



# An Exploration of Sustainability and Inclusiveness within Sanitation Governance in eThekweni, South Africa



Submitted by Huda Lohiya

Student number: 6594425

[h.lohiya@students.uu.nl](mailto:h.lohiya@students.uu.nl)

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Supervisor: Dr. Murtah Shannon

Copernicus Institute for Sustainable Development

## Abstract

South Africa have a unique history, and a fairly recent start of democracy in 1994, hence this research details how the history has led to shift in the governance of sanitation services and the efforts that have been done to increase inclusivity and sustainability, particularly with a focus on informal settlements and vulnerable populations, tending to be non-white people who did not have the same level of access to basic services as the white people did. This study explores the concepts of sustainability and inclusiveness within sanitation services in eThekweni, South Africa through the lens of governance actors. The study outlines some actors that are fundamental in a more inclusive and sustainable sanitation services. This includes local municipalities or a water service provider in charge and responsible for delegating and planning how service provision should be executed. It also includes experts and sanitation providers who can share knowledge to expand the potential of solutions in the local context. The research entailed the perspectives and views of National Government, Local Municipality, Academics, the Private Sector and an NGO. However, further actors that are significant to the governance of sanitation were identified as the users, technology developers and international bodies. Key findings include the absolute importance of local context for increased success of long-term solutions and the value of societal inclusion in services governance. In addition, this study also identifies the shift from traditional flush toilets to focus on innovations that are more resistant to the increasing challenges in the local context, such water scarcity, lack of capacity and urbanisation.

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اللَّهُمَّ إِنِّي أَسْتُوْدِعُكَ مَا قَرَأْتُ وَمَا حَفَظْتُ، فَرَضُهُ عَلَيَّ عِنْدَ حَاجَتِي إِلَيْهِ، إِنَّكَ عَلَى مَا تَشَاءُ قَدِيرٌ وَأَنْتَ حَسْبِي وَنِعْمَ الْوَكِيلُ

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## 1. Abbreviations

<b>ANC</b>	African National Congress
<b>CAB</b>	Communal Ablution Block
<b>DWATS</b>	Decentralized Wastewater Treatment Systems
<b>DWS</b>	Department of Water and Sanitation
<b>EWS</b>	eThekweni Water and Sanitation
<b>KZN</b>	KwaZulu-Natal
<b>PRG</b>	Pollution Research Group
<b>SDG</b>	Sustainable Development Goal
<b>UDDT</b>	Urine Diverting Dry Toilet
<b>UKZN</b>	University of KwaZulu-Natal
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Program
<b>USAID</b>	United States Agency for International Development
<b>VIP</b>	Ventilated Improved Pit Latrine
<b>WASH</b>	Water, Sanitation and Health
<b>WHO</b>	World Health Organization
<b>WRC</b>	Water Research Commission

## 2. Introduction

### 2.1 Global context of sanitation

In 2010, the UN General Assembly acknowledged that access to clean and safe drinking water, and sanitation is a basic human right (WHO, 2019) hence the creation of Sustainable Development Goal (SDG) 6: *Clean Water and Sanitation* which aims to “ensure availability and sustainable management of water and sanitation for all” (p.23, The SDG Report, 2019). The SDG target this research addresses is target 6.2: “By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations”. In the last 2 decades, this has improved, from 28% of the world’s population having access in 2000 to 45% by 2017. However, there still remains 4.2 billion people yet to be provided with safely managed sanitation services. Of this, in 2017, two billion people were left without the most basic sanitation including 673 million people who still practice open defecation (UN, 2020). Furthermore, there was an estimated 3 billion people without access to safely managed hand washing facilities in their homes. There are obvious disparities between regions’ access to hand-washing facilities, with the highest percentage in people not having basic, safe hand washing facilities being in Sub-Saharan Africa at 75% (767 million people) (UN, 2020). A recent UN SDG report emphasized that reducing these gaps, by increasing water and sanitation provision, is critical for providing effective and efficient health care and would help in containing the spread of the current COVID-19 pandemic. Moreover, attention was also brought to water conservation and promotion of water-efficient strategies to reduce water stress. This effort would, in turn, strengthen environmental and economic resilience (UN, 2020). These problems are further exacerbated by urbanization and a growth in population, raising the demand and the need of services. As a result, this has steered conversations towards developing innovative alternatives for sanitation services which are environmentally friendly and affordable for all (Odili, 2018). Considering the challenges mentioned, and in an effort to achieve innovations, there has been a shift in governance actors over time. For African countries, this tends to be an institutional challenge to adjust to, as Edgar Pieterse puts it, “African governments [are] not prepared to deal with urbanization as a set of interrelated issues” (Global Perspectives Initiative GPI, 2019) and as such, city governments and local municipalities are ill-prepared to understand and deal with such challenges that comes with this shift.

This is particularly seen in eThekweni (Zulu language, also known as Durban), South Africa, where there still exists a backlog of people requiring services. South Africa has an incredibly unique environment, where only in 1994, at the end of apartheid and the start of democracy, it was constitutionally mandated that basic services is a human right. This is explained in further detail in chapter 4, but it is essential to know that prior to 1994, Black South Africans were discriminated and excluded from access to such services, including water and sanitation. Hence, with the end of apartheid and a new constitution granting all citizens constitutional rights to basic services including water and sanitation, came the outstanding backlogs of those without access to water and sanitation. As a way to tackle this challenge and provide services to all people, there was a process of devolution of powers and responsibilities for service delivery from the central state. However, 26 years later, backlogs still remain. This is due to number of reasons in how sanitation governance has been managed and how sanitation delivery has progressed, impacting what can and cannot be done. eThekweni Municipality is responsible for the sanitation services in eThekweni and is world-renowned for being experimental with governance strategies and exploring new ways to eradicate backlogs (Bond, 2020). Hence this research attempts to contextualize the sanitation governance in eThekweni, South Africa, to understand what is affecting the significant, outstanding backlogs of sanitation services (an essential basic right for all), by exploring the actors involved and the challenges they encounter.

While there are evident technical issues such as a lack of infrastructure, it is important to understand the complexities involved in integrated urban sanitation governance, as well as the cultural and behavioural drivers of local governments, communities and all other actors. Factors contributing to a lack of sustainability and inclusiveness in sanitation governance are broad and varied. Reasons contributing to this include weak government leadership and governance of service provision, resulting in low political commitment, and consequentially chronic budget shortages and minimal public funds designated to sanitation (Maharaj, 2012; Odili and Sutherland, 2020). Moreover, the WHO (2012) found that when funding is available, often little is directed towards improving the management of available sanitation services. Furthermore, sanitation is often considered a household responsibility rather than a public concern, leading to minimal oversight and cohesion amongst stakeholders involved in urban sanitation planning and delivery (Galli et al., 2014, Welle et al., 2008). Together the numerous factors, from weak governance to poor infrastructure to local context, are interconnected and co-dependent, and tackling the issue through a series of piece-meal solutions or narrow-scoped projects does not work (Galli et al., 2014).



However, before examining the governance of sanitation, it is important to understand: why have sanitation at all? What is its significance? Lack of sanitation results in social, environmental, and economic impacts. An interesting and often overlooked importance of a toilet, as pointed out by Sutherland et al. (2020), is that for the privileged, it is often a space to enjoy privacy, to think alone or to escape momentarily from the hectic life outside. This is especially relevant in the case of informal settlements where there is little privacy to begin with due to more densely populated homes (Sutherland et al., 2020). Therefore, this issue stresses the need to address the lack of sanitation, not only for quality of life or physical health but also for mental health. Moreover, there is personal safety, health, time, and accessibility when considering social impacts of sustainable and inclusive sanitation (Satterthwaite et al., 2019). Open defecation or bad management of human waste can lead to pollution of ecosystems and natural resources. A lack of clean sanitation access results in illness and diseases, and increased school dropouts from illnesses or to make up time lost travelling to services (Satterthwaite et al., 2019). For women, it is even more difficult for menstrual hygiene access (Sutherland et al., 2020). This in turn creates economic impacts from medical fees and loss of capacity and potential future careers. This leads to an endless cycle of poverty from illness and loss of capacity (Martel, 2015).

Figure 1 shows the graph from a 2012 WHO- UN-Water Global Analysis and Assessment for Sanitation and Drinking water (GLAAS) report which conveyed that nearly 80% of the respondent countries recognised that water is a human right and over 50% of the respondent countries recognised the right to sanitation, through law or policy (WHO, 2012). However, despite sanitation being largely recognised as a necessity for all, the demand for access and availability to safe sanitation has yet to end and its challenges are ever-increasing due to population growth (Galli et al., 2014). A growth in population often leads to residents migrating to urban areas in search for jobs, increased income, and opportunities but also to seek safety from climate change impacts. As a result, urbanisation is on the rise globally, in both developed and developing countries proportionally aggravating social and infrastructural challenges for sanitation and enhancing the need for attention from the international development community (Hawkins et al., 2013).

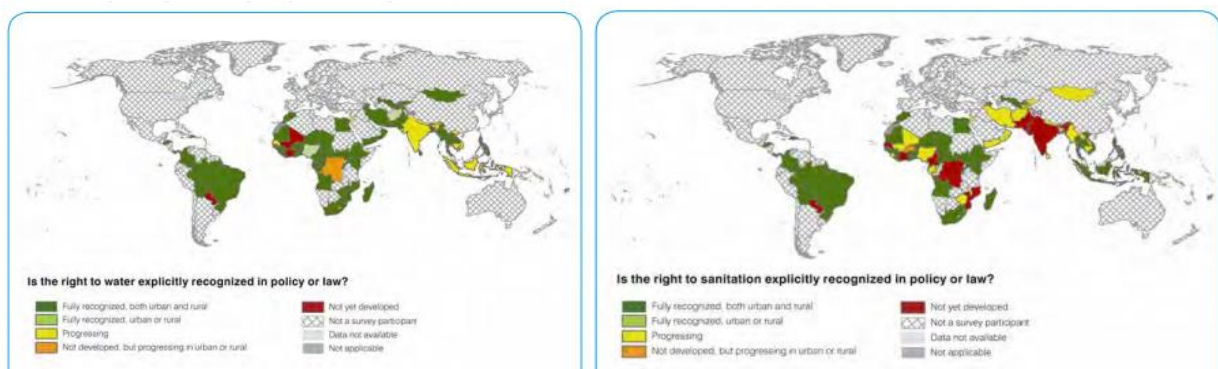


Figure 1: Respondent countries who recognise water (left) and sanitation (right) as a human right (p.44 WHO, 2012)

## 2.2 Country and City context

### 2.2.1 South Africa

South Africa is a developing country and has a population of just below 56.5 million people. As of 2020, 67.4% of the country's population live in urban areas (CIA, 2020). Until the early 1990s, South Africa was ruled under the Apartheid regime; a system of institutionalised racial segregation and discrimination (SA History, 2020). Apartheid, from the Afrikaans language meaning 'Apartness', followed the Population Registration Act in place from 1950-1991 which separated race into four 'racial' categories: Black, White, Coloured (mixed-race) and Asian. This was used to register everyone and determine the status of all South Africans during the apartheid and these labels are still used today, including in the countrywide census (CIA, 2020; Encyclopaedia Britannica, 2020). For this reason, to understand inclusiveness, or a lack of, this research will continue to use these classification terms throughout this research. For this reason, sanitation provision is a unique challenge in South Africa. Challenges are not due to the norms, i.e. increased urbanisation etc, though this does contribute, the urgency and main reason why there is such a high level of inequality in access to sanitation services for all, specifically non-white people, is due to ahistorical discrimination and purposeful exclusion of basic needs during Apartheid.

Democracy began with the majority of the Black population living in informal settlements and without basic services. During the apartheid era, people were treated differently depending on their race and Black people were designated areas for where they could live. Policies put in place by the government indirectly moved Black people out of cities and into townships on the outskirts, far from their places of work. Black people were not allowed to buy real estate and could only rent, and land was only owned by white people (SA History, 2020). Black opposition within politics began in the 1910s, with the introduction of the African National Congress (ANC) party, to oppose the exclusion of Blacks in positions of authority. The struggle continued, with peaceful protests and other forms of demonstrations, until the first democratic election was held in 1994. The ANC party triumphed with a 62% majority and Nelson Mandela became South Africa's first democratically elected president (RSA, 2020). The ANC have continued to win the majority of votes in every election ever since 1994 and the current president, Cyril Ramaphosa, has been in his position since February 2018 (RSA, 2020). Following the start of democracy, the country underwent a series of changes including a decentralisation of power and responsibilities, and a demarcation of provinces, changing from 4 provinces and 10 Black homelands to 9 provinces as shown in Figure 3 (RSA, 2020). The highest populated racial group in South Africa is the Black population (80.9%) followed by mixed (8.8%), white (7.8%) and Asian / other (2.5%) racial groups (CIA, 2020; Encyclopaedia Britannica, 2020).



Figure 2: A map of South Africa, identifying where eThekweni is in the country. (Google, 2020)



Figure 3: A map of South Africa with the boundaries of the provinces (Mapsofworld.com, 2020)

### 2.2.2 Problem definition

The increasing unplanned expansion of small and medium sized towns, alongside the rapid growth of informal settlements in cities, particularly in low and middle income countries, makes urban sanitation provision a necessary challenge to overcome to reduce public health risks and environmental degradation (Galli et al., 2014). The most economically marginalised and unprotected segments of society tend to suffer the most as they are the most susceptible to diseases. Water supply and sanitation systems are inescapably tied to the wider development process for both individuals and as a country, as they act as a key defence in breaking the transmission routes of diseases (Lutchminarayan, 2007). Poor health creates social disruption, narrows economic opportunities, and keeps families in a continuous circle of poverty (Lutchminarayan, 2007).

Due to the historic and political discrimination during apartheid, the majority of Black South Africans did not have access to basic services, impacting their wellbeing and success. Backlogs remain in eThekweni with some residents having limited to no access to sanitation, despite the constitution which mandates access to basic sanitation as a human right. It is these populations that are most at risk of disease and illness which could have an adverse effect on their livelihoods. To address these backlogs, a shift in sanitation governance occurred, in order to create a deeper connection to the local communities and their needs. Hawkins et al. (2013) stated that inclusive and effective sanitation delivery to urban populations requires efforts from all actors within the chain of services, with further support by a combination of decentralised, domestic or fully networked infrastructures. This is in line with eThekweni's transformation, where there are more engagements between actors. This is to drive change, ensure equality and accountability, and to secure sustainable implementation of services provided for public and private sectors. This means reaching out to all communities, including the urban poor and those living in informal settlements who currently do not have improved access to sanitation (Hawkins et al., 2013) as is the case in eThekweni. Therefore, this leaves the problem to be defined as a gap in knowledge of how this shift in sanitation governance is impacting the current delivery of sanitation in eThekweni.

### 2.3 Aims and Objectives

This research delves into exploring the current governance of sanitation delivery and aims to provide a critical analysis of how this is impacting the sustainability and inclusiveness of such services. Therefore, the ultimate goal is to add to existing literature on urban sanitation governance, to systematically explore change to promote sustainable sanitation access for all. This is by studying and analysing expert knowledge, perspectives and experiences contributing towards delivery of inclusive and sustainable sanitation services. This can be used to develop plans for improving sanitation and hygiene facilities in developing urban regions. To accomplish such aims, this research has the following objectives:

1. To give an overview of the actors involved in sanitation governance, how this has changed over the years since apartheid and actors' role in collaboration.
2. To gain an understanding of inclusiveness and sustainability from eThekweni's sanitation governance actors, in the context of global definitions.

3. To understand the challenges experienced by actors involved in the delivery of sustainable and inclusive sanitation services, with focus on the impacts on the overall delivery model.
4. To identify ways in which governance in eThekweni, South Africa can accelerate more inclusive and sustainable sanitation services.

## 2.4 Research Question

To achieve the aims and objectives of this study, the following research questions are the focus over the course of this research.

*How does the current sanitation governance in eThekweni, South Africa impact the sustainability and inclusiveness of sanitation services?*

### Sub-questions

1. *How have actors within sanitation governance changed and evolved over the last 25 years in eThekweni, South Africa?*
2. *How do actors within governance understand sustainability and inclusiveness in sanitation provision in eThekweni, South Africa?*
3. *How do the challenges that actors experience in sanitation service delivery impact sanitation governance in eThekweni, South Africa?*
4. *How can governance facilitate more inclusive and sustainable sanitation in eThekweni, South Africa?*

## 2.5 Relevance

### 2.5.1 Scientific relevance

This research project will provide an analysis of sanitation governance and how this impacts inclusiveness and sustainability in eThekweni. This can be used as a comparative study with other urban environments to see what governance similarities and differences there may be, contributing to global knowledge on governance in urban environments. This is also valuable as the approaches used in eThekweni may be functional, or adapted to be functional, in other environments. This project is also scientifically relevant as it explores challenges, understandings and experiences by actors within sanitation governance, which can be used in comparison to other countries in the Global South; as it is in the wider project this research is a part of. Broadly this project seeks to provide a basis for future research to promote sustainability and inclusiveness in sanitation delivery in developing countries. Alongside SDG 6, this study concerns several other goals. SDG 11: *Sustainable Cities and Communities* focuses on urban planning and management in inclusive and participatory ways. SDG 8: *Decent Work and Economic Growth* is also significant in this project as without sanitation, productivity and a stable income becomes difficult (Hawkins et al., 2013). Hence this project will offer new perspectives and data from actors which can be used in further research to build frameworks to improve sanitation access for everyone. Furthermore, the methodology used to collect data within this project will be replicable in eThekweni and also in other cities and countries, allowing the same analysis and procedure to be carried out again to produce generalizable information when overlaps occur.

## 2.5.2 Societal relevance

The societal relevance of this study occurs both during and after the project. The interviews carried out with stakeholders can potentially raise awareness and highlight any unintentional discrimination whilst planning sanitation access. This can have an immediate impact in implementing inclusive and accessible sanitation within urban environments. In turn, this will impact communities who currently do not have access by improving health, productivity, and overall quality of life (Hawkins et al., 2013). Increasing access to sanitation for vulnerable communities will decrease social inequality and allow families to escape the circle of poverty by better economic opportunities (Lutchminarayan, 2007). Moreover, sickness and time lost whilst fetching water robs whole communities of their futures (Africa Check, 2020) so an inclusive urban plan will result in the overall increase of success in a city by saving valuable time in everyday lives and providing equal opportunities to others. Furthermore, the research could incentivise stakeholders and local governments in collaborating openly against discrimination of vulnerable communities and increase interventions targeted towards poor and informal neighbourhoods. This could encourage community integration from diverse backgrounds. Consequentially, this will result in equity and equality within society. Additionally, this research can promote other sectors such as the education and career departments, in interacting and improving access to vulnerable, excluded, or poor communities.

## 3. Theoretical Framework

### 3.1 Introduction

The role and meaning of government for public services provision is being challenged in recent times as new aspects of governance are rising. Scholars have described governance to be methods to govern, the orders of rule and the engagement of citizens in the distribution of public services and resources (Robichau, 2011; Maharaj, 2012). Governance is a lens for which one can use to study the roll-out of public services and to understand the reasoning behind choices that the state makes (Hubbard et al., 2002). This chapter examines relevant theoretical contributions to governance including regulation theory and Network Governance, the history of sanitation governance which contributes to understanding the key aspects of the challenges, and future South African governance and the choices the state has yet to make. To fully contextualise this, a history of South African governance and sanitation service delivery is also incorporated in this chapter.

Ultimately this leads to the conclusion that it is key to enact mechanisms for promoting inclusiveness to achieve a balance when shifting to 'new' forms of governance from the traditional government-oriented approach. This section shows that an integrated, multi-actor approach is core to a sustainable management and implementation of public services. However, it is important to bear in mind that recently there has been a rise in African Urbanism, arguing that much of the theories used in development are stemming from the Global North and thus not as applicable to countries in the Global South as there are such stark differences. Hence, the following theories, although chosen due to their relevance to this research, should be approached tentatively when applying them to developing contexts, especially South Africa given the historical context.



### 3.2 Governance: differences in definition

'Governance' within the social sciences is ever-changing and has multiple definitions attributed to it, making it a complex term (Robinson and Keating, 2005). It has relevance in a variety of disciplines including, but not limited to, political sciences, business sector and the social sciences, making it an inter-disciplinary term (Robinson and Keating, 2005; Maharaj, 2012).

Political geographers, for example, tend to understand governance as the role of the state in policy and resources allotment, and in the relation between the civil society, state, and market (Hubbard et al, 2002).

Social sciences, on the other hand, define governance as the ways in which policy is translated into action, changing to a more inclusive approach- in contrast to a centralised government (Stoker, 1998; Hubbard et al, 2002, Robichau, 2011).

The managerialist approach taken within the private and business sector has influenced the customs of the public sector, which is specifically seen in the entrepreneurial governance approach of New Public Management (NPM) (Maharaj, 2012). This government model aspires to have 'less government but more governance' where the favoured options for enacting policy decisions and implementation is by means of market mechanisms (Rhodes, 1997).

Finally, the United Nations Development Programme's (UNDP) definition of governance is the way in which society manages its social, political and economic affairs through interactions and partnerships between the state, civil society and the private sector as a tool for managing public resources efficiently (UNDP, 1997). It refers to the ways in which society organises itself to solve problems and implement decisions through mutual agreements and forming relationships to enact action (Mjoli, 2015).

### 3.3 Sustainable Governance

"Think global, act local" is a common way to describe the shifting and recalibration of the state to adapt to globalisation and accommodate new regulations within the global governance sphere (Hubbard et al, 2002). A central point in understanding the emerging forms of governance is the transformations happening in local, national and international politics, mostly in urban areas (Brenner, 2004). Changes in decision-making and those responsible for it is dependent on the boundaries between the state and its citizens, challenging spatial scales and introducing several networks into the process of whom have relative autonomy to the state, amongst other factors (Hubbard et al., 2002). In Ostrom's work, she deduced that a state-centric governance for service delivery, including sanitation, does not fulfil sustainability goals or a socially just delivery (Ostrom, 1990). This emerges in the theory of co-production whereby both private and public entities can collaborate for service delivery. Ostrom also noted that the user's active participation can affect the end result of the service (Ostrom, 1990).

