

# Factors that Hinder Effective Management and the Supply of Clean Potable Water at eThekweni Municipality in KwaZulu-Natal

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**Abstract:** The paper intends to identify challenges for eThekweni District Municipality to supply sustainable fresh drinkable water, explore success factors in terms of efficient water supply and investigate feasible suggestions for future effective management and supply of adequate water to all the citizens of the municipality. Water is a necessity for life, as well as for development. No nation can afford to ignore the issue of effective water management and supply for its community. Water management is especially challenging for water-scarce countries like South Africa. This paper presents a study that examines the factors that hinders effective management and supply of clean potable water in eThekweni Municipality. A desktop analysis was conducted on the existing research studies, as well as reports in evaluating the trials as well as success factors that eThekweni Municipality had encountered in managing and supplying water to their community. The findings reflect that the task of managing and supplying water emanates from many factors such as: infrastructure degradation; climate change; financial sustainability; ineffectiveness and inefficiency on inward-looking local government still prevalent in the Municipality more especially in the rural areas. This study recommends the importance of the implementation of effective water supply management strategy that will work for the province. Six strategic priority areas have been identified in order to achieve and address the encounters faced by the Municipality. These strategic priorities provide the basis for the identification of programmes and projects within the Integrated Development Plan (IDP) that will help refine and evaluate a strategic approach to ensure that these strategies are being implemented for the benefit of their community.

**Keywords:** Economic development, Service delivery, Water management, Water supply

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## 1. Introduction

Water is essential for life and for economic development of any nation. However, there are some major challenges facing water management and supply of quality water in sufficient quantities. In South Africa provision and management of water is challenged in the years to come due to the need to keep pace with the net population growth, close the coverage and service gaps, ensure sustainability of existing and new services, as well as improve the quality of services. Maintaining a truly sustainable system in the water supply sector is as difficult and important as making the initial capital investment. The provision of safe water requires a service-oriented attitude on the part of service providers (Mosdell & Leatt, 2005; Jili, 2014). Water services may normally be set at an affordable level of the consumer, managed and operated in accordance with the principles of good business practice and with the regulations which are intended to protect the consumers and the environment. The continuous improvement of quality of water and sanitation services is an essential target to be achieved. The performance assessment of the water supply

services seems to be the right tool to help solve some of the major problems within the water services supply sector (Hemson & O'Donovan, 2006; Gumbi & Rangongo, 2015). Water is important for economic growth and sustainability of any country. Water is required to grow and process food, as well as transporting that food and other products from one area to another. It is also required for energy, which can be used in "water abstraction, treatment, distribution to end-users, waste water reticulation and treatment" (Von Bormann & Gulati, 2014). South Africa's National Development Plan 2030 clearly states that food, fuel and water are interconnected, particularly in the context of climate change and their impact on one another. However, South Africa, like many water-scarce countries, struggles to provide enough water for its people. The challenge is worse for rural than for urban areas (Department of Cooperative Governance & Department of Traditional Affairs, 2014).

## 2. Literature Review

While many people around the world may take clean drinking water and sanitation for granted,

many others do not even have a drop to spare. It is very important that we use water sparingly. Water scarcity affects more than 40% of people around the world, and that number is projected to go even higher as a result of climate change. If we continue on the path we are on, by 2050 at least one in four people are likely to be affected by recurring water shortages. In order to avoid such, we can opt for more international collaborations, protecting wetlands and rivers, sharing water-treatment technologies and that way we can accomplishing this goal of supplying safe water to our communities (Grey & Sadoff, 2006).

## **2.1 Importance of Water and Sanitation Management for Economic Development**

According to the United Nations Development Programme (UNDP, 2016), there are 17 Sustainable Development Goals. In order to achieve these goals, the government, private sector, legal entities and society need to work together in making sure that all these goals are achievable and people's lives are transformed. The goal for 2030 is that everyone on earth should have access to safe and affordable drinking water as per goal six (6) of the Sustainable Development Goals, clean water and sanitation. Most countries have invested heavily in water infrastructure, institutions and management capacity because water is key to the alleviation of poverty, as well as for sustainable development. Water is a key driver of sustainable growth and poverty alleviation as it is an essential input to almost all production in agriculture, industry, energy, transport and health. The dynamics of water, growth and poverty are extremely complex and highly depend upon specific physical, cultural, political and economic circumstances. Water resource development and management remain at the heart of the struggle for growth, sustainable development and poverty reduction (Grey & Sadoff, 2006).

