 2010). Furthermore, internal plumbing leaks occur at multiple sites and are not monitored regularly, although consumer meter leakages can be assessed through sample surveys of consumer households and by analysing the minimum night flow of bulk meters (WSDP, 2010). A

major issue is that currently, the Water Services Plan does not have any leak detection equipment and relies solely on reports received from consumers or from those SRVM technical personnel active within the area. This means that people with consistent leakages need to regularly report them to the municipality in order for action to be possible.

WATER QUALITY PROBLEMS

Water quality of both treated potable water, and of in stream river water, is regulated by permits, licenses and standards and it is very important that these be put in place if not already effective. Some of the reason why water quality is deemed ‘poor’ by residents is due to diffuse sources of pollution (Chapter 7). This refers to a number of cases where polluted water is returned to the resource (both surface and groundwater) without being treated.

The municipality faces the problems of the WTW being understaffed and not suitably qualified. The WTW needs to be run consistently, with the correct water quality checks and tests, as the amount of chemicals and treatment procedures are dependent on the quantity of water flow (WSDP, 2010). Therefore, this task is a technical one, and inadequate or irregular treatments can result in dirty water, red worms in the water (Chironomidae) which reflect low oxygen levels (Gray, 2008). These red worms are harmless but along with the water having a sour taste or smell, this exacerbate the perception of poor water quality (Chapter 6).

FINANCIAL CONSTRAINTS

There is a growing rate of non-payment for water-related services, resulting in service disconnections becoming increasingly common within the townships of the SRVM. The SRVM is struggling to cope with the backlog of services, and this is exacerbated by the non-payment for services. The Local Government Turnaround Strategy, 2012, revealed that 80% of the total debts facing the SRVM were from rates and service charges. The main challenges they face are inconsistent readings of water metres, incorrect water bills and residents’ non-payment for services. There are a variety of reasons why residents do not pay for water including affordability and concerns about quality. These have created a culture of non-payment’ for services, which is explored more fully in Chapter 6.

INDIGENT POLICY

The process starts when a poor household registers with the SRVM. Once the municipality approves their registration, the financial division updates the indigent register (database with all the details of households that are indigent) and submits this information to the National Treasury.

The National Treasury determines their equitable share and then allocates the necessary funds to the municipality, which provides free basic water to these households (Mackay, 2003). The problem in the SRVM is that the community members are not registering, with only a third of the households in a low income category registered. According to municipal officials as of 2013, only 5% of those that should be registered as indigent are currently on the list.

5.4 CONCLUSION

The literature examined shows that South Africa's water service delivery policies and strategies were previously governed and confined by inflexible political and economic boundaries (Meissner and Turton, 2003). The current water policies and decentralisation of government have shaped and shifted the way water is managed have resulted in a broader, dynamic and decentralised water sector where water resource management no longer only takes place at the bureaucratic, engineering or legal level (Meissner and Turton, 2003). Therefore, from a societal point of view, the water resource sector has become ever more complex (Lotz-Sisitka and Burt, 2006) as decentralisation of management has resulted in an increase of actors in water resource management. Furthermore, this reformation of South Africa's water institutional landscape, has coincided with significant changes in the political environment which have had both intended and unintended consequences for water resource management in South Africa. At a local level, the implementation of water policies has proved to be challenging for municipalities and the water users bear the consequences of poor water service delivery and with SRVM are exemplary of these challenges.

CHAPTER SIX:

RESULTS AND DISCUSSION – WATER SOURCES, ACCESS, USE AND GENDER DYNAMICS

6.1 CHAPTER OVERVIEW

This chapter focusses on exploring the issues around access or rather lack of access to water supply in Nomathamsanqa and Aquapark. Assessing the factors leading to this water insecurity has proved to be complex and multi-dimensional. In this chapter, I unpack various aspects of water security and social water scarcity (Chapter 2) as they play out at a local scale within the SRVM, drawing upon the analysis of South African water policies (Chapter 5). I emphasise that, while the relationships between the state, formal water institutions and water users are critical to determining water security, it is also important for institutional responses to be based upon clearer understandings of residents' own experiences and perspectives and their multiple water uses and needs. From this perspective, this chapter discusses empirical findings related to residents' water access, uses, water collection and gender based division of labour using data collected from the questionnaire survey and in-depth interviews. It details and discusses the results through a comparison of differences and similarities between the two townships and three household categories based upon the following research questions:

- What are the different sources of water for residents and what are community members' perceptions and experiences of the reliability and quality of water from these sources?
- How do community members perceive their water security or, in other words, what does it mean at the local level to have/or not have access to clean, safe water?
- What are the gendered dimensions of water access, in terms of division of labour and how does water insecurity affect women specifically as primary collectors?

6.2 RESULTS AND DISCUSSION

6.2.1 ACCESS TO WATER: PRIMARY AND SECONDARY SOURCES

Within the two townships in the SRVM, all residents reported using two or more sources of water. There are a multitude of reasons why residents have multiple sources of water, that include water access, availability, the frequency of water cuts and shortages, obtaining a sufficient quantity of water and safe water quality. Therefore, residents in both townships and across all household

categories have both a primary and secondary source of water (as well as further alternative sources during water crisis periods (Chapter 7)). These sources and their order of importance, however, differ across household categories and between townships as described below.

RDP HOUSEHOLDS

In Nomathamsanqa the ‘neighbours garden tap’ was used by the majority of the RDP residents (70%) as their primary source of water, whilst ‘the canal’ was relied upon as the secondary source (38%), followed closely by ‘a rainwater tank’ (33%) (Table 6.1.1). With regards to Aquapark RDP residents, the vast majority (77%) relied upon a ‘tap in the garden’, while 65% of respondents utilised water from their ‘neighbours garden tap’ for their secondary source of water, and only a few (13%) reported use of a rainwater tank (Table 6.1.2). Community standpipes were used by only 14 - 17% RDP households as a primary source of water across the two townships, although this increased two-fold as a secondary source for RDP residents in Nomathamsanqa. The low use of community standpipes were related to long collection times as discussed in Section: ‘Walking distance to water source and time poverty’.

From these results, it appears that RDP houses in Aquapark have better access to ‘easy to collect’ and safe supplies of water, and are therefore more water secure, than those in Nomathamsanqa; as more were using their own taps and fewer relied on unsafe water from the canal. On the other hand, the latter formed a potentially dangerous and unsafe secondary source of water for over one third of Nomathamsanqa RDP households (see Chapter 7, Section 7.2.2). Possible reasons for these differences in primary and secondary sources across the townships, is that firstly they vary in size and history – Nomathamsanqa is a far older township, therefore many of the houses have a long history of poor water access and this has become apparent as many residents still face water security challenges. As discussed in Chapter 3, due to the nature of water shortages within Aquapark, residents are able to access water from surrounding neighbours that are on a different water supply circuit. Therefore, the townships face different water security challenges and this is primarily due to social water scarcity problems.

FORMAL TOWNSHIP HOUSEHOLDS

In both study sites, taps on the property were the primary source of water for formal township households. In Nomathamsanqa, 60% of respondents made use of a ‘tap in the garden’, followed by 30 % making use of a ‘tap in the house’ as their primary source of water (Table 6.1.1). Furthermore, not only did these residents have access to taps on their property, but the majority of households in Nomathamsanqa also had a rainwater tank, that was made use of for their secondary

source of water (52%). The results from Aquapark depict a similar pattern with the majority (60%) of residents relying on a 'tap in the house', while the remaining 40% made use of a 'tap in the garden' as their primary water source (Table 6.1.2). Unlike Nomathamsanqa formal township households, but similar to RDP houses in both townships, the 'neighbours garden tap' was an important secondary source in Aquapark, with the majority (53%) of residents relying upon this source, whilst 37% had access to rainwater tanks as their secondary source. Overall, it became apparent that in both townships, formal township households were able to access multiple reliable sources of water.

Formal township households in both study sites thus appear relatively secure in terms of access to water, as in most cases, they have a private source, but this does not mean that they have an assured, reliable supply of water (discussed in Chapter 7). These households still experience social water scarcity, therefore a large number have invested in water tanks on their properties as a backup in time of shortages and as a source of clean drinking water (see Chapter 7). The results show that none of the formal township households relied upon unsafe, untreated sources of water, such as the irrigation canal. Therefore, the formal township households were at a lower risk of possible health consequences from untreated water sources, than the other household categories. The main reason why Nomathamsanqa households are far more dependent on the irrigation canal is that the canal runs directly through the township, making the water easily accessible (Photo 6.6).

INFORMAL DWELLINGS

For the majority of informal dwelling residents in Nomathamsanqa their primary source of water was the 'neighbour's garden tap' (67%), which corresponds with the situation for RDP household residents in this township (Table 6.1.1). Aquapark is similar in that the 'neighbour's garden tap' was again utilised as the primary source of water, with 60% of residents making use of this source and 30% using a 'community standpipe', and 10% using a 'tap in the garden' (Table 6.1.2). For their secondary source, residents of Aquapark either make use of a 'community standpipe' or their 'neighbour's garden tap' with 50% using each source. None of these informal dwelling residents had access to their own private taps, although some have effectively 'privatised' community standpipes as discussed later in this section under 'issues relating to water access'. The 'neighbour's garden tap' refers to a nearby neighbour or friend within the township, who has a tap within their garden and allows local residents to make use of the tap. Respondents stated that they frequently travel to different areas of the community in search of 'neighbours' with an adequate

water supply that allow access. This was evident within Nomathamsanqa as just more than half (57%) of the informal dwelling residents relied on the ‘community standpipe’ as their secondary water source, followed by 30% using ‘the canal’ water. This finding is similar to that of RDP households in Nomathamsanqa and thus poses a health risk for these users. Indeed, there is a direct link between respondents who stated that they considered their secondary source to have ‘safety issues’ and those that rely upon ‘the canal’ water (Table 6.1.1 and 6.1.2).

As one might expect, in terms of accessibility of water and more specifically, of safe water, these results suggest that informal households are highly insecure and vulnerable. All are relying on water sources outside of their own properties and therefore their control. They have to either seek assistance from others (and are consequently at their mercy) (see ‘issues relating to water access’) or wait in long queues at communal sources. Moreover, none had rainwater tanks as a backup (as would be expected where there is no tenure security) and in Nomathamsanqa almost one-third were using the canal as a secondary source which is both time consuming and risky due to the untreated nature of the water (see ‘issues relating to water access’ and Chapter 7)

TABLE 6.1.1: PRIMARY AND SECONDARY SOURCES OF WATER IN NOMATHAMSANQA

NOMATHAMSANQA PRIMARY SOURCE N=90										
Household categories	Tap in the house	Community standpipe	Neighbour's garden tap	Tap in the garden	Rain water tank	The Canal	χ^2	Df	P value	
RDP	17%	14%	70%	0%	0%	0%	57.2 961	6	< 0.01	
FORMAL TOWNSHIP	30%	10%	0%	60%	0%	0%				
INFORMAL	0%	13%	67%	20%	0%	0%				
ALL - CATEGORIES (MEAN %)	16%	12%	46%	27%	0%	0%				
NOMATHAMSANQA SECONDARY SOURCE N=90										
	Tap in the house	Community standpipe	Neighbour's garden tap	Tap in the garden	Rain water tank	The Canal	χ^2	Df	P value	Safety issues with source
RDP	0%	29%	0%	0%	33%	38%	89.188	6	< 0.01	38%
FORMAL TOWNSHIP	0%	24%	0%	0%	52%	24%				24%
INFORMAL	0%	57%	0%	0%	13%	30%				30%
ALL - CATEGORIES (MEAN %)	0%	37%	0%	0%	33%	31%				31%

TABLE 6.1.2: PRIMARY AND SECONDARY SOURCES OF WATER IN AQUAPARK

AQUAPARK PRIMARY SOURCE N=90										
Household categories	Tap in the house	Community standpipe	Neighbour's garden tap	Tap in the garden	Rain water tank	The Canal	χ^2	Df	P value	
RDP	3%	17%	3%	77%	0%	0%	89.188	6	< 0.001	
FORMAL TOWNSHIP	60%	0%	0%	40%	0%	0%				
INFORMAL	0%	30%	60%	10%	0%	0%				
ALL-CATEGORIES (MEAN %)	21%	16%	21%	42%	0%	0%				
AQUAPARK SECONDARY SOURCE N=90										
	Tap in the house	Community standpipe	Neighbour's garden tap	Tap in the garden	Rain water tank	The Canal	χ^2	Df	P value	Safety issues with source
RDP	0%	17%	65%	0%	13%	4%	12.2208	6	0.57221	4%
FORMAL TOWNSHIP	0%	11%	53%	0%	37%	0%				0%
INFORMAL	0%	50%	50%	0%	0%	0%				0%
ALL-CATEGORIES (MEAN %)	0%	26%	56%	0%	17%	1%				1%

COMPARING WATER ACCESS PATTERNS ACROSS HOUSEHOLD CATEGORIES AND THE DIFFERENT TOWNSHIPS

In Nomathamsanqa there was a significant difference between the primary sources of water that residents accessed amongst the three households categories ($p < 0.01$). This is predominantly due to the difference between the township households compared to RDP and informal households. RDP and informal residents have similar patterns of use and access, such as relying heavily on their neighbours, but interestingly, only informal dwelling residents used a 'community standpipe' as an important secondary source of water. Furthermore, there was also a significant difference between the three household categories in Aquapark. The primary sources of water that residents accessed are significantly different between each household category ($p < 0.01$). Consequently, patterns of water access are partially dependent upon which of the three household category one belongs too.

Regarding differences in water access between the two study sites, the results show that across all household categories the 'neighbour's garden tap' was an important source of water in Nomathamsanqa (46%), whilst in Aquapark a 'tap in the garden' was the main primary source of water (42%). On the other hand, 'community standpipes' were the least important primary source of water in both Nomathamsanqa and Aquapark, with only 12% and 16% of residents using this source respectively. This is possibly due to the fact that community standpipes are not the first choice for a reliable water source and therefore become more important as secondary source (see 'issues relating to water access'). The primary sources of water were similar in both townships, therefore there was no significant difference between the two townships ($\chi^2= 1.734$, $DF=3$, $p=0.6295$).

In Nomathamsanqa, a greater number of respondents used the 'community standpipe' for their secondary source (37%) compared to Aquapark where over half of the respondents (56%) stated that they used their 'neighbours' garden tap' for their secondary source (Table 6.1.1 and 6.1.2). Furthermore, in Nomathamsanqa far more residents used the irrigation canal, which runs through the township than in Aquapark (see 'issues relating to water access'). Consequently, the difference between townships was significant for secondary sources of water ($\chi^2= 59.338$, $DF=3$, $p < 0.01$).

These results highlight the different problems residents in each township have in regards to access to water. As stated previously in Chapter 3, in Aquapark, specific areas and zones within the township have different access to water, whilst in Nomathamsanqa, the water problems are widespread and residents' use of a secondary source is strongly linked to the search for a safe source of water (Chapter 5 and Chapter 7). Consequently, no household in either township is fully water secure, as they have to rely on multiple water sources in order to meet their water needs and are forced to depend on other households distributed throughout the township for water access. Overall, residents in Aquapark appear to have better access to private supplies and are less reliant on unsafe sources such as the canal. However, better access to water sources does not imply that water is readily available; residents were faced with severe water shortages that in some cases occur on a daily basis (Chapter 7). From interactions and conversations with respondents at the local level, they perceive social water scarcity to be an inadequacy of the quantity and quality of water sources, and this is directly linked to challenges surrounding water service delivery. Therefore, both townships were faced with challenges of water insecurity and this is predominately due to issues of social water scarcity.

6.2.1 ISSUES RELATED TO DIFFERENT SOURCES OF WATER OVERVIEW OF PERCEIVED IMPACTS OF WATER SCARCITY ON LIVELIHOODS

As discussed previously respondents have primary and secondary sources of water, yet there are problems with water sources. These problems are characterised largely in terms of a combination of infrastructure inadequacy and poor water service delivery. Results from the in-depth interviews, in particular, revealed interesting insights into issues related to accessing and using different water sources, and why certain sources were favoured over others. Specifically, I had revealing and instructive discussions around the use of community standpipes, rainwater tanks, the irrigation canal and the importance of neighbourliness and social networks since so many households rely on others for access to water. I was also able to learn more about the inter-household conflicts and disputes that sometimes arose around water access and use and the consequences of these.

For instance, discussions with respondents in both townships revealed that the ‘community standpipes’ that were put in place by the municipality were seen as a highly unreliable source of water. The unreliability is as a result of the walking distance from houses (up to 30 minutes to reach the tap), queuing, broken taps and leakages (shown in Figure 6.1), as well as water shortages during the day (for example in Nomathamsanqa, many who use this source collect water as early as sunrise as by 10 am the water is cut and only returns later in the day).

“We have to wake up early to get water from the community tap, and it is a long walk and then you get there and sometimes you have to queue. But often those taps are broken and water is always running down the road, so we rather get water from the neighbours, they help us.”

Source: 45-year-old female, RDP house resident (Nomathamsanqa, 2012)

This low access to community standpipes is reinforced by data in the SRVM IDP, where it is reported that only 9.9% of the consumer households are served with communal standpipes with a distance less than 200 m, whilst 11 % use ‘community standpipes’ a distance greater than 200m from their house (SRVM IDP, 2013). Consequently, less vulnerable RDP and formal township households in both townships relied more on the ‘rainwater tanks’ and their ‘neighbours garden tap’ as a secondary source of water rather than the community standpipes, while those living in informal dwellings, were often forced to use this source (as shown in Table 6.1.1 and 6.1.2).

However, given the unreliability of communal supplies and the long waiting time some informal households made alternative plans. From observations and the interviews, I found that some residents had constructed their dwellings around a community standpipe. These households then took primary ‘ownership’ of the tap, such that neighbours could only use the tap on the permission of the ‘owner’. Additionally, informal dwelling households could also gain access to water through a tap in their own or a neighbour’s garden due to illegal connections.

“We would have to queue to get water from the community tap, so we (like many others) made our own connection so that we could get water closer to us. But this water only comes on from 6 am to 10 am, and often there is no water, or else it comes on late at night.”

Source: 42-year-old male, informal dwelling resident (Nomathamsanqa, 2012)

Otherwise, the majority (who may have not been able to afford connections) had to approach households in other neighbourhoods and housing types for assistance. For many residents then, the ability to access water is mediated by their social networks and their relationships with neighbours. The survey results showed that those that had access to water within their property were predominantly formal township household residents. These households were then depended upon by RDP and informal residents who did not have easily accessible water and needed a secondary source. Furthermore, a ‘neighbour’s garden tap’ was seen as pivotal during times of water shortages and difficulty accessing water. Yet during these dire situations, conflict between community members would often arise.