### **3.3.1 Decentralised Governance**

Decentralisation of governance can mean different things depending on the context. Generally, it relates to a change in responsibility of the management and delivery of public resources. This is in terms of authority, planning, decision-making, implementation, where these duties shift to local governments, the private sector or non-governmental organisations; this is dependent on the specific purpose (UNDP, 1999). Advocates of decentralised governance say that it can increase political accountability, citizen participation and economic growth (Cheema and Rondellini, 2007). Moreover, Cheema and Rondellini (2007) express that decentralisation provides the opportunity for innovation of solutions and of empowering communities. Decentralisation happens due to a number of reasons but often with the aim to enhance government response to the needs of its citizens by increased engagement and participation in decision regarding improved living conditions (UNDP, 1999). Interaction and ability to participate in decision-making is seen as being vital to sustainable human development (UNDP, 1999). A decentralised model in India found that there was an increase in knowledge sharing, local participation and NGO driven projects (Maharaj, 2012). Maharaj (2012) details the pros and cons of decentralised governance. Pros include that service delivery can be more suited to local needs, increased innovations, cheaper and more flexible. Cons include decentralisation of corruption and lack of spending accountability (Maharaj, 2012)

### **3.3.2 Governance theories**

Traditional modes of governance (where the state has full control), were reduced by the increased autonomy of non-governmental organisations, which introduced new forms of governance influencing the management, decision-making and implementation of public resources. Academics have said that the rise of new forms of governance escalated eclecticism in terms of transitioning to a mixed governance approach, as opposed to the traditional bureaucratic control (Hubbard et al., 2002). As a result of this shift in governance, the role of the state changes. There is much debate on what the role of the state should be. Some say that the state should be an equal actor or stakeholder (Latour, 2005), others say that it should be a strategic enabler (Hubbard et al., 2002) or a facilitator (Kooiman, 2003) and some even say that the role of the state is to be minimalist (Rhodes, 1997) in governing stance. Ultimately however, some scholars follow the thought that there are certain facets of service delivery which are out of the capacity of non-governmental sectors and that the state's responsibility is maintaining an economic and social balance in governing, i.e. for reliability, accessibility and reasonable prices (Martel, 2005; Bakker, 2008; Bond, 2020). The following governance theories, Regulation Theory and Network Governance Theory, were chosen due to their relevance to the changing shift South Africa's service provision governance is experiencing. However, it is key to note than firstly, these theories are more prominent in the Global North but with increasing urbanisation and the impact thereof, the overlaps in these governance theories were found interesting to relate to this study.



### Regulation Theory

One contributing theory on governance is derived through Marxism, regulation theory. Regulation theory is often brought up by political geographers to develop an understanding of the reorganisation and shifts in power and social order in emerging forms of governance (Hubbard et al., 2002). Karl Marx argued that capitalism, in social, political and economic realms, is an unstable system which would inevitably lead to a class struggle and capital accumulation (Bevir, 2016). As such, regulation theorists study the new forms of governance that emerge as different scales of capitalism react and manage these instabilities (Bevir, 2016). A key aspect of Regulation Theory is to recognise that there are changing interactions and roles within government with an integration of social and political relations, this in turn influences the relationship between the state and other actors involved in governance and service delivery (Tickell and Peck, 1992; Maharaj, 2012). This is relevant in the case of eThekweni, as there is a transition in service governance in South Africa since apartheid, leading to a shift in relationships between the state and non-governmental sector in terms of responsibilities and accountability (Odili and Sutherland, 2020). Tickell and Peck (1992) term this integration of socio-economic relations within the governing network as “mode of social regulation”. They argue that these modes of social regulation have yet to be understood, and an effort needs to be made to try to understand this in a capitalist accumulation (Tickell and Peck, 1992). As such, the regulation theory aims to bridge a balance in capitalist accumulation, bringing attention to the influences of social, legal and cultural provisions on production and consumption in regulatory systems. Regulating regions of diverse history and socio-cultural context presents a challenge for the state, so different methods of governance and processes are required (Tickell and Peck, 1992; Maharaj, 2012). Regulation theory also adopts the belief that society are key stakeholders of emerging modes of governance and as such, regulation should focus more on a societal governance approach (Hubbard et al., 2002). It is this that brings in the similarities to eThekweni, the inclusion of different non-governmental actors in the governance of sanitation brings question to who is considered, what their roles are and particularly, how much society have a voice in sanitation decisions. However, as pointed out by Tickell and Peck (1992), a transition and shift from one form of governance to another is followed by a “*creative destruction and reconstitution of space*”, and balancing the economic, political and cultural aspects of such changes is key. This *creative destruction* is what eThekweni is currently experiencing, with a redesign of how sanitation governance is managed and what the roles of each actor is since the end of apartheid, including considering society and individual communities as a key actor. As such the sanitation landscape is changing in order to bridge different actors in society who can contribute to increasing sustainability and inclusiveness in eThekweni’s sanitation service provision.

### Network Governance Theory

Network governance is an approach studied extensively by scholars and aims to collectively analyse and consider the increasing importance of non-state actors in governance such as NGO’s, academics, the private sector and international institutions (Dedeurwaerdere, 2005). Rhodes (1997) states that this increases the complexity of networks and roles within governance as they operate at different levels, have various degrees of influence and varying power relations to one another. For example, at micro-level this could refer to the networks between individual actors and at macro-level the

relationship between the state and society. In principle, the central goal of developing these relationships is to change the distribution and outlook on public resources through advocacy, open communication, and support between networks towards achieving a mutual, desired goal (Robinson and Keating, 2005).

Network Governance, as an approach, arose when the external, autonomous actors became involved within the delivery, management and engagement of public resources (formally or informally) through developing a relationship with the state. This was not a natural path in South Africa but rather, through the existence of democracy, became a mandatory way of managing service and resource distribution. Network Governance also confirms that independent and separate private and public actors is no longer sustainable, and rather this is detrimental to a productive resource distribution and service delivery (Maharaj, 2012). This is particularly relevant to this research as prior to 1994, South Africa as a state was run in an authoritarian way, which excluded Black people from equal access to basic needs. As such, the engagement of non-state actors lead to a more sustainable outcome with aims of more productive flow of resources. As a result, service delivery challenges could be revamped by inter-organisational capacity of agents within the network. (Maharaj, 2012)

Robinson and Keating (2005) interpret the role of the state to two forms of governance arrangements: the 'old' and the 'new' approaches. The former is in reference to a more traditional approach to governance where the focus is more on state-centric government and politics, whereas the latter is a more recent approach with a more society-centric government through enabling relationships with a variety of stakeholders (Maharaj, 2012). South Africa pre-1994 was very much in an 'old' approach, whereas post-apartheid, it transitioned into a more 'new approach' with the use of local government along with external stakeholders. A conceptualisation of the Network Governance approach (Figure 4) shows several actors from varying sectors, including actors from both within government and outside of it. The South African system follows a similar approach, since devolution into three main branches of government, making use of national, provincial and local government as key authorities who then engage other stakeholders including NGOs and businesses in service delivery (Galvin and Habib, 2003). Rhodes (1997) explains this process of governance change and growth as "hollowing out of the state" where the reach of the core government is reduced, thus increasing the need for diplomacy.

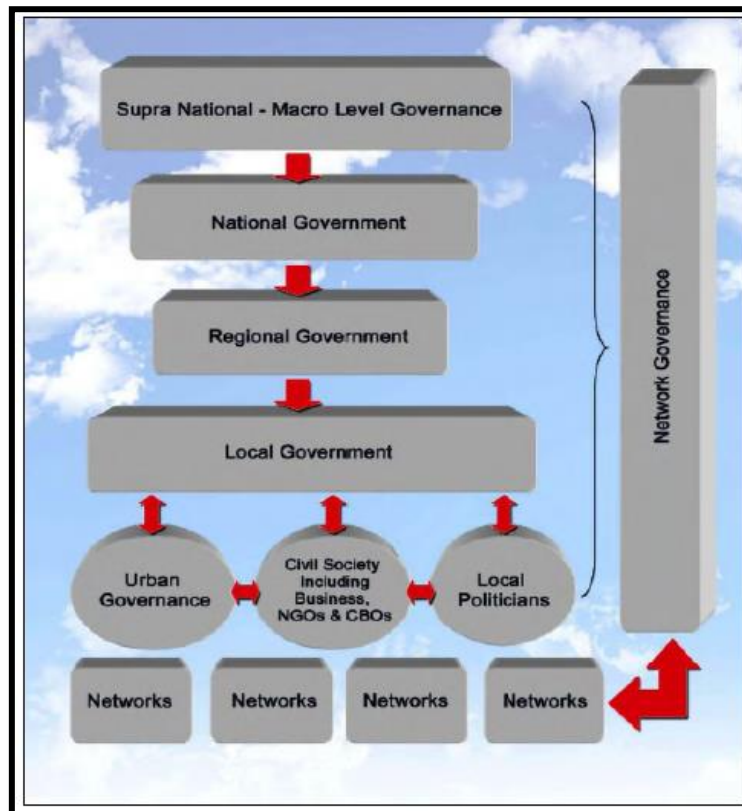


Figure 4: Conceptualising the multi-actor system of Network Governance from Maharaj (2012)

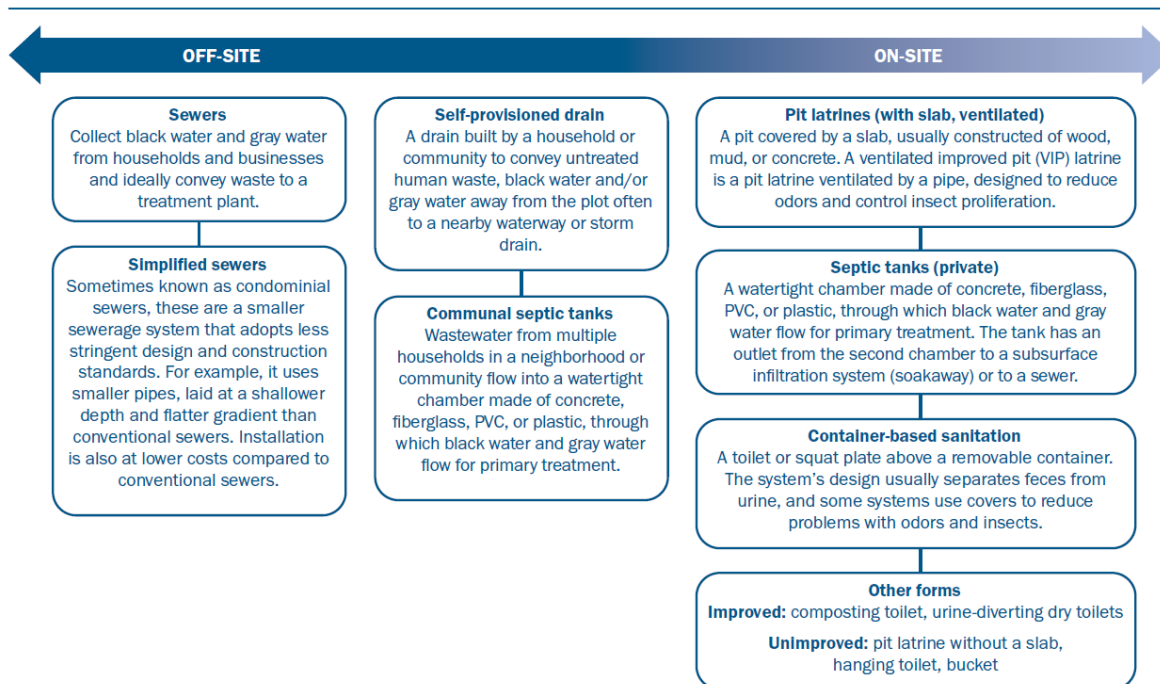
Network activity should, in theory, be based on relationships without a ladder of hierarchy. This is through all agents working together towards a shared end goal, by pooling resources, exchanging knowledge, developing relationships with trust and compromise, and developing systems to increase transparency (Robert and Keating, 2005). Hence the relevance to this research, the end of apartheid signified a change and effort was needed towards eliminating discrimination and provide services for all in a non-discriminatory manner. To omit discrimination, all perspectives must be understood, signifying the importance of collaboration between more actors. By joining resources through many stakeholders, relationships can be built, information sharing would be more normalised and there would be more trust within the systems. This is with the aims of increasing sustainability and longevity of programmes (Mjoli, 2010). These actors include business associations and the private sector, trade unions, non-governmental organisation, governmental bodies, and public members (Robert and Keating, 2005).

Haikio's (2007) writing support that Network Governance is a good approach for promoting sustainable development in urban cities, in the context where local authorities are co-operative facilitators. They are credited and beneficial to governance due to their expertise knowledge and resources available (Haikio, 2002). Swyngedouw (2005) further adds that having networks in governance allows for an iterative interaction between state and agents, increasing checks and decreasing bias, through organised participatory methods and non-traditional, joint decision-making. However, Stoker (1998) warns that if leadership within the agents' network is weak, the autonomy of such networks are at risk of being swayed by the state resulting in a bias, and potentially corrupt, network. Given the history of discrimination and bias in service provision, This is a key factor that South Africa's governance works towards, given the history of discrimination and bias in service provision. Alternatively, Rhodes (1997) suggests a risk of that Network Governance is that networks may become less accountable for their actions due to their increased autonomy from the state and lack of the traditional governance approach (Rhodes, 1997).

### 3.4 Framing the Sanitation Challenge

To contextualise this research, this section outlines a literature review of sanitation governance, the current global state of affairs and the challenge experienced by developing countries in providing services to all people. Sanitation is a key factor impacting a sustainable quality of life, as shown in the link between safe sanitation and well-being and health emphasized by the WHO 2018 Guidelines (Satterthwaite et al., 2019). Urban sanitation is usually approached in two forms: on-site and off-site. On-site sanitation refers to systems where human waste and the associated black water is collected, stored, and in some cases treated, at the point of generation or otherwise eventually transported elsewhere to be treated, reused and disposed of. For on-site services to be successful, they require a high level of capacity from local government and local utilities for planning and implementing sanitation services. Off-site, on the other hand, refers to systems where the waste is removed from the point of generation, typically through a waterborne sewerage system of which there are multiple types, this tends to be more expensive. There are also some systems which have overlaps between off-site and on-site sanitation, to suit the particular context (Satterthwaite et al., 2019). These are illustrated further in Figure 5.

Figure 1 | The range of sanitation approaches used in cities in the global South



Source: Based on authors' analysis.

Figure 5: A conceptual view of the sanitation approaches most common in the Global south from Satterthwaite et al., (2019)

SDG target 6.2 is aimed at achieving adequate and equitable access to sanitation and hygiene for all persons, and to end open defecation, with a specific focus on the needs of women, young girls, and vulnerable persons (UN, 2015). Targets are created as aspirational goals for countries, where governments are expected to localise global targets to suit their environments and set WASH related national targets to reduce inequalities in service delivery and resource distribution (JMP, 2012). The slowest progress towards achieving SDG targets on sanitation and hygiene is in Sub-Saharan Africa, where open defecation is still high (Maharaj, 2012). Generally, the slow pace in which the targets are being achieved globally, indicated by the lack of achievement of the Millennium Development Goals and creation of the Sustainable Development Goals, is worrying. In addition, access to improved sanitation is also correlated with a higher socio-economic status in low- and middle-income countries (Cairncross, 2018).

Improved sanitation is defined by the World Health Organisation (WHO) and UNICEF Joint Monitoring Programme (JMP, 2012) as sanitation facilities which hygienically separates human waste from contact. Access is measured by the indicator 6.2.1; the amount of people who are using improved sanitation services (JMP, 2012), this includes services with sewer connections, pour-flush latrines, pit latrines with a covered pit and Ventilated Improved Pit latrines (VIP) (UN, 2020). Sanitation facilities which are shared between two households or more are not considered to be improved sanitation, but rather a limited service according to the JMP (2012). Other unimproved forms of sanitation include pit latrines without a slab, platform or open pit, bucket latrines and open defecation where human faeces is disposed with other solid waste (JMP, 2012). Human waste should therefore be treated on-site,

stored temporarily and then transported to be emptied later for off-site treatment or treated off-site after being transported via sewer with wastewater (WHO, 2020). Improved sanitation facilities which do not have safely managed systems for waste are classified as basic sanitation services.

There are a number of challenges presented when en route to achieving SDG 6, providing access to adequate sanitation to all, because the improvement of sanitation services is dependent on several contextual factors which vary from region to region (Satterthwaite et al., 2019). These include urbanisation and population growth, spatial and physical conditions, lack of water, cultural norms, finance, and governance, to name a few (Satterthwaite et al., 2019).

### **3.4.1 Sustainable Sanitation Governance**

Safe, sustainable sanitation according to the UN (2019) is described as:

*“When someone has a “safely managed sanitation service,” to use the technical term, it means they use hygienic toilet facilities that are not shared with other households and where excreta are either separated from human contact and safely disposed of in situ or transported and treated off-site, thereby protecting people and the environment from disease agents”*

There are a number of roles the UN contribute to, one of which includes sustainably managing water and sanitation for its member states. This is done through informing policies, monitoring and reporting and inspiring action (UN, 2020). This and the SDGs, their goals and targets frame what sustainable sanitation is for actors globally. However, there can be a number of interpretations from different actors depending on their backgrounds and experiences, thus this research finds it relevant to explore how actors understand sustainability in the governance of sanitation.

However, to begin, it is essential to first understand global understandings and ideas on sustainable sanitation through literature. A key aspect to consider is the regulatory capacity and governance for sanitation systems for cities to reduce health risks, and other impacts from a lack of sanitation. Government must intercede with regulation and provision of sustainable services (Satterthwaite et al., 2019). Van Vliet et al.'s., (2011) study showed that recent approaches to sanitation governance have become more accommodating to diverse stakeholders. Governance with multi-stakeholder collaborative is becoming a global phenomenon with different levels of responses from different regions. This is with input from the private sector, small local organisations and other stakeholders, with new innovative solutions being implemented as a response for provision (Maharaj, 2012; Van Vliet et al., 2011). The shift of governance from a state-led to a more stakeholder inclusive response is explicitly seen in sanitation provision. The director general of UNESCO, Koichuro Matsuura also emphasized the importance of addressing the challenge of sanitation through input of local governments, communities and investors. Furthermore, he voices the need for low-cost sanitation innovations and to overcome the technology barriers (Maharaj, 2012). Tukahirwa et al., (2010) also mentioned that collaborative partnerships between communities, non-governmental, private corporations, and the state, is recommended for sustainable sanitation provision. They further found that projects that were implemented by local governance were found to have a higher likelihood of success (Tukahirwa et al., 2010).

According to Ramachandraiah (2001), inadequate sludge management, poor sanitation systems and unhygienic sanitation practices in India, all entangled within governance, were seen to result in detrimental environmental impacts. The absence of sanitation governance leads to indirect impacts on water resources, contaminating supplies and resulting in increased spread of waterborne diseases and contributing to impacts on the economy. Maharaj (2012) also add that sanitation, whether it is off-site or on-site, must be environmentally friendly with a focus on wastewater and faecal management. In Sub-Saharan Africa, there is a minimum 12% of national health budget spent on responding to sanitation-related diseases (Mwebaza, 2010). Hence, it would be more financially sustainable to the individual to solve the problem at the source by having safe and hygienic sanitation systems.

Ostrom (1996) calls for a collaboration of stakeholders for service provision, to enable a sustainable, long-term outcome. She argues that by pooling together resources from different backgrounds, it can result in innovative and creative ways of providing services, that would not have been an option with just one service provider. Ostrom explains that co-production is “a process through which inputs used to produce a good or service are contributed by individuals who are not ‘in’ the same organisation” is the best way forward rather than shifting responsibility between different authorities. (Ostrom, 1996). Gaziulusoy and Boyle (2013) add to the definition of co-production by arguing this is a transdisciplinary collaboration of various knowledge and service backgrounds contributions. Heaton et al., (2016) underline 5 key features of co-production which appear throughout literature.

1. First, that users are engaged as active, rather than passive, recipients during service delivery
2. Beneficiaries and providers are given equal opportunities to contribute knowledge and experiences to every stage of sanitation delivery, from planning to implementation
3. The roles of beneficiaries and sanitation providers are not mutually exclusive and cannot work in isolation for service delivery and until this is realised, there will not be an efficient and effective sanitation provision
4. Authentic collaboration, partnership and engagement between providers and beneficiaries in the planning, designing and operating stages lead to innovation and ways to supply the current and future demands
5. Finally, academics have noted that co-production is strongly encouraged by networks and organisations that support user participation.

Sutherland et al., (2020) also emphasize the second feature, expressing that so-called “failed technologies” are often due to a lack of social acceptance. They also point out that despite this, there are more publications available on function and technical design rather than on use and socio-cultural meaning to the beneficiaries. In the numerous papers released over the years on sanitation innovations, the majority of focus is on how the system works and there is little available on whether individuals, family and communities have accepted these technologies and integrated them within their lives (Sutherland et al., 2020). The acceptance of technologies within a user’s life is dependent

on historical, political, geographical and socio-economic factors, explicitly focusing on the users and their feedback into the solution. In the co-production of knowledge and information to design sanitation services, these factors must be considered in order to ensure sustainable sanitation that is applicable and affordable for all (Sutherland et al., 2020). Odili and Sutherland's (2020) study further enforces that deepening relationships between the state and its people will lead to increased sustainability and inclusiveness in sanitation governance.

This section has illustrated that sustainable sanitation is a broad term which concerns a number of aspects, including environmental, social, and political facets. Thus, this study deemed it important to understand how governance actors in eThekweni understand sustainable sanitation, and whether there were discrepancies between definitions. This was in the hopes of understanding processes behind decision-making in the provision and governance of sanitation.



## 4. Country Context

### 4.1 Sanitation Governance in South Africa

This research studies the sanitation governance in South Africa and its current structure. The history of South Africa is unique and has shaped the current outlook and circumstances in the country. This chapter describes the national policies and mechanisms in place to combat the existing sanitation crisis as well as the history of eThekweni's governance system. Moreover, arguments on the sources of weaknesses within the sanitation governance of South Africa are presented.