Investment in water development and management remain an urgent priority in many developing countries. Water is a source of life. It can also be a force for destruction, catastrophically through drought, flood, landslides, epidemic, as well as progressively through erosion, inundation, desertification, contamination and disease. If these challenges are not met, sustainable growth and poverty eradication cannot be achieved (Grey & Sadoff, 2006). According to studies by Hutton and Haller (2004), Stockholm International Water Institute (2007) and Water and

Sanitation Program (2007), investment in water and sanitation is the most effective and sustainable way of promoting equitable economic growth and social development. Hutton and Haller (2004), showed benefits of improved water supply and sanitation in terms of hospital costs saved; productivity and school days gained due to less diarrhoeal illness; convenience time savings and avoided deaths. According to a SIDA Brief (2015) women and girl children suffer the most when there is no water as they have to go and fetch water. In South Africa the studies estimate that rural women spend over four hours a day gathering fuel and water (Morna, 2000). The need for running water is specific to women as it relates to their reproductive responsibilities. It is also women who are responsible for the collection of water (Hlophe, 2004). Therefore, the importance of effective water supply and management cannot be emphasised enough especially in this era of promotion and support of women development, as well as gender equity mandates and legislation. The basic policy principles emphasise the fact that development should be demand-driven and community-based. The importance of gender approach to development needs to be considered. Duncker (1998) puts forward strategies to empower women in water delivery and makes the following points: women should be more involved in planning and operations as part of a strategy to build a more equitable society; their involvement should be more than labour-related and should include access to resources, decision-making and management. In addition, care should be taken not to overburden women or to automatically perpetuate and reinforce the traditional roles of women.

## **2.2 Challenges in Water Supply**

There is a need to allocate water among sectors in a way that optimizes economic growth and to enhance the integration of water into long-term economic sector plans as well as into broad and poverty reduction strategy development process (Manase, 2009). According to Mckenzie, Siqalaba & Wegelin (2013), climate change is predicted to exacerbate risks associated with water scarcity and quality. Flooding associated with intense rainfall could lead to infrastructure failure, water-borne diseases and increased insurance costs for municipalities. Land use practices such as over grazing and the modification of flood plains, river banks, and wetlands will reduce the regulating capacity of catchments and will increase erosion

and sediment loads in rivers as well as the risk of flooding. Unsustainable land use practices pose a major threat to ecosystems, businesses and the livelihood of local communities.

One of the major challenges that South Africa faces is the lack of adequate capacity at the local government level to effectively manage water resources. The responsibility for compliance monitoring, enforcement and infrastructure maintenance lies with local authorities, who in some cases lack the skills and capacity to execute their duties. Pollution in many cases is attributed to failing waste water treatment works, resulting in raw sewage spills into river systems. The lack of appropriately qualified municipal engineers and the capacity for long-term planning, to effectively maintain and upgrade water infrastructure timeously, is a key driver of this risk. Capacity challenges with local municipalities could also be addressed through strategic engagement with the private sector (Amis & Nel, 2011). Water resources should be properly managed otherwise South Africa is heading for a crisis. There are a number of factors that have a negative impact on the current water situation in South Africa namely: climate change; land use; water use; pollution. The impact of climate change on precipitation, increasing urbanisation, population growth, expansion of business activity and increasing influence (Hedden & Cilliers, 2014). Water is everybody's responsibility, even though the provision of freshwater and sanitation services is primarily the government's responsibility. The most complex challenge on poor management and supply of water is drought, which is linked to climate change. Climate change results in other lower rains during rainy seasons or floods that do not help much in alleviation of water supply as they pose other challenges.

### 2.3 Water Management and Supply in South Africa

About 83.5% of households in South Africa have access to piped water. In KwaZulu-Natal there is a slight improvement in water supply because in 1996 about 5.1% households did not have access to clean drinkable water and in 2011, only about 3.8% still do not have access to water. In comparison with other provinces KwaZulu-Natal in doing much better in comparison with North West 80.2%, Mpumalanga 77.3%, Limpopo 75.7% and Eastern Cape 72.7% but doing worse than Northern Cape at 88.5%, Gauteng 92.9% and Western Cape 93.2% (StatsSA, 2016).

Water has always played a critical role in sustainable economic growth and development. Globally countries have cushioned their economies from weather shocks (droughts and floods) by investing in hydrological infrastructure and in human capital to manage these investments to have more stable economies. Water plays a critical role in South Africa's economy particularly in agriculture, mining and manufacturing. The role of agriculture in a country's economy and related effects of weather shocks (droughts and floods) depend on the complexity of the economy. South Africa has a fairly complex economy with well-developed inter-sectoral and intra-sectoral linkages as well as international linkages through trade (Manase, 2009).