“There are conflicts and fights about the water, especially now that we don’t have a gate, people just come in and get water from my tap without asking for it, and because there isn’t enough water I get angry ... so yes it does cause conflicts.”

Source: 42-year-old female, formal township house resident (Aquapark, 2012).

“Sometimes people get angry when you ask them for water, but so many of them don’t even pay for the water, so why do they get worked up?”

Source: 33-year-old female, informal dwelling resident (Aquapark, 2012).

From my interactions with respondents, it became clear that the water conflicts that take place at the local level are multi-layered and interrelated. In regards to the above quote, the perspectives of both the ‘owner’ of the tap and the users of the tap have some validity and this conflict is not easily reconciled. The issue of payment for water and viewing water as a basic human right is

deeply intertwined in any explanation of the water conflicts. Furthermore, as discussed above, many residents have made illegal connections to the community standpipes, and therefore this begs the question who has ‘ownership’ and rights to use these taps.



FIGURE 6.1 LEAKAGES AND BROKEN TAPS THAT ARE COMMON WITHIN NOMATHAMSANQA AND AQUAPARK

In contrast to the use of community standpipes by informal township residents, the users of rainwater tanks were predominately those living in formal private township households, followed by a smaller number of RDP residents. Households with water tanks were often approached by their neighbours and other residents for water (especially drinking water). Most rainwater tanks had been privately installed by homeowners as a coping/adaptive mechanism to deal with unreliable water supply and, as such, owning a rainwater tank (with safe water) was viewed as a privilege and advantage within the communities.

“The rainwater tank helps us - we can at least drink clean water and not get sick, but we save that water... its valuable because it’s clean and we can store it. We have lots of people asking for water... we try to help especially with those in the shacks, the children are hungry and they need water.”

Source: 55-year-old female, formal township resident (Aquapark, 2012)

Since most rainwater tanks were privately installed, only the more prosperous within the community are able to take advantage of this option to increase water security and reduce scarcity. To date the SRVM has not installed or subsidised the installation of rainwater tanks within these communities. The residents that own a rainwater tank, as well as the local clinic and schools, have paid for these tanks and their installation themselves, or found alternative funding.

“We use to have drums that we stored rainwater in, but it wasn’t enough water so we saved and put up these rainwater tanks ourselves, we need our own water because this tap (pointing at the garden tap) the water always gets cut. We want good water to drink and that’s why we got the (rainwater) tank.”

Source: 48-year-old female, formal township resident (Nomathamsanqa, 2012)

Rainwater tanks are helpful as not only a secondary safe source of water, but also they help provide food security and self-sufficiency for local households and organisations. The local schools within Nomathamsanqa as well as the clinic have rainwater tanks, which they use to grow nutritious vegetables (as seen in Figure 6.2). Such alternative sources are necessary for gardening as township residents are not permitted (legally) to use municipal water supplies for this purpose.



FIGURE 6.2 AV BUKANI PRIMARY SCHOOL VEGETABLE GARDEN

The Headmaster of AV Bukani Primary school, in Nomathamsanqa reiterated this value of water tanks:

“Now we have rain water tanks we can grow vegetables and these are used in the kitchen to feed the children lunch or else they are sold to local markets, it has been a very good thing having the garden.”

From discussions with local women through the in-depth interviews, many stated that if they had the space within their properties for a vegetable garden and if they had a reliable access to water they would grow vegetables. The main motivation would be for subsistence living as well as selling the vegetables to local neighbours. The women stated that although they were aware of the problems with water service delivery within the SRVM they expected the municipality to ensure a basic minimum of adequate communal water supply but these aspirations were invariably tempered by the current constraints that water insecurity posed on their livelihoods.

At the other end of the spectrum of secondary sources, there is the irrigation canal water. When the RDP and informal residents have the option of their secondary source of water, many rely on local community standpipes and neighbours garden tap before the irrigation canal (Table 6.1.1 and 6.1.2). However, during times of water shortages and cuts in municipal water supply many are faced with little alternative and the irrigation canal water is an easily accessible option. In Nomathamsanqa, the use of the irrigation canal was far more predominant, with 31% of residents overall using this as their secondary source compared to only 1% in Aquapark (Table 6.1.1 and 6.1.2). This is mainly because the canal runs directly through Nomathamsanqa (as seen in Figure 6.3).

Clearly, residents recognise the canal as an unsafe option of last resort, but also know they sometimes have no choice. The results showed a direct link between those that rely on the irrigation canal for their secondary water source and those who consider this source unsafe.

“This canal is wide open and the water is dirty - there are dead animals and rubbish in it..., only when the municipal worker found three dead bodies they go around on loudspeakers and start telling people not to use the canal water... They must cover it up so children don’t drown and so people don’t drink it - because it makes us sick.”

Source: 57-year-old female formal township resident (Nomathamsanqa, 2012).

Residents that utilise water from the irrigation canal all highlighted how the canal is a safety hazard, for health reasons as well as the dangers associated with falling in as it is unfenced in certain areas (Figure 6.4). The irrigation canal also poses a threat in regards to safety as accessing the water is difficult, and children swim and play in the water, which has resulted in four drowning’s (that I am aware of) over the last two years, with a child drowning in the month of August 2012. This has resulted in many complaints to the municipality, and residents are highly concerned about the safety of children in the township.

The Ward Councillors and municipality are also aware of the problem of people using this water for drinking and household purposes as well as the problems with children swimming in the canal and livestock drinking from this source. However, despite fencing being put up it does not provide a good barrier (in some areas the fencing has been totally removed) and therefore the safety hazard that the canal presents is still a major source of concern.

“I want this canal closed! So many children here have drowned, it makes me angry because it is dangerous - there is sewerage drain that always over flows and it goes into the canal.”

Source: 46-year-old female, informal dwelling resident (Nomathamsanqa, 2012).

This photo below shows the potentially dangerous proximity of the canal to the houses.



FIGURE 6.3 THE IRRIGATION CANAL THAT RUNS THROUGH NOMATHAMSANQA .



FIGURE 6.4 THE YOUNG GIRLS PLAYING NEXT TO THE CANAL

WATER ACCESS IN THE SRVM AND RELATIONSHIP TO WATER MANAGEMENT AND POLICY

From the results and discussion presented in this Chapter, it is evident that many people in Nomathamsanqa and Aquapark do not have reliable and direct access to water and therefore face a situation of low water security. This is in an era where the policy environment supports otherwise (Chapter 5). Clearly, residents' basic water rights are not being met by the SRVM and there are problems with local level implementation of new, more equitable water policies.

One of the reasons for this is the poor implementation of the ‘Free Basic Water’ (FBW) policy by the SRVM (Chapter 5). The *“basic water supply of a minimum quantity of potable water of 25 litres...within 200 metres of a household; and with an effectiveness such that no consumer is without a supply for more than seven full days in any year”* (RSA, 1997) is not being met within the SRVM. The FBW policy ideally should change the nature of water service delivery mechanisms in municipalities, including the relationship between citizens and municipalities and the awareness of households of their water rights, water requirements and delivery systems. This does not appear to have happened in the SRVM. Furthermore, the discrepancies in the RDP households between townships shows that many RDP residents do not have sufficient access to water within their property. This contradicts the RDP manifesto, which supports the constitutional right to a ‘basic minimum supply’ as stated above.

Improving water use efficiency, water equity and water access and quality are substantial challenges, yet their effective implementation would significantly improve household water security within the SRVM. The current reality is that these townships and informal settlements that surround the towns of the SRVM are expanding, which is exacerbating the already enormous water services backlog and the municipality cannot cope currently to meet the demand and ensure equitable access of water (SRVM IDP, 2011).

The challenges the SRVM are faced with are not uncommon amongst municipalities in South Africa. Green and Smith’s (2005) research of the free basic water policy and low-income households’ water service delivery in Msunduzi, Pietermaritzburg, found that these households suffer major water security issues. The main challenges found were that the FBW policy failed to meet the basic requirements of Msunduzi low-income households and households were unable to pay tariffs beyond the 6 kl, which resulted in a backlog of water service delivery. Green and Smith (2005) therefore emphasise that the FBW policy needs to be re-addressed with a ‘grass roots perspective’ in order to provide insight into how the implementation strategies are working on the ground.

WATER ISSUES

While all households have multiple sources of water, it is clear that particular sources of water are often used for specific needs and household chores. These sources of water are selected based upon the quality and quantity needed for the household chore or to meet daily needs. This is illustrated in Figure 6.5, which shows how much water, on average, respondents used within Nomathamsanqa and Aquapark for household needs. In regards to drinking water, the quality of

water is essential, and therefore residents will try source what is deemed the safest and cleanest source. Thereafter, for household chores such as washing and cleaning, the quality of the water is not so vital, but obtaining sufficient quantity of water is important. The quality of water predominately affects the ability to drink safe water and water for cooking and respondents are aware of this.

“When the water is bad, we make sure to treat it because it’s dirty. We boil it and add some jik (bleach) in before we use it for cooking or drinking.”

Source: 53-year-old female, informal dwelling resident (Nomathamsanqa, 2012)

WATER USE

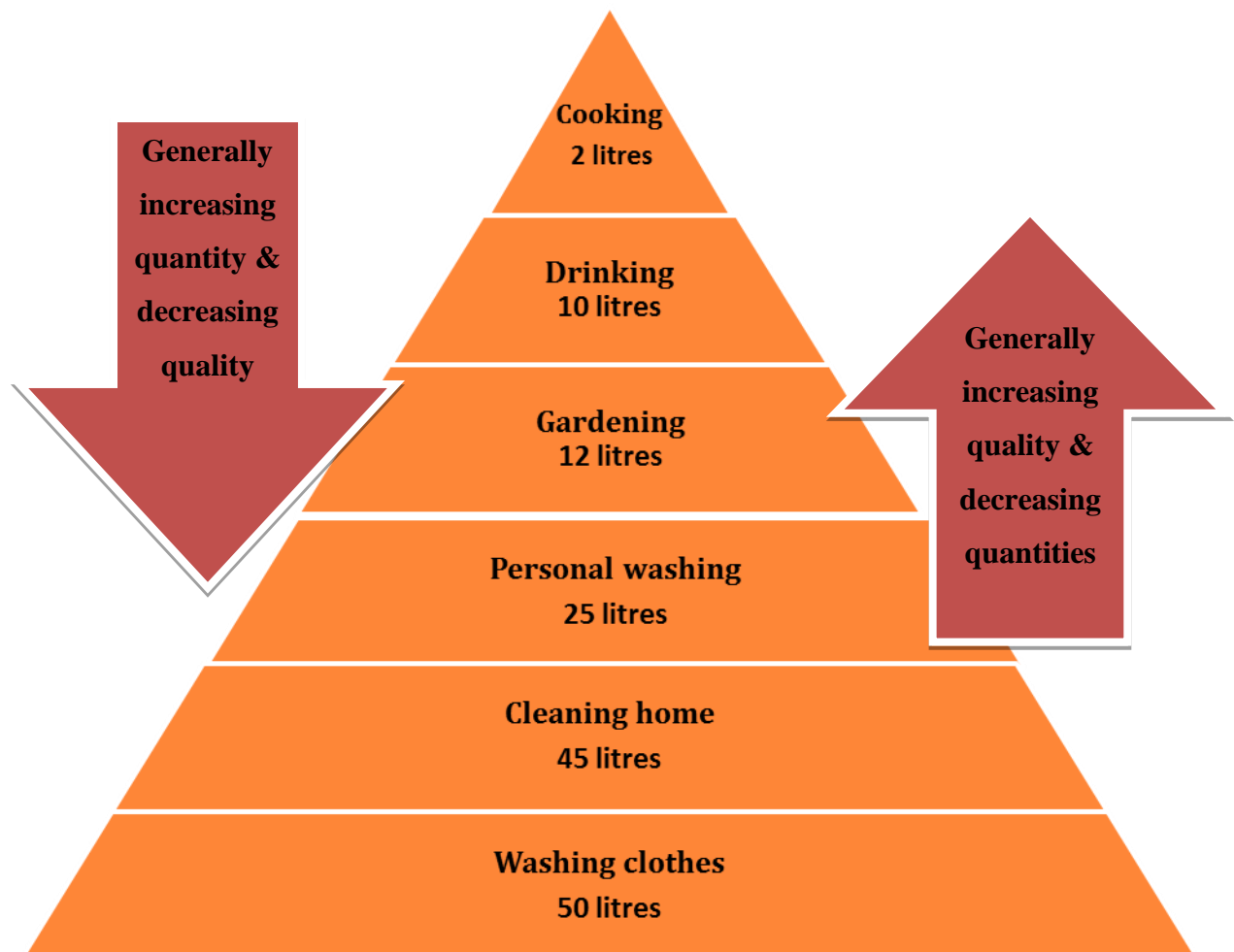


FIGURE 6.5 AN OUTLINE OF DIFFERENT QUANTITIES OF WATER FOR DIFFERENT PURPOSES (QUANTITIES ARE MEASURED IN LITRES PER HOUSEHOLD, PER DAY). ADAPATED FROM REED B AND REED B (2011)

While water is used for several everyday purposes, very few respondents stated that they use the water for vegetable gardens. This could be due to the fact that living in a township and informal

settlement many do not have adequate space for a garden and many respondents claim they do not have the disposable income to invest in a vegetable garden. Furthermore, the legalities of water use for vegetable gardens becomes an issue, as use of water from the community standpipes for recreational or garden use is prohibited (as discussed in ‘issues related to different sources of water’). Yet, the municipality does not monitor water use closely and, as a result, water use is ‘self-managed’ amongst community members. As discussed previously during times of water shortages, conflict does arise over water use for activities beyond meeting households ‘basic needs’. Therefore, there is a need to redress water needs and uses within townships, as well as rethink planning for RDP houses to include vegetable gardens and rainwater tanks. These need to be supported by FBW and RDP policies, as this will be a step towards creating sustainability and self-sufficiency for community members.

For those residents and local organisation that do have vegetable gardens many complain of their produce being stolen (see ‘issues related to different sources of water’). As a 52-year-old female, formal township resident from Nomathamsanqa explains:

“I tried to grow some spinach and some carrots... but people come and steal them, or the goats come in.... and now so often the water goes off that my vegetables die if they not stolen.”

In some cases, residents did not see the value in having a vegetable garden not only due to the problem with stealing, but also because of the problems and frequency of water shortages in the townships.

“People shouldn’t waste water on gardens because the young ones they come at night and steal the food anyway and we must save as much water as we can.”

Source: 46-year-old female, RDP household resident (Nomathamsanqa, 2012).

The Headmaster of AV Bukani Primary school reinforced this:

“People steal the vegetables. We had to erect a big fence around the school yard because people come in at night and steal.”

Therefore, the problems with stealing along with the current water shortages result in vegetable gardens being rare in both townships.

Mokape and Butterworth (2001) found that water use for domestic purposes and productive activities is far greater in areas where water supply systems are superior. This highlights the fact that a better, improved supply in water results in greater use. Therefore, improving water supply to townships and rural areas will, ultimately results in an increase of water use and demand. Mokape and Butterworth (2001) argue that this places stress on water resources and infrastructure. This perpetual struggle between improving water services and infrastructure and the sustainable use of water leads to immense pressure place upon water demand management systems.

Households with diminished access to basic services, which include the use of unimproved sources of water and inadequate sanitation, are more likely to experience inadequate access to food (UNDP, 2011). However, nationally, only 1.6% of households participate in smallholder agriculture (when households produce food to generate an income) while 18.4% of households practice subsistence agriculture (when households engage in agriculture to produce a main or additional source of food) (Stats SA, 2011). Therefore, not only is food security and water security interlinked, but water security can improve sustainable living. This was expressed in interviews with women; many stated that they would like to have gardens for vegetables in order to sell produce for a living.

6.2.2 GENDER AND WATER ACCESS AND COLLECTION

Water access is defined broadly as the ability of a community to actually benefit from water resources and, most importantly, this definition of access includes a wider range of relations than those derived from property rights alone (Ribot and Peluso 2003). Water access problems are particularly compromised in situations of water scarcity, which result long walking distance to the source, low water quality and a lack of a sufficient quantity of water.

PREDOMINANCE OF FEMALE-HEADED HOUSEHOLDS IN SRVM

A high proportion of female-headed households is evident in the SRVM. Overall, female heads of households were dominant within both townships, with 74% in Nomathamsanqa and 80% in Aquapark (Table 6.2). The highest numbers of female-headed households occurred amongst those that lived in informal dwellings (78%) in Nomathamsanqa and in RDP households (87%) in Aquapark (Table 6.2).

TABLE 6.2 GENDER OF THE HEAD OF HOUSEHOLD

NOMATHAMSANQA N=90		
Households categories	Female	Male
RDP	77%	23%
FORMAL TOWNSHIP	67%	33%
INFORMAL	78%	22%
ALL CATEGORIES (MEAN %)	74%	26%
AQUAPARK N=90		
	Female	Male
RDP	87%	13%
FORMAL TOWNSHIP	77%	23%
INFORMAL	77%	23%
ALL CATEGORIES (MEAN %)	80%	20%

In the interviews and discussions with respondents the female heads of households and the women in male-headed households were asked to indicate the roles they play within the household and key decisions they make. Their responses revealed marked gender differences within households in regards to roles and responsibilities for households that were male headed, while this was much less obvious in the numerous female-headed households. Men were predominantly involved in productive roles, whilst women's roles were mainly reproductive in nature. This gendered division of labour is a central feature of gender inequality, both in its economic aspects and in the social construction of gender identities. The role of women is often defined as the caregiver and caretaker, whereas men are regarded as the 'breadwinners' and are defined by their productive role (Poverty in Focus, 2008). For the vast majority of women in the SRVM these roles are intertwined; i.e. the woman plays a double role and is both primary caregiver and provider as she is often the only adult in the household (Table 6.3). This 'double' role is emphasised below:

“A woman never stops being a mother in this place... there is always someone to support, some child to care for... that is our role. My son he has sent his children to live with me, I must be mother, father and take care of them... it's hard”

Source: 48-year-old female, formal township resident (Nomathamsanqa, 2012).



FIGURE 6.6 THESE WOMEN ARE THE HEAD OF HOUSEHOLD AND SPEND A LARGE AMOUNT OF THEIR DAY DOING CHORES SUCH AS COLLECTING WATER AND WASHING CLOTHES

Furthermore, many of these women heads of household are older. From data gathered it was found that the average age of female heads of the household is 55. These results suggest that female-headed households in the SRVM are under severe time constraints and so poor access to water and water shortages can place a serious burden on them affecting broader livelihood security.