### 4.2 History of South Africa

The democratic movement in 1994, as a result in the end of the authoritarian regime was seen as opportunity to provide services for all of the people that had previously been overlooked due to racial discrimination. This however was a difficult process due to challenges in the social, political, and economic sectors. Yet the country underwent a whole process of policy and regulation change with the objective of an inclusive approach (DWAF, 1994). To contextualise the sanitation governance approach in South Africa well, a history of the country, its challenges, and innovations must be noted. This section will briefly present the changes in governance that has occurred over the last 26 years or so.

Pre-1994, there was a population of 21 million people that was unserved and did not have access to basic sanitation. During this period, government and the separation of lands were fragmented, including areas that were not run by government but by tribal authorities. Resources and authority were determined by race (DWAF, 2002). This era lacked guidelines for sanitation service delivery, amongst other basic needs. Black authorities and citizens were not provided with the support, such as infrastructure and resources, required to address basic needs including water and sanitation. Moreover, there was also the lack of policy guidelines, regulation, and voice to demand change and equality for Black people. As a result, these Black urban and rural areas resorted to buckets systems or open defecation where there was an evident absence of thought in design, maintenance and operation, health, or environmental impact (DWAF, 2002).

Democracy began in 1994 with the victory of the ANC party and the first Black President of South Africa, anti-apartheid revolutionary, Nelson Mandela. With this came the new constitution stating that sanitation was a necessity and thus a priority in delivering. To accomplish this, as well as the many other basic need's goals, the decentralisation of the government occurred whereby local governments were given the responsibility of providing water and sanitation, calling municipalities the Water Service Authority. The key role of government was to supply at least the minimum basic sanitation to all people within the shortest possible time. Born out of this goal was the Free Basic Water Policy where all households are entitled were 25 litres of free water per day and it must be within 200m of their residence. This came with the delivery of a Ventilated Improved Pit (VIP) latrine and a focus on providing a level of hygiene and sanitation awareness in communities as well. This was mostly targeted at those that were in most need of services where a lack of sanitation was impacting

their health and quality of life. These were mostly situated in rural, peri-urban and informal areas (DWAF, 1998.)

By 2001 there had already been significant improvements in the amount of people with access to basic water and sanitation by addressing backlogs and creating frameworks for sanitation provision. However, there was still a large portion of the population without improved sanitation due to demand surpassing supply (DWAF, 2002). To aggravate the situation further, the cholera outbreak in 2001 brought an urgency to improve access to water and sanitation facilities and sanitation practices amongst the urban poor, calling for a revision of governance mechanisms (DWAF, 2003). Impacts of improved sanitation depends on availability and access to water resources and on knowledge on implementing and sustaining sanitation practices. This provides a clear link between water, sanitation and health and for the need of collaborative work in the initial design and implementation stages to improve and enrich the lives of individuals (DWAF, 2002).

The Free Basic Sanitation Implementation Strategy started to be drafted in 2004 as a response to the constitutional obligation of sanitation and water being basic rights which affect dignity, well-being and quality of life. This was not completed until 2009 (Mjoli et al., 2009). In 2005, the bucket eradication programme was introduced with the aim of ending the practice entirely by 2007. This proved to be difficult. In 2007, there was an estimated backlog of estimated 252 thousand, and by the end of 2008, there was still 23 thousand remaining and still using bucket systems (Maharaj, 2012; DWAF, 2008). Sanitation delivery was then transferred to the responsibility of the Department of Human Settlements (DHS, previously DoH), as sanitation was seen as a basic service which must be included within inclusive housing initiatives. This includes the responsibility of setting national and provincial targets for recognising constitutional rights to water and sanitation and integrating this within housing developments. Local municipalities receive some grants from national government but these do not cover the full operational costs of providing sanitation to all people and so local municipalities are expected to find a way to cover the rest to be able to strategize and delivery sanitation to all (Maharaj, 2012).

### 4.3 Decentralised governance of South Africa

The end of the apartheid regime resulted in a decentralisation of power from central government. A change in the relationship between the state and its citizens is expected in post-authoritarianism states, where a complexity develops between neoliberalism, decentralisation, and democratisation (Guarneros-Meza and Geddes, 2010). This is often dependent on access to and availability of financial resources and capacity of government (Guarneros-Meza and Geddes, 2010). Decentralisation is becoming more popular within international settings, particularly in developing countries, as a way to serve the public more efficiently and effectively by improving management of resources, increasing participatory governance to promote democracy and further develop the capacity of branches off of national government (Conyers, 2007; Galvin and Habib, 2003).

The decentralised system within South Africa now is with a devolution of authority from central state power to a government split into national, provincial, and local domains (Mattes, 2008). Local government have a distinctively separate role from national and provincial government, where they are constitutionally responsible for “building democracy and prompting socio-economic

development” (RSA, 1996) to ensure sustainable service provision to communities. According to the South African constitution, the separation in the spheres of governance system are supposed to be independent, distinctive and inter-related between each other, to maintain a synergistic institutional structure (Act 108 Constitution, 1996). Hence, to improve sanitation delivery, municipalities have responded in different mechanisms such as public-private-partnerships, outsourcing and privatisation (Odili, 2018). Mattes (2008) adds that this decentralised government increases democracy within the system and is a clear-cut different from the centralist government that existed previously. Dickovick’s (2005) study states that with the decentralisation of government, came also the demarcation of the provinces, changing from four to nine provinces. This was done to ensure that those who were previously left unserved, would then be within municipality boundaries, allowing them equal advantage in social, economic, and financial governmental benefits (RSA, 1998). During this process, public resources were separated as well by ‘equitable share’ which provided provinces with the responsibility to initiate and implement service delivery within their jurisdictions. Hence, where national government were still responsible for regulation, the decentralisation process transferred accountability and responsibility of service delivery to local municipality (Maharaj, 2012; Lane, 2004). Embedded within the constitution is the importance of co-operative governance and working within and between all spheres on government to provide a co-ordinated, efficient and effective delivery of service to all people (Dickovick’s, 2005; Act 108 Constitution, 1996; Maharaj, 2012). However, according to Burger (2005), the intended impacts of decentralisation was slow to show due to a lack of willingness to transfer power from central state to local municipality. Moreover, De la Harpe (2008) states that some municipalities also refused to accept any accountability or responsibility for a lack of capacity and skill in staff and of poor service infrastructure, albeit it being constitutionally mandated. Additionally, there was poor interpretation of accountability and responsibility leading to a failure in decentralised policies across various sectors (Burger, 2005). Figure 6 shows the roles of each sphere of government since decentralisation.

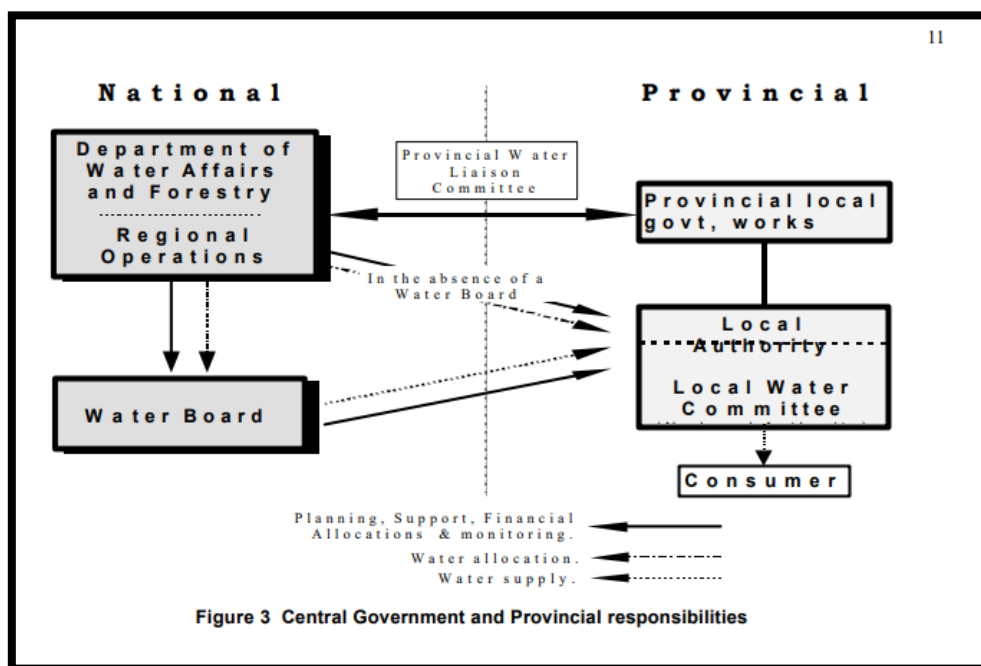


Figure 6: Governmental Responsibilities since Decentralisation (RSA, 1994)

#### 4.4 Decentralised sanitation governance in South Africa

Sanitation delivery in South Africa is carried out within the decentralised governance system explained in the section previously, where each sphere of government is responsible, either through policy, delivery or monitoring and evaluation. Residences are comprised of urban suburbs, peri-urban township and also rural areas. Decentralisation was seen as a pragmatic solution as a way to address the services backlogs existing in the country from the discrimination and absence in services for the majority of the country's population (Heller, 2001). Though this was seen to be the most plausible way of eradicating backlogs, its legitimacy has been contested as there is a lack of resources available to achieve the goals in the democratic constitution of improved services for all, poverty eradication and a better quality of life for the citizens of South Africa (Guarneros-Meza and Geddes, 2010). This is essential when implementing an innovative technology for sanitation, as the providers must ensure it is appropriate to the specific context (Sutherland et al., 2020). The work of Maharaj (2012) in Figure 7 illustrates the decentralised sanitation governance system in South Africa well.

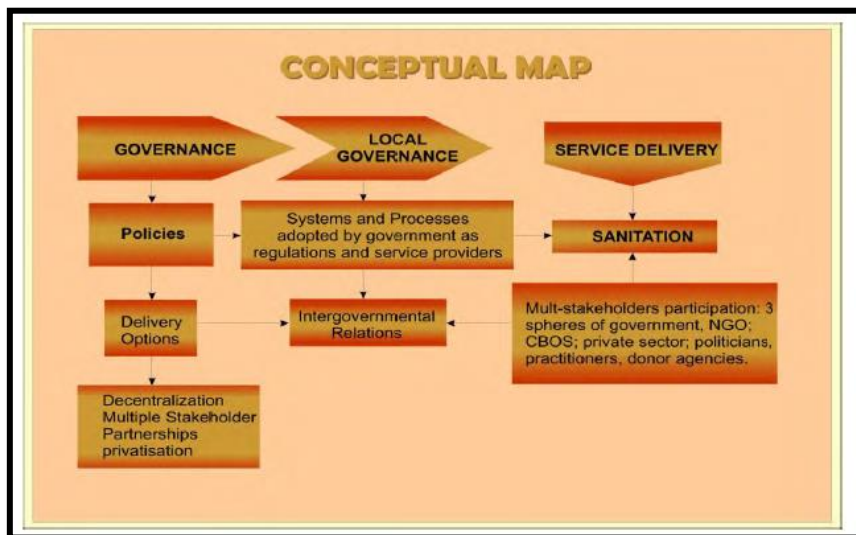


Figure 7: Governance of sanitation delivery in South Africa (Maharaj, 2012)

Relationships exist between the central national state, who are responsible for designing policies asserting goals and standards for what the situation should be, and the local municipalities, who are responsible for implementing solutions to achieve the goals. This is often not feasible due to local contexts, meaning one solution cannot be rolled out for everyone as well as a lack on financial resources. Therefore, local government often engage with other sanitation stakeholders, such as NGOs and the private sector, to aid in achieving sanitation service delivery goals (Maharaj, 2012). One challenge of devolving powers even further and making use of external stakeholders is that there is the potential of social and political instability, as contended by Tapscott (2000). This is in the sense that government have worked towards overcoming the remnants of apartheid and a lack of authority at lower levels of governance can lead to political instability and undoing the efforts that have been done for equality and a better future for South Africa. However, the South African government created

the Inter-Governmental Relations Framework in 2005 aiming to promote inter-governmental relations and provide mechanisms to facilitate inter-governmental disputes (RSA , 2005).

In spite of this, in the 26 years since democracy began, sanitation service delivery goals have yet to be achieved through decentralised governance. One reason that this may be entailed to is weak leadership and a relationship of competition as opposed to co-operation between different spheres of governance which impacts the outcomes of sanitation delivery (Ile, 2010). Inadequate interpretation of policy by authorities resulted further in a lack of focus on behavioural change, community involvement, hygiene awareness & education and on waste disposal, all of which are essential to improved quality of life for citizens (Mjoli, 2010a). Ile (2010) also outlines some of the flaws in South Africa's inter-governmental relations in providing services including weak co-ordination in operation and monitoring of progress, a lack of compliance and adherence to policy and frameworks, and sub-par communication between authorities.

#### **4.4.1 Stakeholder engagement and collaboration**

Sanitation delivery requires an inter-governmental, integrated operation needing the co-operation of all stakeholders to provide the constitutional right of access to improved water and sanitation (DWAF, 1994). Inclusiveness and participation of multi-stakeholders enables a democratic decision-making process through public-private partnerships, privatisation and outsourcing. Municipalities engaging with local businesses to achieve sanitation goals by outsourcing or privatising basic services can increase job opportunities as well as offer a more cost-effective way of providing sanitation services (RSA, 1998)

A strategy named "Masibambane" was adopted by the water services sector, meaning "let's work together" in an effort to join sector-wide stakeholders in sanitation, water and waste-management to collaborate on decision-making and service delivery. Bringing different actors into the solution is seen as the crux in addressing historic governance fragmentation, incapacity and delivery reform (De la Harpe, 2008). This is particularly needed in South Africa, not only due to the authoritarianist history but also due to the fact that it is a water scarce country according to International Research Commission. Multi-stakeholder collaboration is also key due to the movement away from "one size fits all", i.e. that there is one solution or service delivery applicable to all people. This transition was identified as one of the principles for good regularity practice and policy by the Department of Water Affairs (DWA, previously DWAF) because contexts differ between urban, rural and peri-urban areas presenting different challenges and as such, necessitate different solutions. One way of achieving this is through the incorporations of multiple external actors. Actors within these sectors include municipalities, funders, non-governmental organisations, private companies, experts, academics and water service institutes, plus more (De la Harpe, 2008). This was with the aim of

developing capacity and to guide stakeholders through partnerships and support. Masibambane as a process is illustrated in Figure 8 adapted from Maharaj's (2012) paper.

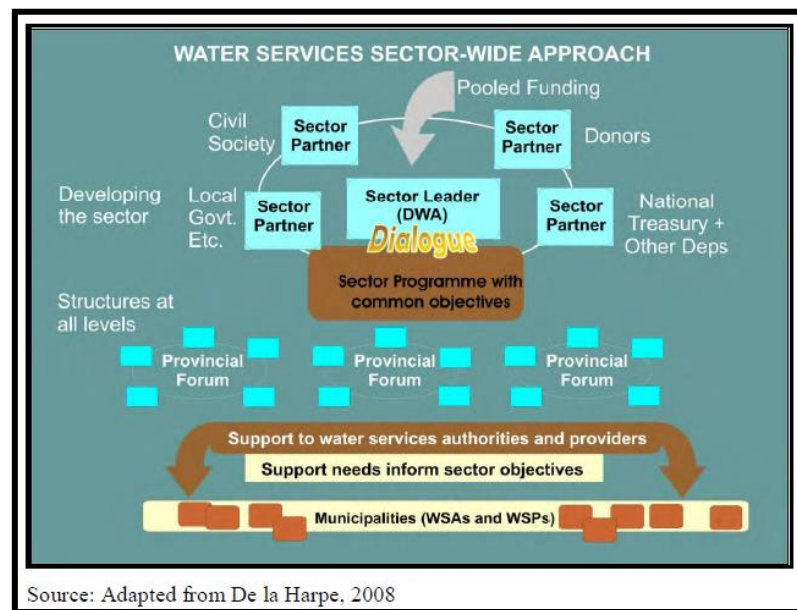


Figure 8: 'Masibambane' illustrated for sector-wide approach

The collaboration of stakeholders stemming from a decentralisation of powers and responsibility to non-governmental sectors, created a transition in the role of the government from a provider to a developmental agent. This is because, while local municipalities are responsible and accountable for providing services such as sanitation for all citizens within its jurisdiction, the water service authorities may choose to sign a contract with an alternative provider or to outsource the job to a private or public body to actually provide the service. It is envisioned that this transition in roles will result in a higher performance efficiency, increased innovations adoptions, reduced 'red tape' in service provision and increased capacity of local government and the private sector (Niksic, 2004). In addition, academics argue that a decentralised government provides local municipalities with a heightened opportunity to engage with regular citizens, and that it offers a platform of flexibility to broaden options and mechanisms of delivery (Farlam, 2005).

It is also key to note philanthropic and external involvement and contributions to sanitation delivery. The rise in populations has led to the government's inability to provide or afford services for all (UNDP, 2014). As such, supranational agencies, philanthropic organisation, donor agencies and such have stepped in and play a significant role in provision of sanitation services in many developing countries, including South Africa (Odili, 2018). Philanthropy is defined as "the desire to promote the welfare of others, expressed especially by the generous donation of money to good causes" in the Oxford dictionary (1992), in other words the wealthy giving money to those in need for use in humanitarian functions.

#### 4.4.2 Community engagement

Multi-stakeholder collaboration includes community participation, such as ward committees, which allow for empowerment and engagement at the community level in developmental processes (Govender, 2008). Public participation is the panacea for democratic governance, particularly in the context of south Africa where the majority of the population were deprived of basic rights previous to 1994. Therefore, community engagement provides a platform for residents to voice aloud their needs and to exercise their rights to services and also to hold the government accountable when necessary (Reddy and Nzimakwe, 2008).

The Department of Water Affairs states that if sanitation delivery is done through treating poor people as beneficiaries rather than as customers, it will result in less services provided due to limited resources (DWAF, 1994). This is because internationally, the poor are perpetuated as objects, rather than as subjects and as such are regarded as resource-less and unable to pay for service, thus entitled to free services from the government which is not always realistic or plausible. Hence, other stakeholders external to the government provide support in South Africa in terms of policy, financial resources, monitoring and evaluation and health and hygiene education. Much of this is dependent on the willingness of the communities, this is in terms of not only accepting the operations and maintenance provided by the municipality, but also to engage with providers to ensure sustainability of sanitation systems through understanding and wanting to use it correctly and maintaining the system themselves (DWAF, 1994). The ideal situation is for communities to engage with implementing authorities, during initial stages of services- including initial planning stages, whereby the government are suppliers who provide a sanitation environment where the community feel ownership towards the system (DWAF, 1994). Sutherland et al.'s (2020) study of testing an innovation within a community also supports this, whereby they found that participants appreciated information on the technology as it "increased their knowledge and therefore their ability to interact with the engineers and municipal officials". This exemplifies the significance of an integrated participatory approach which ensures the beneficiaries are heard in all stages of the project, from design to post-implementation maintenance (Sutherland et al., 2020)

This transitions from a central state governed to a decentralised system and integrating non-governmental actors and the users, signals a new movement and shift in urban governance. Services provision now draws on the expertise of the private sector, community-based organisations, NGOs and other groups. These changes shape the path to a "meaningful, vibrant, democratic and decentralised governance" (Mhone & Edigheji, 2003). As a result, there has been a paradigm shift of the public being viewed as active recipients, rather than passive users (Torfing at al., 2012). Sutherland et al. (2020) found that the community that participated in the study were willing to engage and in fact did not want to be treated as passive recipients but rather wanted to be actively engaged and participating in the sharing of knowledge.

## 4.5 Sanitation policy delivery challenges

### 4.5.1 Definition

Since 1994, the stakeholder and policy definitions of Sanitation have been redefined and adapted numerous times. The DWA originally provided a very broad defined of sanitation services, to be:

*“Physical infrastructure, hygiene-related, behaviour, disposal of wastewater, excreta and other solid wastes, in the context of household and institutional activities” (DWAF, 1996).*

The National Sanitation Policy (1996) defined basic sanitation even further, specifying the type to be a Ventilated Improved Pit (VIP) toilet:

*“Basic level of service for a household means a Ventilated Improved Pit (VIP) toilet in a variety of forms, or its equivalent, as long as it meets minimum requirements in terms of cost, sturdiness, health benefits and environmental impact. In addition, provision should be made for an ongoing programme of ‘easy to understand information’ about correct hygiene practices” (National Sanitation Policy, 1996)*

The 2003 Strategic Framework for Water Services revised the definition following a series of national sanitation service delivery interpretations and the cholera epidemic where many people died, and it became clear a strict change was needed. This resulted in the following definition:

*“The infrastructure necessary to provide a sanitation facility which is safe, reliable, private, protected from the weather and ventilated, keeps smells to the minimum, is easy to keep clean, minimises the risk of the spread of sanitation-related diseases by facilitating the appropriate control of disease carrying flies and pests, and enables safe and appropriate treatment and/or removal of human waste and wastewater in an environmentally sound manner (DWAF, 2003)*

In 2009, the Basic Service Publication went further and specifically included a flush toilet inferring that this is the top of the ‘sanitations ladder’ despite there being financial, technical and capacity restraints:

*“Basic level of service includes flush toilet with septic tank and pit latrine with ventilation. Higher level of service includes, flush toilet connected to sewerage system” (Basic Service Publication, 2009)*



The changing definitions indicate the difficulty in providing sanitation. According to Mjoli et al. (2009), governmental guidelines are too constricting and do not allow municipalities flexibilities in providing sanitation services. They further argue that having multiple definitions, with different types and requirements, throughout different government articles creates a difficulty in providing sanitation services. The change in definitions also lead to a change of perception of the users as they are being told that there are different levels of sanitation and a waterborne system is the top of the sanitation ladder. As such, academics have found that the preferred sanitation system is a waterborne system (Maharaj, 2012)

#### **4.5.2 Challenges in Providing Sustainable Sanitation to All**

The policies, 'basic services as a human right' and 'user-pays', of the National Sanitation Policy are contradicting and yet both are part of the Policy and aimed to be fulfilled. The situation as it is currently is municipalities or water service authorities are providing free sanitation to poor communities, however this is seemingly unsustainable for municipalities with a lower revenue base as they struggle financially in providing sanitation services to a vast number of poor communities (Mjoli et al., 2009). Therefore, despite there being a significant progress in eliminating bucket sanitation, there still remains a backlog of provision. The study of Mjoli (2010), showed that despite the increased force working towards achieving goals, the sanitation schemes were still unsustainable. This indicates that despite South Africa having policy in place for sanitation provision and equality, translating this into action has proven to be difficult. The reasons for not being able to accomplish eradication of the backlogs and provide access to sanitation for all can happen for a number of reasons. This can include a lack of understanding or misinterpretation of sanitation policies (Mjoli, 2010). However, the issue goes further than just policy.