Water is a human right, thus the South African government introduced a number of measures to ensure that everyone has access to at least the basic level of services. As a water scarce country, the country has made concerted efforts to manage water and sanitation more effectively. The Bill of Rights, within the Constitution of the Republic of South Africa No 108 of 1996, emphasises the right of all South African citizens to water and sanitation. The Reconstruction and Development Programme (RDP, 1994) also talked about access to water and sanitation as one of its pillars. The lack of basic services, such as water supply and sanitation, are the key symptoms of poverty and underdevelopment. The provision of such services was regarded as central to the RDP. The need for running water is specific to women as it relates to their reproductive responsibilities. It is also women who are responsible for the collection of water. That is why the then Department of Water and Sanitation (DWS) implemented the RDP to specifically address water supply and sanitation in rural areas amongst other considerations (Hlophe, 2004). It was also in 1994 that DWS reported that only about 14 million of the population in the country had access to water, and about half of the population did not have access to sanitation. With the realisation of the backlogs in water and sanitation services, South Africa developed the White Paper on Water Supply and Sanitation in 1994 to focus on speedy delivery of water and sanitation services (DWS, 2008).

Several initiatives and a few years later, the Water Services Act No 108 of 1997 was promulgated with the main aim of making local government take responsibility for water management and delivery. Localisation of service delivery was envisaged to

be one of the routes that could expedite service delivery. In 2000, municipalities were mandated to facilitate process of water delivery, starting with providing 6 000 litres of water to each household for free. However, there are challenges that hinder the process of delivering services to communities and thus needs to properly address in plans.

In South Africa the National Government is responsible for and has authority over the country's water resources but Local Governments or Municipalities which act as Water Services Authorities (WSAs) are responsible for water and sanitation service provision. DWS subsequently began to help in building capacity within municipalities in terms of resources, energies and skills to promote effective delivery of water and sanitation services. The financial resources included allocation of Municipal Infrastructure Grants. The Strategic Framework for Water Services, which was first adopted in 2003, was outlined to provide guidelines on approaches to follow in terms of planning and implementing water and sanitation services, as well as financing approaches. In April 2007, South Africa launched the theme of Water for Growth and Development as a driving paradigm for the water sector. This together with the launch of the Accelerated and Shared Growth Initiative of South Africa (ASGISA, 2005), shifted focus of the water sector beyond the provision of basic water and sanitation services, it called for a comprehensive national plan that addresses the dynamics of water, growth, poverty and development.

DWS (2008) reported that close to six (6) million South Africans do not have access to any reliable source of safe drinking water while thirteen million do not have access to adequate sanitation, which is seen as a possible major restricting factor for economic growth. Water problems impact negatively on the local people's health and wellbeing since communities are exposed to disease outbreaks from consuming untreated water (Mothetha, Nkuna & Mema, 2015). According to Manase (2009), at the 4<sup>th</sup> World Water Forum held in Mexico in 2006, the global community emphasised the need to manage and develop water resources in a way that promote growth and alleviate poverty in a responsible and equitable manner. Unfortunately, water and sanitation related diseases still have considerable public health significance in South Africa and in other developing countries. For example, diarrhoea is among the top ten causes of death

in South Africa claiming 13 600 lives annually. The explicit and implicit costs of poor water supply and sanitation to society in terms of medical costs, low productivity due to ill health, cholera outbreaks are substantial. In an environment where a number of priorities dominate the national development agenda there is a need to quantify the economic benefits of improved water supply and sanitation (Mothetha, Nkuna & Mema, 2015). The second draft of the National Water Resources Strategy (NWRS2, 2013) has identified the implementation of water use efficiency, conservation and water demand management as a core strategy to ensure sufficient water to meet South Africa's needs into the future. The strategy talks about "sustainable, equitable and secure water for a better life and environment for all". Many municipalities have realised the value of understanding a proper and reliable water balance. The issue of non-revenue water is ignored by many municipalities. Non-revenue water refers to all the water that is lost through physical leakage or commercial losses (billing errors, theft, and meter under-registration) as well as unbilled authorised consumption (fire-fighting, mains flushing etc.). The large metros like eThekewini Municipality are now monitoring their water use and trying to establish a proper and reliable water balance in line with international recommendations. The Department of Water and Sanitation (DWS) and the Water Research Commission (WRC) are creating awareness and encouraging proper water auditing at the municipal level (Van Vuuren, 2009; Mckenzie *et al.*, 2013).

More recent studies observed that substantial progress has been made in supplying clean water in South Africa, especially in urban areas. All the initiatives and strategies the country embarked on seem to have made a positive impact as South Africa reports that overall 89.4% of the country's people have access to water (StatsSA, 2015). However, rural areas still lag behind their urban counterparts. This gap has to be closed to avoid inequality between the rural poor and those in the urban areas (Hemson & O'Donovan, 2006). Access to safe drinking water continues to be one of the most complex challenges facing rural communities. The rural areas particularly those under traditional authorities live in abject poverty arising from a high rate of unemployment, functional illiteracy, service backlog and poor access to public facilities (Gumbi & Rangongo, 2015). Furthermore, South Africa is a water scarce country, with several challenges that keep depleting water resources. The challenges are natural like drought



and/or floods or man-made due to for instance, agriculture, deforestation and industrialisation. It was also estimated that the water supply in the country would decrease by about 1.7% by 2025 (Von Bormann & Gulati, 2014). Thus, it is imperative that diligent and rigorous strategies be put into place to increase and maintain adequate water supply to the communities.