GENDER-BASED DIVISION OF LABOUR IN WATER COLLECTION

When addressing water collection it is essential to consider the gender dynamics of the household, as water collection has been shown to reveal a gender-based division of labour (WaterAid, 2012; Zwarteveen, 1997). Indeed, the most important sources of gender differences with respect to water lie not so much in the gender specificity of water uses, but in gender differences with regards to water collection responsibilities and access to, and control of, water (Zwarteveen, 1997).

In this study, across all household categories, some 27% and 19% of respondents in Nomathamsanqa and Aquapark respectively, indicated that males collected the household water supplies (Table 6.3). However, as expected, females were the main household members responsible for collecting water in both townships, with 49% of women in Nomathamsanqa and 46% in Aquapark taking on this duty (Table 6.3).



FIGURE 6.7 AN OLDER WOMAN FETCHING WATER: SHE COMPLAINS ABOUT THE DISTANCE FROM THE COMMUNITY STANDPIPE TO HER HOUSE AS IT TAKES HER ABOUT 20 MINUTES



FIGURE 6.8 A YOUNG UNEMPLOYED MAN HELPS WITH COLLECTING WATER AS HIS WIFE IS BUSY WITH THE CHILDREN

RDP HOUSEHOLDS

In RDP houses in Nomathamsanqa, females formed the majority of the water collectors with 57% taking on this task, whilst in Aquapark 47% of females were responsible for water collection, followed by 'anyone home' (33%) (Table 6.3). Amongst RDP houses, taps are generally within the property, therefore women do not have long distances to walk (expanded on in water collection).

FORMAL TOWNSHIP HOUSEHOLDS

Amongst township households in Nomathamsanqa, 40% of females play a role in water collection, whilst in Aquapark; it consists of only 20% of females (Table 6.3). In formal township households often, 'anyone home' will collect water when necessary (33% in Nomathamsanqa and 70 % in Aquapark) (Table 6.3). It is important to note that 'anyone home' in many cases refers to a female and often it is young girls or older women (expanded on under walking distance to water source and time poverty). This is because in most cases for formal township houses, the water is available on the property and so members of the household access it as needed.

INFORMAL DWELLINGS

In Nomathamsanqa, half of the water collectors in informal dwellings are female (50%) and in Aquapark the vast majority are female (70%) (Table 6.3). In this situations water collection is a more time consuming task as it may require going some distances to collect from neighbours, waiting at a community standpipe or collecting from the canal. Informal dwelling respondents face the most challenges in regards to water security and access to water, as they are generally more vulnerable.

TABLE 6.3 GENDER AND WATER COLLECTION DUTIES

NOMATHAMSANQA N=90			
	Female	Male	Anyone Home
RDP	57%	27%	17%
FORMAL TOWNSHIP	40%	27%	33%
INFORMAL	50%	27%	23%
ALL CATEGORIES (MEAN %)	49%	27%	24%
AQUAPARK N=90			
	Female	Male	Anyone Home
RDP	47%	20%	33%
FORMAL TOWNSHIP	20%	10%	70%
INFORMAL	70%	27%	3%
ALL CATEGORIES (MEAN %)	46%	19%	36%

Therefore, from the results above it becomes evident that within these townships there is a division of labour, whereby women are the main water carriers. When asked about women's roles in the household, many (in both areas) responded that they consider it a woman's 'duty' to collect water, as it forms part of one's daily household activities.

"The household duties are the mothers' responsibility and the women who live in the house's responsibility. The man's job is to fix the house, like we had a storm and thing broke so he must fix that, but the household duties like fetching water, cooking, cleaning and taking care of children, this is a woman's job."

Source: 45-year-old female, RDP house resident (Aquapark, 2012).

During water shortages and irregular supply, obtaining clean, potable water becomes a priority and men often assist in ways of accessing water, such as collecting large amount of water in cars or purchasing barrels to store rainwater (Figure 6.7 and 6.8; Table 6.3). Yet the higher proportions of women that are responsible for water collection emphasises that women have more responsibility in regards to household duties.

"Before women and men had different roles in the household. You would come home from work, tired and you'll find your husband waiting there for you to cook and clean. But now some cook and clean and whenever the mother is cooking they now help out, peel potatoes

or I tell the boys to go fetch the water. I think we should have the same roles. I shouldn't be the one doing everything around the house and having to work. "

Source: 51-year-old female, RDP house resident (Nomathamsanqa, 2012).

WALKING DISTANCE TO WATER SOURCE AND TIME POVERTY

As shown through water access of primary and secondary supplies of water, residents in SRVM not only have to rely on multiple sources of water, but many do not have easy access to these water supplies, especially during water shortages. For a large proportion of residents, except those in formal township households, water collection during times of water shortages involves walking to the (alternative) source of water with buckets and storage containers to fill up, and then returning back home. In many cases, these containers are 25 litres and are heavy and often a burden to carry. Table 6.4 depicts the time consuming activity of walking to collect water from the primary source.

There was a significant difference between the two townships and the average time taken for users' to walk to their primary water sources ($\chi^2=19.8142$, $Df=3$, $p < 0.01$). About two-thirds (60%) of Nomathamsanqa respondents stated that it takes them, on average, a 30 minute walk or more to reach their alternative source of water when there is a water shortage or problems with water supply (Table 6.4). Whilst in Aquapark, only about one third (31%) of respondents stated that they have to walk a distance which takes them '30 minutes or more' to reach water (Table 6.4). This reinforces earlier discussions that Aquapark respondents have more easily accessible water sources, compared to those in Nomathamsanqa.

RDP HOUSEHOLDS

In Nomathamsanqa the majority of RDP household residents (63%) stated that their primary water source is a far distance which takes '30 minutes or more' (Table 6.4). As the indepth interviews with respondents revealed, during times of water shortages many residents do not have access to water, therefore respondents have to walk a distance in search of a reliable water source. The situation was similar for 50% of RDP household respondents in Aquapark, who stated that it takes '30 minutes or more' to reach their water source (Table 6.4).

FORMAL TOWNSHIP HOUSEHOLDS

As depicted in Table 6.1.1. and Table 6.1.2, many respondents in this category of household have access to water within their property, which means that they have far easier access to water compared to RDP and informal residents. This is confirmed in Table 6.4, which shows 50% of

formal township household respondents living in Nomathamsanqa stated that their primary water source during water shortages is ‘close by’ and this was also the case for 60% of respondents in Aquapark. This reinforces earlier findings, which show that formal township households are more water secure compared to RDP and informal residents.

INFORMAL DWELLINGS

In Nomathamsanqa 73% of informal dwelling respondents, state that it takes them a 30 minute walk or more to reach their primary source of water (Table 6.4), which fits with the sources of water they have access to. Whereas in Aquapark only 30% informal dwelling residents state that their primary water source during water shortages is ‘30 minutes or more’ away (Table 6.4).

TABLE 6.4 WATER COLLECTION AND TIME CONSUMPTION (WHEN MUNICIPAL WATER SOURCES ARE NOT AVAILABLE)

NOMATHAMSANQA N=90							
Household categories	Close By	< 15 min	15- 30 min	> 30 min	χ^2	Df	P value
RDP	23%	3%	10%	63%	17.8833	4	0.00653
FORMAL TOWNSHIP	50%	7%	0%	43%			
INFORMAL	7%	13%	7%	73%			
ALL CATEGORIES (MEAN %)	27%	8%	6%	60%			
AQUAPARK N=90							
	Close By	< 15 min	15- 30 min	> 30 min	χ^2	Df	P value
RDP	23%	7%	20%	50%	14.8445	4	0.021501
FORMAL TOWNSHIP	60%	3%	23%	13%			
INFORMAL	30%	13%	27%	30%			
ALL CATEGORIES (MEAN %)	38%	8%	23%	31%			

Therefore, from the results in Table 6.3 and Table 6.4, it is apparent that women bear the burden of carrying water from far distances. This is an internationally recognised issue as in Sub-Saharan Africa, 71 % of water collection burden falls on women and girls (MDG Report, 2012). This heavy burden is also the case in other parts of the world, as globally, it is estimated that women spend more than 200 million hours per day collecting water (UN-Water, 2013; WHO/UNICEF, 2010). It became evident within the two townships that, due to a high number of female-headed households and gender-based division of labour, there is a heavier time burden on women, as women and girls bear the primary responsibility for water collection. The lack of water access

often results in an additional responsibility for women and girls. When primary water supplies are not readily accessible, water must be sourced from alternative supplies.

“I don’t have time to go queue in the morning and fetch water... I am an old woman now but I must still take care of the grand children, the house, try make money and take care of family. That is my job. There is no one else who will do it all.”

Source: 62-year-old, female RDP resident (Nomathamsanqa, 2012).

Research has shown that those spending more than half an hour per round trip progressively collect less water, and eventually fail to meet their families’ minimum daily drinking water needs (Cairncross and Feachem, 1993; Hutton and Haller, 2004). In such cases, the quantity of water collected is often less than 5 litres per person per day, which is not sufficient for good hygiene practices such as hand washing (Howard and Bartram, 2003). Therefore, time to collect drinking water can be viewed in terms of both a gender and a health perspective.

Essentially women’s income poverty can be linked to time poverty. The time that women spend on domestic chores represents significant forgone income, especially if they are the providers for the household as well. For poor women, time is often their most valuable resource, but it is consumed by caring work, and consequently remain caught in a vicious circle of poverty (Howard and Bartram, 2003; Zwarteveen, 1997). Therefore, time consuming household duties, such as fetching water daily (which can take 30 minutes or more) but critical to household members’ ability to sustain basic daily consumption, can take up much of women’s time. This is clear through the differential impacts of poverty on girls versus boys, and women versus men, within the household as well as the gendered ways in which poor households and their members respond to lack of services. Through development of infrastructure provision and improving service delivery especially for residents in RDP households and informal dwellings, it could potentially reduce women’s ‘time burden’. The saving includes time spent on collecting, loading and purifying water. This saving could enable women to engage in remunerated activities, and dedicate more time to pursuing paid work or education (Sultana, 2002; Schriener et al., 2002).

6.3 CONCLUSION

This chapter focused on exploring the issues around access to water and how this affects water security. The findings reveal that the water services situation in the SRVM is precarious with many respondents struggling to gain access to sufficient quantity and quality of water. It is evident that water access is driven, and enabled by, the type of household category households’ fall into

and this is closely linked to wealth. Therefore, it becomes clear that water security is directly linked to poverty. Furthermore, it became apparent that women bear the responsibility of carrying water from far distances when there is an inadequate water supply and there are clear linkages between time poverty, gender and water access. Overall, the results have revealed that not only is water insecurity a major problem within the SRVM, but the FBW policy has not been able to redress the skewed water resources and service delivery history. The fact that in order to be water secure, residents need to access multiple sources of water as well as to become self-sufficient through their own means, shows that there are serious gaps in water services and this highlights the need for improved delivery. Despite the clarity in water legislation and policy there are considerable challenges for the SRVM in meeting the basic standards of households water security which is ensuring water availability, water access and sufficient water for use (Chapter 8). The result of this is that poor residents' lives become even harder.

CHAPTER SEVEN:

RESULTS AND DISCUSSION – WATER SERVICE DELIVERY: SUPPLY, QUALITY AND RESPONSES

7.1 CHAPTER OVERVIEW

This chapter presents results and discussion specifically related to water shortages and cuts in municipal water supply, water quality concerns, water service delivery and payment for water. The following research questions will be answered and discussed in this chapter, comparing across household categories and study sites:

- What is the frequency of water shortages and how does this impact on water security?
- What are the alternative sources of water and coping mechanisms during water shortages?
- What are the current perspectives on water quality and how do residents evaluate the water quality in terms of health and safety?
- What are the reasons behind failures in water service provision and water service delivery? To what degree is water security an issue of voice and power and does it correspond with poverty and political marginalisation?

7.2 RESULTS AND DISCUSSION

7.2.1 WATER SHORTAGES AND COPING MECHANISMS

As discussed previously (Chapter 3 and 5) water security can be related to three main areas: availability, access and usage. However, it has become apparent that access to an available source of water (such as a tap) does not necessarily mean residents have water for use. This is mainly due to water shortages and cuts in water supply. A water shortage refers to a shortage of water supply of an acceptable quality; low levels of water supply as a result of insufficient water resources, and infrastructural problems (Water Aid, 2012; UN Water, 2013). In regards to this specific study, a water shortage refers to a cut in municipal supply water for an extended period of time which results in residents having to find alternative sources of water. As discussed in chapter 2, this is due to social water scarcity and a lack of infrastructure or poorly maintained infrastructure. Water shortages were a common occurrence in the SRVM, with some differences between the two townships.

RDP HOUSEHOLDS

In Nomathamsanqa RDP households, 73% of respondents stated that the shortages occurred one to three times a week, whilst in Aquapark 63% of respondents stated that shortages were as often as four to six times a week (Table 7.1).

FORMAL TOWNSHIP HOUSEHOLDS

Similar, to RDP households, 77% of formal township respondents stated that water shortages occur one to three times a week in Nomathamsanqa (Table 7.1). This corresponded with just more than half of Aquapark respondents that stated that shortages only occur one to three times a week, whilst 23% of respondents stated that these shortages occur on daily basis (Table 7.1).

INFORMAL DWELLINGS

Amongst informal dwelling respondents, the situation was similar; in Nomathamsanqa, like the RDP households, 77% of informal dwelling respondents stated that water shortages occur one to three times a week, while in Aquapark as many as 47% of informal dwelling respondents in Aquapark stated that these shortages occur on a daily basis (Table 7.1).

Therefore, these results show that regardless of the source of water all respondents experience similar cuts and shortages (differences between housing categories are not significant, evident by the p-values in Table 7.1). Although this does seem worse amongst informal households and could be a reflection of the fact that most are using community standpipes are an important water source and these seem to frequently run short of water, and consequently water security is highly precarious amongst the more vulnerable residents.

From Table 7.1, it is evident that water shortages are a cause for concern for the community of Aquapark, with 33% overall stating that there are shortages up to four to six times a week, whilst 30% stated that these water shortages occur daily. Contrastingly, in Nomathamsanqa the majority of respondents (76%) stated that shortages occur between once and three times a week. This difference in the frequency of water shortages between the townships was significant ($\chi^2=54.1109$, $DF=5$, $p < 0.01$).

As discussed in Chapter 5, the main reason for the higher frequency of shortages in Aquapark is due to the problems with insufficient water storage facilities in the Kirkwood Water Treatment Works, which lead to cuts in the water supply to Aquapark and surrounding townships. There is

no significant difference in Nomathamsanqa ($p=0.73444$) between the household categories and the frequency of water shortages, as well as in Aquapark ($p=0.43519$).

Furthermore, many respondents who stated shortages occurred daily complained of shortages for an entire week or two. This leaves many residents feeling frustrated and angry by their situation. It is therefore not surprising that those who do pay for water are dwindling due to the unreliable and erratic water supply.

TABLE 7.1 FREQUENCY OF WATER SHORTAGES

NOMATHAMSANQA N=90								
Household Categories	Daily	one-three times a week	four-times a week	Monthly	Never	χ^2	Df	P value
RDP	7%	73%	13%	3%	0%	3.57143	5	0.73444
FORMAL TOWNSHIP	10%	77%	13%	0%	0%			
INFORMAL	3%	77%	20%	0%	0%			
ALL CATEGORIES (MEAN %)	7%	76%	15%	1%	0%			
AQUAPARK N=90								
	Daily	one-three times a week	four-six times a week	Monthly	Never	χ^2	Df	P value
RDP	17%	13%	63%	3%	3%	15.9214	5	0.43519
FORMAL TOWNSHIP	27%	53%	13%	0%	3%			
INFORMAL	47%	27%	23%	3%	0%			
ALL CATEGORIES (MEAN %)	30%	31%	33%	2%	2%			

These water shortages clearly have had dramatic effects on people's lives and water insecure households have adopted various coping strategies such as the use of multiple water sources and covering long distances to access water (Chapter 6) (Water Aid, 2012). As discussed in Chapter 6, water shortages can also lead to an increase in gender disparities within the communities as the responsibility of fetching water generally falls upon women, whose productive roles are already a burden. Respondents in both townships expressed frustration concerning the frequent water shortages:

“We need water! What must I clean with? What must I cook with? I can’t do anything when there’s no water, and then I have to go queue at the rand office (municipal office) or go ask people for water...”

Source: 51-year-old female, RDP house resident (Nomathamsanqa, 2012)

“There are often water shortages, now there wasn’t any water yesterday and this morning. We don’t have any tanks or drums to store water so we suffer when there are these water shortages.”

Source: 38-year-old female, informal dwelling resident (Aquapark, 2012)

Alongside frequent water shortages, another cause of complaint is that many of the respondents indicated that the municipality does not inform them when cuts in water supply will be occurring, or if the municipality does relay this, the information is delayed.

“If only they would go through the right channels, the men from the municipality tell the Ward Councillor that they are going to close off the water and that there won’t be any water for those days then he can inform the community so we can store water or look for alternatives.”

Source: 43-year-old female, formal township house resident (Aquapark, 2012)

With regards to Table 7.2, overall, 66% of respondents in Nomathamsanqa stated that they were only informed of the water shortages and cuts in supply after they had occurred. Among the 33% that stated ‘yes’ they were informed about a water shortage, 65% claimed that this information was only relayed ‘after the water cut’. There was no significant difference amongst the different household categories in Nomathamsanqa regarding information related to water shortages ($p=0.859061$) (Table 7.2).

The situation in Aquapark was very similar, with only 33% of respondents stating that they were made aware of water shortages. However, the majority of these respondents (68%) did receive information from their local municipal representative that water shortages were going to take place before they occurred. Interestingly, there was a significant difference in regards to being informed of water shortage amongst the different household categories in Aquapark ($p < 0.01$) with more informal households agreeing with this (Table 7.2).

This illustrates the problem of lack of communication between the SRVM and the local communities as this ‘delayed information’ does not allow for residents to store or conserve water in preparation for water cuts. This inefficiency could also be due to the current way the municipality informs the communities, which is through a loudspeaker. This method of communication is not effective as it does not reach everyone. This lack of communication and unreliable water supply leads to residents relying on alternative methods for water collection such as rainwater tanks, and the irrigation canal (Chapter 6).