A further issue is evident when noticing that Free Basic Sanitation does not in fact benefit the poorest citizens, as the main beneficiaries are those connected to the waterborne networks, as such most informal settlements do not have access. This is a neglect of the poorest citizens living in peri-urban areas. As such, Mjoli et al. (2010) suggest the need for pro-poor policies rather than free basic services.

Moreover, the Water Research Commission investigated ways of providing sustainable and cost-effective sanitation because delivery was seen to be the most common issue for systems in informal settlements (Mjoli, 2010). The Basic Services Publication (2009) stated that a sharing of knowledge was key for improving sanitation governance and for meeting the goals, hence engagement between different levels of government and stakeholders is essential for success. This includes the communities where delivery is needed. It is essential to note that policy ambitions do not translate into successive action unless the user accepts the system and can afford it (Maharaj, 2010). However, a difficulty presented here is that there is a lack of education on hygiene and cleanliness, so sanitation practices result in contaminated water supplies and increased illness and disease, impacting one's quality of life (Mjoli, 2010).

Furthermore, the delivery costs of sanitation services have been said to be unsustainable as there is a high cost in the infrastructure which is necessary as most households did not have sanitation bulk infrastructure. Financial challenges have been identified early on in the democratic process, as were technical and managerial capacity (Elledge, 2003). Mjoli et al.'s (2009) study identified that there

needs to be stronger relationships within communities to develop practices and services further locally. The study mentions that sustainable development is a gradual process and that there was an absence in consistent engagement or the extent of engagement in attempting to achieve sustainable sanitation delivery.

Most urban areas are connected to a sewerage network and as such, the most difficult area to serve is the peri-urban areas. These tend to reside outside of the formal land areas and often have difficult terrain to build on, with steep or rocky lands. After the demarcation of the provinces, municipalities found it difficult to adapt to the new spatial surroundings within their jurisdictions.

#### 4.6 Inclusiveness

The significant change in inclusiveness began in 1994 when democracy was adopted, and racial inclusiveness became the central goal. This objective continues to progress today, and a lack of inclusiveness is still evident whereby the majority of people living in informal settlements are Black, indicating the past and previous political agenda is still very much impacting and discriminating against those living in the present. This is expressed by Sutherland et al. (2020) writing, “the impact of race on access to flush toilets and the presence of white engineers in under-developed black communities, reflects the ongoing inequalities and the racialised politics of development”.

More specifically, inclusiveness is also progressing to include certain marginalised groups within society, as well as those that were racial discriminated against. According to Gadd & Holden (2003), women often do not use sanitation systems at night if they are communal or away from their home, for fear of safety. This is an issue that sanitation providers often overlook (Gadd & Holden, 2003). For a sustainable sanitation system to be delivered, both genders must be equally involved as they have different perspectives and understandings to contribute, as well as needs and capacity of their own which need to be considered when designing sanitation systems (Elledge, 2003). Moreover, Maharaj (2012) details that women are the catalysts for change in many environments for improving the governance and provision of sanitation.

Another marginalised group that is impacted from a lack of inclusive sanitation are people with disabilities. Very little policy thus far has yet to include clearly services which consider disabilities. The VIP toilet, mentioned as the most basic level of sanitation for roll-out, is not considerate of the needs of people with disabilities. This is including accessibility to the facility also, location and infrastructure can be inaccessible for some, and thus not inclusive of all people. New innovations and policy need to consider people with disabilities when planning sanitation. One’s dignity is at stake by excluding such individuals as they are then forced to resort to open defecation (Mjoli., 2009).

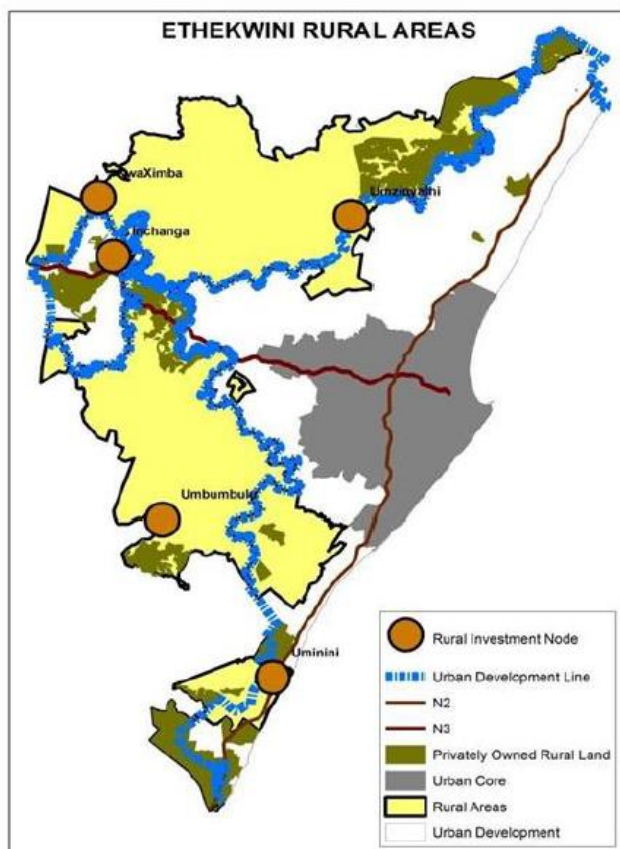
The concept of inclusiveness is key in achieving the SDGs, in order to provide access to all people. However, as demonstrated above, there can be different interpretations of what inclusiveness means. Thus, it would be beneficial for this study to understand how actors within governance understand inclusiveness and whether that impacts governance decisions.

#### 4.7 Sanitation services in eThekweni municipality

eThekweni Water and Sanitation (EWS) is the services authority responsible for eThekweni city as well as the municipal area. EWS provide services throughout the sanitation chain, including not only

the technical aspects but also capacity building through education and training, often outsourcing this to the private sector (Odili, 2018). EWS face a number of challenges including those that the entire country experience including water scarcity, urbanisation, financial capacity and inadequate infrastructure (Odili and Sutherland, 2020). The challenge in the context of eThekweni Municipality is in the fact that during the demarcation process, eThekweni's land area increased by 68%, inheriting rural and peri-urban areas and 60,000 unserved households (Gounden et al., 2006). Moreover, as noted previously, it is difficult to include all marginalised groups of society withstanding the complexity of local contexts, environmental systems, and difficult landscapes. As a result, eThekweni turned to experimentation with innovative sanitation technologies that tackle these challenges and provide new solutions in service delivery, whilst providing platforms for active participation from users in decision-making processes, and have been globally recognised since (Bond, 2020). However, in some aspects, the municipality are limited in what innovative sanitation systems can be implemented due to national governmental policy definitions, and the evolving nature of them which results in unrealistic expectations from communities believing that any type of sanitation system that is not waterborne is inferior (Odili, 2018).

Governance actors in eThekweni have thus seen the challenges in providing services and taken them to be an opportunity of testing different innovations and studying the effects and responses, following the thought that “not one size fits all” (Maharaj, 2012). This was emphasized as a justification for the creation of the Urban Development Line (UDL), shown in Figure 9, as a way of differentiating the rural from urban areas and consequently guiding sanitation development towards appropriate levels of services (Odili, 2018). The Urban Development Line marks where the sewer connections extend to, within the UDL there is waterborne sanitation. The eThekweni Municipality's 2017 Integrated Development Plan (IDP) identified the need of the UDL as “*future residential development outside the UDL supports different lifestyles, densities and has different servicing needs and constraints as opposed to those within the UDL which are higher density and urban in nature*” (eThekweni Municipality, 2017a). In other words, the creation of the UDL was seen as a spatial tool acknowledging there are differences between rural and urban areas, contributing to new solutions to achieve efficient and sustainable growth (Odili and Sutherland, 2020). Past this there are no sewer connections and thus waterborne sanitation is more difficult to provide. A contrary perspective on the existence of the UDL is presented by Bond (2020) who argues that the line is actually a discriminatory line separating the wealthy from the poor.



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Figure 9: The Urban Development Line in eThekweni (Odili, 2018)

In 2017, eThekweni collaborated with the Bill and Melinda Gates Foundation in the 'Reinvent The Toilet Challenge' to conduct testing of sanitation innovations to improve services for the poor (eThekweni Municipality, 2017). This is just one of the many collaborations EWS has done to test more innovations to find suitable ones for informal settlements and the city. For such actions, the municipality has become globally renowned for experimentation with innovative sanitation technologies. However, not all are supporters of such collaborations or see much success in previous projects. Bond (2020) argues that much of these projects can be judged as failures or inadequate attempts, terming it 'tokenistic sanitation'.

## 5. Regional Context

### 5.1 Socio-economic breakdown of eThekweni

Durban City, within the eThekweni Metropolitan Municipality, is the third largest, most-urbanised city in South Africa after Johannesburg and Cape Town. It spans just under 3000km<sup>2</sup> and is also the largest city in the province of KwaZulu-Natal, located on the east coast (eThekweni Municipality, 2019; Arafah et al., 2017) (Figure 2) with a population of just over 595,000 people (Worldpopulationreview.com, 2020). The General Household Survey found that in eThekweni, 83.4% of the households had access to improved sanitation in 2017, of the eight metropolitan areas this was the penultimate lowest percentage (GHS, 2019; Africa Check, 2020). The province of KwaZulu-Natal had a significant increase in households with access to sanitation over the last two decades, rising from 50.9% in 2002 to 80.8% in 2017 (GHS, 2019; Africa Check, 2020). However, a UN-Habitat commissioned study on eThekweni municipality showed that there was still a backlog of almost 69,000 households without access to clean water and approximately 182,000 households without access to sanitation (Sutcliffe and Bannister, 2015). KwaZulu-Natal is one of the most common provinces for vulnerabilities due to being one of the least privileged areas in terms of education, family, income, and access to services.

In 2001 and 2003, there were two major outbreaks of cholera in South Africa and the KwaZulu-Natal province was most affected. Hence, the increase in access to sanitation specifically in this province was due to the response of the eThekweni Municipality acknowledging the need in providing clean water and sanitation facility access to households who were not being served by the city's sewerage systems. Their chosen solution was to provide urine diversion (UD) toilets in some of the peri-urban and rural communities located just outside the central areas. This was adopted as they saw it to be both affordable and sustainable as it is a form of Ecological Sanitation (EcoSan). Morgan (2008) essentially defines this as a system which makes use of human waste by transforming it into something more valuable and useful, with minimum impacts on the environment. By 2007, over 56,000 households had been provided with UD toilets, a free bulk of 200 litres per day of safe water and had been given hygiene education programmes however there was still a backlog of 53,000 households (Lutchminarayan, 2007). The 2017 General Household Survey also investigated the quality of water and sanitation services provided. The eThekweni municipality was rated to provide a good quality of water services to 75.8% of households considered however it had the second highest percentage (17.7%) for reported water interruptions out of the eight metropolitan municipalities (GHS, 2019).

Approximately one third of eThekweni's population live in informal settlements and it is these households who often have the least access to services including hygiene, sanitation and clean water facilities (UN-Habitat, 2003). The current pattern of informal settlements in eThekweni are largely contributed to by the history of Apartheid during the second half of the 20<sup>th</sup> century. The settlements grew as a response to a shortage of housing as well as to the extensive drought of the 1970's - 1980's forcing people to seek opportunities and a livelihood in the city. Hence, the settlements mostly developed around the outskirts of the urban areas (UN-Habitat, 2003), these are termed peri-urban households in the context of eThekweni. There is an overwhelmingly majority of Black South Africans living in informal areas; approximately half of the municipalities Black population live in informal settlements. These tend to be regarded as incubators for diseases housing large populations of 'shunned' and unemployed people (UN-Habitat, 2003). There are significant disparities in the share of income between races in eThekweni where 67% of the Black population are poor whereas only 2% of the White population are categorised as such. There is also a higher percentage (56%) of females, a particularly vulnerable group, in the informal settlements (UN-Habitat, 2003). A lack of inclusive and equitable sanitation provision and access for all enhances the negative impacts endured by vulnerable communities; in eThekweni this particularly is felt by women, elders, the black African population and the poor. Many of these categories overlap in which case, repercussions are even more so.

## 5.2 City context

The following section details the most up to date information on households, livelihoods and policy in South Africa, to show the context of eThekweni in the frame of all the other provinces in the country. This is for the reader to understand the quality of life and challenges the people, and governance actors, in the country are exposed to. The General Household Survey (GHS, 2018), conducted by Statistics South Africa, began in 2002 and has been used to track the annual progress of development since. The most recent 2018 edition provides a landscape of the current development circumstances of the country collecting data on from households on health, education, income and more. However, it is key to mention that the General Household Survey only includes legally recognised households in the nine provinces of South Africa (Omotayo et al., 2019) hence excludes the approximate 1.9 million households living in informal settlements (UNICEF, 2012).

### Households

The GHS (2018) found that the most common household composition amongst households were 'nuclear' families (32.9%) followed by 'extended' families (39.1%) living together. Out of the nine provinces, the ones with the least nuclear family's compositions were East Cape, KwaZulu-Natal, and Limpopo. Coincidentally, these provinces have the highest percentage of 'extended' family households at 42%, 40.4% and 39.3% respectively and also of double generation households (comprised of children and parents) of all the provinces at 46%, 33% and 34,8% respectively (GHS, 2018). Furthermore, East Cape, KwaZulu-Natal and Limpopo had the highest percentage distribution (45-46.9%) of female-headed households of the nine provinces (GHS, 2018).

Other than the formal households within the city, there are also informal settlements and townships in rural and peri-urban areas. Informal settlements are tin or wood shacks that do not belong to homeowners, and who's residents do not have formal legal right to be there. Informal settlements tend not to have access to formal infrastructure for services, but this is dependent on how long the settlements have been there. Townships, on the other hand, are legal low-cost housing that are in areas that were designated for non-white citizens prior to 1994. Originally these were in more peri-urban areas but with the increased urbanisation in the city they now tend to be in urban areas (Connective Cities, 2014).

### **Children**

Households and family members play a core role in the developmental process of children in both emotional growth and physical health aspects (GHS, 2018). In this context, the GHS (2018) investigates the living arrangements of children. The most common living situation of children was to live only with their mothers (43.1%). The provinces with the highest number of orphaned children are KwaZulu-Natal (16.1%), Eastern Cape (14.6%) and Mpumalnga (13.4%). Similarly, the provinces with the highest number of children living with neither parent was prominent in Eastern Cape (33.1%), KwaZulu-Natal (24.4%) and Limpopo (22.8%).

### **Education**

South Africans all have the right to basic education, enforced by the Bill of Rights obliging the government to continuously work towards providing accessible and affordable education to all citizens (GHS, 2018). The GHS (2018) found that the majority of 7-15-year olds in South Africa attend school (87.7%) however number is dramatically decreased by those attending higher education institutions. By the age of 24, only 11.4% of individuals attend an educational institute. When questioned why they were not in education, the most common response from those aged 7-18 was a lack of money (24.2%). The largest percentage difference in reasons between female and male individuals was family commitments. Women are more likely to leave education due to family reasons which can include marriage, pregnancy or household work (GHS, 2018). Moreover, the majority (53.4%) of the country's young population between 15-24 years are unemployed (CIA, 2020).

### **Health**

There are large discrepancies between individuals who are covered by a medical aid scheme in the context of race. The white individuals are the highest group who are members at 72.9%, this is dramatically decreased by the other racial groups in the order of Indian/ Asian, coloured (mixed-race) and lastly black African of which 9.9% are members (GHS, 2018). The survey also found that there was a larger population of female disabilities than male (GHS, 2018).

## Services

Access to services such as water, electricity and sanitation are key to development and to addressing poverty. The GHS (2018) found that although there has been a significant increase in access to electricity since 2002, there are still many people who are still not connected. The provinces with the lowest access to electricity are Gauteng (77.7%), KwaZulu-Natal (83.5%) and North West (83.7%).

In terms of access to clean and safe piped or tap water, the average percentage over the eight metropolitan cities is relatively high at 97.7% (GHS, 2018). The metropolitan areas which were found to have the lowest access are Mangauang (90.1%), City of Tshwane (93.3%) and eThekweni (98.3%). However, the number of households who rated their water services to be 'poor' increased from 2006 (6.9%) to 2018 (11.4%) (GHS, 2018) indicating that the access does not show the true picture as faults and broken services are of no use of providing the service despite the accessibility of its existence.

Furthermore, the survey found that 83% (13.3 million) of households had access to improved sanitation, this was a 20% increase since 2002 when the first General Household Survey was carried out (GHS, 2019; Africa Check, 2020). The definition used for improved sanitation was "flush toilets connected to a public sewerage system or a septic tank" or "a pit toilet with a ventilation pipe" (GHS, 2019). The survey also looked at the share of households without access to improved sanitation in respect to the race of the household head. It was found that 21.5% of households with black African headed households did not have access to improved sanitation, a stark contrast to those headed by coloured (3.1%), Indian/Asian (0.8%) and white (0.2%) people.

## Legislation

In terms of policy, South Africa's Post- Apartheid Legislative Framework and Policy Directive states that provision and access to water and sanitation for all as a basic human right. Section 24 of the Bill of Rights states that everyone has the right to an environment which is not harmful to one's health- a lack of sanitation and access to unsafe and unclean water constitutes to such an environment (Lutchminarayan, 2007). Furthermore, Section 3 of Chapter 1 in the National Health Act narrates that there is a responsibility to warrant the health of the country's population is maintained, protected, promoted and improved. Providing adequate sanitation and hygiene facilities with access to clean water would contribute largely to the success of this Act (Lutchminarayan, 2007).



### 5.3 South Africa's National Principles of Sanitation Policy

As mentioned previously, access to sanitation is enshrined within the constitution as a basic, human right. As such, all citizens should have improved sanitation access, without any discrimination upon their race, sex, culture, or ability (DWA, 1994). To bring this to life, the DWA created National Principles of Sanitation Policy. Figure 10 is a snapshot of the DWA's document outlining the principles and what they entail. There are 8 principles in total which provide the basis for sustainable provision of sanitation for all. All key aspects and details contribute to this project, but specifically what is interesting is that the policy includes the following: that development should be carried out by accountable local structures (1), that services are a right for all (2), that it is better to have a minimal sanitation provision for all than having full-functioning access and provision for some (3) that development should be integrated with other stakeholders and all levels of government (7) and mentions the importance of the environment (8) (DWA, 1994).

**POLICY PRINCIPLES**

Based on local and international experience, and on the premises of the Reconstruction and Development Programme, the following principles are adopted as the basis for the policy which follows. These principles assume a context of universal human rights and the equality of all persons regardless of race, gender, creed or culture.

Policy principles:

1. **Development should be demand driven and community based.** Decision making and control will be devolved as far as possible to accountable local structures. There is a reciprocal obligation on communities to accept responsibility for their own development and governance, with the assistance of the State.
2. **Basic services are a human right.** This will be interpreted, in terms of the Constitution, as a right to a level of services adequate to provide a healthy environment. They do not imply the right of an individual person or community to demand services at the expense of others.
3. **"Some for All", rather than "All for Some".** To give expression to the constitutional requirements, priority in planning and allocation of public funds will be given to those who are presently inadequately served.
4. **Equitable regional allocation of development resources.** The limited national resources available to support the provision of basic services should be equitably distributed among regions, taking account of population and level of development.
5. **Water has economic value.** The way in which water and sanitation services are provided must reflect the growing scarcity of good quality water in South Africa in a manner which reflects their value and does not undermine long term sustainability and economic growth.
6. **The user pays.** This is a central principle to ensure sustainable and equitable development, as well as efficient and effective management.
7. **Integrated development.** Water and sanitation development are not possible in isolation from development in other sectors. Co-ordination is necessary with all tiers of government and other involved parties and maximum direct and indirect benefit must be derived from development in, for instance, education and training, job creation and the promotion of local democracy.
8. **Environmental integrity.** It is necessary to ensure that the environment is considered and protected in all development activities.

It must be noted that principle 1 may appear to contradict principles 2 and 3 in that the first implies a demand driven development philosophy whereas the second and third imply a supply driven, centralised approach. **The primary principle is that development should be demand driven.** The second two principles will determine how the State prioritises its response to community demand.

Figure 10: DWA Sanitation Policy Principles (1994)

## 6. Methodology

### 6.1 Introduction

This section details the methodology on how the research was carried out including the processes in the initial project stages, ethical considerations, data collection, coding, analysis and writing. The methodology is essentially “*the scientific procedures followed, and tools employed in answering the research question*” (Babbie and Mouten, 2002). In other words, this chapter explains the processes embedded behind finding the answers to the research questions and sub-questions. A case study approach has been used focusing on data collected in eThekweni, South Africa. Creswell (2007) stated the purpose behind a case study approach is for “*multi-perspective and multi-sectoral analysis*” because it allows voices of multiple actors to be heard and for an examination of interactions between actors (Odili, 2018).

### 6.2 Starting point of the research

This project began with contacting the Pollution Research Group in eThekweni, where I joined with another team of researchers investigating a larger ongoing study of inclusive and sustainable sanitation. The main point of contact was Rebecca Sindall for this research, but the larger project is being carried out over 5 countries in total with other researchers.