#### 2.4 Goals to Effective Water Supply Management in eThekweni Municipality

eThekweni Municipality in KwaZulu-Natal is divided into one metropolitan municipality, viz. the eThekweni Metropolitan Municipality and ten (10) district municipalities, which are further subdivided into forty-three (43) local municipalities. eThekweni Municipality is located on the east coast of South Africa in the province of KwaZulu-Natal and spans an area of approximately 2297 square kilometres. It is home to 3 442 361 million people of different ethnic and cultural backgrounds. The population consists of 73.3% Africans; 16.7% Indians; 6.6% Whites; 2.5% Coloureds and 0.4% other. The majority of the population age ranges between 15-34 years. In terms of gender the municipal population has 1 679 040 males and 1 763 321 females (StatsSA, 2016). In 2008, a Water Reconciliation Strategy Study for KwaZulu Natal Coastal Metropolitan Areas was done where partnerships were formed with key stakeholders representing all three spheres of government; parastatals; non-governmental organisations (NGOs); community based organisations (CBOs); research institutions; universities; organised business and industry; organised agriculture; organised commercial forestry and conservancy. The aim of the reconciliation strategy was to identify, evaluate and prioritise interventions to reconcile the water requirements with the available water resources involving the different key stakeholders and developing a reconciliation strategy with collective endorsement. The findings indicated that urgent interventions are required to prevent a shortfall in water supply over the short term. Interventions in dealing with both water resource developments and demand side management had to be balanced (DWS, 2008).

Most rural areas use ground water supply. However, use of ground water is not appropriate in KwaZulu-Natal because of its hilly landscape. It is difficult to dig for ground water because the area is mountainous. According to the study done by uMgeni

Water (2008) as the main water supplier in KwaZulu-Natal, the findings indicated that water shortages will become more prevalent if proper attention is not given to providing more water and managing water demand by 2025. South Africa is more likely to experience water shortages than water surpluses. The major metropolitan areas of South Africa are hubs of economic growth and economic development which leads to increased water use. However, these areas, eThekweni included, are experiencing high population growth rates due to rapid urbanisation which in turn increases the stress on water infrastructure. The availability of water quantity is closely linked to water quality. Water supply should be sustainable, viable and equitable.

Umgeni Water in its role as the regional Water Service Provider implemented the South Coast Augmentation Pipeline (SCA) to augment the water supply of the South Coast System from the water resources of the uMgeni River System. This pipeline is currently under construction and will transfer purified water to the South Coast area which will also cover the rural areas. This will address the imbalance between the rural and urban water management supply. A Strategy Steering Committee is overlooking this whole procedure (Sutherland, Hordijk, Lewis, Meyer & Buthelezi, 2014). eThekweni Metropolitan Municipality has already successfully implemented water reuse for industrial purposes. This can be done by applying additional nutrient removal treatment processes in addition to current wastewater treatment plants. Besides progress that has been made since 1994, there are still challenges that are lying ahead. The quality and availability of the water are of extreme importance for the quality of human life and living standards (StatsSA, 2016). Water and sanitation in the eThekweni Municipality is managed by the eThekweni Water and Sanitation Services (EWS), which is located within Engineering Services. EWS is globally commended for its technical capacity and innovative approach to water and sanitation provision in a fast growing developing world city (Sutherland, Robbins, Scott and Sim, 2013).

According to Roberts & O'Donoghue (2013) the water supply systems in eThekweni are under considerable stress as a result of periods of droughts, more intense rainfall events due to climate change, deterioration of water quality and catchments, lack of adequate bulk infrastructure and rapid urban growth. eThekweni Municipality is a water scarce

Municipality, the city experiences periods of higher rainfall that creates the public perception that water supply is not a major issue in the city. Climate change predictions suggest that the Municipality will experience wetter summers and winters, with a higher frequency of storm events.

These high rates of rainfall do not translate into a stable supply of water for the city due to the increasing demand for water and the lack of bulk infrastructure to manage and distribute water. Poor long term infrastructure planning over the past twenty years has impacted on the future supply of water in the Municipality. The steep topography of the Municipality, particularly in the rural periphery, also poses significant challenges for water supply. The Umgeni Water system can only provide a level of assurance of water supply at 95% which has dropped from 99%, which will lead to water restrictions once rainfall returns to normal from the wet cycle the city has currently been experiencing (eThekweni Municipality, 2012). The EWS had adopted a pro-active and socially responsive position in terms of the provision of free basic water. The Municipality was the first to provide free basic water in South Africa and the lessons learnt in the city led to the development of the free basic water policy at National level. Initially the poor were provided with 6 000 litres of free basic water per household per month. EWS had hoped that by providing an additional amount of free basic water household would be more willing to participate in the formal administrative system of water provision, rather than obtaining it from illegal connections. The increase of free basic water was also cost effective for the municipality as the costs associated with providing additional water were balanced by the costs of billing people once they had used 6 000 litres per month. Initially this was provided universally across the city, but in June 2012 the policy shifted whereby only those living in households valued at below R250 000 per month had access to free basic water (Galvin, 2013).