TABLE 7.2 INFORMED BY THE SRVM OF WATER SHORTAGES AND CUTS IN SUPPLY

NOMATHAMSANQA N=90				
Household categories	Yes	No	Before The Water Cut	After The Water Cut
RDP	33%	67%	29%	71%
FORMAL TOWNSHIP	31%	69%	38%	63%
INFORMAL	37%	63%	37%	63%
ALL CATEGORIES (MEAN %)	33%	66%	35%	65%
χ^2	-	-	0.303831	
Df	-	-	2	
P value	-	-	0.85906	
AQUAPARK N=90				
	Yes	No	Before The Water Cut	After The Water Cut
RDP	26%	74%	29%	71%
FORMAL TOWNSHIP	22%	78%	83%	17%
INFORMAL	52%	48%	93%	7%
ALL CATEGORIES (MEAN %)	33%	67%	68%	32%
χ^2	-	-	10.3867	
Df	-	-	2	
P value	-	-	0.01	

The details of the Kirkwood WTW and the challenges facing the SRVM (discussed previously in Chapter 3 and 5) emphasises that these water shortages are due to a complex variety of problems, but ultimately through better communication methods, the SRVM could ensure that residents are at least made aware of impending water cuts which enables them to prepare themselves.

7.2.2 ALTERNATIVE WATER SUPPLIES AND COPING MECHANISMS

In Chapter 6, primary and secondary sources were discussed, but when there are water shortages due to cuts in the municipal supply, residents no longer have access to many of their primary and secondary sources. An alternative water source here refers to a water source that does not originate from municipal supply (i.e. A tap in the house, a tap in the garden or community standpipe).

RDP HOUSEHOLDS

In Nomathamsanqa, 57% of RDP residents relied on ‘the canal’ as their alternative source of water because it runs through the township (as discussed in Chapter 6). In Aquapark there is still a high reliance (60%) on ‘neighbours/friends’ for alternative sources of water amongst RDP household respondents (Table 7.3). The dependence on ‘neighbours/friends’ is due to the nature of water shortages in the township, whereby some residents have access to water whilst others do not (Chapter 5).

FORMAL TOWNSHIP HOUSEHOLDS

In regards to formal township households, the highest portion (44%) of respondents within Nomathamsanqa relied on rainwater tanks as their alternative supply of water, whilst the highest proportion (43%) in Aquapark relied on neighbours/friends, whilst a significant proportion (20%) relied on rainwater tanks (Table 7.3). Many also ‘wait’ for municipal water supplies to return in both townships.

INFORMAL DWELLING HOUSEHOLDS

Like RDP residents, as many as 57% of Nomathamsanqa informal dwelling respondents stated that they are forced to rely upon ‘the canal’ during times of water shortages. Whilst in Aquapark 40% of respondents rely upon ‘neighbours/friends’ and as many as 47% ‘wait’ for municipal water supplies to return.

TABLE 7.3 ALTERNATIVE WATER SUPPLIES

NOMATHAMSANQA N=90										
Household categories	Rainwater tank	The canal	Ask neighbours/Friends	Wait	Use saved water	Buy water	Water from work	χ^2	Df	P value
RDP	23%	57%	0%	17%	0%	0%	3%	13.6957	7	0.09005
FORMAL TOWNSHIP	44%	40%	0%	10%	0%	3%	3%			
INFORMAL	10%	57%	0%	20%	0%	0%	13%			
ALL CATEGORIES (MEAN %)	26%	51%	0%	16%	0%	1%	6%			
AQUAPARK N=90										
	Rainwater tank	The canal	Ask neighbours/Friends	Wait	Use saved water	Buy water	Water from Work	χ^2	Df	P value
RDP	10%	7%	60%	17%	0%	0%	7%	24.6933	7	0.01
FORMAL TOWNSHIP	20%	0%	43%	27%	3%	7%	0%			
INFORMAL	0%	0%	40%	47%	7%	7%	0%			
ALL CATEGORIES (MEAN %)	10%	2%	48%	30%	3%	5%	2%			

Therefore, during water shortages residents in both townships are forced to rely on sources such as rainwater tanks (their own or others) and the canal. Access to these alternative sources of water ensures that residents are able to meet their daily needs and this can be seen as a coping mechanism in dealing with the challenges of water insecurity.

In Nomathamsanqa, just more than half of the respondents (51%) stated that they rely on ‘the canal’ during times of water shortages (Table 7.3) and this predominantly consisted of RDP and informal households, whereas in Aquapark only 2% of respondents overall turned to ‘the canal’ (Table 7.3). In Aquapark, 40% of respondents continued to ask their ‘neighbours/friends’ for water during shortages (Table 7.3). Therefore, there was a significant difference between the townships and the alternative sources of water used during water shortages ($\chi^2=101.894$, $DF=7$, $p < 0.01$).

Furthermore, it becomes evident that many respondents do not have reliable alternative supplies and for those that make use of ‘rainwater tanks’ this water becomes highly valuable and precious, as it is one of the only healthy sources of water for drinking during shortages. As depicted in Chapter 6, household chores require larger quantities of water, and residents struggle to find adequate ways to meet their daily needs. Furthermore, very few respondents used ‘saved water’ with only 3% mentioning this in Aquapark and none in Nomathamsanqa and very few respondents mentioned buying water and making use of water from work (Table 7.3). There was a

significant difference between the sources of water household categories relied upon during times of water shortages in Aquapark ($p < 0.01$) but this was not the case in Nomathamsanqa ($p=0.09005$) (Table 7.3).

Along with the above results, Table 7.2 emphasised that due to the fact that many of the residents are not aware of when the water shortages will occur; they do not take action to ensure that they have a backup. The majority of residents tended to rely on social networks for access to water, or else utilise raw untreated water from the irrigation canal. A social network refers to a set of individuals who are linked by specific social connections and these generally refer to neighbours or family relations. Those without strong social networks and relationships were forced to wait for the water to return.

The ability to access social networks through reciprocity and community ties enables residents to obtain water during times of shortage. A 36-year-old female informal township resident from Nomathamsanqa explains,

“We have to get water from the neighbours’ houses when there is no water but I wish we had a rainwater tank, and then we could have clean water.” This iterated by another: “When we don’t have water we have to go ask the neighbours with rainwater tanks for water, because they are the only ones that have access to water and its clean water”

Source: 32-year-old, female informal dwelling resident (Nomathamsanqa, 2012).

“We’ve had many days where we’d wake up to find that there isn’t any water. Then you would find out that there is a house with water, so you’d run to that house to see if you can get water from them. Or we have to go to the rand office to get water, and it’s very far for us old women to go there.”

Source: 44-year-old, female RDP house resident (Nomathamsanqa, 2012)

It was found that rainwater tanks were perceived to be the best and most favoured solution to water insecurity and as a coping mechanism. These residents are predominantly formal township residents and they have personally invested in an alternative source of water. The rainwater tanks create a sense of independence from the inefficient municipality water supply systems and provide a safe source of drinking water. However, as shown above and in Chapter 6, those who own rainwater tanks are greatly relied upon by other community residents during times of water

shortages, therefore placing them under tremendous pressure to not only provide water for their own households but to support neighbouring households too.

“There are often water shortages, now there wasn’t any water yesterday and this morning. We don’t have any tanks or drums to store water so we suffer when there are these water shortages.”

Source: 38-year-old female, informal dwelling resident (Aquapark, 2012)

Therefore, it becomes apparent that there is a parallel between the wealth and means of residents and their access to water and ability to access alternative sources of water as a coping mechanism. Community members are left to address water shortages and problems with supply through their own means such as installing rainwater tanks, but this means that the option of increasing water security is only available to those that can afford it.

“How a community gains, maintains, and controls access to a critical resource can be expressed through an analysis of the means, processes, and relations, or “mechanisms” that facilitate access as these are embedded in the social and environmental histories of a region” (Ribot and Peluso 2003: 26).

Given the overall lack of self-sufficient coping mechanisms, respondents were questioned whether they would invest in alternative supplies or conserve water if they were informed by the municipality when there are problems with the water supply. Overall, 97% of Nomathamsanqa respondents stated that they would keep water in storage and 100% of Aquapark respondents agreed, as well as stating that they would make more of a conscious effort to conserve water. Therefore, this illustrates the integral role water security plays in facilitating water conservation and self-sufficiency.

7.2.3 WATER QUALITY PROBLEMS

PERCEPTION OF WATER QUALITY AND SAFETY

Table 7.4 provides residents’ the perceptions of water quality from the different sources of water in each township. These observations are based upon the determinants of what is perceived to constitute poor water quality, which is illustrated in Table 7.4 and Table 7.4.1. The communities’ rate water quality through experiential means such as a taste, smell and sight and it is from these experiences that concerns arise about the safety of the water.

TABLE 7.4.1 THE HOUSEHOLD RATING OF WATER QUALITY

NOMATHAMSANQA N=90								
Household Categories	Very Good	Good	Adequate	Poor	Very Poor	χ^2	Df	P Value
RDP	7%	13%	7%	23%	50%	14.0967	5	0.07928
FORMAL TOWNSHIP	10%	10%	0%	53%	27%			
INFORMAL	3%	17%	10%	53%	17%			
ALL CATEGORIES (MEAN %)	7%	13%	6%	43%	31%			
AQUAPARK N=90								
	Very Good	Good	Adequate	Poor	Very Poor	χ^2	Df	P value
RDP	50%	13%	37%	0%	0%	16.2478	5	0.01248
FORMAL TOWNSHIP	23%	40%	33%	3%	0%			
INFORMAL	60%	7%	33%	0%	0%			
ALL CATEGORIES (MEAN %)	50%	20%	34%	1%	0%			

RDP HOUSEHOLDS

Firstly in Nomathamsanqa, half of the RDP respondents stated ‘the canal’, which forms the main secondary source of water for RDP residents was of very poor quality (Chapter 6). In Aquapark, the opposite is true, with 50% stating that their water source is ‘very good’, and respondents stated that this refers to the ‘neighbour's garden tap’ and the ‘tap in the garden’ (Chapter 6).

FORMAL TOWNSHIP HOUSEHOLDS

In Nomathamsanqa, 53% of formal township households stated that the quality of their water source was ‘poor’ and this referred to the ‘tap in the garden.’ Whereas in Aquapark, 40% stated that their water source was ‘good’ and this referred to ‘tap in the house’ and the ‘tap in the garden’ (Chapter 6).

INFORMAL DWELLINGS

In Nomathamsanqa, like the formal township households, 53% of informal dwelling respondents stated that the quality of their water source was ‘poor’, and this referred to the ‘neighbour's garden tap’ and the ‘community standpipe’. Whereas in Aquapark the majority of respondents (60%) stated that, the quality of their water source was ‘very good’ and this referred to ‘neighbour's garden tap’ and the ‘community standpipe.’

The water quality from the municipal sources in Nomathamsanqa was reported to be poor by residents; overall 43% of respondents reported that in terms of health they personally considered the water quality to be ‘poor’. Second to this was 31%, who responded that the water quality was ‘very poor’ (Table 7.4.1). In Aquapark the majority stated that their water supply was ‘very good’. Therefore, from the above results it is evident that there are stark differences between the perceived quality of the water sources in each township, and this is significant ($\chi^2=54.4770$, Df=4, $p < 0.01$). This again clearly illustrates the differences in water services between the townships.

SPECIFIC CONCERNS WITH THE QUALITY OF WATER

In regards to Nomathamsanqa respondents, overall 97% stated that the water is ‘dirty’, dirty water was based upon the perception of water being brown or murky; whilst in Aquapark, the majority 62% state that water is never ‘dirty’ and 38% state that it is often ‘dirty’ (Table 7.4.2) and this difference was significant ($\chi^2=78.2850$, Df=3, $p < 0.01$). There was no significant difference amongst the household categories within each township.

TABLE 7.4.2 DIRTY WATER

NOMATHAMSANQA N=90						
Household categories	Always	Often	Never	χ^2	Df	P value
RDP	0%	100%	0%	6.0689 7	3	0.19406
FORMAL TOWNSHIP	0%	97%	3%			
INFORMAL	7%	93%	0%			
ALL CATEGORIES (MEAN %)	2%	97%	1%			
AQUAPARK N=90						
	Always	Often	Never	χ^2	Df	P value
RDP	0%	47%	53%	1.7962 2	3	0.40734
FORMAL TOWNSHIP	0%	37%	63%			
INFORMAL	0%	30%	70%			
ALL CATEGORIES (MEAN %)	0%	38%	62%			

According to the local residents and clinics, the frequency of water diseases increases during periods of water shortages as people fail to follow basic sanitation rules which the municipality and clinic advises, such as boiling water and washing hands thoroughly. Respondents stated that they rarely boil water they collect from the community standpipes, as it considered safer than the water from the irrigation canal. This perspective has impacted the increase of water related diseases, as residents take it for granted that the water sources are safe and water is consumable.

As discussed previously the red worms in the water are Chironomidae which reflect low oxygen levels, and are not harmful, but they signify the fact that the WTW are not functioning correctly (Gray, 2008). In Nomathamsanqa, the majority of respondents (78%) complained that they ‘often’ find red worms in water sources, whilst in Aquapark only 10% agree with the majority (90%) stating that they never find red worms in their water, with all (100%) informal dwelling respondents agreeing with this (Table 7.4.3). There was a significant difference between the two townships and the occurrence of red worms in water sources ($\chi^2= 83.9428$, $DF=3$, $p < 0.01$) whilst there was no significant difference in Nomathamsanqa amongst the different household categories, there was a significant difference in Aquapark.

TABLE 7.4.3 RED WORMS IN WATER

NOMATHAMSANQA N=90						
Household categories	Always	Often	Never	χ^2	Df	P value
RDP	0%	70%	30%	1.67143	3	0.43357
FORMAL TOWNSHIP	0%	80%	20%			
INFORMAL	0%	83%	17%			
ALL CATEGORIES (MEAN %)	0%	78%	22%			
AQUAPARK N=90						
	Always	Often	Never	χ^2	Df	P value
RDP	0%	20%	80%	6.66667	3	0.03567
FORMAL TOWNSHIP	0%	10%	90%			
INFORMAL	0%	0%	100%			
ALL CATEGORIES (MEAN %)	0%	10%	90%			

Therefore, from the above three tables it is evident that water quality problems are common complaints in the Nomathamsanqa. Many respondents state that the perceived ‘poor’ or ‘very poor’ water quality is due to water being dirty, having red worms in it and the water having a sour taste or smell (Table 7.4.2 and Table 7.4.3).

7.2.4 PERCEPTIONS OF WATER SAFETY

The respondents were aware that some of the water quality issues have resulted in their health being affected, and many draw parallels between poor water quality and water borne illnesses, such as diarrhoea. Factors thought to contribute to deterioration in water quality include poor hygiene and sanitation practices; the use of contaminated transport and storage containers; insertion of contaminated hands and utensils into water; contact of water with particulate matter,

animals and insects as a result of openings in containers; and a poor environment surrounding a water source (Water Aid, 2012; UN-Water, 2013).

RDP HOUSEHOLDS

In Nomathamsanqa, the majority of RDP households (63%) stated that they perceived their water sources to be 'not safe at all' and this was followed by 23% stating that their water sources are 'safe' (Table 7.4.4). In Aquapark, although 43% stated that their water sources were 'not safe at all' 40% stated that water source was 'safe' (Table 7.4.4). This apparent contradiction must be taken into consideration with the fact that households have various primary and secondary water sources. At various times after these municipal sources of water are cut the water is often initially brown and dirty and low pressure.

FORMAL TOWNSHIP HOUSEHOLDS

The vast majority of respondents in Nomathamsanqa (80%) stated that they considered their water sources to be 'not safe at all', and only 10% stated that they consider their water source to be 'safe' (Table 7.4.4). Many township houses have access to a rainwater tank and use this for drinking water and this therefore have a higher expectation for good drinking water. The situation is different in Aquapark whereby the majority (60%) state that they consider their water sources to be 'safe' and 17% state that their water source is 'not safe at all' (Table 7.4.4). This begins to highlight the differences in regards to water security problems.

INFORMAL DWELLINGS

In Nomathamsanqa, the majority (83%) of respondents stated that they considered their water source to be 'not safe at all' whilst a mere 3% stated that they regard their water sources to be 'safe' (Table 7.4.4). The opposite was the case for respondents in Aquapark, whereby the majority (70%) stated that they considered their primary water source to be 'safe', and only 7% stated that their water source was 'not safe at all' (Table 7.4.4).

From the above results, it is clear that water quality is far greater concern for Nomathamsanqa residents with as many as 76% of all respondents stating that they perceived their primary water sources to be 'not safe at all' (Table 7.4.4). Whilst in Aquapark the majority of respondents (57%) stated that their water sources were 'safe'. Therefore, there was a significant difference between the two townships regarding the perceived safety of water sources ($\chi^2=59.0714$, $DF=5$, $p < 0.01$). In regards to water quality in Aquapark, a complaint was that the water is sometimes very white, and SRVM water treatment work officials, state that this is due to over chlorination. Although this

is not a health hazard, this reinforces the discussion above concerning inadequate and insufficient WTW procedures. Evidently the water is not being correctly monitored and the correct adjustments of water treatments made.

TABLE 7.4.4 SAFETY AND WATER SOURCES

NOMATHAMSANQA N=90								
Household categories	Not Safe At All	Somewhat Unsafe	Partially Safe	Safe	Very Safe	X²	Df	P value
RDP	63%	3%	10%	23%	0%	14.4118	5	0.2536
FORMAL TOWNSHIP	80%	10%	10%	0%	0%			
INFORMAL	83%	10%	3%	3%	0%			
ALL CATEGORIES (MEAN %)	76%	7%	9%	9%	0%			
AQUAPARK N=90								
	Not Safe At All	Somewhat Unsafe	Partially Safe	Safe	Very Safe	X²	Df	P value
RDP	43%	3%	10%	40%	3%	15.4953	5	0.50201
FORMAL TOWNSHIP	17%	10%	13%	60%	0%			
INFORMAL	7%	10%	13%	70%	0%			
ALL CATEGORIES (MEAN %)	22%	8%	12%	57%	1%			

Those who responded that their water was ‘not safe at all’ stated that they considered the water to be a health hazard.

“The water isn’t safe - it smells bad and is often brown and dirty with red worms in it.”

Source: 50-year-old female, RDP house resident (Nomathamsanqa, 2012)

Generally, when the primary water source was not viewed as safe, alternative sources were relied upon for drinking water as the respondents stated that safety was vital for drinking water, but not for household uses. Furthermore, from discussions with respondents, many stated that when they considered water ‘unsafe’ for consumption, they would treat their own water by boiling the water and adding bleach (jik) before use. As discussed previously, water was considered ‘unsafe’ when it appeared dirty, had red worms or had a sour taste or smell. The source that was considered the most ‘safe’ were the rainwater tank or barrels containing rainwater, whilst the source that was considered the most unsafe was ‘the canal’.