Before data collection could begin, a proposal had to be written and approved and an interview guide was produced. The interview guide was created from a collaboration of all the researchers involved in the larger research project to create a guide that could be used in all contexts. In order to answer the research question, the interview guide entailed questions centred around actors involved within sanitation provision, on difficulties and possibilities in future provision and on extracting information from the most vulnerable communities. The interview guide can be found in Appendix 1. The topics that the interview guide focused around were:

- Sustainability
- Inclusivity
- Sanitation
- Community Engagement
- Challenges

### 6.3 Ethical considerations

Prior to data collection ethical considerations were made. Firstly, ethical approvals were acquired from ethical committees at both Utrecht University and the University of KwaZulu-Natal. Secondly, every participant was provided with an information sheet, found in Appendix 2, containing:

- The purpose of the study
- Who has access to the collected data

- Confidentiality specifying that no risks were involved, that names will remain anonymous (rather their position and company will be cited), and that participation was voluntary and so interviewees knew that they could withdraw from the interview at any point.
- Contact details of both the interviewer's and the local (eThekweni) supervisor's

No sensitive information was asked of the participants to involve or expose personal vulnerabilities or beliefs. The research is focused on programme ethic and process-related information and thus will be interviewing stakeholders on such. Participants were also asked if the interview could be recorded by audio for transcription to which all said yes. Once participants agreed to be interviewed and be recorded, they were asked to sign a consent form. However, due to the COVID-19 pandemic, these were sent online, and approvals had to be changed to confirmation and consent via email. Certificates were obtained also; one for Introduction to research ethics and the other for South Africa. These have been presented in Appendix 2.

#### 6.4 Data collection

This research adopted qualitative data collection as the primary method because opinions, perspectives and thoughts were sought after, which cannot be attained through quantitative data as objectively (Reja et al., 2003). The qualitative data type undertaken were semi-structured interviews with open-ended questions. Semi-structured interviews are appropriate for officials and experts as they are often accustomed to organisation and an efficient use of their time (Bernard, 2011). An interview guide provides basis for comparable and reliable qualitative data as well as replicability in the future (Bernard, 2011). This is especially relevant in this research as the interview guide was used for interviews in 5 countries in total. Open-ended questions are appropriate to this project as they do not limit the answer of the respondent and rather, they are able to express their opinion without being influenced or restricted by the interviewer (Reja et al., 2003). As a result, this can lead to new data from unanticipated responses and spontaneous answers of individuals by reducing bias which may occur through closed questions (Reja et al., 2003). This was motivated by follow-up questions for when expansion of the response was necessary. In total, 18 interviews were carried out. These averaged around 45 minutes long each, some being up to 1.5 hours long.

Interviewees were chosen based on their expertise and role within sanitation governance in eThekweni. Individual participants were chosen through the contacts of the Pollution Research Group and specifically, Rebecca Sindall and Preyan Arumugam as they have a good local understanding which is essential for this study. They were chosen via purposive sampling as it was necessary that participants have real experience of governance in sanitation projects (Babbie and Mouton, 2002) and of the history of South Africa. Thus, by using the networks of the Pollution Research Group (PRG<sup>1</sup>), I was able to call each interviewee directly, discuss the project and schedule an online interview with them. These were all experts in senior positions, and all contributed to sanitation governance in designing, planning, implementing and/or monitoring projects. These were deemed relevant as they had direct knowledge in sanitation projects and the local context (Kothari, 2004).

By having a diverse list of interviewees, as shown in Table 1, a holistic perspective of how eThekweni views inclusivity and sustainability in sanitation can be formed (Hawkins et al., 2013). Actors interviewed, presented in Table 2, included officials within local municipality, national government, academics, private organisations, and NGOs. These were identified as the key actors within sanitation governance in eThekweni, through literature and by academics with a local context.

*Table 1:  
List of participants in this study with interview No., organisation, position and actor group*

<b>Interview No.</b>	<b>Organisation</b>	<b>Position</b>	<b>Actor Group</b>
1	<i>University KwaZulu-Natal</i>	<i>Crop Scientist</i>	<i>Academic</i>
2	<i>Pollution Research Group, UKZN</i>	<i>Co-head</i>	<i>Academic</i>
3	<i>Umgenti Water</i>	<i>Regional Manager</i>	<i>Utilities</i>
4	<i>Durban University of Technology</i>	<i>Researcher</i>	<i>Academic</i>
5	<i>Catchment Management</i>	<i>Manager</i>	<i>Municipality</i>
6	<i>Bosch Projects</i>	<i>Lead Engineer</i>	<i>Private Sector</i>
7	<i>Khanyisa Projects</i>	<i>Manging member</i>	<i>Private Sector</i>
8	<i>BORDA</i>	<i>Project Engineer</i>	<i>NGO</i>
9	<i>KZN Department of Water and Sanitation</i>	<i>Director of Planning and Information</i>	<i>Provincial Government</i>
10	<i>eThekweni Water and Sanitation</i>	<i>Professional Technologist for inclusion and environment</i>	<i>Municipality</i>
11	<i>Toilet Board Coalition</i>	<i>Consultant</i>	<i>Private Consultant</i>
12	<i>Khanyisa Projects</i>	<i>Co-owner</i>	<i>Private Sector</i>
13	<i>Climate Protection</i>	<i>Climate Scientist</i>	<i>Municipality</i>
14	<i>Pollution Research Group, UKZN</i>	<i>Co-head</i>	<i>Academic</i>
15	<i>Water Research Commission</i>	<i>Executive manager of Business development and Innovations</i>	<i>National Government</i>
16	<i>eThekweni Water and Sanitation</i>	<i>Manager</i>	<i>Municipality</i>
17	<i>eThekweni Water and Sanitation</i>	<i>Manager for special Programmes</i>	<i>Municipality</i>
18	<i>Pollution Research Group, UKZN</i>	<i>Operation Manager</i>	<i>Academic</i>

<sup>1</sup> A central academic organisation that collaborates closely eThekweni municipality in sanitation research is the Pollution Research Group, a part of the University of KwaZulu-Natal

Table 2:

Table showing the actor groups interviewed in this study and the number of people from each group

<b>Actor Group</b>	<b>Number of Participants</b>
Academics	5
Private sector	3
Local Municipality	5
Provincial government	1
National Government	1
Utilities	1
NGO	1
Private Sanitation Consultant	1

Interviews were originally planned to be taken out in-person but upon arrival in South Africa, the country went into lockdown with the start of the COVID-19 pandemic. Lockdown in South Africa was much stricter compared to European countries, as people were prevented from going outside. Most organisations and institutions were also closed as people were forced to work from home. As such, the research design was changed so all interviews could be carried out via Microsoft Teams, Zoom and Skype. Interviews were all carried out in English, but this was not always the first language of all the participants and thus may have influenced what people said.

In addition to interviews, an extensive and in-depth desk research was conducted to gain an understanding of the theories and concepts which are required to frame the study. This was deemed necessary given the historical and political context mentioned in the previous chapter. The desk research included both online desk research and government published data.

## 6.5 Data coding and analysis

The next stage in this research was to transcribe the interviews and code them. Transcripts were precisely written word-to-word of what participants had said in response to the questions in the interview guide. Copies of transcriptions are given only to the researchers in this study and the broader study this contributes to, as well as the supervisor for this thesis. After transcriptions were completed, all the interviews were coded through the programme Nvivo. Nvivo is typically used for qualitative and mixed-methods research to analyse unstructured text, audio or video including interviews, surveys and focus groups. It has been proven useful to manage large amounts of data, such as interview transcripts, as it can provide a broad understanding of the themes in the data allowing for easier interpretation of the data (McNiff, 2016). There was an iterative process of coding, first on similarities and overlaps in the interviews, then critically analysing the content against the theory which further coded interviews into separate themes. There was continuous self-reflection and consultation with local academics (in South Africa), to reduce bias and improve understanding in any uncertainties. After this step, I began to plan and write the thesis.

## 7. Results and Analysis

### 7.1 Introduction

This section presents the results, once analysed and coded through NVivo. This chapter introduces the stakeholders that were interviewed and what their roles in sanitation provision are. Followed by a mapping out of who they interact with and whether these relationships are in conflict or co-operative, and how this can impact sanitation service delivery in eThekweni. This will continue to other restraints that all actors encounter in sanitation provision in eThekweni and how this contributes to a lack of sustainability and inclusiveness in sanitation. Finally, the participants' understandings of the key terms of this research, sustainable and inclusive sanitation, are presented and analysed in how this may impact sustainability and inclusiveness of eThekweni's services. The participants referenced through this section are identified by their interview number and actor group details in the methods chapter.

### 7.2 Governance Actors

Providing sanitation was identified as a wicked and complex problem by a few of the participants, academics, municipality and government interviewees, for the following reason:

*“you've got like wicked problem so those and it links into so many bigger systems because sanitation self service delivery in Durban is very much dependent on your income level and the area where you live, so if you are on a really good salary you almost certainly don't live in an informal settlement with the community<sup>2</sup> ablution block. So, because it links in so many issues around inequality and poverty and that kind of things, it's very- it's a challenge yeah. The biggest challenge is that it's a really complex system and there's a lot of role players with very different backgrounds” (18, academic)*

As this participant explains, there are a number of actors with different experiences, perspectives, technical challenges of climate change and urbanisation that contribute to the governance of sanitation, and much of the challenges are based around socio-political inequalities in eThekweni. An over-arching finding in this research that there is no clear solution for sanitation services in eThekweni. It was found that it is more than the responsibility of just one actor, and implemented solutions often lead to unforeseen outcomes and consequences. As such, participants identified a clear need for multiple actors in sanitation provision to improve inclusiveness and sustainability;

*“links in so many issues around inequality and poverty and that kind of things, it's very- it's a challenge yeah. The biggest challenge is that it's a really complex system and there's a lot of role players with very different backgrounds” (18, Academic).*

In other words, the challenge of sanitation provision in eThekweni has multiple dimensions and therefore should take a range of actors into account when developing new solutions to tackle this.

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<sup>2</sup> CABs are “are modified shipping containers, each having 2 showers, 2 flush toilets, 2 hand basins, 4 basins used for washing clothes, a small-locked storeroom for cleaning materials and outside lighting to improve safety. They are connected to the municipal sewerage and water systems and are installed in pairs - one for women and one for men” (Connective Cities, 2014)

This can entail many stakeholders, such as *“these economists, these risk people, the insurance sector, the health sector”* (3, Private) as sanitation is part of a larger problem relating to housing and education. As such, this study identified the need for multi-actor inclusion; not only in terms of sanitation delivery but also in designing and supplying innovative technologies that can withstand the challenges of increasing density and water scarcity, whilst simultaneously being affordable to everyone regardless of settlement. As one participant puts it, *“it’s about managing risk in a different way and putting innovation in a different space”* (3, Private).

Unfortunately, bringing multiple actors together to successfully produce and supply such innovations is not happening. This is negatively impacting the sustainability and inclusivity of sanitation within eThekweni and thus suggests that either actors are not thinking unanimously or there are not enough – or any – incentives in place for actors create change . One may point out that if the municipality are responsible for sanitation provision, it would be their responsibility to work out a resolution. These challenges will be explored in greater depth later in the chapter, however it is first necessary to identify the actors involved in sanitation governance and the roles they play.

To analyse the data, participants were put into the actor groups – as mentioned in the theory chapter – identified by the participants themselves. These were:

- **National Government**
- Provincial Government
- **Local Municipality**
- **Academic**
- **Private sector**
- NGOs
- Utilities

There were also some actors which were mentioned but not interviewed in this study:

- **Communities**
- Technology Developers.

The actors in **bold** are those that were most mentioned as key actors throughout interviews. The researcher found it important to separate these into categories to see what actors contribute to service provision in eThekweni, other than the municipality.

Communities in informal settlements were not engaged with in this research but were identified as the primary group to provide services to

*“because people without adequate sanitation are going to have all sorts of health issues, so you know to try and sort of improve health and hygiene, to give people I guess dignity, particularly in schools you know it’s safety as well as hygiene and we had children that are falling into pit-latrines and yeah. So right yeah you just kind of upgrade um people’s quality of life”* (14, academic).

In short: sanitation is not merely concerned with health and cleanliness but relates to issues of dignity, safety, hygiene and quality of life. All things that would be neglectful of the researcher to ignore. To provide sanitation services to all, several actors are employed to complete different roles along the sanitation chain. Participants in this study were asked to name their roles, the actors they engage with and what that engagement entailed. From this we can understand which stakeholders are interacting with whom and what roles they play in the governance of sanitation, how that may impact the sharing and flow of knowledge, and ultimately how this affects sustainability and inclusivity in sanitation. Hence, the following section outlines the roles of each of the actor group in this study, briefly referenced in Table 3.

An important trend throughout the interviews is the rising popularity of sanitation innovations. All actors and participants were interested in providing more suitable sanitation services for informal settlements. A fundamental reason for this interest is these are the areas currently lacking in useful sanitation and hygiene services as these areas' denser populations make normal waterborne, flush toilets less feasible to provide *en masse*. Moreover, increasing non-waterborne sanitation will lead to an important and necessary decrease in the demand for water from eThekweni's citizens.

The following sections show the process of sanitation governance and how actors contribute in different ways to decision-making by defining their roles. In brief, actors' relationships form a process of sharing information from bottom local level to top national level to form policy. This begins from baseline studies, tests and research conducted by academics, the apparent main point of contact to communities, who engage users in communities and informal settlements for data collection while providing a platform for communities to be heard. This is through feedback on how innovative technologies can be improved and whether they were suitable for the tested environment. This is reported to all funders and involved parties including local municipality, technology developers, private sector and NGOs to improve technologies and find suitable solutions for each environment. This is then shared with provincial and national government in order to enact change and improve service delivery through policy. The primary focus throughout the interviews was providing sanitation for informal communities within eThekweni as those were identified to be the areas with missing or limited access to, safe basic sanitation. It was found that academics play a vital role in finding suitable, sustainable sanitation innovations, particularly through community-based testing. However, when such innovations are tested in informal settlements, the academics primary role becomes providing feedback, not in implementation, policy or roll-out.

*Table 3: Actor roles in sanitation governance in eThekweni*

<b>Actor Group</b>	<b>Role</b>
<i>National Government</i>	<ul style="list-style-type: none"> <li>• Policy</li> <li>• Research Platform</li> </ul>
<i>Provincial</i>	<ul style="list-style-type: none"> <li>• Link municipalities and water service authorities</li> <li>• Oversight of services</li> </ul>



*Local Municipality*

- Planning, implementing and monitoring of sanitation systems for all citizens

*Academics*

- Provide information and knowledge from in-field testing of innovative sanitation solutions, alternative to flush toilets

*Private Sector*

- For-profit organisations that are involved in developing innovative technologies for more efficient waste treatment systems and new cost-effective ways the Water Service Authorities can provide sanitation to its citizens

*NGO*

- Working with local municipality to share knowledge and build capacity through research, marketing, technologies, educating communities and advising the municipality on Decentralised Wastewater Systems (DEWATS) and other wastewater treatments

*Communities*

- The users in informal settlements or on the urban edge that have limited access to safe sanitation

*Philanthropic organisations*

- Major funders, particularly the Bill and Melinda Gates Foundation in eThekweni, which contribute to sanitation innovations. Also have Water, Sanitation and Hygiene (WASH) frameworks which were found to act as guidelines to many of the participants in this study

### **National Government**

The participant interviewed from the national government in this study was the Executive Manager of Business development and Innovations at the Water Research Commission (WRC), a public entity. This is a government funded institution, formed through tax-payers money, which conducts research in water and sanitation. WRC supports research projects through engagement with academic institutions like the Pollution Research Group and provide a platform for knowledge sharing between other actors. Outcomes of WRC funded research feeds into policy at national level and focuses on all stages of the water cycle:

*“We cover from resource, which is catchment and dams, rivers, ecosystems, all the way down to what we call the water services side which is the municipalities actually supplying water to people so research across the entire value chain is covered” (15, Government)*

This also entails the roles of bringing together partners and funding projects to look at sanitation challenges and incorporate different perspectives, from local, national and international sectors.

*“We've now got this mega project which we bring different partners like the Department of science and innovation and the Bill and Melinda Gates Foundation, that's called SASTEP which is the South African Sanitation Technology Enterprise Program and the whole idea there is to really look at new services and technologies around what we call the really difficult and wicked problems around sanitation in South Africa” (15, Government)*

## **Provincial Government**

The participant from the KwaZulu-Natal provincial level of government worked in the Department of Water and Sanitation. The role of this branch of government is to work with partners in municipalities and other government department towards providing citizens within the province with sustainable sanitation services.

*“The intention of our government department, in conjunction with its partners in through the municipalities, and other government departments is to provide basic water and sanitation services to all citizens of the country..... and we are meant to assist and contribute to that” (9, Provincial)*

This is in the form of supporting municipalities with approving projects, providing recommendations, grant funding, and sometimes involved in the technical aspects of sanitation services as constitutionally mandated.

*“The other element of service that I mean we would offer is that if there are challenges with actual sanitation and sewage systems, where there are massive leaks and systems are not working and it's polluting the environment, then we also have a role to play as the oversight authority and as a regulator, as well.” (9, Provincial)*

Thus, Provincial government are also responsible for monitoring and oversight of municipality supplied services and ensuring services are reducing environmental impacts.

## **Local municipality**

The constitution mandates that everyone has the right to sanitation and with devolved responsibilities, every province has a Water Service Authority (WSA) responsible for providing all of the citizens in that province with adequate, basic sanitation. The WSA of the KwaZulu-Natal Province is eThekweni Water and Sanitation (EWS). The role of the municipality is to develop, plan and implement projects in order to *“provide a service to the community”* and;

*“Improve the livelihoods of our citizens and especially those who are within our boundaries, within the municipality boundary, the main objective of improving their livelihoods as a local government” (13, Municipality)*

However, in supplying services to everyone at the local level several technical and social challenges arise. Technical challenges include finance, diverse and steep terrains and most importantly; a severe lack of infrastructure for waterborne sanitation around the edges of the city where there are informal settlements are. There is a strong focus by all participants on informal settlements as it is seen to represent a discriminatory apartheid government previous to 1994,

*“it's still got the remnants of our previous government administrative and backdate. so, you find that most of the plans or most of the services were designed to serve a particular interest group. if I can say it was designed to, to serve the whites, the white people instead of serving all of South Africans, so now such areas, they were left behind until '94” (13, Municipality)*

This is in the sense that informal settlements are around the central city and do not have access to water networks and infrastructure. There is therefore an urgency to provide sanitation for informal settlements specifically, to eradicate any form of racial discrimination and include everyone with access to basic services. To do so, the municipality have employed new strategies to speed up sanitation services. This includes finding alternative solutions to the traditional flush toilet that use less space to comply with dense urban settings, uses less water than the 10-13 litres traditional flush toilet to tackle looming water scarcity challenges and can treat waste on-site. To do this, the local municipality EWS collaborate and engage with a number of other actors including academics, private sector, NGOs, national government, and communities.

*“We’re trying to find alternative solutions, that why you see a lot of our work with the research institution and the [Bill and Melinda Gates] Foundation in non-sewage sanitation, we're hoping that you know, we could get a breakthrough, some stage with the different types of technologies coming in, that has, doesn't have too much of [reliance] on too much water [and] such, as doesn't need for big, bulky infrastructure. All of these would have cost benefits and equally different models of how we need for my sanitation. So, it's moving away [from traditional sanitation systems]” (16, Municipality)*

However, all non-governmental actors also play their own roles and have varying perspectives and strategies in implementing innovative solutions.

## **Academics**

It was found that the academics’ role in eThekweni’s sanitation governance was in providing non-biased information on sanitation innovations to improve sustainability. Through researching innovative technologies by engaging communities and collecting data on their perspectives and flaws in sanitation technologies, they were able to relay this information to developers working on improving sanitation systems supplied by the EWS municipality in eThekweni. Academics prioritised engaging communities for their perspectives and feedback, as well as raising awareness on the need of innovative technologies for a long period of time before pilot projects began, some saying up to 6-8 months prior. This relationship was not seen to be as prioritised by any other actor in this study.

*“To provide reliable research and data to support other organisations in developing sanitation technologies and providing, using this information to support the municipality and roll out their water and sanitation services” (14, Academic)*

*Pollution Research Group goal supports the municipality with the provision of water sanitation services and that's done through research into innovative, particularly through innovative sanitation systems and I would say that most of our research is at the kind of applied research end of the spectrum rather than sort of first principles but there's sort of a combination of applied implementation research with the municipality, they're one of our big funders and with other sanitation funders or other [...] organisations within sector (18, Academic)*

*“Providing support to technology developers to test their innovative sanitation systems in the field so they would bring out their systems whether it’s just a pedestal or a [backing] treatment process or fully integrated system, so they would bring that and install it in the field and we would provide support in terms of having an engineer on-site to run them and operate it, we would take samples, do the analyses in the lab and provide this data back to the technology developers so that they can optimise their processes so that it’s achieving the standard that are required” (14, Academic)*

### **Private Sector**

The private sector refers to for-profit businesses involved in marketing innovative technologies. They also develop cost-effective ways the WSA can provide sanitation and efficient waste treatment systems to ultimately, improve people’s lives. In doing so, they engage with a number of actors including local municipalities, academics;

*“It’s just about being involved in these technologies that are going to be more cost-effective, more able to be rolled out by municipalities and sustainable... [including] on-site sanitation systems” (12, Private)*

*“We’re working with developing new apps for quicker response, to help municipalities to respond quicker to pollution and other problems in rivers” (12, Private)*

### **NGO**

NGOs within eThekweni are also involved in sharing knowledge between other actors as well as building capacity through research, marketing, educating communities and advising municipalities on Decentralised Wastewater Systems (DEWATS). The participant who took part in this study was from BORDA, a global NGO, hence also linking international networks and technologies to eThekweni.

### **Utilities**

Umgeni Water is a State-Owned Entity (SOE) that supplies most of the potable water in the KwaZulu-Natal Province. They work with the WSA’s to provide water in the province and are involved in storage, treatment and distribution to local authorities. Recently, there’s been a shift to include more sustainable approaches to water and adjusting their role according to restraints on resources

*“It’s adjusted its vision and mission and moved away not just bulk water and bulk wastewater but trying to add the other streams which is reuse, recycling, sanitation, trying to understand all these components and look at the role we can play” (3, Private)*

### **Technology developers**

Technology developers were not interviewed in this study but are also actors in the provision of governance. Participants indicated that they are an increasingly prominent actor in eThekweni with the new interest towards alternatives to the flush toilet. It was indicated to most Technology Developers are oversees thus justifying the need to pilot projects before roll-out, as specific local contexts can alter the versatility of the innovations.