Unfortunately, the status of water supply and management is not the same for both the rural and urban areas of the municipality. During the apartheid era, the homeland of KwaZulu was located adjacent to the boundary of the city of Durban, resulting in a dense under-developed zone of rural and peri-urban households on the edge of the city. In 2002 under the national municipal demarcation process, which focused on the redistribution of

urban resources to rural hinterlands, 75 000 rural households were added to the city. The boundaries of the Durban Metropolitan Area were extended by a land area of 67% to incorporate the rural periphery, forming the eThekweni Municipality. At that time, due to the underdevelopment of the previous homeland areas, 60 000 of households in the eThekweni municipality did not have access to basic sanitation. The rural areas of the city to the north-west and south-west of the municipality were the ones more affected by lack of safe clean water. These areas contain dispersed settlement patterns of traditional homes and are extremely poor with many people relying on social grants (eThekweni Municipality, 2012). The Municipality has to generate revenue to support sustainable water and sanitation services and that by attaching an economic value to water, the social value of water and its value as a limited resource, is raised within communities (Sutherland, Robbins, Scott & Sim, 2013). The municipality also needs to maintain its existing network of water and sanitation services and hence cannot focus all its technical capacity and resources in to expanding new networks out to the periphery. This creates a tension between the technical staff officials of the municipality and the politicians, whose main interest is to extend and expand the service networks. If the municipality does not maintain its existing network it will not be able to service the newly expanded networks to the periphery (Sutherland, Robbins, Scott & Sim, 2013).

## **2.5 Water Awareness Campaigns**

eThekweni Water Services is committed to enhancing school children's knowledge about water and sanitation through a structured and sustainable education programme. Besides visibility in national conservation efforts such as National Water Conservation Program and National Water Week, eThekweni Water Services (EWS) is also deeply involved in a wide range of educational programmes which focus on promoting water conservation, water demand management, sanitation, health and hygiene awareness among learners and adult members of the community. These programmes take the form of organised site visits, water testing, visits to schools, hands on workshops, a mobile education unit, community theatre and tours of the water/wastewater treatment works (eThekweni Municipality, 2004). According to the eThekweni Municipality Final 2017/2018 IDP

Report, after several water projects were implemented, there has been remarkable improvement in the supply of water. However, challenges still remain, especially in the rural areas.

### 3. Research Methods

Document analysis was conducted on the existing research documents, the Integrated Development Plans and StatsSA exploring the challenges that eThekweni Municipality faces in an attempt to provide water for their community.

### 4. Results

The study identified challenges that hinder effective water management. They are hereby presented as follows:

#### 4.1 Poor Maintenance of Infrastructure

Most infrastructure is poorly maintained and are aged and defective. Defective infrastructure includes pipes that are leaking, thereby resulting in water leakage and loss as water is transported from the water sources to the end-users. In addition, aged infrastructure is vulnerable to issues like constant pipe bursts that lead to further loss of water. In cases of sanitation, a burst pipe can imply health hazards in the affected area(s). Unfortunately, municipalities lose about 35% of water through damaged pipes and subsequent leakage of water (National Water and Sanitation Master Plan, 2018). The challenge is also that aged and problematic infrastructure implies that money and other resources are often used in repairing damages rather than building/constructing newer infrastructure.

#### 4.2 Lack of Skills

Analysis shows that in some instances the municipality officials/employees who are charged with rendering services do not have adequate skills, especially in financial management and technical skills to construct and maintain infrastructure. Financial services are important for revenue collection and record keeping. According to the National Water and Sanitation Master Plan, (2018) municipalities lose about 1660 million m<sup>3</sup> per year through not collecting revenue for water supply and "this amounts to R9.9 billion each year". The problem with lack of technical skills is the constant outsourcing of services that are first difficult to monitor and

secondly are costly to the already financially struggling municipalities. A report by Aoyi, Onyango, Majosi, Seid, Leswif, Rwanga and Kesis (2015) suggested that for effective management and supply of safe drinking water municipalities require personnel with strategic, financial and developmental skills. The employees need to have skills that they can utilise to plan well and execute their plans while they use the allocated budgets properly for developmental purposes.

#### 4.3 Illegal Connections

Illegal connections exacerbate the problem of leaking pipes and connections. Illegal connections also result in unauthorised consumption of water (United Nations Human Settlement Programme, 2012). These illegal connections also make it difficult for the municipality to know who to collect revenue from.

#### 4.4 Political Interference

The interference by politicians' impact on prioritisation of services as outlined in the IDP. Political interference also has an effect on how funds allocated to water supply are utilised for other projects. This reallocation due to political interference affects supply of quality water to local communities.