“Sometimes this water makes us (her family) sick, the children, they get diarrhoea. When I tell the municipality they say I must put bleach in the water and leave it to stand before we use it for cooking and drinking.”

Source: 52-year-old female, RDP house resident (Nomathamsanqa, 2012)

According to the nurses in Nomathamsanqa clinic, they regularly get residents coming in with complaints of diarrhoea, especially during times of water shortages and when the water is dirty. However, the clinic does not have enough evidence to determine that diarrhoea and stomach problem are directly due to poor water quality. This comment was supported by the Kirkwood clinic (which has now been moved to the Sundays River hospital in Kirkwood) where the residents of Aquapark seek treatment.

“The community suffers when there is no water and the children often get sick with diarrhoea because they are not clean, and cannot get clean. Many of the schools are forced to close, as it becomes unsanitary. We have four big rainwater tanks so that we can ensure that our clinics can stay open and provide support to the community when there is no water. We also have to use the rainwater tanks for our vegetable garden.”

Source: Anonymous Nurse, (Nomathamsanqa, 2012)

There are frequent complaints of children with consistent diarrhoea, and the clinic nurses then inform the residents to treat the water they get and make sure they do not use the water from the irrigation canal. The Nomathamsanqa clinic have also had cases with people having rashes after washing themselves with dirty water or water from the canal

“The children they get sick, they get rashes and my wife she got rashes from the water, when the water is dirty, and after the water cuts when the water comes back on the water is brown and dirty.”

Source: 46-year-old male, Formal township resident (Nomathamsanqa, 2012)

“We are so angry about the water situation. We have to drink this water but it makes us sick, so we go to the clinic... and then you just get sick again”.

Source: 43-year-old female, informal dwelling resident (Nomathamsanqa, 2012).

7.2.5 WATER SECURITY AND THE PAYMENT OF WATER

The townships in the SRVM (much like the rest of South Africa) disproportionately comprise of households, which face varying degrees of poverty, as shown within the three household categories. This influences the capability of citizens to become consumers and pay for the water used. There are various issues surrounding the payment for water (Chapter 5) and within the SRVM, residents' willingness to pay for water, is strongly dependent on water availability and water quality.

PAYMENT FOR WATER SERVICE DELIVERY

Considering the context of water security challenges within the SRVM, respondents were asked which was more important in regards to paying for water: undisrupted supply of water or better quality of water.

RDP HOUSEHOLDS

In Nomathamsanqa 62% of RDP respondents stated that an 'undisrupted supply of water' was more important than 'better quality of water.' Whilst in Aquapark, every RDP respondent stated that an 'undisrupted supply of water' was essential (Table 7.5.1).

FORMAL TOWNSHIP HOUSEHOLDS

In Nomathamsanqa, 72% of formal township household respondents agree that an 'undisrupted supply of water' was more important than 'better quality of water' and this was supported by 96% of Aquapark respondents (Table 7.5.1).

INFORMAL DWELLING

In Nomathamsanqa, the majority (93%) of informal dwelling respondents stated that an 'undisrupted supply of water' was viewed as more important and helpful than a 'better quality of water' and all Aquapark informal dwelling respondents agree (Table 7.5.1).

Therefore, it is clear that respondents believe that a regular supply of water is more important than the quality of water. Overall, in Nomathamsanqa and Aquapark most respondents stated that they were willing to pay for water if there is 'undisrupted access to water', with 76% and 99%, respectively, agreeing (Table 7.5.1). In regards to 'better quality of water' there was a higher proportion of respondents in Nomathamsanqa (24%) that emphasised this over a regular supply of water as being important, compared to the 1% in Aquapark (Table 7.5.1). A greater proportion of Nomathamsanqa respondents stated that quality was important and this can be linked to the low perceptions of water quality. This clearly reflects the concerns over water quality in this township

and water shortages in Aquapark. Therefore, there was a significant difference in residents' responses between the two townships ($\chi^2=54.1109$, Df= 2, $p < 0.01$).

TABLE 7.5.1 THE LEVEL OF WATER SECURITY RESIDENTS ARE WILLING TO PAY FOR

NOMATHAMSANQA N=90					
Household categories	Undisrupted Supply Of Water	Better Quality Of Water	χ^2	Df	P value
RDP	62%	38%	7.52667	2	0.02
FORMAL TOWNSHIP	72%	28%			
INFORMAL	93%	7%			
ALL CATEGORIES (MEAN %)	76%	24%			
AQUAPARK N=90					
	Undisrupted Supply Of Water	Better Quality Of Water	χ^2	Df	P value
RDP	100%	0%	1.76718	2	0.4133
FORMAL TOWNSHIP	96%	4%			
INFORMAL	100%	0%			
ALL CATEGORIES (MEAN %)	99%	1%			

7.2.6 INDIGENCY AND PAYMENT FOR WATER SERVICES

The payment for water is closely linked to the FBW policy and the indigency register. The indigent registration helps to determine the households that should be receiving Free Basic Services by local government and allow for the adequate planning of the scale and scope of their free basic delivery. An indigent household refers to a poor household that is insolvent and disadvantaged and is therefore entitled to the Free Basic Services. In order to obtain these Free Basic Services from the SRVM residents must register themselves as indigent, and the SRVM bases the implementation of the FBW policy on the indigent policy and state that earnings must be between R100 to R1 800 per month in order to qualify (Chapter 5) (SRVM, 2011).

RDP HOUSEHOLDS

In Nomathamsanqa, 63% of RDP residents are registered indigent, and for those that were not, the main reason is that they work (67%) (Table 7.5.2). In Aquapark, as many as 80% of RDP respondents were registered, and the reason given for those that had not registered was that they were either underage (33%) or for various other reasons (such as no ID document) (Table 7.5.2).

FORMAL HOUSEHOLDS

In Nomathamsanqa, 73% of formal township respondents were registered, whilst those that have stated 'no' they were not registered indigent have not begun the process of registering (Table 7.5.2). Whereas in Aquapark 63% have registered, but for those that are not registered indigent, the main reason cited was that they work (73%) (Table 7.5.2).

INFORMAL DWELLING HOUSEHOLDS

In Nomathamsanqa, 80% of informal dwelling respondents were registered indigent, and for those that were not, it was because they work (67%) (Table 7.5.2). In Aquapark, 77% of respondents were registered indigent and for the main reason why those they were not registered was because they work (43%) (Table 7.5.2).

Despite the high rates of those that are registered indigent, the SRVM have highlighted problems with process of registering: many residents either do not keep their information updated or do not re-register when they move houses or they do not re-register when their employment status changes.

"Many people here they rely in social grants from pensions or child grants, there isn't a lot of work, and when there is, it's hard because we (women) have to leave the babies at crèche or with someone who wants money to care for them....so we can't work all the time"

Source: 32-year-old female resident (Aquapark, 2012)

The indigent policy is aimed at including those currently excluded from access to basic services, through the provision of a social safety net. However, the issue is that the majority of residents which are deemed the 'most vulnerable' are the residents that live in informal dwellings, which are essentially illegal constructions of housing. Therefore, due to their informal nature, these residents have no legitimate access to water, electricity and municipal service subsidies because they do not have a legitimate address, and therefore do not form part of the registered residents. This was exemplified as an issue by the SRVM, the fact that informal dwelling residents are 'registered' is counter acted by the fact that live in illegal dwellings, which therefore means that they do not receive resources and municipal services.

This is seen previously in regards to water access where many of the informal dwelling residents have ‘illegally’ constructed their dwellings around a community standpipe in order to gain access to water in ‘their property’. Therefore this is a complex issue, and water insecurity and lack of water access demonstrates how the indigent policy fails to actually meet the needs of the most vulnerable and how many of these residents fall under the radar.

TABLE 7.5.2 INDIGENCY REGISTRATION

NOMATHAMSANQA N=90						
	Yes	No	Work	Underage	Haven't registered	Currently applying
RDP	63%	38%	67%	0%	33%	0%
FORMAL TOWNSHIP	73%	27%	38%	0%	50%	13%
INFORMAL	80%	20%	67%	0%	17%	17%
ALL CATEGORIES (MEAN %)	73%	27%	57%	35%	0%	9%
χ^2	-	-	3.24359			
Df	-	-	4			
P value	-	-	0.517919			
AQUAPARK N=90						
	Yes	No	Work	Underage	Haven't Registered	Currently Applying
RDP	80%	20%	17%	33%	33%	17%
FORMALTOWNSHIP	63%	37%	73%	27%	0%	0%
INFORMAL	77%	23%	43%	29%	0%	29%
ALL CATEGORIES (MEAN %)	73%	27%	50%	29%	8%	13%
χ^2	-	-	11.496			
Df	-	-	4			
P value	-	-	0.074205			

Overall, 73% of respondents in Nomathamsanqa and Aquapark stated that they are registered indigent with the SRVM. For those that are not registered, the main reason was because they ‘work’ (57% in Nomathamsanqa and 50% in Aquapark) and therefore earn more than R1800 monthly. There was no significant difference between the two townships and the reasons why respondents were not registered as indigent ($\chi^2=0.011244$, $DF=4$, $p=0.915$).

The indigent population interviewed in this study have identified that the registration process is onerous and some mentioned that they already receive a free service and do not see the need to register. The municipality is aware of this and incorporated ‘raising awareness’ of the importance

of the indigent register and being more vigilant about updating the register into their IDP (SRVM, 2011). Furthermore, due to the nature of seasonal work on local orange farms, many find that they do not ‘technically’ qualify (during the picking season) according to the SRVM indigent policy:

“Residents qualify if the combined or joint gross income of all occupants or dependents in a single household does not exceed two times the government pension grant” (SRVM, 2011).

7.2.7 PAYMENT FOR WATER SERVICES

As a result of the low number of ‘actual’ registered indigent residents, the municipality does not have sufficient finances to deliver free water to the different communities. In addition, disgruntled community members were frustrated with the metering and payment for water. Many respondents claimed that their water bills are irregular and incorrect, with many running bills into the tens of thousands of Rands.

“Look at this bill - why does it say that I have used this much water and haven’t paid. They want me to pay so much money but this bill is wrong and I refuse to pay.”

Source: 41-year-old female, formal township resident (Aquapark, 2012)

“They send me bills, and they say I must pay otherwise they will cut off the water. But I have only stayed for 2 years and it’s the people that lived here before, but they (the municipality) don’t care they just say I must pay.”

Source: 48-year-old female, formal township resident (Aquapark, 2012)

The SRVM is faced with backlogs in many areas, including water meters. In cases where households consume more than the free allocation of water, but are not paying for the amounts used above that threshold, municipalities have been introducing devices that either stop the flow of water at 6 kl, limit the water flow rate to make it impossible to use more than 6 kl per month, or simply cut off the water supply altogether (Bond in Johnston *et al*, 2011).

“When I didn’t pay for my water, it got cut off so I had to pay then they put it back on. I must pay what I can, but I only have my pension so I can’t pay lots of money, I still have to live and have to feed these children.”

Source: 62-year-old female, RDP household resident (Aquapark, 2012)

The ever-expanding townships of Nomathamsanqa and Aquapark make it difficult for the already struggling SRVM to ensure that water access points are consistently monitored and that meters are being read as well as payments being made. The failure to effectively do so, has resulted in a ‘culture of non-payment’, whereby residents refuse to pay because they either are unable to afford to pay or are unwilling to pay for the current level of water service delivery received (Bond in Johnston et al, 2011). In the SRVM, both of these reasons were used to rationalise non-payment for water services.

“I pay for water but the water isn’t good and it makes me angry because I pay for this water but I can’t drink it, I can’t cook with it... the municipality should make sure the water is clean then maybe people will pay.”

Source: 52-year-old female, formal township resident (Nomathamsanqa, 2012)

The current situation in Aquapark of water shortages and cuts in supply occurring on a weekly basis alongside with the complaints about water bills have resulted in people refusing to pay for water services. The reason given is that due to the regular water shortages many are highly dissatisfied and do not view the current service being provided as worthy of payment. This highlights an important problem for the municipality of monitoring and enforcing payment for services. This is emphasised by the quotes below:

“No I don’t believe in paying for water because there is no water for me to pay for. If I had a tap in the house that worked, and I could flush my toilet, then they can ask me for money, but now? No, no I will not pay when we don’t get any water.”

Source: 43-year-old female, RDP house resident (Aquapark, 2012)

“People should pay for water, but they don’t because they don’t get enough water or because they don’t have money so yes we should pay...but no we don’t pay”

Source: 44-year-old male, formal township resident (Nomathamsanqa, 2012)

“People they get so angry about the water, but I get angry because if no one will pay for water then how do people think we can get water.”

Source: 52-year-old female, formal township resident (Nomathamsanqa, 2012)

“They said they will come fix my tap, and that they will fix the water bill and clear it. But they haven’t, they now say I must pay for it, but who wants to pay for dirty water? No one wants to pay and no one does pay.”

Source: 44-year-old female, formal township resident (Nomathamsanqa, 2012)

Furthermore, informal dwelling residents who have illegal water connections are not paying for the water supplied by the municipality. This further creates conflict over who has access to water (Chapter 6).

7.2.8 WATER SERVICE AND RELIABILITY

Residents within the SRVM have expectations of sufficient water service delivery, but the current rate of delivery they are receiving is far less than adequate and leave many in dire situations. Therefore, consistent water service delivery and a reliable access to safe water supplies are inextricably linked to ensuring water security. When residents do not feel that their needs are being met, they make formal or informal complaints to ward councillors and municipal officials, with the hope that circumstances will improve as discussed below and in Chapter 8, this places tremendous pressure on the SRVM to deliver the standard of service promised and supported by the Constitution and water policies.

RDP HOUSEHOLDS

The majority (63%) of RDP respondents in Nomathamsanqa stated that they have not made a formal complaint with the municipality concerning water problems and for those that have complained, half of which (50%) stated that the response was ‘delayed response or action’ from the municipality (Table 7.6.1). Similarly, in Aquapark, the majority (57%) of respondents stated that they have not made a complaint but for those that have, the large majority (77%) stated that their complaint resulted in ‘no response’ (Table 7.6.1).

FORMAL TOWNSHIP HOUSEHOLDS

In Nomathamsanqa, 43% of formal township respondents have made a formal complaint and this was reported to a municipal representative, and their complaints resulted in a ‘delayed response or action’ and/or ‘no response’ (46% each) (Table 7.6.1). For Aquapark formal township respondents, the majorities (60%) have made a complaint, and this was addressed mainly to a municipal representative, which according to every respondent (100%) resulted in ‘no response’ (Table 7.6.1).

INFORMAL DWELLINGS

In Nomathamsanqa, the majority (60%) of informal dwelling respondents have not made a complaint, but for those that have, every one stated that they received ‘no response’ (Table 7.6.1). The situation is similar in Aquapark, as the large majority (83%) stated that they have not made a complaint with the municipality. For those 17% that have complained, these were all made with a municipal representative, and these all resulted in ‘no response’ from the municipality (100%) (Table 7.6.1).

TABLE 7.6.1 FORMAL COMPLAINTS TO THE MUNICIPALITY

NOMATHAMSANQA N=90							
	Have you made a formal complaint?		Who did you complain to?		What was the result?		
Household categories	Yes	No	Ward Councillor	Municipal Rep	Prompt Action	Delayed Action	No Response
RDP	37%	63%	23%	0%	25%	50%	25%
FORMAL TOWNSHIP	43%	57%	13%	30%	8%	46%	46%
INFORMAL	40%	60%	13%	27%	0%	0%	100%
ALL CATEGORIES (MEAN %)	40%	60%	16%	19%	9%	31%	59%
χ^2	-	-	-	-	13.4478		
Df	-	-	-	-	3		
P value	-	-	-	-	0.00928		
AQUAPARK N=90							
	Have you made a formal complaint?		Who did you complain to?		What was the result?		
	Yes	No	Ward Councillor	Municipal Rep	Prompt Action	Delayed Action	No Response
RDP	43%	57%	17%	27%	0%	23%	77%
FORMAL TOWNSHIP	60%	40%	3%	37%	0%	0%	100%
INFORMAL	17%	83%	0%	17%	0%	0%	100%
ALL CATEGORIES (MEAN %)	40%	60%	7%	27%	0%	10%	90%
χ^2	-	-	-	-	4.35897		
Df	-	-	-	-	3		
P value	-	-	-	-	0.1131		

Overall, respondents that do complain to Ward Councillors or municipality representatives are outweighed by those that do not complain (40% and 60% respectively) (Table 7.6.1). Interestingly, the results were the same in both research areas. Those that do complain have seen or had in their opinion ‘no response’ in Aquapark (90%), whilst in Nomathamsanqa 59% agree

(Table 7.6.1), resulting in a significant difference between the two townships ($\chi^2=8.10445$, $Df=2$, $p < 0.01$). This difference is due to perception and satisfaction with the current service delivery, Aquapark respondents were considerably more despondent and felt that their ‘voices went unheard.’

Within Nomathamsanqa, there was a significant difference between the two townships and the result of the complaint ($p < 0.01$). Whereas in Aquapark, the majority of respondents stated that they received ‘no responses’, which resulted in there being no significant difference between the two townships and the result of the complaints ($p < 0.01$) (Table 7.6.1). The low result of responses and communication from the SRVM, are the main reason that many say they no longer or do not complain, because quite simply ‘nothing gets done.’

7.2.9 SATISFACTION WITH SERVICE DELIVERY LINKED TO PAYMENT

RDP HOUSEHOLDS

In Nomathamsanqa, the majority (67%) of the RDP household respondents were ‘dissatisfied’ with the water service delivery and this is supported by Aquapark respondents whereby the large majority (83%) agree that they are dissatisfied (Table 7.6.2).

FORMAL TOWNSHIP HOUSEHOLDS

In Nomathamsanqa, 53% of formal township respondents stated that they were partially satisfied with the current level of service delivery they receive, whilst only 27% of Aquapark respondents agreed, 53% stated that they were ‘dissatisfied’ with the water service delivery (Table 7.6.2).

INFORMAL DWELLING HOUSEHOLDS

The large majority (80%) of Nomathamsanqa informal dwelling respondents stated that they were ‘dissatisfied’ with the water service delivery, whereas half of this (40%) of informal dwelling respondents in Aquapark stated that they were ‘partially satisfied’ with the water service delivery (Table 7.6.2).

There was a significant difference between the two townships and satisfaction with the level of water service delivery ($p < 0.01$) in Nomathamsanqa as well as in Aquapark ($p < 0.01$).

Overall, in Nomathamsanqa, the majority (64%) states that they were dissatisfied with their current level of service delivery, and in Aquapark, the results were very similar with 63% being dissatisfied (Table 7.6.2). These similar results mean that there is no significant difference

between the two townships and the level of satisfaction with service delivery ($\chi^2=5.54091$, $DF=3$, $p=0.062634$).