## Communities

Local municipality, academics and technology developers were named the key players in deciding what technology is most suitable to test. However, communities were named the “*deciding factor*” (18, *Academic*) on whether the technology will be tested and accepted locally. For example,

*“So, if we identify a site where for example, we have the space and the infrastructure available to test civic system but there are political reasons like the politics within that community means that there's disagreement about whether the test should happen there or if the community aren't supportive of the idea of having innovative sanitation test run there then they have the final say so we would not test somewhere where we did not have community [buy-in]” (15, Government)*

The view of communities in this study formed through the other participants and literature, as they were not interviewed. Actors identified a significant change in communities and informal settlements' role from passive to active beneficiaries and users, thus, key actors in sanitation governance in eThekweni now need to increase inclusiveness and sustainability in services. The participant from the WRC identified that communities are engaged via academic organisations by collecting feedback of sanitation technologies by the users to understand how they can be improved. This information is then passed from the researchers to the Water Service Authorities, technology developers and any actor interested in sanitation provision.

*“So one of the things that this platform includes is we do a baseline survey to understand what people think of the sanitation before putting [in] a new system and then afterwards we go back and we ask them what they thought of the new system compared to their existing sanitation. Any particular issues that they might have with, I don't know, noise or smell or using recycled water, those kind of things, and we get feedback on what they thought of the system and how they think the system could be improved and that's all fed back to the technology developer so the technology developer is in a position to act on that advice. And we've had at least one front end pedestal that they've made numerous changes to after collecting feedback from the users on the platform (15, government)*

The key point here being; academics are the main point of contact to communities for the government, in all spheres. They are needed to improve innovative solutions through user surveys, interviews, and further data collection. This is done to gain local feedback and understand what the challenges encountered were in innovative sanitation implementations. All actors identified community engagement as an essential process in understanding the perspectives of communities. Actors reported an increase in inclusiveness and sustainability in services by providing solutions that are accepted by communities and suitable to individual contexts.

*“The fact that there's no-one-size-fits-all approach, that you know sanitation, you're not going to be able to roll out one thing and it's going to achieve the same for everybody...[aim] to make sure that whatever is developed and rolled out is accepted by the people that they're intended for” (14, academic)*

Consequently, academics and all other actors approached sanitation provision with the view that implemented solutions may differ in and between communities but can still provide adequate and safe sanitation. Participants referred to differences and potential solutions depending on the local context, the culture and socio-political dynamics and ultimately, the community themselves.

### 7.3 Actor Engagement and Interactions

It is important to understand which actors engage with whom, whether these are in co-operation or conflict, and ultimately how this may impact sustainability and inclusiveness of services. This was identified as significant as participants emphasized that it is not just important for there to be interaction between actors but also, it is more productive and sustainable when both parties have the same agenda and a good working relationship where political or personal agenda does not impact the outcome of the project. As one participant words it;

*“when it’s easy to work with project partners, it’s easier to drive the project forward. So when there’s challenges between the organisations that are involved, the project suffers simply because you’re spending more of your time worrying about the ‘how is this going to affect that organisation’ or ‘how is this going to- how is the relationship between the organisations going to be affected’ rather than ‘how is it going to affect project’” (18, Academic).*

Hence, indicating that the outcome of the project is dependent on positive, continuous interaction between actors, with the same focus on the project. Collaborations were not always easy, and it was found that *“everyone is challenging in their own way” (18, Academic)*, which could impact the sustainability and inclusivity in sanitation services. Thus, I have explored the challenges participants encounter in collaborating with other actors in their roles of sanitation service provision in eThekweni.

I have created a stakeholder map in Figure 11 to visualise the engagements between actors daily in their roles in sanitation provision, created from participants identifying the actors they work with. Following this, the study explores how engagement can impact the sustainability and inclusiveness of sanitation services, through analysing the causes of any conflict or cooperation between actors.

The stakeholder map in Figure 11 contains actor groups which were not interviewed in this study but were mentioned as key actors involved in the governance of eThekweni’s sanitation services by other participants; the actors not interviewed are in red. The findings presented in this chapter are based specifically on information provided from interviews with the 18 participants in this study and as such may not be entirely representative of the sanitation situation in eThekweni, particularly as the views of communities were not collected in this study. The participants were asked open-ended questions so provided the answer the way they felt best to. Arrowheads in Figure 11 show the direction of engagement starting with who initiates it and going to whom they engage with, i.e. a double-headed arrow means that at least one participant from that stakeholder group mentioned the other group and vice versa. The actors outlined in red, i.e. schools, communities, technology developers and international groups, are the stakeholders that were not interviewed. We must take into consideration the lack of arrows from the actors in red do not represent a lack of engagement, but rather a gap of knowledge when looking at which stakeholder mentioned engagement with another. A lack of arrows from other actors that partook in this study may either indicate a lack of interaction or an actor choosing not to answer certain questions.

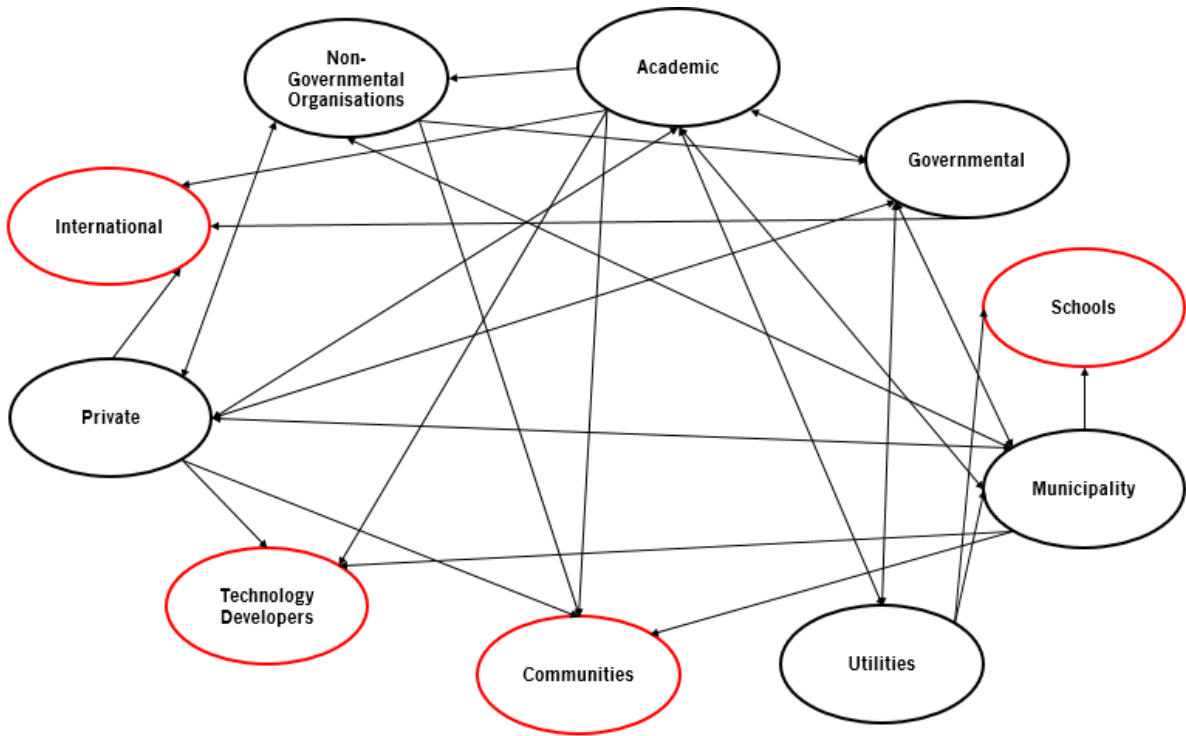


Figure 11: Stakeholder Map designed through responses of participants to identify which actors interact with whom in their roles of sanitation provision

### 7.3.1 Community engagement

Despite recognising that communities and informal settlements require access to improved sanitation, action has been a challenge. This is partially due to terrain and lack of traditional homes which were obstacles mentioned by all actors and explained in further depth later in the chapter. It is evident that communities in informal settlements form a different part of society, as a result of historic discrimination pushing these communities to the edges of the city. Moreover, all participants mentioned that the vested interests of governance actors which can affect the opinions of communities. One participant paraphrased it as *“there’s a lot of politics and community dynamics that come into play that sometimes make it difficult to really understand what is at play sometimes (4, Academic)*. Participants all agreed that communities can be swayed in their preferences of sanitation by political parties and cultural mindsets, yet the implemented solution must be accepted by the community themselves. As such, actors identified the need for new innovative approaches to providing sanitation as well as new sanitation systems that can be suitable and sustainable to replace the need for 10-13 litre flush toilets that need to be connected to sewerage networks. A key approach identified as a necessity in finding suitable, sustainable long-term sanitation solutions is community engagement.

Thus, to find an improved sanitation system that is suitable within the specific context, participants identified that communities must be included and engaged with other actors in the process of provision. There are different ways of interacting and engaging with actors, and communities must be equally considered to increase inclusivity and sustainability of sanitation in eThekweni.

This is easier said than done as the role of communities until recently has been as passive beneficiaries. Communities are a unique type of stakeholder as they are not experts and thus cannot be engaged like one, rather actors must find a suitable means to approach communities. If this is not done in the appropriate way, communities may *“turn down your project, not because they don't want your project but because they cannot understand the technicalities of that project”* (13, Municipality). There must be a different approach to engaging communities in order to keep them knowledgeable and up to date on technologies but not overload them with so much technical information that they are not interested.

As mentioned earlier, academics are the central point of contact with communities through surveys and collecting data on perspectives of those living in rural areas or informal settlements. Academics were found to focus on building long-term relationships with communities and including an aspect of education to raise awareness of innovative technologies to encourage acceptance.

*“Do the user survey so they [communities] work with us very closely whose households were tested to get their understanding and whether they find the system a good system, whether it's doing what they want so yeah we have this continuous kind of engagement* (14, academic)

This led academics to find communities the easiest to engage with of all the stakeholders. A large factor in this was building long-term relationships, academics found communities willing to engage with them and provide feedback because those were the people *“feeling the problem”* (1, Academic) and thus were more willing to engage with them on improving solutions. Academics were the most vocal about their engagement with communities beginning from the initial planning stages of a sanitation project never just designing a programme and implementing it without consulting the users,

*“We're obviously going to try and get by in as early as possible so for example with field testing with these programs, we have an engagement process that starts, oh gosh, about 6-8 months before we actually get the system in the field. So we went with the community liaising officer and we engage with the ward councillors, we engage with the, if there's any tribal leaders involved, we engage them, we engage with the community committees, with schools, we engage with the department of education and the school governing bodies. yeah so there's a lot of that up front trying to explain what we want to do, getting their buy in and you know and if they're not happy with us doing it, then obviously we don't do the work in that community or school”* (14, Academic)

On the other hand, municipal, private sector and NGO actors held a different perspective, with several finding communities most difficult to engage with. The private sector participants, although admitting that it was key to engage such communities, had differing levels of engagement with communities from one another. This is due to less policy governing the actions of the private sector so they can choose whether and when they will engage communities. Interestingly, when participants referred to communities as being difficult to engage with, they tended not refer to their experiences with communities but rather to the difficulty in accessing and interacting with communities and changing their perception of innovative technologies.

Hence, although the need for innovative technologies were agreed upon by all the participants, when implementing such projects, the majority of participants (excluding academic



actors) found communities rarely accepted innovative technologies for their sanitation systems, viewing them to inferior solutions. Rather, participants from the private sector, municipality and NGO reported that communities preferred flush toilets as they believe this to be the top of the sanitation ladder. As such a prominent and frequently mentioned challenge is tackling the perception of innovative technologies in informal settlements, where innovative on-site technology appears inferior to the traditional systems such as the flush toilet. A recurring theme in interviews showed:

*“When you are working within informal settlements, and you’re trying to create formal housing, if you bring in new technology, that’s not the same as a flush toilet that the settlement people have seen in traditional infrastructure development, there’s a negativity of almost – the response often is, you’re giving me something of a lesser standard, ‘I want a flush toilet’ because the flush toilet is seen as a status symbol” (5, Municipality)*

This indicated a scepticism of innovative solutions amongst communities. Upon digging deeper into this challenge, interviewees often mentioned awareness, cultural mind-set, exposure, and education of the communities as to why they may have a preference of flush toilets and believe anything different feels inferior. The interviewees highlighted two main reasons for why this could be:

1. Historical Inequality – some participants suggested that the fact that white, more affluent people had access to flush toilets within their households during apartheid and still to this day use them. Now that this period of discrimination is apparently over, communities are being told that the flush toilets are not possible or that it is not environmentally friendly. Thus adding to the perception that they are still not being offered the same services as the rest of the city and rather that these solutions are put in for the poor.
2. Political exhaustion – there is *“a lot of [dissatisfaction] is driven by political agendas” (14, Academic)*. For example, politicians often make false promises on various topics (including sanitation) and raise expectations to acquire more party votes. With each new politician that is over-promising, without regard to financial or physical feasibility, the community have a renewed hope of ‘getting a flush toilet’. As a result, *“there’s a continuous change of expectations for this community. You know, they want flush toilets, when a new person comes in, he makes huge promises, knowing that cannot be [possible]” (16, Municipality)*.

We can establish that these challenges all surmount to the negative perception of innovative technologies and of *“trying to undo something that’s been more than 100 years, you know, sort of the standard” (5, Municipality)*. This negative perception impacts the inclusivity and sustainability of sanitation in eThekweni because, and all participants agreed, *“it’s the level of acceptance that really makes or breaks when certain technologies are adopted, and whether certain technologies are appropriate for those uses” (6, NGO)*, and so without community buy-in of innovative sanitation technology the chances of implementing said technology successfully for the long-term disappears.

As such when another new technology comes up, participants from the municipality, private sector and NGO believe that there is a lack of willingness to adopt it which is what they believe leads to violence and vandalism of these services. Consequently, these participants identified a lack of effort or focus from the municipality towards education and awareness of innovative technologies within informal settlements. This was named essential by all participants for increasing acceptance within communities.

After reviewing participants in this study, the majority come from technical backgrounds and as such do not have much of a connection to the social science side. This could be why participants in the municipality, private sector and NGO found it more difficult to communicate with communities than academics.

This also a factor in the participants' unanimous support of a multi-actor approach in sanitation governance. Instead of a siloed acknowledgement of the problem without action, the participants acknowledged a need for actors to share knowledge, collaborate effectively and achieve synergy in decision-making and service delivery. These factors are important in order to increase inclusivity and sustainability.

### **7.3.2 Challenges encountered**

All participants mentioned challenges, barriers or threats that they found in the governance of sanitation. However, not all of these were the same between actors, some with opposing views. Hence, this section analysis the different challenges and advantages participants experience in providing sanitation, analysing who says them and possibly why.

#### *Municipal willingness*

Academics and municipal staff identified a lack of awareness as evident within government and municipalities, indicating that the system the municipality follow can be quite “old-school” (18, *Academic*) and municipality and government like to work with systems that are already currently in place, in a more traditional, top-down approach, rather than learning new things.

*“Willingness of municipalities and government, you know, to try new things, to take a risk” (14, Academic).*

This is an issue because there are several sanitation projects implemented in eThekweni's informal settlements that are changing and shaping what sanitation can look like. Academics and the municipal participants indicated that that if the municipality do not stay up to date with innovations and projects, there will be a gap in knowledge of technologies that could potentially work in some informal settlements in eThekweni. This can result in a missed opportunity to develop a better understanding of the needs of informal settlements, of what contributes to failures in projects and ultimately, how the municipality can improve sanitation service delivery within eThekweni.

On the other hand, other academics and the private sector believe that the local eThekweni Municipality *“has a very progressive mindset in terms of the leadership and actually being able to look at the things differently and being innovative”* (1, Academic) and all participants believe that municipal support was key for successful implementation. All participants indicated in one way or another that they thought that the projects that have been implemented thus far to tackle the challenge of sanitation have been steps in the right direction. This is referring to municipal implementation of CABs and UD<sup>3</sup> in informal settlements which showed all participants that the municipality are interested in pursuing innovative technologies as a way to increase sustainability and inclusivity in sanitation governance.

#### Legislative ‘red tape’

One reason why academics and municipal actors may have referred to government bodies being traditional could be due to restrictions in legislation and policy. Many participants, (academics, NGO, municipality, private consultant) mentioned that it is difficult and slow to implement any sanitation services which are not the norm for the municipality or are different to previous policy. This was seen to limit the extent of innovative services that can be implemented. Ultimately, these all referred to ‘red tape’, as a barrier in implementing solutions. This is in terms of excessive bureaucracy and existing legislation, from national government and not local municipality, slowing down roll-out of services.

The senior manager of the Municipality’s Catchment Management mentioned that he found red tape to be difficult in a situation of an unexpected sewage leak which ran into and contaminated the Umhlangar river. There is a series of protocols one must follow before implementing a solution, which are directed by government legislation. However, given the dire situation where the river is being contaminated, this was not possible. The managers team decided that it was necessary to implement a temporary solution in to immediately stop pollutants entering the river but as they did not first ask for permission, the Environmental Affairs team

*“issued a compliance notice on the Water and Sanitation people for carrying out work without proper authorization to reinstate the temporary sewer, the fact that they were putting in measures to reduce environmental pollution was ignored”* (5, Municipality).

This suggests that legislation is not always suited to local contexts, can act as a barrier or ‘red tape’, and even has the potential to cause further environmental damage. As such, this can impact the implementation of different sanitation strategies and ultimately, the sustainability and inclusivity of sanitation systems in eThekweni.

Despite governmental ‘red tape’, slow processes and immense paperwork being identified as a challenge and a frustration by most of the participants. It is seen as necessary by academics and municipal actors as governments are responsible for the citizens and thus, to limit corruption, paperwork and slow processes exist for transparency and are a realistic norm. As expressed by one municipal participant, *“with government, you are responsible to the people [for service provision]”* (17, Municipality) and as such, legislation was written to aid this and was a necessary requirement, given

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<sup>3</sup> The UD toilet consists of two chambers is constructed above or slightly below ground. The pedestal is designed to allow urine to flow to a soak away, while the faecal matter collects in the first chamber...The householder is required to remove the contents, dig a hole and bury the contents on site. The pedestal is moved back to the now empty first chamber” Gounden et al., (2013). An image detailing how this works is available in Appendix 3

the previous discriminatory government pre-1994. Despite this, most participants still acknowledged that national government policy is not always contextually relevant to informal settlements in eThekweni and can limit solutions and the time taken to implement them. As such, 'red tape' was still a factor influencing why some participants (Academics, municipality and private sector) said they found working with the private sector and philanthropic organisations easiest as with these actors, *"they can make instantaneous decisions because it's their company"* (17, Municipality) and are not held back by legislation or how to approach problems.

### Financial restraints

Financial constraints were another challenge identified by all actors in engaging with municipality. A lack of funding or budgets in place can be impactful and limit the number of solutions. Not only are waterborne solutions unsustainable due to space and high-water consumption in a water scarce country, but *"our [eThekweni] city certainly can't afford it"* (12, Private). This is significant as participants indicated that financial constraints are reflected in how well services can be equipped, and post-project monitoring. Participants implied that when the municipality supply public sanitation services, there must be continuous monitoring or when something breaks, nobody is responsible for fixing it. This includes, lighting, *"another thing related to cost is the lights. Lights because usually most places are dark"* (4, Academic) and any energy needed to keep the services working, which are supplied at the beginning of a project but are often not monitored. Therefore, financial restraints can contribute to a failure from the municipality as they do not have enough money, time or the capacity to monitor or actually pay for any damages, as voiced by one participant, *"I think time and money is a major limiting barrier"* (9, Municipality).

Linked to this is the underlying assumption of the municipality, government, private sector and NGO participants that communities will not fix the damages because they also consider the municipality to be responsible for such things and so do not attempt to maintain it themselves. Academics, on the other hand, reported that if communities accept and like the sanitation system implemented, they tend to build a structure within the community that maintains the system. This indicates two things

- Communities may not be viewed as active users by all actors excluding academics. This may be because actors are used to providing for passive beneficiaries and are not ready to change their views of communities, thus impacting the level of sanitation implemented and how accepted it will be by communities
- As academics have a higher level of engagement; they can increase awareness of innovative technologies to the communities that they have worked with. This in turn may explain why academics explain communities being more ready to take an active role in their own sanitation provision.

### Budgets

An interesting challenge of financial restraints is national and municipal budgeting for sanitation provision. This was brought to the surface by the national government participant recognizing that when big structures that have economic gain are planned, there is often money available but in rolling out sanitation services, even those at a much smaller scale, it is more of a challenge to find this money.

This suggests that there is an increased challenge in augmenting sustainability and inclusiveness in sanitation services due to an ongoing lack of priority in providing these services,

*“Linked to Capex<sup>4</sup>, you want to build a big dam you generally can find money. You want to build a big wastewater treatment plant, you can generally find money. But if you want to build... 50, you know, 1 megaliter/day plants it's difficult to [find money] and that's because [of] the decentralized off-grid systems, it doesn't form part of a Capex budget, it forms part of... they've kind of put it to the back of the line, in terms of how they do the budgeting and I think this is weird to some extent, if we really take a nice long look and start to really interrogate how the money flows and how we could use that money flow more effectively, we might actually lead to more sustainable sanitation on the ground” (15, Government)*

### Political interests

Another frequently mentioned challenge by all participants was political or vested interests affecting the outcome of projects. It was mentioned quite a few times by participants that, *“we [South Africa] are in a highly politicised” (6, Private)* and hence

*“there's a big connection between politics and infrastructure, specifically related to water and sanitation. So, you'll find also the prioritisation in terms of the number of settlements, or the ranking in which you will tackle settlements also varies” (6, Private)*

All participants indicated that the municipality where the actors responsible for providing sanitation, as mandated by legislation, and consequently indicated that a project will not be successfully implemented if the municipality is not interested. One participant expressed this as, *“if people or whoever is in charge decide that it's not something they want to support, they can very much derail a program” (14, Academic)*. Another participant stated that the success of a sanitation project is dependent on *“political willingness, the ability to have competent people and staff around it with good leadership” (16, Municipality)*. This suggests that if innovative sanitation solutions are to be implemented, the municipality must support the project and, as the responsible party, be a central actor in its delivery. However, participants' response indicate that due to a lack of capacity, knowledge or corruption, this is not always the case. As such, this also supports why all actors were in support of multi-actor collaboration in the governance of sanitation, in order to increase knowledge sharing and accountability between different perspectives in sanitation services.