#### 4.5 Drought and Floods

Both drought and flood have effect on water management. Drought inevitably results in lower levels of water from sources that supply water to the municipality and its communities. Floods on other hand can cause damage to the already ailing infrastructure on the one hand, or contaminate the rivers, dams and other sources of water on the other hand.

#### 4.6 Vandalism of Infrastructure

This emanates from the deliberate destruction of municipal water infrastructure or theft of water pipes and other infrastructure. This destruction places a heavy burden on the already affected, aged infrastructure. The financial liability is immense as a result.

The eThekweni Municipality has been the first in the country to build a large-scale sea water desalination plan as an option to their water supply strategy.

This was after a feasible study was done by Umgeni Water. It was believed that the large scale desalination will supplement its water supply. However, desalination proved to be a very expensive option because it consumes a lot of energy and as a region and a country there is already load shedding due to not having enough energy. The Department of Water Affairs and Forestry has not ruled out desalination and research is currently being done to try and bring down the cost of desalination (Balzer, 2013).

## 5. Conclusion and Recommendations

Blaming apartheid will not resolve the challenges that are currently faced by communities due to the lack of efficient water supply. It is up to individuals to make sure that they take an initiative to improve the current water situation, to address the inequalities of the past for the rural poor who have not had the privileges to access clean drinking water. Vandalism of infrastructure stands out to be a major concern in rural areas. Therefore, the Water Service Authorities (WSA) should involve the local communities in projects that will ensure a sense of ownership of the infrastructure within their communities and therefore reduce the level of vandalism. The impact of poorly managed wastewater treatment works is the inability to sustain safe drinking water. Integrated planning between the Water Conservation (WC); Water Demand Management (WDM) and Water Services Development Plan (WSDP) will ensure that all spheres of government provide efficient, equitable and sustainable water supply services. Government policies state that everyone has the right to basic sanitation which is affordable, appropriate, effective, socially acceptable and sustainable, as well as free basic water for all.

According to the Strategic Framework for Water Services, Water Service Authorities (WSAs) should not only provide the water services necessary for basic health and hygiene, they are also required to provide services that support sustainable livelihoods and economic development. Provision of these services should be in line with the Millennium Development Goals for water supply and sanitation. There is an urgent need for sustainable service delivery in this country (Gounden, Pfaff, Macleod & Buckley, 2006). The average per capita water consumption in South Africa is higher than in most other countries. In order for South Africa to have

a successful water story, it is important that there should be behavioural changes in water consumption. A change in attitude is required to achieve the emerging global notion of stewardship, which is based on a philosophy of sustainable custodianship rather than on consumption. South Africans currently use 27% more municipal water than would be expected given the size of the urban population. The Draft Second National Water Resources Strategy (NWRS2) sets the goal of reducing water demand in urban areas to 15% by 2030. In order to achieve this, the strategy proposes water-conservation and water demand management programmes (Mckenzie *et al.*, 2013).

Water re-use if economically comparable to other alternatives and further research can be done by eThekweni Municipality with the assistance of the Department of Water and Sanitation (DWS) where possible to check and see if it will not be feasible for KwaZulu-Natal, especially the areas where there are water shortages. eThekweni Metropolitan Municipality's goal should be to find the global path in which the world promotes sustainable economic development; combining economic, social and environmental objectives; where good governance of both the government and business is also achieved. Good governance means both government (public) and business (private) operate according to the rule of law; with accountability; transparency; responsiveness to needs of stakeholders; land use; pollution; fairness and honesty of political as well as business practices. When we reach a balance between water demand and water supply then we can say South Africa has a successful water supply management story for its citizens. The study recommends the following:

- There should be a strategy in place to deal with water demand management. This strategic planning should involve scanning the environment for trends in population movement to forecast future water demand. The constant increase in the number of people in the Durban Metropolitan area, due to emigration of people from rural areas to urban areas in the search for jobs and better living, makes it very important for the water services to ensure that there is enough water for all in the area. This challenge of changing demographics in the area also calls for collaboration between several government departments for more effective service delivery.



- Reducing the volume of non-revenue water will reduce the rise in municipal water demand. Improved monitoring of municipal and industrial water supply might also help reduce lost water. New technology, such as advanced metering infrastructure, could also help to reduce these losses. Ageing water and wastewater infrastructure also needs to be well maintained to avoid excessive water losses (Hedden & Cilliers, 2014).
- Craft and implement a communication strategy that will enable the municipality to have better links with the surrounding community. Better communication will help the community to own the problem of water scarcity, as well as the proposed solutions thereby helping in several issues that include theft and vandalism of the infrastructure.
- In terms of theft and vandalism of infrastructure as well as illegal connections, and thus illegal access to water, the municipality should find a mechanism of promoting community reporting of such acts. Rewards can be offered to people who report wrongdoers. This implies that there has to be a budget allocated for such contingencies. In addition, heavy fines should be imposed on people who are found guilty of those acts. Another mechanism of curbing illegal access to water can be through regular follow-ups of people who live within illegal settlements, who applied for water and never came back to follow-up.
- Different sectors need to be involved in making a combined, concerted effort in promoting environmental awareness, as well as mechanisms of saving water. These can include schools and religious forums that have children gathering so that water awareness education can start early in life
- The municipality should consider adopting innovative and sustainable technologies and services in upgrading poor areas if their infrastructure is to be sustainable into the future.