TABLE 7.6.2 SATISFACTION WITH SERVICE DELIVERY

NOMATHAMSANQA N=90						
Household categories	Completely satisfied	Partially satisfied	Dissatisfied	X²	Df	P value
RDP	10%	23%	67%	14.8966	3	0.00492
FORMAL TOWNSHIP	0%	53%	47%			
INFORMAL	0%	20%	80%			
ALL CATEGORIES (MEAN %)	3%	32%	64%			
AQUAPARK N=90						
	Completely satisfied	Partially satisfied	Dissatisfied	X²	Df	P value
RDP	10%	7%	83%	12.1148	3	0.01652
FORMAL TOWNSHIP	20%	27%	53%			
INFORMAL	7%	40%	53%			
ALL CATEGORIES (MEAN %)	12%	24%	63%			

The service delivery and reliability for water supply within the SRVM is of major concern and as discussed in Chapter 2, is primarily due to social water scarcity. The fact that people across the households, regardless of wealth, are forced to have an alternative supply (Chapter 6) aside from the municipal sources raises major concerns in regards to the municipality being able to cope with current demand for water, as well as future water demand as within Nomathamsanqa and Aquapark RDP houses are still currently being built. The fact that many of the respondents feel dissatisfied with the current rate of service delivery is indicative of the daily problems that they face.

Furthermore, the municipality does not have any leak detection equipment and relies solely on reports received from consumers or from its own technical personnel who are active within the area. However, the lack of response or action taken has discouraged members of these communities to report leakages in community standpipes or sewage and drain leakages.

The dissatisfaction of the current level of service delivery in the SRVM is apparent from the results, but the consequence of the municipality not fulfilling their duties has created contention from the residents and distrust.

“I wish they would think of the community, no one trusts them or believes them when they say that they will fix the taps or make sure the water comes back on or clean the water properly.”

Source: 32-year-old female, RDP household resident (Aquapark, 2012)

Essentially, the residents have very little faith in the municipality to provide a satisfactory level of service delivery and take action when there are problems surrounding water shortages and water quality.

“I think everyone should pay for water because they need the money to buy the chemicals to clean the water from the dams, I know the water is dirty but still pay for it. I must pray that they actually keep to their promises and fix the water problems.”

Source: 60-year-old female, formal township resident (Nomathamsanqa, 2012)

“If only they would go through the right channels, the men from the municipality tell the ward councillor that they are going to close off the water and that there won’t be any water for those days then he can inform the community so we can store water or look for alternatives.”

Source: 43-year-old female, formal township house resident (Aquapark, 2012)

“They just make promises but then nothing changes. We still don’t have water and when we do it’s brown and dirty and trickles out the tap. “

Source: 38-year-old female, informal dwelling resident (Aquapark, 2012)

Although there have been reported protests and strikes in Aquapark surrounding service delivery failures, mass action has not resulted in overnight improvements of the water services and this has left residents feeling more frustrated and hopeless, with many emphasising that they do not feel that have a place or space where their voices can be heard and their concerns addressed. Many residents in the SRVM state that they do not attend the ward council meetings, as they are merely a ‘political agenda’ or a ‘political platform’ for political parties to rally support. This means that day-to-day concerns are often not addressed and are not communicated to the municipality.

“Hey (laughing) they sleep on the job, they always blame each other for why the water is dirty. No one gets the right answers they just blames other people in the municipality or where they treat the water (WTW) they don’t take responsibility.”

Source: 41-year-old female, formal township resident (Nomathamsanqa, 2012)

This above quote highlights a very important barrier in overcoming the current water security problems facing the SRVM communities and that is communication and education, or lack thereof. There seems to be insufficient details supplied to the communities, about the reasons why there are water shortages or their complaints are simply not met. This has resulted in many residents taking matters into their own hands. This became clear with conversations with some residents in Nomathamsanqa who formed a community group to help deal with problems such as water shortages, poor water quality along with problems surrounding general maintenance such as poor roads and broken street lights as well as crime.

WATER SERVICE DELIVERY AND POLITICAL TENSIONS

The water shortages in the area have also led to an increase in political tension. Most respondents stated that they blamed the municipality government officials for the water crisis that the municipality is failing. The political pressures of the municipality to fulfil their duties and commitments to residents were highlighted when an opposition PAC Councillor became involved with running the community group. This was seen as a political threat by local (ANC) Ward Councillors, which was not the aim of the group. Rather the community group was formed out of necessity, as a way in which people could voice their problems and support one another in finding solutions. The respondents' perspectives on service delivery and the formation of a community group are explained below:

“The PAC Councillor said that we should form the community group so that we can resolve community problems, but we don’t want to have to strike and take to the streets about water service delivery, we just want them to do their jobs.”

Source: 46 year old male (Nomathamsanqa, 2012)

“We try to solve our problems first in the community group, and then we take it to the councillors. We speak to municipality often but they either don’t help or it takes so long to help, so we try see where we can do something, and where we can help each other- like fixing taps or helping the older ladies get water.”

Source: 58 year old female, RDP household resident (Nomathamsanqa, 2012)

“We report the water cuts to the Ward Councillor in desperate times and then we went to the PAC ‘chief’ Councillor and asked what we can do, and now the ward Councillor

visited me, and said that we were against him, against the ANC, and that we must not try solve these problems but just go to speak to him. But we started this community group because the ward councillors they say they will do something and then nothing changes, so we are forced to take matters into our own hands.”

Source: 46-year-old male, formal township resident (Nomathamsanqa, 2012).

7.3 CONCLUSION

It has become clear from the results that there are two main differences in regards to water security in the research sites. Firstly as addressed above Aquapark has a problem with storage in the Kirkwood WTW reservoirs, which has been one of the causes leading to major water cuts and shortages for the community. In regards to Nomathamsanqa, the main problem along with irregular water supply is that of water quality.

It has also become evident that the consequence of social water scarcity are felt in daily lives of the resident. The community members do not have much contact or interaction with the municipality and are not aware of how much water they are entitled to, or their water rights. The involvement of communities in political and municipal processes continues to be a big challenge in the SRVM. Lack of municipal response to community problems as experienced in SRVM does not only fuel community frustrations and anger but it also confirms the view that the process of fundamental transformation of local government in the country still has to undergo. Although there is more attention to the challenge of dealing with ordinary people's problems and service delivery from the national and provincial governments, there is a crucial need for the municipality to prioritise community concerns and creating functional communication channels as well as address water conservation and education.

CHAPTER EIGHT:

SYNTHESIS AND CONCLUSION

8.1 CHAPTER OVERVIEW

This chapter provides a synthesis of this study and a discussion of the results in reference to South Africa water policy and legislation. Firstly, this study analyses how the provision of water services, as a component of the FBW policy, is integral in addressing poverty and water insecurity in South Africa, emphasising the direct link between the standard of water services and water security. Secondly, this study addresses social water scarcity and water security at a local level, utilising the residents perceptions and experiences and as a tool for analysis of the efficiency and effectiveness of water service delivery.

8.2 OVERVIEW OF THE CHALLENGES OF WATER INSECURITY AND SERVICE DELIVERY

8.2.1 WATER SECURITY AND POLICY IMPLICATIONS

“Access to safe water and sanitation is now a fundamental human right. But water management also requires realistic ways of recovering delivery costs. An agreed definition of water security is vitally important in that context.”

(Michel Jarraud, Chair of UN-Water, (2013).

As discussed in Chapter 2, a summary of core elements needed to achieve and maintain water security has been produced from a broad range of sources, which includes access to safe and sufficient drinking water at an affordable cost in order to meet basic needs, including sanitation and hygiene, and safeguard health and levels of well-being (Water Aid, 2012; UN-Water, 2013). Therefore, a common understanding of water security and its implications has central importance in policies, governance and research. Building on the literature, social scarcity of water refers to a social construct of ‘resource management’, which is determined by political, economic and social power dynamics underpinning the institutions that provide structure to social relations, security of access to bases of social power and productive wealth, and stability to the social organization of human societies. Since secure access to water is an integral part of people’s multi-faceted livelihoods, manifestations of social water scarcity become strongly manifest at the micro-levels of social organization namely, communities and households at the local level (Tapela, 2012).

8.2.2 FREE BASIC WATER AND GAPS IN WATER POLICY

Water is fundamental to everyday lives, given this fundamental importance fulfilling people's right to water could not be any clearer. Whilst the 'right to water' unites policy makers, researchers and activists; struggles over this right has emerged as a focal point for political action and protest throughout South Africa. Despite the core focus of the 'right to water' internationally as well as being enshrined in our constitution, this study has sought to bring attention to the challenges in materialising this right.

The Constitution of South Africa has placed a legal obligation on the government to ensure and implement the right to sufficient water. In order to do this, South Africa has developed policies, strategies and institutions to manage water resources and deliver water services to people through local government structures. By 2001, a number of poverty-stricken households could not afford to pay for water. In response, the Government introduced 'Free Basic Water' to ensure that people's human rights are honoured, and to ensure that all citizens have access to clean water and the implementation of the water services is dependent on local government structures. Furthermore, indigent policies have been introduced which result in municipal decisions over which households are "poor enough" to receive free water. In theory, all households receive a free lifeline supply of water, subsidized by rising tariff blocks that penalize wealthier households and act as a demand management tool. Yet, in practice, the volume of free water has proved inadequate for most low-income households, forcing them into the second or third block of consumption, often-creating higher water bills than these households were charged prior to the introduction of "free" water. Therefore whilst recognising the 'right to water', as illustrating equity, this is often trumped by efficiency and cost-recovery, through framing water as economic good. This in turn highlights the importance of water governance and the fact that greater debates around the right to water and the need to emphasise the power relations in water allocation, availability and management.

FREE BASIC WATER CHALLENGES AT THE LOCAL LEVEL

The effectiveness of the FBW policy is especially relevant for poor communities such as those in the SRVM, whose lack of access to treated water exposes them to the dangers of polluted water from irrigation canals. Kapatamoyo (2004), for example, argues that a lack of clean water is a sufficient 'manifestation of poverty', which results in serious implications for livelihoods. Poverty alleviation and social development initiatives have a central position in post-apartheid development policy, such that conditions can be improved for the impoverished townships within

the country. The Draft White Paper on Water Services of 2002 acknowledges that, “*Water services are intimately linked with poverty. Lack of access to water supply and sanitation constrains opportunities to escape poverty*” and the work completed for this thesis supports this.

The problems with the implementation of FBW (Chapter 5) became apparent in the case of the SRVM. Households that are designated ‘indigent’ struggled with the payment for the water bills, this was predominately because these bills were very costly and many stated that they were sent incorrect bills. Furthermore, due to the lack of water security many residents could not reconcile paying for a service that they perceived they were not receiving (Chapter 7). Furthermore, the municipality does not have any leak detection equipment and relies solely on reports received from consumers or from its own technical personnel who are active within the area. But the lack of response or action taken has discouraged members of these communities to report leakages in community standpipes or sewage and drain leakages. This perpetuates the cycle of non-payment for services, and therefore contributes to the lack of service delivery. This continuous cycle has resulted in the SRVM facing a hefty backlog in service delivery.

This was emphasised as SRVM officials have reported a number of challenges and difficulties in implementation of FBW and ensure safe and sustainable access to water for residents living in townships (Chapter 5). These challenges include; growing population within the townships, which places pressure on current water sources; backlogs in infrastructure development; resource constraints that include financial and technical expertise; inadequacy of water service development planning; water treatment works capacity and operation and maintenance issues of sustainability.

8.2.3 WATER SERVICE DELIVERY CHALLENGES

Water service delivery has been called into question throughout South Africa. Service delivery remains a central, real and symbolic part of reality of life in poor urban areas, particularly in small urban settings in rural landscapes. Improved water service delivery is linked to increasing the dignity of an urban poor which have been systematically denied access to services and decent living conditions under Apartheid. The democratic government has played an important part in upgrading and improving the conditions of the poor through the implementation of RDP and water policies. Despite the improvement, water services as well as housing and other forms of service delivery has lagged behind the growth of the informal settlements, which remain largely poorly serviced throughout the country (Water Services Report, 2008). In the Water Services report 2008 study, fifteen municipalities were surveyed across the country and every municipality

remarked that backlogs and improving levels of service were the major challenges that they were faced with. A relentless problem is that many households still have poor access to water, and are forced to use unacceptable methods of sanitation; this situation is not expected to improving in the foreseeable future.

The failure of municipalities to deliver basic services not only causes immense hardship to the residents of municipalities, but also can have a detrimental impact the social and economic development. In many cases, service delivery failures in South Africa have been characterised by mass protests, demonstrations and petitions (Atkinson, 2007; Tapela, 2012). Research has shown that these protests have not only been about the provision of services, particularly water services and sanitation and housing, but many were about failure of local governments to engage ordinary people in political processes. While analysing these protests Atkinson (2007:63) observes,

“At municipal level, protesters have regularly complained about the unresponsiveness of officials and councillors. Channels of communication with municipal mayors and councillors are blocked”.

Therefore, communities resort to protests when municipal governments fail to take action regarding community challenges.

WATER SERVICE DELIVERY CHALLENGES AT THE LOCAL LEVEL

In the SRVM, the relationship between water insecurity and scarcity of social capacity, ingenuity and initiative to resolve the water problems is stark; ward councillors are expected to pacify and reassure the water authorities, whilst coping with urgent demands for material improvements from the residents whom they represent and who see them as trustworthy and as representing their interests. A noticeable issue found within the SRVM was that many of the ward councillors do not have an adequate understanding of water resource management and are not proficient in “scientific” language. This lack of understanding, therefore affects their capability to adequately respond to water insecurity, as well as influencing decisions about water management and coping mechanisms at a local government level. The issue is that residents assume that their elected ward councillors have the power to network and influence water policy networks, but in reality they have little influence in building these water policy networks and service delivery will forever be “a moving target” as Anton Harber (2009) argues:

“Service delivery is not a neutral phrase. It contains a host of assumptions, policies, attitudes and promises – which are starting to haunt a government which has built its

promise entirely on the notion of improving service delivery. They did not promise better opportunities, better access or better support in getting services...they promised delivery, simple and straightforward.”

An unintended consequence of the language of service delivery and the supply-driven approach is that citizens place great expectations on government to assume full responsibility for, and costs of, water service delivery and management. As seen in the SRVM, the failure to do so has resulted in a complete inability of the municipality to provide the quantity and quality of services demanded by the communities. This resulted in a perception by residents that the municipality being inaccessible and not listening to them.

The dissatisfaction with the current level of service delivery in the SRVM is apparent from the results, but the consequence of the municipality not fulfilling their duties has created contention from the residents and distrust. Furthermore the distrust with the Ward councillors and the perceived lack of action taken by the municipal officials, has necessitated the creation of community forums and groups by residents. The fact that the water service delivery is categorised by poorly functioning services with a high level of interruptions shows that there are serious failures in regards to the ‘basic needs’ of SRVM residents, with the implications being far reaching. Furthermore, there is a “no one size fits all”. The type of service delivery mechanism needs to be tailored to characteristics of the service and circumstances of the country.

8.2.4 KEY RESEARCH FINDINGS

It has become clear from the results that there are two main differences in regards to water security in the research sites. Firstly, Aquapark has a problem with storage in the Kirkwood WTW reservoirs, which has been one of the causes leading to major water cuts and shortages for the community. In regards to Nomathamsanqa, the main problem, in addition to irregular water supply, is that of water quality.

It has also become evident that community members do not have much contact or interaction with the municipality and are not aware of how much water they are entitled to, or their water rights. The involvement of communities in political and municipal processes continues to be a big challenge in the SRVM. Lack of municipal response to community problems not only fuels community frustrations and anger but also confirms the view that the process of fundamental transformation of local government in the country still has a long way to undergo. Though there is more attention to the challenge of dealing with ordinary people’s problems and service delivery from the national and provincial governments, there is a crucial need for the municipality to

prioritise community concerns and create functional communication channels as well as address water conservation and education.

The service delivery and reliability for water supply within the SRVM is of major concern. The fact that people across the households, regardless of wealth, are forced to have an alternative supply aside from the municipal sources raises concerns in regards to the municipality being able to cope with current demand for water, and these areas are growing. Within Nomathamsanqa and Aquapark, RDP houses are currently being built. The fact that many of the respondents feel dissatisfied with the current rate of service delivery is indicative of the daily problems that they face.

The results from this study have shown that water security within the SRVM is precarious. The current reality faced by residents within the SRVM is due to social water scarcity rather than physical water scarcity. As discussed in Chapter 5, the SRVM water supply system faces many challenges yet this is not due to a lack of available water supplies, but due to water management and governance challenges of implementing FBW, indigency registration and payment for water services.

8.3 CONCLUDING REMARKS

The fundamental goal of a democratic system is citizen satisfaction and the effectiveness of good local governance needs to be judged by the capacity of local government structures to provide an integrated development approach to social and economic development issues and to supply essential services congruent with the needs and desires of the local communities (Akhmouch, 2012; Tapela, 2012). In this regard, municipalities should be able to identify and prioritise local needs, determine adequate levels of services, allocate necessary resources to the public.

This research study addressed how the poor and vulnerable in SRVM respond and react to poor water service delivery and how these communities face multiple threats to their water security. Together, these threats have an impact on access to water supplies of sufficient quantity and quality for basic needs. There are knock-on impacts on health, livelihoods and overall wellbeing. The relationships between these different threats are complex and therefore they should not be considered in isolation. The social dimensions of social water scarcity and water use, as well as the concept of social water scarcity at a local level, has broadly been overlooked within the research realm. More importantly, it brings the voices and perceptions from the local level to the forefront and allows for policy makers and municipal managers to take cognisance of the current

realities of water security and the impact they have at a local level. The value of facilitating a ‘voice’ for local residents in this study provided a platform for the emergence of relationships between domestic water users, Ward Councillors and local municipal officials.

Furthermore, a better understanding of FBW and indigent policy at a local level, and its impact on alleviation of poverty, especially within townships and informal settlement areas, cannot be under-estimated. There is a need to develop simple and user-friendly guidelines that would assist local government to provide free basic water services to the communities. These guidelines should take into account the realities encountered by municipalities, the current water backlogs, the financial situation of the Municipalities and Water Services Authorities as well as the challenges faced in water service delivery.

The major challenge is for municipalities and policy managers to no longer treat water service delivery as a silo; a separate entity that functions independently from the municipality and local government. The shift in thinking towards viewing water service delivery as key and integral in ensuring household water security also needs to take into consideration the broader governance structures that impact the day to day delivery of services. Therefore, social water scarcity is directly linked to water insecurity and to the many challenges that residents face. Through viewing water institutions, management, infrastructure and policy design as all part of the integral function that impacts service delivery; water security challenges can be addressed in more holistic, innovative ways.