### Corruption

Corruption in government was also mentioned numerous times as a threat to achieving sustainability and inclusiveness in sanitation by academics, private consultant and the private sector and links to financial constraints because *“where when you need money, there's no money [be]cause someone has stolen it” (1, Academic)*. The challenge of not having money, theft or misplacing money is a challenge contributed to by all levels of government (*“that is being mired in corruption, a maze of corruption at national government and you have pervasive corruption at the municipal” (11, Private)*

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<sup>4</sup> Capital Expenditure

*Consultant*)). However, it was also mentioned by the participant in government and municipality that corruption is also evident in the private sector. This suggests that despite the decentralisation of government, there is still a lack of accountability and corruption is still very possible. It was indicated that there is a lack of accountability for the private sector and they are able to over-charge people easily:

*“people abuse public sector funds and as much as private sector likes to accuse government of corruption, they are part of it as well, and if they can charge a way extra margin on something, they’ll charge it” (15, Government).*

This suggests a very interesting finding that there is a lack of trust between central actors in sanitation governance in providing honestly and in the interest of the public, which could impact the sustainability and inclusiveness of sanitation systems

#### Academics engagement

Academics were repeated most often as the easiest to engage with by private, utilities, academic and all governmental sphere actor groups for numerous reasons. One central benefit of academics voiced by a few was that “[Academics] provide the research component so that whenever we are implementing or piloting a project, it's backed by scientific, by scientific evidence” (13, Municipality). Further reasons for ease of engagement with academics include similar agenda, a non-bias relationship to investigate and test certain solutions, and that academic actors tend to be clear in what they expect from the other actors and what they can provide realistically themselves. It was also interesting to see academics interact with almost all actor groups within the map, indicating there is a flow of scientific information between actors. However, some participants in the municipality also mentioned academics as a good network to use because they attract funds and, in this situation, an academic may be overlooked once funders are in the picture. This can impact inclusivity and sustainability of the sanitation outcomes. It is significant that all government participants were able to name specific academics within research groups that they work alongside, indicating a close working relationship with regular contact and that government consult academics often

## 7.4 eThekweni’s underlying challenges

Prominent throughout the interviews were two challenges that actors within sanitation governance in South Africa must adapt to: urbanisation and global warming. As mentioned in the theory, these two affect the provision of sanitation and are effectively the reason behind the need for innovative sanitation technologies.

#### 7.4.1 Urbanisation

A crucial challenge that the city must adapt to is increased urbanisation, *“what happens a lot is the inward migration of people from the rural areas to the cities.”* (7, Private). Growth in population increases the demand for resources and also heightens pressure on land and spaces. Hence there the challenge of providing for *“the influx into the city, and the growth of the informal settlement, it might take us 30 years to meet all of the requirements”* (10, Municipality). Participants indicated that the growth of population is in informal settlements around the city where there is no waterborne sanitation. These areas were explained to have difficult terrains to manoeuvre and provide to, with very densely populated areas. As one participant says, *“Our city certainly can’t afford it and [it will] be really really difficult with the topography we’ve got in our rural areas to roll out [sanitation services]”* (12, Private). There is a lack of space within informal settlements to provide waterborne sanitation due to tight, densely packed spaces as well as the topography of the land. As a result, innovative sanitation solutions such as on-site systems that require less water and space were promoted by all participants in this study as a means of enabling sustainability and inclusivity within eThekweni’s sanitation services.

#### 7.4.2 Global warming

A threat mentioned multiple times throughout the interviews was global warming’s impact on water scarcity. Waterborne sanitation specifically requires a lot of water to work. This is a big challenge for stakeholders within sanitation as it indicates that of the water supply there is, not enough is allocated to supply communities so actors are turning to alternatives to provide the same services to everyone – even if it results in different systems for different people. Global warming affects the whole country, yet actors chose to explore innovative technologies within communities and not within affluent areas. This questions whether innovative technologies are a way of dividing the rich from the poor with a strong prejudice against informal settlements. However, participants did clearly say that they aimed to provide the same level of services to all people in eThekweni, i.e. a sanitation system which does not smell, is safe to use and accessible and affordable to all. Participants consistently said that this may not necessarily be a flush toilet but a system which accomplishes the same outcome and uses less water to combat water scarcity. As such, *“we’ve got to design and understand our systems to be more robust to deal with [global warming impacts]”* (10, Municipality).

### 7.5 Understandings of key concepts by eThekweni’s Governance Actors

To contextualise ‘inclusivity’ and ‘sustainability’ in eThekweni, participants were asked to mention what they believed the key themes within these were. This was to see whether there were key discrepancies in different actors, but it was found that participants tended to say the same one another so have been grouped into themes for each key term. Given the backgrounds of all the participants and the environment of eThekweni, they all had pre-established knowledge of sustainability and sustainable development within eThekweni. The following sections provide the results of participants’ response on sustainability and inclusivity.

### 7.5.1 Sustainability

When asked how they define sustainability in sanitation provision, numerous themes arose amongst the participants that added put the challenges into context. The next step was to analyse these responses and categorise them based on their overlaps, to see what participants aimed at in the context of sustainability in eThekweni's sanitation provision. It is important to remember that participants were all from expert backgrounds and as such, there was a notable underlying understanding of the Sustainable Development Goals and its definitions amongst the participants. Furthermore, all participants explicitly said that there are no best-fit solutions and that each solution was dependent upon the environment and context,

*"it's really horses for courses, because what might work in one area may not work in another area. Related to terrain, ground condition, density of development" (5, Municipality).*

Hence, participants responses were coded into themes on what contributes sustainability to sanitation services in eThekweni, which are more locally suitable and most relatable for the context of this study. These have been grouped together based on overlaps and formed the following themes

- Longevity
- Social aspect
- Environmentally safe
- Financially affordable
- Adaptability

The most common theme, from every actor group, was longevity. Many said that sustainability meant a solution that was successfully implemented, maintained and operational for a long time, hence a robust solution. This is likely due to a one-time infrastructure cost and implementation time so less resources are used in the long run. As one participant says, *"it is effective and for the long term, that it's something people are going to like now and like in X number of years' time" (14, Academic).* So, once a solution has been implemented, governance actors expect it to be in place for a long time. It is notable that the academic mentions 'liking' the product, i.e. the product must be accepted for it to be in place for a long time, not just technical and infrastructurally able. As such, longevity is a key theme of sustainability for the participants in this study. Hence, both technical actors, in the private sector, municipality and NGO, and social actors, the academics and communities, must be involved as all contribute to some aspect of eThekweni's sanitation governance.

A second theme introduced was on the social aspect, on physically and socially *"minimizing negative impacts on people" (9, Municipality).* Participants from academic, private and municipal actor groups mentioned that the dignity and social acceptance of a solution is key to sustainability. Moreover, education and awareness for communities was seen by academics, the private sector and the municipality as an essential for sustainable services. As one participant says, *"if the people do not have the knowledge, or even the attitude, to manage the facility, without the right attitude, the facility becomes unsustainable to use" (7, Private).* This indicates that if people are not interested or do not understand the purpose of a sanitation facility, then it will not last long or be successful. Thus,



participants believe it is up to the service provider, i.e. EWS, to provide education on the need and benefits of improved sanitation not just implementing a sanitation system and leaving it. This also links to longevity as it indicates that solutions tend to last longer when the users are educated on its use and purpose and want to use and maintain it.

Participants in all spheres of government, in the private sector and in academic actor groups mentioned that sustainability in sanitation means to be careful of conserving and not polluting natural resources. This was in terms of water, nutrients in soils and efficient disposal of waste. For water, recycling and reuse processes to conserve water were also mentioned throughout interviews. One participant summarises all the thoughts of the aforementioned participants, *“something that is environmentally sustainable and that it doesn't pollute the environment, you're not releasing untreated waste into the environment”* (18, Academic). All participants indicated that waste treatment is also a vital part of sanitation governance. All actors were in favour of on-site sanitation systems, wherein communities are active participants in waste treatment. Participants indicated that communities should be made more aware of the impacts of unsafe and unhygienic ways of removing waste, indicating that this would decrease pollution of natural resources. This suggests that sanitation solutions which are environmentally friendly throughout the life cycle of a system, including waste treatment, is needed to increase sustainability in eThekweni. This is key with on-site sanitation. This also suggests that actors in this study are trying to shift responsibility of waste treatment to communities in informal settlements, implying that this will increase longevity of services. This may be because of financial restraints and lack of capacity in the municipality, as suggested by both academic, private sector and governmental actors in this study. However, successful implementation of on-site solutions and then dependent on an increased capacity and understanding of sanitation and hygiene within communities.

Another common theme was the finance. All actor groups, except utilities, mentioned that sustainability meant a solution that was affordable to both the user and the supplier, as well as cost-effectiveness in production. In other words, these participants believe that there is sustainability in a solution when the city can afford to continue providing a service into the future. As one municipal manager states sustainability for them is something which is *“cost effective enough in an affordable way that the city can afford to sustain that service in perpetuity”* (5, Municipality). Participants espoused that it is sometimes necessary to implement different solutions in different places for there to be affordability in provision into the future. This indicates that there could be the possibility of funds and budgets being prioritised in some places and not others, leaving there no option but to find cheaper solutions for informal settlements, as earlier suggested by the Government participant in this study.

Finally, participants in the private sector, municipality and academic actor groups mentioned the theme of adaptation and evolving through time in order to be sustainable. As further constraints such as population growth, stakeholders in service delivery must adapt and *“evolve over time”* (6, Private) to be able to provide services at a high level. This is significant as there are always unforeseen

circumstances in the future and hence evolving is key so when any changes occur, sanitation can be adapted to the newest challenges.

### 7.5.2 Inclusive sanitation

It was also important for this research to analyse the participants' different understandings of 'inclusive' in reference to sanitation as this can impact the governance of sanitation. The responses were again grouped into themes based on participants' responses around inclusive sanitation. Before themes are identified and analysed, it should be noted that a trend seen through all interviews is participants all believing that increased inclusion in the sanitation service chain would inevitably lead to increased sustainability. The themes of inclusivity are:

- Sanitation for all people
- Sanitation with a specific focus on informal communities
- Increased actors incorporated in sanitation governance
- Inclusion of innovative technologies as alternative solutions

The most frequent and obvious theme of inclusive sanitation mentioned by every actor group was *"sanitation for all"* (5, Municipality). When probed further, many responses continued along the line of every person, *"whether they are rich or poor is irrelevant"* (15, Government) and that access to sanitation meant to a *"safe, functional toilet that separates your waste from you"* (18, Academic). "All" was specified further in many of the interviews as access to everyone, without any discrimination against genders, ages, disabilities, races and religions. These participants did not specifically refer to informal settlements needing extra attention or different technologies here but stated that everyone had the right to access sanitation and it was the municipalities responsibility to provide this, as stated in the constitution. Solutions designed for all genders, religions and races were identified as easier than designing services for people with disabilities, as this can come in different forms making it more difficult to know what the needs are and you cannot always see disabilities, so when collecting data on service requirements, it is easier to miss people with disabilities than women for example. That said, participants indicated that collecting data on anyone who does not fit generic requirements is difficult. Hence, the challenge in including all different types of people and needs within communities impacts the inclusivity and sustainability of services.

A portion of the interviewees, from academic, private, municipal and utility actor groups, specified inclusion of informal and rural communities in their definition. This was because these communities often live outside the waterborne edge of the city and do not have access to flush toilets or sewerage networks. In these cases, inclusion meant a specific focus on those who are most vulnerable from the risks of lack of sanitation services. There was a specific focus on informal settlements as a priority for some participants due to the intentional, historic discrimination of Black South Africans and as a result, despite apartheid now being over, the current system still has

*“the remnants of our previous government administrative and backdate. so, you find that most of the plans or most of the services were designed to serve a particular interest group..... so now such areas, they were left behind until '94” (Municipality, 13).*

In other words, the service system is yet to catch up with providing adequate services and there are backlogs to address from the previous authoritarian state so this should be the focus for inclusivity. Some indicated that without the intentional focus and action towards improving these situations, it cannot be said that there is inclusivity in access to sanitation.

Often, these participants considered the impacts of lack of inclusive sanitation here, this included health and hygiene issues, safety; *“particularly in schools you know it’s safety as well as hygiene and we had children that are falling into pit-latrines” (14, Academic)*, quality of life, and politically bridging the gap between the rich and the poor. Therefore, suggesting that sanitation contributes to increasing the status of the poor and improving their quality of life to feel less marginalised from society. As such, this understanding of inclusion was mostly focused on *“informal communities and rural communities that don't have access, that are outside of the waterborne edge and haven't had the benefit of being on our evaluation roll” (10, Municipality)* and getting service delivery out to people who do not have adequate sanitation, mostly in townships and informal settlements outside of the Urban Development Line. Furthermore, interviewees often went further than just delivery in their understandings of inclusion to also include operation and maintenance. Some saying if

*“you don't have systems in place, and you don't have, you know, policies guiding municipalities on how to operate it, look after them, then yeah they are going to fail. You know you can't put something in and walk away” (14, Academic).*

This suggests that operation and maintenance stages are overlooked occasionally once a sanitation service is in place and this can be a cause of failure and a lack of longevity in a service. This also indicates that it is the responsibility of the local municipality to put such processes in place but without clear guidelines on how to do this, it is unlikely to be done well. One may deduce that there needs to be clearly defined operation and maintenance processes within policy. However, the difficulty in such policy being translated into action is that some communities have *“their own systems within their space, municipality has no oversight of those, so the consultation is extremely poor for my experience” (3, Private)*. This suggests that due to the historic exclusion of these communities, many have created their own sanitation systems without aid of the municipality and as such it is more difficult for operation and maintenance. Yet, including communities in operation and maintenance processes was seen to be necessary in increasing inclusivity in sanitation services.

Another common theme referred to the approach in which to provide sanitation. Private sector and some academic and municipal actors vouched for a need to work for a more inclusive approach of service providers and sanitation actors, including academics, engineers, municipality, technology developers and the private sector in the design, planning, implementation and post-delivery phases of projects. This is in order to share knowledge and develop more innovative, sustainable solutions by having a better understanding and more insight into other disciplines. It was also further defined that these relationships should be formed in the initial or early stages of the projects to develop expectations and understandings of how the other actors work. Actors that were

mentioned included, but are not limited to, communities, engineers, agriculturalists, NGOs, government and social scientists. This was generally key for two main reasons, firstly that *“inclusiveness could mean different things for different people”* (7, Private) so it is to broaden understandings of everyone involved to develop a solution that works for everyone. The second reason that this was reiterated multiple times is to increase financial sustainability. In the words of one participant, inclusion of multiple actors and backgrounds aids in *“closing the nutrients loop and that can affect your economy”* (1, Academic). By this, participants are referring to the attempts that have been made in starting a circular economy loop with innovative sanitation technologies. This is between communities, the private sector and the municipality whereby the communities can collect and sell their waste for use as fertilisers by using the technology of the private sector and the oversight of the municipality. This suggests that the inclusion of multiple actors in each phase of the provision of sanitation can help improve the financial capacity and income of communities, and also can aid in developing deeper relationships between actors and establishing a better understanding of what each actor is expecting. This concept of circular economy came up in multiple interviews, where examples were given of different pilot projects which have been tested, but none have been approved thus far.

The final theme in inclusive sanitation understandings focused on innovation. All participants thought that the needs of people are different and thus there must be an inclusion of different solutions and innovations working alongside each other to provide a high level of service. The main goal was explained that everyone benefits and for this to happen *“there might be a mix of different types of sanitation solutions”* (14, Academic). Linked to this was a phrase very often repeated throughout the interviews, *“that is within the city itself, it’s not a one size fits all”* (16, Municipality) which is due to different levels of infrastructure available and *“structures of the past that we inherited”* (16, Municipality), referring to the historical discrimination experienced leaving the population living in racially divided lines. The difficulties in reaching certain areas with challenging terrains was also mentioned as reason why the same approaches cannot be provided to everyone by private sector, academic and municipal actor groups. As was the fact that there are areas which sewerage networks do not reach and as such, innovative solutions must be developed as its unfeasible to build sewerage networks in these areas due to landscape and finance.

## 7.6 Facilitating Inclusivity and Sustainability In eThekweni's Sanitation Governance

Finally, participants in this study highlighted potential strategies that could facilitate more inclusive and sustainable sanitation systems in eThekweni, given the challenges presented. This section outlines and expands upon the strategies identified.

- Sanitation Innovations
- Community engagement
- Multi-actor participation
- Circular economy
- Capacity building
- Monitoring

The first approach, which was unanimously agreed on, is the introduction of innovative technologies. As mentioned previously, the interviews made clear that there was an explicit need for innovation and decentralised sanitation systems, thus *“moving away from this thought that a flushing toilet is the only solution. Because that is not sustainable”* (11, Private Consultant). Flush toilets and waterborne sanitation were explained to be an incredible, almost impossible, challenge to supply informal settlements, as is the case in the more affluent areas. It was found that the lack of sewerage access in these areas providing a justification for experimenting with innovations in informal settlements, *“Durban has areas or residences that are not connected to a centralised waterborne sewage system, that’s an opportunity because that allows us to [test] new models* (1, Academic). As such, actors in sanitation governance have decided to pursue technologies that can be implemented in smaller spaces, which can treat waste on-site and considers *“the fact that we have periodic droughts and there’s water shortages so that forces us to come up with solutions that may, you know, use less water”* (12, Private). Seeing as water scarcity impacts the whole country, such solutions that consume less water should be made available to all citizens within eThekweni, not just those within informal settlements. Hence, some participants proposed developing water-saving, innovative technologies that are accessible to everyone as an approach to facilitate inclusivity and sustainability in sanitation, *“the one good thing about all of the work we’re doing in terms of non-sewered sanitation, it’s not just designed for the poor. It is how that kind of facilities or technology can be made available to anybody that wants to save water or not use the flush toilet* (16, Municipality)”

Interestingly these projects were often only piloted in informal settlements and not the rich white areas, likely due to informal areas being the places that are in most need of such technologies. Moreover, with the regular flush toilet consuming between 10-13 litres per flush, *“there isn’t capacity at the local wastewater treatment works to take the additional wastewater”* (14, Academic), thus indicating that the privileged urban areas still have priority in sanitation provision indirectly as they can use wastewater plants that have been constructed during apartheid and are still in use. Informal settlements are now treated more as an addition to the city and consequently there are new and different ways being considered in how to supply the same level of services.

A multitude of possibilities were presented when considering innovative technology capacities in order to *“to reduce the amount of water that’s been used and make the treatment process*

more effective" (14, Academic). These included: "some sort of very low flush, port flush system so you get the water seal, that's the simplest way of stopping smells and that" (12, Private), "a solar powered system that recycles water and cleans it" (12, Private) and "at the same time provide people with toilets that are actually really nice to look at and really nice to use" (14, Academic). These are all examples of innovative technologies to reduce the pressure on water systems and simultaneously provide adequate sanitation which is appealing to the user. Additionally, the concept of innovative technologies is intertwined with continuous, long-term evolution to enhance sustainability as time goes on, "when you expand the system..... [it's also] a system that can evolve and is adaptable" (6, Private). Following this thought, it is also key for innovations to be "scalable" (6, Private) so they can continue being adapted and improved over time as demand and restraints change. This suggests that sanitation services that are to be delivered now are expected to last for a long period of time and as such must be robust and have the capacity to adapt to eThekweni's continuous escalating challenges from global warming. This enables a more sustainable solution, providing the sanitation innovations are financial affordable to all people, particularly for the municipality, as the responsible actor, so it's possible to roll innovative solutions out to informal settlements; "for example, the municipality if they're the people who are going to be buying these systems, is it something that they can afford to buy and to run" (18, Academic).

Therefore, innovative technologies was named a way of promoting inclusivity and sustainability within eThekweni's sanitation governance. Despite this yet to be successfully implemented anywhere in eThekweni, most participants believe that from projects tested so far, "technology is moving in the right direction" (10, Municipality) and it is a legitimate solution that needs more efforts but can be implemented in eThekweni.

A significant challenge in implementing innovative technologies is the negative perception they carry amongst beneficiaries. Participants mentioned that communities in informal settlements tend to view innovations as inferior solutions, rather than sustainable and plausible sanitation systems that are more applicable to tackle challenges of the future. Therefore, the second approach which could facilitate inclusivity and sustainability in eThekweni's sanitation services, is to change the role of communities and beneficiaries in sanitation provision from a passive agents to active ones by engaging them in the initial stages of the project and integrating them throughout till the end.

One way suggested by participants to change the perception of innovations would be through education and interacting with the communities during the initial planning stages of a project to develop deeper understandings of their wants and needs. As a result, many participants expressed there must be an educational aspect to it also to increase likelihood and success of uptake of innovations, "so I think it's about educating, exposing people to those ideas, making sure that they are aware of the skills that they need to make those things a viable option" (18, Academic). This suggests that if communities are more integrated within sanitation innovation plans, and understand why it innovations are necessary and also how to use the systems, it will change the perception of these and increase uptake of such technologies, which can lead to increased sustainability and inclusivity of sanitation governance in eThekweni. Participants who suggested this also stated that education and awareness should be a continuous theme of all projects for there to be lasting impacts,

*“There should always be like, continual, periodical, the renewal of the raising of the awareness, because you know, people are [...], you know, it's human nature. You know, people would tend to default back to where they were before. So, there should be you know like sustained, or sustained education. Yeah, in your communities, everything needs to be sustained” (7, Private).*

The long-term goal here is to create solutions which are accepted by the users. Thus it was said to be important to build a relationship between communities and sanitation strategies where they feel ownership of the system. This is so communities feel motivated to keep systems maintained, as one participant explained, it is key that *“its owned by that community, [and] they feel its there's and it's something that they can look after and you don't always have to rely on big governments to do it” (12, Private)*. This is essential as the municipality were said to not have a capacity to maintain systems in informal settlements and thus, responsibility is devolved to the users. To accomplish this, along with education, participants often followed the thought that solutions should *“be guided by that community themselves and be sure that they can, as much as possible, its within their means to look after” (12, private)*. This suggests that if the communities do not feel ownership of the innovative technology solutions or any sanitation implementation, it could render the whole project useless. Another aspect reinforced here is that there must be efforts made to change the perception of innovations being a solution for the poor and rather a sustainable solution for everyone, *“we need to be looking at sanitation solutions that are acceptable to everyone, so regardless of whether you are rich or poor, and that I think that they obviously need to be safe” (14, Academic)*.