In short, this paper recommends that water must be placed at the heart of all development planning decisions. Service backlogs for universal access to water should be addressed. There should be proper planning and implementation of water supply management plans. In addition, it is recommended

that development plans such as the Integrated Development Plans (IDPs) should be developed through a participatory process that includes multi stakeholder consultations including the water sector and the surrounding communities. The study also recommends capacitation of both the municipal officials/employees as well as the local community to come up with innovative ways of saving water that is available and supplying clean water to all.

## References

- Accelerated and Shared Growth Initiative – *South Africa* (ASGISA). 2005. Available at: <http://www.daff.gov.za/docs/GenPub/asgisa.pdf>. Accessed 31 March 2018.
- Amis, M. & Nel, D. 2011. *Managing water risk: business response to the risk of climate change in South Africa – a synthesis*. WWF-SA Report. Together investing in the future of South Africa's Marine and Freshwater Ecosystems.
- Aoyi, O., Onyango, M., Majozi, T., Seid, E., Leswifi, T., Rwanga, S. & Kesis, J. 2015. *Water and wastewater management in Local Government: Skills needs and development*. A report for the Local Government Sector Education and Training (LGSETA). Available at: [cdn.lgseta.co.za/resources/.../Water%20%20Wastewater%20Management%20Research](http://cdn.lgseta.co.za/resources/.../Water%20%20Wastewater%20Management%20Research). Accessed 16 June 2018.
- Balzer, T. 2013. *Government moots desalination plant for Durban*. Available at: <http://www.engineeringnews.co.za/article/govt-moots-desalination-plant-for-durban-2-13-07-03/>. Accessed 13 September 2017.
- Cooper, K. 2012. *Water Conservation Tips for the Home*. Iowa State University Extension and Outreach Program. Available at: <http://www.extension.iastate.edu/Documents/Drought/WaterConversationTips.pdf>. Accessed 16 October 2017.
- Department of Cooperative Governance and the Department of Traditional Affairs, 2014. *Cooperative Governance Traditional Affairs Annual Report*. Available at: <http://www.cogta.gov.za/cgta2016/wp-content/uploads/2016/06/COGTA-Annual-Report-2014-2015.pdf>. Accessed 28 December 2017.
- Department of Water Affairs and Forestry, DWAf, 2008. *Water Reconciliation Strategy Study for the KwaZulu-Natal Coastal Metropolitan Areas*. Available at: <http://www.dwa.gov.za/Projects/KZN%20Recon/documents.aspx>
- Duncker, L. 1998. *Report on the development of strategies for empowerment of women in water supply and sanitation*. Pretoria: Centre for Scientific Industrial Research.
- eThekweni Municipality. 2004. *eThekweni Water and Sanitation Unit Draft. Water Services Development Plan Volume 2*. Durban: eThekweni Municipality.
- eThekweni Municipality. 2012. *Spatial Development Framework SDF Report 2012/2013*. Durban. Durban: eThekweni Municipality.
- Galvin, M. 2013. Interview. Chance2Sustain.