Although this study’s has provided a useful vantage point for working with water security and social water scarcity within a South African context, these concepts are still a work-in-progress and further research is required to develop and integrate them into water policy. Developing a greater understanding of these dynamics allows water sector to improve and strengthen water policies and processes to better respond to the current emerging challenges and constraints of water insecurity.

REFERENCES

- Adams, W. M., and Hutton, J. (2007). People, parks and poverty: Political Ecology and biodiversity conservation. *Conservation and society*, 5(2), 147.
- Akhmouch, A. (2012). *Water Governance in Latin America and the Caribbean: A Multi-Level Approach* (No. 2012/4). OECD Publishing.
- Allen, J.A. (1998). Productive Efficiency and Allocative Efficiency: Why Better Water Management may not Solve the Problem. *Agricultural Water Management*, No. 1425; 1-5. Elsevier Sciences
- Appelgren, B., and Klohn, W. (1999). Management of water scarcity: a focus on social capacities and options. *Physics and Chemistry of the Earth, Part B: Hydrology, Oceans and Atmosphere*, 24(4), 361-373.
- Ariyabandu, R. (2001). Household water security using rainwater harvesting. In *Domestic Roof-water Harvesting Workshop, IIT Delhi, India*.
- Ashton, P., and Turton, A. (2009). Water and security in sub-Saharan Africa: Emerging concepts and their implications for effective water resource management in the southern African region. *Facing Global Environmental Change*. Springer, Berlin Heidelberg.
- Ashton, P., and Turton, A. (2005). Trans boundary water resource management in Southern Africa: opportunities, challenges and lessons learned. *Wirkus, L*, 5-32.
- Ashton, P., and Turton, A. (2009). Water and security in sub-Saharan Africa: Emerging concepts and their implications for effective water resource management in the southern African region. *Facing Global Environmental Change*. Springer, Berlin Heidelberg.
- Atkinson, P., and Hammersley, M. (1994). Ethnography and participant observation. *Handbook of qualitative research*, 1(23), 248-261.
- Atkinson, D. (2002). *Local government, local governance and sustainable development: getting the parameters right* (Vol. 4). HSRC Press.
- Atkinson, D. (2007). Taking to the streets: has developmental local government failed in South Africa. *State of the nation: South Africa, 2007*, 53-77.

- Bauer, M. W., and Gaskell, G. (Eds.). (2000). Qualitative researching with text, image and sound: A practical handbook for social research. Sage.
- Biswas, A. K. (2008). Integrated water resources management: is it working?. *Water Resources Development*, 24(1), 5-22.
- Bodlani, O, and Khene, C. (2012) *Preliminary Report on Information and Communication Needs for Service Delivery in Rural Communities in the Sunday River Municipality: Potential for Accessible E-Government Services*. Unpublished Report. Department of Information Systems, Rhodes University
- Bond, P. (2000). Elite transition: From apartheid to neoliberalism in South Africa. London: Pluto Press.
- Bond, P. (2011). South Africa's 'rights culture' of water consumption. *Water, Cultural Diversity and Global Environmental Change: Emerging Trends, Sustainable Futures*.
- Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Bravo-Baumann, H. (2000). Capitalisation of experiences on the contribution of livestock projects to gender issues. Working Document. Bern, Swiss Agency for Development and Cooperation.
- Brown, V. A., Harris, J. A., and Russel, J. Y. (2010). *Tackling Wicked Problems: Through the Transdisciplinary Imagination*. (V. A. Brown, J. A. Harris, & J. Y. Russel, Eds.). London: Earth scan.
- Bryant, R. L., and Bailey, S. (1997). Third World political ecology. *London, New York: Routledge Carew-Reid, J.*
- Bryant, R. L. (1998). Power, knowledge and political ecology in the third world: a review. *Progress in physical geography*, 22(1), 79-94.
- Burt, J., Du Toit, D. and Neves, D. (2006) '*Participation in water resource management: book 1. Learning about participation in IWRM: a South African review*', WRC project report #TT 293/06, Water Research Commission Pub., Pretoria, South Africa
- Buzan, B. (1997) *Cooperation and Conflict*.; 32: 5-28.

- Clifford-Homes, J. Molony, L., Muller, M. and Rivers, N., 2013. *Extended Narrative of Change of the Lower Sundays River Valley*. DRAFT 1, 2013. Unpublished Report
- Cook, C. and Bakker, K. (2012). Water security: debating an emerging paradigm. *Global Environmental Change*, 22(1), 94-102.
- Cottle, E. (2004). The class nature of free water in South Africa: From past to present. *Centre for Civil Society online library*. URL:([http://www. nu. ac. za/ccs](http://www.nu.ac.za/ccs)) University of KwaZulu-Natal (Accessed 10 August 2014).
- Creswell, J. W., and Clark, V. L. P. (2007). Designing and conducting mixed methods research.
- Crow, B., and Sultana, F. (2002). Gender, class, and access to water: Three cases in a poor and crowded delta. *Society and Natural Resources*, 15(8), 709-724.
- De Coning, C., and Sherwill, T. (2004). *An assessment of the water policy process in South Africa (1994 to 2003)*. Pretoria: Water Research Commission.
- Denzin, N. K., and Lincoln, Y. S. (Eds.). (1994). *Handbook of Qualitative Research*. : Sage Production, Inc. USA.
- DeWalt, K. M., and DeWalt, B. R. (2010). *Participant observation: A guide for fieldworkers*. Rowman Altamira.
- D'Hont, F., Clifford-Holmes, J., and Slinger, J. (2013). Addressing Stakeholder Conflicts in Rural South Africa Using a Water Supply Model. Conference proceeding - 31st International Conference of the System Dynamics Society. Cambridge, Massachusetts.
- DWAF (1994). *Water supply and sanitation policy*. White Paper, Department of Water Affairs and Forestry, Pretoria.
- DWAF (1997) *White Paper on a National Water Policy for South Africa*. Department of Water Affairs and Forestry, Pretoria.
- DWAF (2002a): *Free Basic Water. Tap into life. Regulations & guidelines*, Department of Water Affairs and Forestry, Directorate: Interventions and Operations Support, Pretoria
- DWAF (2002b): *Water is life, sanitation is dignity*, White paper on water services, Department of Water Affairs and Forestry, Pretoria

DWAF (2002c), *Free Basic Water Implementation Guidelines for Local Authorities*, Version 2.3, Department of Water Affairs and Forestry, Pretoria, April.

DWAF (2002d): *Free Basic Water. Tap into life. Implementation strategy: version 2*, Department of Water Affairs and Forestry, Directorate: Interventions and Operations Support, Pretoria

DWAF (2004). Annual Report 2002/2003. Pretoria, South Africa.

DWAF (2007). *Free basic water implementation status*. Department of Water Affairs and Forestry, Pretoria.

DWAF, (2009) *The National Sanitation Bucket Replacement Programme: Lessons Learnt*. Pretoria, South Africa

DWA (2011), *2011 Green Drop Report: Chapter 3*, Department of Water Affairs, Pretoria

Earle, A., Goldin, J., and Kgomotso, P. (2005). Domestic Water Provision in the Democratic South Africa, changes and challenges. *Uppsala: The Nordic Africa Institute*.

Earle, A. and Turton, A.R. (2003). The Virtual Water Trade amongst Countries of the SADC. In Hoekstra, A. (Ed.) *Virtual Water Trade: Proceedings of the International Experts Meeting on Virtual Water Trade*. Delft, the Netherlands, 12-13 December 2002. Research Report Series No. 12. Delft: IHE. Pp. 183-200.

Eastern Cape Development Report, (2012). Eastern Cape Socio Economic Consultative Council. Available: www.ecsecc.org/files/library/documents/ECSECCensus2011_1.pdf (Accessed 15 September 2013)

Escobar, A. (1999). After nature: steps to an anti essentialist political ecology. *Current anthropology*, 40(1), 1-30.

FAO (1997). Gender: the key to sustainability and food security. SD Dimensions, May 1997 Available at <ftp://ftp.fao.org/docrep/fao/010/w4430e/w4430e00.pdf> (Accessed 7 May 2015).

FAO (2009). The State of Food Insecurity in the World. Available: www.fao.org/3/a-i0876e.pdf (Accessed 13 July 2013).

FAO (2011). The State of Food and Agriculture. Available: www.fao.org/docrep/018/i3300e/i3300e.pdf (Accessed 13 July 2013).

- Folke, C., Hahn, T., Olsson, P., and Norberg, J. (2005). Adaptive governance of social- ecological systems. *Annu. Rev. Environ. Resour.*, 30, 441-473.
- Funke, N., Nortje, K., Findlater, K., Burns, M., Turton, A., Weaver, A., and Hattingh, H. (2007). Redressing inequality: South Africa's new water policy. *Environment: Science and Policy for Sustainable Development*, 49(3), 10-23.
- Gildenhuys, A., (1997) The National Water Act: A Short Review, *De Rebus*, (December) 58-61
- Gleick, P. H. (1993). *Water in crisis: a guide to the world's fresh water resources*. Oxford University Press, Inc.
- Global Water Partnership (2009). Global Water Partnership Strategy 2009-2013. Available: www.gwp.org/Global/GWP-CEE_Files/About/GWP_Strategy_2009-2013_final.pdf (Accessed 15 September 2013).
- Goldblatt, M., and Davies, G. (2002). Water, energy and sustainable economic development in South Africa. *Development Southern Africa*, 19(3), 369-387.
- Goldin, J. (2004) "Prepacked trust and the water sector" in Askvik, S and Bak, N. *Trust in Public Institutions in South Africa*, Ashgate, UK.
- Gowlland-Gualtieri, A. (2007) *South Africa's water law and policy framework implications for the right to water*. International Environmental Law Research Centre, working paper, 2007 – 03
- Greenberg, J.B and Park, TK. (1994) Political ecology. *Journal of Political Ecology*, 1-12.
- Gray, N. F. (2008). *Drinking water quality*. Cambridge University Press.
- Grey, D. and Sadoff, C. W. (2007). Sink or swim? Water security for growth and development. *Water Policy*, 9(6), 545.
- Harber, A. 2009. The meaning of service delivery. Available: <http://www.theharbinger.co.za/wordpress/2009/08/04/the-meaning-of-service-delivery> (Accessed 11 February 2014).
- Hemson., D (2004) South Africa's poverty by numbers. Based on paper: 'Beating the Backlog: Meeting Targets and Providing Free Basic Services.' Human Sciences Research Council, South Africa.

Hemson, D., Kulindwa, K., Lein, H., and Mascarenhas, A. (2008). Poverty and water. *Explorations of the Reciprocal Relationship*, Zed Books Ltd, 7.

Hope, R. A., and Gowing, J. W. (2003). Managing water to reduce poverty: water and livelihood linkages in a rural South African context. In *Alternative Water Forum*, University of Bradford Centre for International Development.

Hope, R., Foster, T., Money, A., and Rouse, M. (2012). Harnessing mobile communications innovations for water security. *Global Policy*, 3(4), 433-442.

Howard, G., and Bartram, J. (2003). *Domestic water quantity, service level, and health* Geneva: World Health Organization.

Housing Development Agency (2012). Housing Development Agency Annual Report. Available: <http://www.thehda.co.za/resources/entry/hda-annual-report-2011-2012> (Accessed 11 February 2014).

Jahn, T., Becker, E., Keil, F., and Schramm, E. (2009). Understanding social-ecological systems: frontier research for sustainable development. Implications for European Research Policy. *Institute for Social-Ecological Research (ISOE)*, Frankfurt/Main.

Jakob, A. (2001). On the Triangulation of Quantitative and Qualitative Data in Typological Social Research: Reflections on a Typology of Conceptualizing "Uncertainty" in the Context of Employment Biographies. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 2, No. 1).

Jepperson, R. L. (1991). Institutions, institutional effects, and institutionalism. *The new institutionalism in organizational analysis*, 6, 143-163.

Kepe, T., and Roberts, D. J. (2008). Why are students attracted to political ecology?. *Environment and Planning A*, 40(11), 2539-2543.

Khosa., M (2000) Re-thinking infrastructure policies in the 21st century. In: Khosa M (ed.) *Infrastructure Mandate for Change 1994–1999*. Human Sciences Research Council Publishers, South Africa. 176-181.

Leibbrandt, M., Woolard, I., McEwen, H., and Koep, C. (2010). Employment and inequality outcomes in South Africa. *University of Cape Town: Southern Africa Labour and Development Research Unit*.

- Lotz-Sisitka, H., and Burt, J. (2006). *A critical review of participatory practice in integrated water resource management*. Pretoria: Water Research Commission.
- Mackay, H. (2003). Water policies and practices. *Towards a just South Africa: The political economy of natural wealth*.
- MacKay, H., Rogers, K., and Roux, D. (2004). Implementing the South African water policy: Holding the vision while exploring an uncharted mountain. *Water SA*, 29(4), 353-358.
- McDonald, D and Pape, J (2002). *Cost Recovery and the Crisis of Service Delivery in South Africa*. Human Sciences Research Council Publishers, South Africa.
- MDG Report, 2012. The Millennium Development Goals Report (2012). Available: www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf (Accessed: 15 September 2014).
- Mehta, L. (2006). Water and human development: capabilities, entitlements and power. *Background paper for the Human Development Report*.
- Meissner, R., and Turton, A. R. (2003). The hydrosocial contract theory and the Lesotho Highlands Water Project. *Water Policy*, 5(2), 115-126.
- Mokgope, K., Pollard, S., and Butterworth, J. (2001). Water resources and water supply for rural communities in the Sand River Catchment, South Africa. In *27th WEDC Conference, People and systems for water, sanitation and health, Lusaka, Zambia* (pp. 20-24).
- Mosdell, T and A Leatt (2005), "On tap: a review of the free basic water policy", in Muller, M. and Lane, J., 2002. *The National Water and Sanitation Programme in South Africa: turning the "right to water" into reality*, 1(1).
- Muller, M. (2008). Free basic water—a sustainable instrument for a sustainable future in South Africa. *Environment and Urbanization*, 20(1), 67-87.
- Muller, M., Schreiner, B., Smith, L., van Koppen, B., Sally, H., Aliber, M., and Pietersen, K. (2009). Water security in South Africa. *Development Planning Division. Working Paper Series*, (12).
- Muller, M., (2012). *An investigation of the effects of a small wastewater treatment works on a small river using the Green Drop Certification Programme to draw a link between the National Water Act and the Water Services Act*. Unpublished report, 2012

Municipal Services Act, 2000: *Local Government: Municipal Systems Act*, Republic of South Africa, Government Gazette, Cape Town 20th of November 2000, Act No. 32, 2000.

Neefjes, K. 2000. *Environments and livelihoods: Strategies for sustainability*. London: Oxfam Publishers.

Nleya, N. (2008). Development policy and water services in South Africa: an urban poverty perspective. *Development Southern Africa*, 25(3), 269-281.

Nnadozie, R. C. (2013). Access to basic services in post-apartheid South Africa: What has changed? Measuring on a relative basis. *African Statistical Journal statistique Africain*, 82, 81.

National Water Act (1998). *Republic of South Africa*, governmental gazette, August 1998:19182 (398): 38:1998.

National Water Resource Strategy 2 (NWRS 2) (2013). Water for an Equitable and Sustainable Future. Department of Water Affairs. June 2013, Second Edition. Available: <https://www.dwa.gov.za/nwrs/LinkClick.aspx?fileticket=CIwWyptzLRk%3D&tabid=91&mid=49>
6 Accessed 18 July 2015

Ohlsson L, and Appelgren B. (1998) Water and Social Resource Scarcity PADRIGU. FAO, AGLW.

Ohlsson, L. (1999). Environment Scarcity and Conflict: A Study of Malthusian Concerns. Department of Peace and Development Research, Göteborg University ISBN 91-87380- 43-9

Ohlsson, L., and Turton, A. R. (1999). The turning of a screw: Social resource scarcity as a bottleneck in adaptation to water scarcity. *Occasional Paper Series, School of Oriental and African Studies Water Study Group, University of London*.

Olsson, P., Folke, C., and Hahn, T. (2004). Social-ecological transformation for ecosystem management: the development of adaptive co-management of a wetland landscape in southern Sweden. *Ecology and Society*, 9(4), 2.

Ostrom, E., Schroeder, L., Wynne, S.G. (1993). Institutional incentives and sustainable development: Infrastructure policies in perspective, Westview Press, Boulder.

Ostrom, E. (2009). *Understanding institutional diversity*. Princeton university press.

- Ostrom, E. (2011). Background on the institutional analysis and development framework. *Policy Studies Journal*, 39(1), 7-27.
- Padowski, J. C., and Jawitz, J. W. (2009). Future of Global Water Scarcity: Policy and Management Challenges and Opportunities, The. *Whitehead J. Dipl. & Int'l Rel.*, 10, 99.
- Pallet, J. (1997). *Sharing Water Resources in Southern Africa*. Desert Research Foundation of Namibia. Windhoek, Namibia.
- Perret, S. R. (2002). Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges. *Water Policy*, 4(3), 283-300
- Pietersen, K., Beekman, H. E., and Holland, M. (2011). South African Groundwater Governance Case Study. Report prepared for the World Bank in partnership with the South African Department of Water Affairs and the Water Research Commission.
- Ratnaweera, H.P (2001). Modelling Household Water Security Workshop in Rain Water Harvesting, IIT, Delhi, India, 2001. Available: www.lankarainwater.org/pubs/papers.htm (Accessed 15 September 2013)
- RDP, 1994: Reconstruction and Development Programme: A policy framework. *African National Congress*
- Republic of South Africa. (1996). Constitution of the Republic of South Africa, Act 108 of 1996. *Government Gazette*, 378.
- Ribot, J. C., and Peluso, N. L. (2003). A Theory of Access. *Rural sociology*, 68(2), 153-181.
- Robbins, P. (2004) *Political ecology: A critical introduction*. Blackwell Publishers, Oxford.
- Rogers, P., and Hall, A. W. (2003). *Effective water governance* (Vol. 7). Stockholm: Global Water Partnership.
- Rogerson, C. M. (2003). Towards pro-poor local economic development: the case for sectorial targeting in South Africa. In *Urban Forum* 14 (1), 53-79. Springer Netherlands.
- Rorty, A. O. (1992), "Power and powers: A dialogue between Buff and Rebuff", in Wartenberg, T.E. (ed), *Rethinking power*. State University of New York Press, Albany.