- Gounden, T., Pfaff, B., Macleod, N. & Buckley, C. 2006. *Provision of Free Sustainable Basic Sanitation: The Durban Experience*. A paper presented at the 32<sup>nd</sup> WEDC International Conference on Sustainable Development of Water Resource, Water Supply and Environmental Sanitation, Colombo, Sri Lanka.
- Grey, D. & Sadoff, C.W. 2006. *Water for Growth and Development*. A Thematic Documents of the IV World Water Forum. Comision Nacional del Agua: Mexico City.
- Gumbi, N & Rangongo, M.F. 2015. *Challenges of Water Supply Management: A case of Umdoni Local Municipality, KwaZulu-Natal Province –South Africa*. Conference paper presented at the 4<sup>th</sup> SAAPAM Limpopo Chapter Annual Conference on African Governance: Society, Human Migration, State, Xenophobia and Business Contestations. Polokwane: SAAPAM Limpopo Chapter.
- Heppen, S. & Cilliers, J. 2014. *Parched prospects. The emerging water crisis in South Africa*. Frederick S. Pardee Center for International Futures. Explore Understand Shape. Institute for Security Studies. African Futures Paper 11.
- Hemson, D. & O'Donovan, M. 2006. *Putting the numbers to the scorecard: presidential targets and the state of delivery*. In: Buhlungu, S., Daniel, J., Southall, R. and Lutchman, J. (eds) *State of the Nation: South Africa, 2005-2006*. Pretoria: Human Sciences Research Council
- Hlophe, T.V. 2004. *An evaluation of the success of the Vulindlela Water Supply Scheme*. Unpublished Masters Thesis. Durban: University of KwaZulu-Natal.
- Hutton, G. & Haller, L. 2004. *Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level*. World Health Organisation, Geneva.
- KwaZulu-Natal Municipalities. Available at: <http://www.localgovernment.co.za/provinces/view/4/kwazulu-natal>. Accessed 21 September 2017.
- Lewis, B., Sutherland, C., Scott, C. & Hordijk, M. 2013. *Private and public spheres of citizenship: A justice perspective of water governance in eThekweni Municipality, South Africa*, unpublished paper, Chance2Sustain.
- Manase, G. 2009. *The strategic role of water in sustainable economic growth and development: The case of South Africa*. Water, Sanitation and Hygiene: Sustainable Development and Multisectoral Approaches. 34<sup>th</sup> WEDC International Conference. Addis Ababa, Ethiopia.
- Mckenzie, R., Sigalaba, Z.N. & Wegelin, W.A. 2013. *The State of Non-Revenue Water in South Africa*. Water Research Commission. TT522/12, 15-18.
- Molobela, I.P. & Sinha, P. 2011. Management of water resources in South Africa: A review. *African Journal of Environmental Science and Technology*, 5(12):993-1002.
- Momba, M.N.B., Obi, C.L. & Thompson, P. 2009. *Survey of disinfection efficiency of small drinking water treatment plants: challenges facing small water treatment plants in South Africa*. *Water SA*, 35(4):475-493.
- Mosdell, T. & Leatt, A. 2005. *On tap: A review of the free basic water policy in Leatt*. A. and Rosa, S. (editors), *Towards a means to live: targeting poverty alleviation to make children's rights real*. University of Cape Town: Children's Institute.
- Mothetha, M., Nkuna, Z. & Mema, V. 2015. *The challenges of rural water supply: a case study of rural areas in Limpopo Province*. Pretoria: Council for Scientific and Industrial Research.
- Republic of South Africa 1996. *The Constitution of the Republic of South Africa of 1996*. Pretoria: Government Printers
- Republic of South Africa. 2018. *National Water and Sanitation Master Plan*. Department of Water and Sanitation. Pretoria.
- Roberts, D. & O'Donoghue, S. 2013. Urban environmental challenges and climate change action in Durban, South Africa. *Environment & Urbanization*, 25(2):299-319.
- SIDA Brief 2015. Women, water, sanitation and hygiene. A Gender Toolbox Brief. Available at: <https://www.sida.se/contentassets/sets/.../women-water-sanitation-and-hygiene.pdf>. Accessed 16 June 2018.
- Statistics SA. 2016. Statistical Release P0301. Community Survey. Available at: [http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-Statistical-releas\\_1-July-2016.pdf](http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-Statistical-releas_1-July-2016.pdf). Accessed 31 March 2018.
- Sutherland, C., Hordijk, M., Lewis, C., Meyer, C. & Buthelezi, S. 2014. Water and sanitation provision in eThekweni Municipality: a spatially differentiated approach. *Environment and Urbanization*. 26(2):469-488.
- Sutherland, C., Robbins, G., Scott, D. & Sim, V. 2013. Durban City Report. Chance2Sustain.
- The Water Wheel. ISSN 0258-2244. January/February 2013, 12:(1). *Water loss –SA needs to do more*. Water Research Commission.
- United Nations Development Programme (UNDP). 2016. *Sustainable Development Goals*. Available at: [http://www.undp.org/content/dam/undp/library/corporate/.../SDGs\\_Booklet\\_Web\\_En.pdf](http://www.undp.org/content/dam/undp/library/corporate/.../SDGs_Booklet_Web_En.pdf) Accessed 21 September 2017.
- Van Vuuren, L. 2009. *Counting the lost drops – Study into non-revenue water shows we can do more*. Pretoria: Water Research Commission.
- Von Bormann, T. & Gulati, M. 2014. Von Bormann, T. and Gulati, M. 2014. *The Food Energy Water Nexus: Understanding South Africa's most urgent sustainability challenge*. WWF-SA, South Africa.
- Water and Sanitation Program. 2007. *Economic Impacts of Sanitation in Southeast Asia: Summary*: Water and Sanitation Program-east Asia (WSP-EAP). Washington DC: The World Bank.
- Water Resource Institute. 2008. Increasing water scarcity. Increase Business Vulnerability.
- Wegelin, W.A. & Jacobs, H.E. 2013. *The development of a municipal water conservation and demand management strategy and business plan as required by the Water Services Act, South Africa*. Available from: <http://www.wrc.org.za/>. Accessed 22 September 2017.