Saleth, R. M., and Dinar, A. (2000). Institutional changes in global water sector: trends, patterns, and implications. *Water Policy*, 2(3), 175-199.

SANPAD proposal (2010). 'Water and Sustainability project.' Unpublished research proposal.

Schmandt, J., and Ward, C. H. (Eds.). (2000). *Sustainable development: the challenge of transition*. Cambridge University Press.

Schreiner, B., van Koppen, B., and Khumbane, T. (2002). From bucket to basin: A new water management paradigm for poverty eradication and gender equity. *Hydro politics in the developing world: A Southern African perspective*. African Water Issues Research Unit, Pretoria, 127-140.

Smith, J. A., and Green, J. M. (2006). Water service delivery in Pietermaritzburg: A community perspective. *Water SA*, 31(4), 435-448

Smith, L., and Hanson, S. (2003). Access to water for the urban poor in Cape Town: where equity meets cost recovery. *Urban Studies*, 40(8), 1517-1548.

South African Cities Network, (2004) State Cities Report. Available: <http://www.sacities.net/knowledge-centre/research/publications/25-what-we-do/socr/397-sacn-launches-hard-look-at-sa-cities> (Accessed 10 September 2013).

Stats, S. A. (2011). Census 2011 methodology and highlights of key results.

Stats, S. A. (2012). Census 2011. *STATSSA (ed.) Statistical Release P*, 301.

Sultana, F., and Loftus, A. (Eds.). (2013). *The right to water: Politics, governance and social struggles*. Routledge.

Sultana, F. (2002). "Gender, Class and Access to Water: Three Cases in a Poor and Crowded Delta". *Society and Natural Resources* 15, 8.

Sundays River Valley Municipality. (2010a). 'Chapter 5: Water Services Infrastructure Profile', *Water Services Development Plan: January 2010 Review*. Kirkwood, South Africa

Sundays River Valley Municipality. (2010b). 'Chapter 2: Service Level Profile', *Water Services Development Plan: January 2010 Review*. Kirkwood, South Africa

Sundays River Valley Municipality, Integrated Development Plan, 2011. (*IDP*): 2011-2016 (5 Year Plan). Available:

http://www.dwa.gov.za/Dir_WS/WSDP/WSDP/UserControls/WSDPDownloadAttachment.aspx?id=104 (Accessed 10 September 2013)

Swyngedouw, E., and Swyngedouw, E. (2004). *Social power and the urbanization of water: flows of power*. Oxford: Oxford University Press.

Tapela, B. 2012. *Social Water Scarcity And Water Use*. Water Research Commission report. Available: <http://www.wrc.org.za/SiteCollectionDocuments/News%20documents/1940.dotx> (Accessed 10 September 2013)

Teddlie, C., and Tashakkori, A. (Eds.). (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage Publications Inc.

Terrence, B. (1992), "New faces of power", in Wartenberg, T.E. (ed), *Rethinking power*", State University of New York Press, Albany.

Tewari, D. D. (2009). A detailed analysis of evolution of water rights in South Africa: an account of three and a half centuries from 1652 AD to present. *Water SA*, 35(5), 693-710.

Turton, A. (1999). *Water scarcity and social adaptive capacity: towards an understanding of the social dynamics of water demand management in developing countries*. School of Oriental and African Studies, University of London.

UNDP (2006). Human Development Report. "Beyond scarcity: power, poverty and the global water crisis." Available: <http://hdr.undp.org/en/media/HDR06-complete.pdf> (Accessed 22 February 2014).

UNDP (2010) *Power, Voice and Rights. A turning point for gender equality in Asia and the Pacific*. New Delhi: Macmillan Publishers India Ltd. Available: www.undp.org/content/dam/undp/library/corporate/HDR/Asia%20and%20Pacific%20HDR/APHumanDevelopmentReport2010-en.pdf (Accessed 23 February 2014).

UNDP (2011) Human Development Report. *Sustainability and Equity: A Better Future for All*. Washington DC . Available: http://hdr.undp.org/sites/default/files/reports/271/hdr_2011_en_complete.pdf (Accessed 23 February 2014).

UNESCO-IHE, (2009). Research Themes: Water Security. Available: www.unesco-ihe.org/Research/Research-Themes/Water-security (Accessed 23 February 2014).

UNFPA, (2002.) *Water: A Critical Resource*, See: http://www.unfpa.org/issues/factsheets/pdfs/linking_water.pdf (accessed on 13 September 2013).

UNICEF (2012). South Africa Annual Report. Available: www.unicef.org/southafrica/SAF_resources_annual2012.pdf (Accessed 23 February 2014).

UN-Water (2013). Water Security and the Global Water Agenda. A UN-Water Analytical Brief. Available: http://www.unwater.org/downloads/watersecurity_analyticalbrief.pdf (Accessed 25 June 2013)

UNWWAP (2006). Water a Shared Responsibility, United Nations World Water Development Report. UNESCO, Paris. Available: www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/wwdr2-2006/ (Accessed 21 July 2013).

UNWWAP (2009). Water in a Changing World, United Nations World Water Development Report. UNESCO, Paris. Available: www.unwater.org/publications/publications-detail/en/c/202716/ (Accessed 21 July 2013).

US AID (2013). US AID Water And Development Strategy 2013-2018. Available: www.usaid.gov/sites/default/files/documents/1865/USAID_Water_Strategy_3.pdf Accessed 21 September 2013).

Van Koppen, B., and Jha, N. (2005). Redressing Racial Inequities through Water Law in South Africa. *Liquid relations: contested water rights and legal complexity*

Vayda, A. P., and Walters, B. B. (1999). Against political ecology. *Human ecology*, 27(1), 167-179.

WaterAid (2012). Water Scarcity Report <http://www.wateraid.org/uk/who-we-are/annual-reports#/annual-reports>

Water Services Act (1997), *Republic of South Africa*, Government Gazette, Cape Town, December 1997 (390) 108:1997

Water Services Report (2008). Provision of basic services at local government. WRC report.

WHO. World Health Organisation. (2003). *The benefits of water and sanitation improvements at the global level*. Washington, DC: WHO.

WHO. World Health Organisation (2004) *Evaluation of the costs and benefits of water and sanitation improvements at the global level*. New York: WHO.

WHO. World Health Organisation (2008). World Health Statistics. Available: www.who.int/gho/publications/world_health_statistics/EN_WHS08_Full.pdf (Accessed 21 September 2013)

WHO/UNICEF, 2010. Progress on sanitation and drinking water. Available: www.unicef.org/eapro/JMP-2010Final.pdf (Accessed 22 September 2013).

WHO. World Health Organization. 2011a. “Recent developments on the recognition of safe and clean water and sanitation as a human right.” Available: www.who.int/water_sanitation_health/recognition_safe_clean_water/en/ (Accessed 14 March 2013).

WHO. World Health Organization (2011b). “Water Supply, sanitation and hygiene development.” http://www.who.int/water_sanitation_health/hygiene/en/ (Accessed 14 March 2013).

Wolfe, S., and Brooks, D. B. (2003, May). Water scarcity: An alternative view and its implications for policy and capacity building. In *Natural Resources Forum* (Vol. 27, No. 2, pp. 99-107). Blackwell Publishing Ltd.

World Bank (2009). The South African Urban Agenda: Municipal Infrastructure Finance Synthesis Report (p. 77).

Zwarteveen, M. Z. (1997). Water: From basic need to commodity: A discussion on gender and water rights in the context of irrigation. *World development*, 25(8), 1335-1349.

APPENDIX: QUESTIONNAIRE

Water security amongst impoverished households in the Sundays River Valley: The realities of access, use, and conflicts.

The objective of this questionnaire is to research water demand, use, access, service provision and conservation amongst RDP, informal and township households with a past of poor service delivery as well as the links between water security and livelihoods within the SRV.

The interviewer will explain to the respondents who they are, who they represent, the aim of the study, and why and how the information will be used. The respondents need to be guaranteed of their anonymity.

1. **Questionnaire number:** To be numbered according to the following details:

<u>Household Type:</u>	Informal: A	RDP: B	Formal: C
------------------------	-------------	--------	-----------

Number of questionnaire:

2. **Details of Interviewer:**

Name: _____

Date of Interview: _____

3. **Water Access:**

Where do you obtain your water from? Tick appropriate answer/s.	Main source	Alternative primary sources	How far away from your house is the water? Close By- 0 Less than 15 min- 1 15- 30 min- 2 30 min or more- 3	How many days a week do you collect water from this source? 1-3 per week-A 4- 6 per week -B Daily- C	Are there any safety issues associated with accessing any of the sources of water listed below?
A tap in the house	A				
A community standpipe	B				
Borehole	C				
Rain water tank	D				
The canal	E				
A tap in the garden	F				
A neighbour's garden tap	G				
River or spring	H				

4. How do you view the location of the main water source with respect your household? (please circle)

Very inconvenient	Inconvenient	Convenient	More convenient	Very convenient
-------------------	--------------	------------	-----------------	-----------------

5. Who usually collects the water for your household? (circle answer and note age and gender)

I collect the water		A child in the family		Other:	
Male/ Female	Age:	Male/Female	Age:	Male/Female	Age:

6. Is your access to water restricted in any way?

YES	NO
-----	----

6.1 By whom?

6.2 Do you think these restrictions are fair?

YES	NO
-----	----

7. There are disputes over water access and allocation in the community

Agree	Unsure	Disagree
-------	--------	----------

7.1 If you Agree: In my view the disputes over access to water are caused by (circle answer)

Traditional leaders in my community	Community Member s	People outside my community	Political leaders	Other
-------------------------------------	--------------------	-----------------------------	-------------------	-------

8. Are you and your family registered indigent? (Have you been registered by the municipality for qualifying for social grants and welfare?)

YES	NO
-----	----

9. If you are not currently registered, what are the reasons preventing you from doing so?

10. Do you have a metered water access?

YES	NO
-----	----

10.1 If so, how much beyond the free 6 kilolitres per month do you use?

10.2 How often is the meter read?

Once a month	Once every 3 months	3 months or more
--------------	---------------------	------------------

10.3 Are the bills that you receive accurate?

YES	NO
-----	----

10.4 If you do not pay for water are you willing to?

YES	NO
-----	----

10.5 If no. Why not?

11. At what level of water security would you be willing to pay for water?

Undisrupted access to water	
Better quality of water	
Access to water to be closer to house.	
Other (Please provide details)	

12. Water Use

Do you have livestock?

YES	NO
-----	----

12.1 If so where do they drink water from?

13.

What do you use your daily water for?	From which source of water?	How many 10 L containers of water do use daily?	Is their adequate water quantity for this activity? Yes/No	Do you ever re use this water? Tick if Yes	If so what do re use it for?
Drinking					
Washing					
Vegetable Garden or Fruit trees					
Cleaning& washing					
Cooking					

Sources of water:

A tap in the house	A	A community standpipe	B	Borehole	C	Rain water tank	D
The canal	E	A tap in the garden	F	A neighbours garden tap	G	River or spring	H

14. During the past year, how frequently have you used the water from the source for generating income (an example might be for vegetable production)?

Not at all	Sometimes	Often	Very Often
------------	-----------	-------	------------

Water delivery and reliability

15. How many times a week do you have a cut in water?

Daily	One- Three times a week	Four- Six times a week	Less than once a week but monthly	Never
-------	-------------------------	------------------------	-----------------------------------	-------

16. Which day of the week does it most commonly occur? Circle answer

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
--------	---------	-----------	----------	--------	----------	--------

17. Do you have problems with low water pressure?

YES	NO
-----	----

18. When there is a cut in municipal supply what is the alternative? Circle answer

Borehole	Rainwater Tank	A canal	River or spring	Other :
----------	----------------	---------	-----------------	---------

19. Are tankers ever used to deliver water for emergency supplies?

YES	NO
-----	----

20. Have you been informed by the municipality when there will be a cut in water supply?

YES	NO
-----	----

21. If so how was this communicated to you?

Municipal officials using a Loudspeaker	Other:
-----------------------------------------	--------

21.1 Was this before or after the cut in supply?

BEFORE	AFTER
--------	-------

22. Have you ever been informed by the municipality of problems with water quality of the community and garden taps?

YES	NO
-----	----

23. If so how was this communicated to you?

Municipal officials using a Loudspeaker	Other:
-----------------------------------------	--------

Cellphone usage:

24. Do you own a cellphone?

YES	NO
-----	----

If your answer is yes to the above question, you may answer questions 29– 36.

25. How many cell phones are there in your households?

26. What year did you get your first cell phone?

27. What type of cellphone do you own?

28. Can you access the Internet using your cellphone?

YES	NO
-----	----

29. Which network provider do you use?

Vodacom	MTN	Cell C	Other:
---------	-----	--------	--------

30. What problems, if any, do you face with your current cellphone network provider?

Lack of coverage or network in the area	
Airtime is too expensive	
No problems	
Other (specify):	

31. What do you use your cellphone for?

Social (calling friends and family)	Business related	Emergency only	Other (specify)
-------------------------------------	------------------	----------------	-----------------

32. Please indicate the most common destination of calls/SMS you make (*select all that apply with a number, using the 'Extent' key below*)

Local calls/SMS (people in the community or township, 1-20km)	Calls/SMS to people in the closest town	Calls/SMS to people throughout South Africa	Calls/SMS to people outside of South Africa

EXTENT OF DESTINATION

TYPE	MOST COMMON DESTINATION	FAIRLY COMMON DESTINATION	RARELY/NOT COMMON DESTINATION	NOT APPLICABLE
CODE	1	2	3	4

33. Do you think that receiving an SMS from the municipality would be the most affective and reliable form of communicating any water cuts, shortages and maintenance in your community?

YES	NO
-----	----

34. If I am informed in time of water cuts, shortages, maintenance and problems with water quality, I will...

	Conserve more water by using less for daily tasks.	Use an alternative water source	Keep more water in storage
Agree			
Unsure			
Disagree			

Computer usage:

35. Do you know how to use a computer?

YES	NO
-----	----

If YES....

36. Do you have access to a Computer?

YES	NO
-----	----

37. If yes, where do you have access to a computer?

Home	
A friend's house	
School	
Internet Café	
Development project	
Other:	

Sources of Water:

A tap in the house	A	A community standpipe	B	Borehole	C	Rain water tank	D
The canal	E	A tap in the garden	F	A neighbours garden tap	G	River or spring	H

Please state which source of water you are referring to when answering question 38.

38. **Water quality:**

Where relevant how would you rate the water quality?	Very good	Good	Adequate	Poor	Very poor
A community standpipe					
Borehole					
Rain water tank					
The canal					
A tap in the garden					
A neighbour's garden tap					
River or spring					

39.

Please tick the extent to which you agree with the following statements	My water has a sour taste or smell	The water is brown and dirty	There are little red worms in water	My water has a salty taste
ALWAYS				
VERY OFTEN				
FAIRLY OFTEN				
SOMETIMES				
ALMOST NEVER				
NEVER				
How often per month does this occur? <u>1-3 times</u> 1 <u>Once a week</u> 2 <u>Daily</u> 3				

40. In terms of health, how safe do you think your water is?

Safety	Main source	Most commonly used alternative source
Not safe at all		
Somewhat unsafe		
Partially safe		
Safe		
Very Safe		

41. Do you treat your water in any way to make it safer for drinking?

YES	NO
-----	----

42. What do you usually do to make the water safer? (Circle the appropriate answer)

Boil	Let it stand and settle	Add bleach/chlorine	Strain it through a cloth	Use a water filter (ceramic, sand, composite, etc.)	Other (specify)
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43. What kind of toilet facility do members of your household usually use? (Tick the appropriate answer)

Flush system	
Ventilated improved pit latrine (VIP)	
Bucket system	
No facilities or bush or field	
Other (specify)	

43.1 Is the facility shared with other households?

YES	NO
-----	----

43.2 Are there any problems with this facility?

YES	NO
-----	----

If yes please explain

44. Are the local organisations (schools, churches, clinic) suffering from water shortages?

YES	NO
-----	----

45. And in turn, do these water shortages affect you and your family?

YES	NO
-----	----

45.1 If yes please explain how.

46. Have you noticed any leaks in water pipes or taps in the community?

YES	NO
-----	----

46.1 How many leakages are there?

One leakage	Three leakages	More than Three leakages
-------------	----------------	--------------------------

46.2 How often does this occur?

Once a week	Three times a week	Daily	Once a month	Three times a month	Never	Other
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46.3 Have you noticed any sewerage leakages in the community?

YES	NO
-----	----

46.4 How many leakages are there?

One leakage	Three leakages	More than Three leakages
-------------	----------------	--------------------------

46.5 How often does this occur?

Once a week	Three times a week	Daily	Once a month	Three times a month	Never	Other
-------------	--------------------	-------	--------------	---------------------	-------	-------

46.6 Are these leakages fixed by the municipality?

YES	NO
-----	----

46.7 If so how promptly? Tick the appropriate answer

Within a week	Within a month	More than a month
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47. Have you made a formal complaint related to your drinking water service in the past one year?

47.1 To whom did you complain? Circle answer

Ward counsellor	Municipality representative	Leader in the community	Other:
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47.2 What was the result of the complaint?

Prompt action taken	
Delayed action	
No response	

48. Have you had any interaction with any of the Community Development Workers in you ward?

YES	NO
-----	----

48.1 If yes please explain.

49. Have you attended any of the ward committee meetings?

YES	NO
-----	----

49.1 Are any water related issue discussed at these meetings?

YES	NO
-----	----

50. Do you know the ward counsellor or any representatives in your area?

YES	NO
-----	----

51. How do you communicate with the relevant person?

Speaking one on one	
Telephone- Moblie/landline	
Email	
Community meeting:	

51.1 Are you aware there is a customer service line where complaints can be addressed?

YES	NO
-----	----

52. Overall, are you satisfied with the water service delivery?

Completely satisfied	
Partially satisfied	
Dissatisfied	

52.1 What are the reasons for your dissatisfaction?

53. Details of respondent:

53.1 Name:

53.2 Gender:

53.3 Age:

53.4 Position in family:

53.5 If you are not the head of household who is:

53.6 Permanent residents living in the house:

34.6.1 under the age of 5:

34.6.1 Older than 65 years:

54. What are the illnesses facing your family?

54.1 Do any of these results in a greater water need?

55. Have there been any diseases in your family over the last six months that are water borne?

Children	
Adults	

55.1 Have you noticed an increase in these water borne illnesses in the last 2 years?

YES	NO
-----	----

Thank you very much for taking part in this study.

Would you be willing to be involved in follow up interviews about the issues surrounding water that have been discussed?

YES	NO
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If so, please may we have a Cellphone number in order to contact you again?