Therefore, in integrating communities within sanitation solutions, their role must be changed in sanitation governance. Until now, the municipality have been responsible for implementation and upkeep of services, but this has not resulted in long-lasting solutions. As such, participants suggest that communities should be more involved in the solutions and have a more prominent position to play in its outcome. Having communities more involved with sanitation solutions can potentially lead to their voices, needs and demands being heard more, enhancing the ability *“to understand their [informal settlements] frustration or the issue that they might be having” (13, Municipality)*. This would change the relationship between the state and its citizens where they are both key actors in its delivery and as such, should be equally involved. In doing so, this suggest that the capacity of both communities and the municipality will be increased, leading to more inclusivity and sustainability in eThekweni's sanitation services.

A third approach to facilitate inclusivity and sustainability in eThekweni's sanitation is by increasing the actors involved in sanitation governance. Some participants specified that in design stages of the solution, municipalities should collaborate with the private sector to increase access to innovative solutions, *“encouraging governments or municipalities to link up with [the] private sector to make sanitation more effective” (12, Private)*, others on the implementation and post- project stages, for example: *“you also look at how the back-end processing is [dealt]. It cannot be left to the households” (16, Municipality)* but ultimately, the majority of participants referred to something along the lines of *“the solution will need the input of all the stakeholder to say what is the best solution to solving this problem” (1, Academic)*. This suggests that sanitation governance will not foster inclusivity or sustainability until it is considering the perspectives and sharing information with other actors within the sanitation chain. Hence, this study find that multi-actor participation can increase

knowledge growth, accountability and also build capacity in all sectors by devolving roles and working together to increase financial sustainability and be more productive and efficient.

As mentioned previously, a key actor are the communities. Despite not being service providers and the ones experiencing the problems and thus can shed light from a new and entirely relevant perspective. Participants also vouched for increased involvement of the private sector and philanthropic organisations to promote inclusivity and sustainability in sanitation services, anticipated with the increased access to innovations. This was an opportunity to explore:

*“what are the different technologies that we can provide and the different service models, not the municipality providing the service all the time, what is the business model around sanitation that allows the private sector to look at the value at the end” (16, Municipality).*

The Bill and Melinda Gates Foundation was a popular private organisation amongst interviewees, *“not only because we get a lot of funding from it, but I mean around about the beginning they’d already identified... with what we do” (2, Academic).* Several of the participants found that engagement with the private sector led to more opportunities to test innovative technologies from the funding provided, to find suitable solutions for each of the environments or communities involved. This indicates it could also contribute to knowledge sharing and capacity building as well.

However, participants also admitted that successful implementation and adoption of innovations are still dependent on the community perspective and uptake and thus success of a project mainly depends on how the community are interacted and engaged throughout and whether they decide the innovation is suitable to their specific contexts.

Moreover, participants acknowledged that there is a challenge involving more actors in sanitation governance given the threat of corruption in some sectors (such as in the government or the private sector) and specifically mentioned that for a multi-actor approach to work,

*“they require massive honesty ethics, a trust relationship, all of those things are part of the solution in making sure inclusive sanitation works. It is not just a public sector intervention in my opinion” (15, Government)*

...and to increase trust between governance actors which is not an easy task, *“we [South Africa] need to limit the amount of corruption which isn't as easy as [just saying] ‘let’s limit the amount of corruption’”.*

This suggests that governing sanitation by means of integrating private organisations, academics, government, and the communities in the solution can facilitate inclusivity and sustainability in sanitation provision, given that relationships built upon trust and transparency.

Relating to innovations and involving multiple actors in sanitation governance, is the possibility of implementing a circular economy system within sanitation to promote inclusivity and sustainability of services according to participants. This is by using the opportunity of human waste through recycling it to *“improve food production and even income and improved livelihoods” (1, academic).* Due to the backgrounds of the stakeholders involved in this research, there were various aspects contributing to circular economy here including provision, collection and treatment of waste and conversion into new products including fertiliser. This was often based off of using local *“urban agriculture, so these nutrients can be recovered, and fertilisers made, and farmers can actually use that to grow food in urban areas” (1, Academic).* Circular economy was seen to be an optimal



characteristic of a sanitation solution to increase sustainability and inclusivity as it addresses the environment by recycling waste and wastewater, whilst having the possibility to engage communities and increase financial capital within informal settlements. It can also increase social capital through knowledge and status. Lastly, it could provide an improved, adequate, safe sanitation service for communities. In the words of one participant,

*“The idea is to create these small businesses where they go around and collect the diverted urine, they create the [struvite], which then can be sold back to the community as a form of fertiliser, because your urine is where you've got most of your nitrates and phosphate. And so that's another aspect of finding solutions where the community is involved with the outputs, or the outputs in the form of resource, [like] out of the composting of the sludge, the [struvite] from the urine diversion, the watering of crops with the treated effluent that then result in growth of crops, or better growth of crops, which is now a food source, or even an economic resource which they can get the food through to [market]” (5, Municipality).*

Some went on to explain that ultimately the goal is to implement a system where it would need as little involvement from external stakeholders as possible; *“a recycling system where also the faecal matter is treated to a point where you can safely scatter that waste on your garden so that you're no longer reliant on any outside interventions” (12, Private)*. Others also were of the thought that it would be most sustainable for solutions to be decentralised, simple to use and robust, to provide the user with independence and increase individual autonomy once the innovation or solution has been implemented successfully. This was seen a best-fit characteristic due to the difficult terrains and lack of waterborne systems in the peri-urban areas around the city, where it is unlikely to connect sewerage to, a decentralised system is more fitted to this space *“within these crowded areas for them to put facilities that is easily accessible to everyone” (4, Academic)*. This also suggests that the difficulties in providing to communities due to terrain and also a lack in municipal capacity result in sanitation providers wanting to provide independence to the users. Hence why most actors referred to some solution where they would need as little intervention from externalities in the use and maintenance of sanitation services indicating that this will result in longer-lasting sustainable solutions that can be implemented by more people.

As briefly mentioned earlier, the opportunities of innovations, knowledge-sharing and circular economy all can result in capacity building of all actors, particularly the municipality and communities. In terms of the municipality, there is a need to build capacity as *“they're the main service provider for the area, so it's their responsibility to provide sanitation systems” (18, Academic)*. The innovative technologies and circular economy is reliant on successful community engagement and so there is the opportunity of *“building their [communities] capacity to think, to be aware and to understand these things, it will contribute” (7, Private)*. Participants mentioned that the processes mentioned were not immediate possibilities and required continuous efforts from all actors in sanitation governance for this to be successfully implemented, but ultimately the increase in capacity would result in higher inclusivity of sanitation outcomes and a more sustainable solution.

The final approach mentioned which could facilitate more inclusive and sustainable sanitation mentioned by participants is monitoring after implementation, *“you can’t put something in and walk away”* (14, Academic). This suggests that a lack of monitoring can result in a situation outcome where *“the entire system became dysfunctional, because when one person abused it, the next person came in, it just doubled and then eventually the entire thing became dysfunctional and [became] one great mess with greater risk”* (16, Municipality).

This also emphasises the lack of ownership towards sanitation systems in informal settlements, which reduces the longevity of services. To reduce such events from happening, on top of decentralisation and more responsibility taken from all actors in sanitation governance, several participants promoted the idea that

*“implementing authorities need to have a much more rigorous routine for monitoring and evaluation, and providing the necessary support for the cleaners or for the caretakers of these facilities, which sometimes includes maintenance for instance, sometimes [it] takes a long time to repair so if these things are tended to in quicker time then it [improves] in sanitation delivery* (4, Academic).

This suggests that once sanitation services have been implemented, the municipality are responsible for ensuring services are monitored and maintained so they do not fail and not be used in the end. This indicates that without monitoring processes in place, it can impact the overall inclusivity and sustainability of eThekweni’s sanitation services.

## 8. Discussion

Over the past 25 years, eThekweni has witnessed a shift in its sanitation governance. This can be seen in the results of this study through the increased number of actors involved in sanitation provision due to the growing need to create solutions that are more sustainable and inclusive. This study found that in the context of eThekweni, specific aspects to focus on in creating solutions are longevity, affordability to all, non-discriminatory, and environmentally friendly. To navigate this challenge, the government devolved responsibilities from being solely national government to sharing responsibilities between national, provincial and local government, giving local municipalities the responsibility of planning and implementing sanitation within their boundaries. Hubbard et al. (2002) mention that decision-making processes can be affected by changes in the role of the state and this has been evident in eThekweni since central state devolved responsibilities to local municipalities, resulting in changes in decision-making processes. The work of Maharaj (2012) details the benefits of decentralised governance which include greater flexibility, and tailored more adequately to local needs. This was also confirmed by the participants in this study and by authors from the literature review stating that cities are unique in their own ways, and thus a decentralised government is more beneficial to gain a contextual understanding. By municipalities integrating more actors, a better local understanding of the specific context can be acquired. Participants in this study also added to this by stating that the decentralisation of government has led to an increase in capacity by the sharing of knowledge and roles between actors. This aids on-site innovative technology implementations, as backed by Satterthwaite et al. (2019) who stated that on-site services can only be successful with a higher capacity from local governance actors.

Nevertheless, participants in this study also indicated that despite solutions being planned and implemented by municipalities, legislations and policies are still derived through national government, which limits flexibility in how service delivery can take place. This is in contrast to Niksik (2004) who stated that decentralised governance would result in reduced 'red tape' or bureaucratic hurdles, but this was not found to be the case in eThekweni. Participants found that policy has not kept up to date with sanitation provision and thus, governance is limited in the possibilities of new and innovative ways of providing services. Hence, one may deduce that Niksik's (2004) writings does not take into consideration the local context and how conversant the policy is, which can impact the sustainability and inclusivity of services. Furthermore, this emphasises the fact that local contexts are significant in designing sanitation solutions, and policy does not always aid inclusivity and sustainability in sanitation governance. This is noteworthy as much global policy has guided sanitation governance in developing countries and in South Africa, but this research has found that such policies may be good as umbrella guidelines but can be limiting in specific local contexts.

eThekweni Water and Sanitation acknowledged that providing sanitation access to all people would be too slow if they acted alone. This was especially noticed as the majority of informal settlements around the urban edge of the city had no access to sanitation. A number of challenges were faced when supplying sanitation to informal settlements and so by increasing the number of actors within the governance of sanitation systems, this would increase the contribution to new ideas, solutions and delivery of sanitation in eThekweni. This supports the UNDP (1999) in saying that devolving governance responsibilities is often with the aim of increasing participation in decision-

making to lead to improved living conditions. However, one may also argue that increasing the number of actors could pose the threat of slowing down processes, and actually creating more bureaucratic hurdles due to decentralized processes.

Actors within sanitation governance include academics, the private sector, communities, technology developers, NGOs, international bodies, and philanthropic organisations. This is a key aspect of Network Governance, identified by the work of Dedeurwaerdere (2005) as a way of contributing to the solution of a problem by involving multiple backgrounds and more actors. Interestingly, there was limited literature on the importance of academics within sanitation governance in eThekweni. However, it was found that these are the actors testing innovations and providing feedback on how they went, making them a key player in the sharing of knowledge. Despite innovations playing a greater role within the private sector, it was found that philanthropic organisations in eThekweni were at the forefront in testing, changing, and governing the innovative technology projects.

Besides the urgency in providing all citizens with adequate sanitation services, another justification for involving more actors was to eliminate the remnants of discriminations left within the city from apartheid. According to participants, including more actors has increased accountability in services and created a platform for knowledge-sharing. This in turn has led to increased innovative technology experimentation, and ultimately a less discriminatory, and a more sustainable and inclusive sanitation service. This is also mentioned by Cheema and Rondellini (2007), who state that there can be more political accountability, citizen participation and economic growth through decentralised governance. However, participants also mentioned that there is still corruption within the government as well as in the private sector, indicating that decentralisation can also lead to a gateway of allowing other actors to take advantage of their new roles. This may be due to weak governance at the centre as argued by Stoker (1998) allowing for bias and corrupt networks. Robert and Keating (2005) also argue that actors within network governance should develop relationships over time with trust. In this sense, participants follow the same thought believing that there must be time invested in building deeper relationships where there is a foundation of trust. Perhaps a reason why corruption is still substantial is due to lack of efforts in building sustainable partnerships in sanitation governance. However, as pointed out by the academics in this study, developing relationships require a lot of time. eThekweni is still experiencing this shift in governance and so, it may also be possible that actors have not had enough time to adjust to their new roles, nor develop deep trusting relationships.

Moreover, a local context is key to understand the needs and restraints of the area. This is not always in a technical sense and as such, participants claimed that the inclusion of local actors and communities was vital to facilitate inclusivity and sustainability in a sanitation solution by developing more thorough understandings of sanitation requirements. This is in order to create solutions that are more specific to the needs of the user.

Consequently, in an effort to include the needs of communities, actors are making changes to give communities a more significant role in sanitation governance transforming their roles from a passive beneficiary to a more active actor, involved in every stage of sanitation provision. Community involvement and increased actor participation was said to enhance the sustainability and inclusivity of sanitation services by extending the knowledge shared between actors and gaining a better

understanding of the community perspective. This overlaps with Network Governance theory, as increased engagement between actors can help build relationships and normalise the sharing of information as a strategy to increase sustainability of services (Robert and Keating, 2005). Participants' views overlapped with many aspects of Network Governance theories mentioned in the theoretical chapter. For example, eThekweni's sanitation actors promoted the engagement of many actors in sanitation provision as a way of increasing accountability and trust. This is supported by Swyngedouw's (2005) article which mentions that increasing the networks in governance decreases bias and allows for an iterative interaction, as stated by participants, where they can consult one another throughout the process to continuously adapt and improve. Participants also added that this allows for the sharing of different backgrounds and perspectives by including actors that were not considered before. The study found that academics have the most active and thorough engagements with communities and are vital for a project to be successfully implemented. Despite other actors (private, NGO, government) also recognising the importance to engage with the community, it was found that they did not budget enough to be able to build sustainable relationships, and this seemingly was the cause for unsuccessful innovative implementations. Hence, the municipality chooses to work alongside academics so they both have individual roles in sanitation provision, but both contribute to governance of sanitation in eThekweni. Other actors and funders also followed the same procedure, often outsourcing these processes to academics, enforcing the need for knowledge sharing.

According to all actors with the exception of academics, there are negative perceptions on innovative sanitation technologies by communities, where it was said they are generally regarded as inferior to the traditional flush toilet system. This study has found that could be due to changing expectations and definitions within policy, with some authorities have specifically saying a flush toilet is at the top of the sanitation ladder. This as well as the years of discrimination and lack of services in the past, may have influenced the negative perception on any other solutions. This was also stated by Maharaj (2012) who found that waterborne sanitation was the preferred sanitation system. This results in further challenges in implementing innovative sanitation technologies. Sutherland et al. (2020) however, found that communities wanted to be informed on new innovations and were interested in increasing their knowledge to enhance capacity in relaying their wants and needs to technology developers, academics and the municipality, and thus improving their sanitation access. This may be due to the fact that in the study, the communities were integrated and engaged in every stage of the project and were given the platform to provide feedback. This was not always the case with participants who mentioned community's negative perception and as such, may be the reason why projects failed, and communities were found difficult to engage with. This indicates and once again reinforces the need for community engagement from the beginning of the project, so there is a greater likelihood of acceptance, adoption, and provision of suitable innovative sanitation technologies, to increase inclusiveness and sustainability in sanitation services. This study has shown that areas within developing countries tend to have different levels of provision, thus the need for bottom-up approaches through community input. Although this may take longer to implement, the results suggest that this will lead to more sustainable and inclusive services in the long-term. Therefore, this study argues for there to be more policy promoting the importance of locally suitable solutions with

regards to geographical and political factors, rather than broad umbrella concepts and recommendations.

The rise in the potential decentralised and on-site sanitation systems are hand-in-hand with the reinvention or change of sanitation space. Participants in this study advocated the possibilities of providing the city's citizens with different sanitation facilities but still having the same outcome or level of service. Thus, this presents an interesting finding of reinventing what sanitation could look like in urban environments, and that it may not always be a flush toilet. However, it is crucial to be considerate of human rights throughout and not use people in disadvantaged areas as experimental subjects for testing innovations. Hence, this once again reinforces the need for the involvement of more actors to increase accountability (Lane, 2004).

Moreover, Maharaj (2012) and Van Vliet et al. (2011) both mention that low-cost innovative solutions are a response for provision, and Ostrom (1996) argues that stakeholders can pool together knowledge and resources to result in innovative ways of providing sanitation. These were also reiterated by participants in the study with a specific focus on international network and philanthropic organisations who bring in technology and ideas from outside the country. This was key as solutions were said to not be implemented solely for the poor, but rather to be accessible for everyone. This was to eliminate the thought that innovative technologies are designed for the poor, and ultimately to reduce inferior thoughts associated with innovative technologies. Niksic (2004) states that a transition in roles of governance actors can lead to increased innovations and increased capacity. This was also supported by all participants who specifically mentioned the benefits of academics, private sector, philanthropic organisations and NGOs in bringing innovations to the forefront of sanitation governance and expanding knowledge. Therefore, bringing international, national and local networks together can increase the flow of knowledge and bring more sustainable, inclusive and innovative technologies into the developing country contexts, in turn, increasing sustainable development in the Global South.

An important challenge identified in this research is that informal settlements are outside of the waterborne edge and thus it is more difficult to supply homes within these areas with their own flush toilet. Consequently, the Urban Development Line (UDL) was created to show a difference in rural and urban areas, indicating that there are different needs and contexts to consider when providing services. Thus, the focus has changed to innovative technologies in order to provide the same level of sanitation to everyone (Odili, 2018). Bond (2020) argues that the UDL signals a discriminatory system where the municipality is separating the poorer informal communities and rural areas from the urban affluent areas. However, participants clearly supported the creation of the UDL, stating that the terrain in which these informal settlements are in are not feasible to have the same sanitation systems as the city and as such there is a definite need for different solutions to fit different contexts, hence the topic of innovations. This is supported by Sutherland et al. (2014), stating that this is not a discriminatory way to separate poor from the rich but rather a spatial tool to aid municipalities in understanding what sanitation solutions can be provided realistically. This suggests that subjecting informal settlements with the aim of providing individual homes with flush toilets is unrealistic and also somewhat unfair, and a false promise because it would just take too long. Therefore, it is noteworthy to see that there are different solutions for each context and as developing countries often have very

underdeveloped areas, it is more plausible to look into alternatives to the norm. Participants in this study suggested that innovative technologies could need less infrastructure and be supplied faster, thus tackling challenges in sanitation more efficiently. This is key in providing greater numbers of people with sustainable, safe, hygienic, accessible and affordable sanitation, thus helping to achieve SDG 6.

As a result, in the global context, this study also observes how 'equality' also changes with the understandings of inclusivity and sustainability in the local context. Generally, equality is seen by supplying the same services to all people. However, for the reasons mentioned previously, this is not promoting inclusivity or sustainability because of the fact that it would be less effective in the long run. Rather, services designed should focus more on equity, to be more suitable for the populations in the least advantageous areas whilst considering specific constraints, as this would promote sustainability and inclusiveness more. This is so ultimately, different services can provide people living in different environments with more of an opportunity to live an equal life in the long-term. In other words, focusing equity rather than equality in provision is more concerned with the bigger picture. Hence, this suggests that equality in services is not in the service itself but rather in the end result and how this impacts quality of life. Thus, this study argues that providing different services to different areas within a city by considering local contexts and people, is more sustainable and inclusive as it could provide people with a more equal quality of life, regardless of their status or wealth.

As such, participants in this study support the idea of innovative technologies research to find the solutions that are feasible in informal settlements and densely packed areas. This is supported by Sutherland et al. (2020) who tested an innovative sanitation solution within an informal settlement and received positive feedback. This suggests that it is equally important to address the societal perception of innovative technologies as well as the technical possibilities as these are both key in the implementation of new sanitation solutions. The results of this research identified that this is likely due to the generations of flush toilets within affluent areas and the global north. However, innovative sanitation solutions should be on the global agenda as global warming impacts are global and water consumption is a concern amongst climate scientists. As such, participants within this study suggest education and awareness on the need of innovative technologies is key on its adoption, and believe it is not happening enough within eThekweni. This is also supported by Odili (2018).

Innovations that are being explored include on-site systems, non-waterborne systems, and waste recycling systems, yet none have been successful to a point where they can be scaled up. A prominent reason why this is not possible is because landscapes are different as there are no proper roads, sewerage piping and steeper terrains in the informal settlements and each one presents its own difficulties. Moreover, these spaces are densely packed and so implementing such piping is near to impossible, or would take an unreasonable amount time, given the restraints, not to mention that participants stated that the municipality do not have enough money to spend on this level of a project.

Sanitation is often looked at from a technical side as most global policy is on technical aspects on how to provide sanitation in developing countries and what flush toilet alternatives exist. As important as this is, there is also an essential social aspect to sanitation as it is a basic need that everyone has. Without access to safe, adequate sanitation, which separates human waste from the user and so

prevents the spread of diseases, one's quality of life is impacted. The social aspect to sanitation, however, is not always confronted by providers nor conveyed to the users of the sanitation, resulting in less knowledge in communities and as such, a lack of prioritising improved sanitation in their lives. Hence, a lack of education to communities and users on the importance of sanitation can also impact the sustainability and inclusiveness of sanitation systems. Notably, to incorporate and prioritise social impacts from a lack of safe sanitation, it requires a change in mind-set for both providers and of the users. This is a challenge not explicitly mentioned by the participants, nor theory, but can be done through education workshops and developing a broader understanding of local impacts from unsafe sanitation services.

Mjoli (2010) found that there was a lack of sanitation and hygiene awareness from the users and this was also emphasised by participants in this study. A lack of awareness in sanitation and hygiene was found to affect acceptance up innovations and user acceptance in this study, which was also found by Maharaj (2010) and Mjoli (2010). As Maharaj (2010) suggests, this may be linked to a lack of translation into action from policy by service providers. This is because the South African Basic Services Publication (2009) clearly says that sharing knowledge between stakeholders is key, including communities as a key stakeholder. Mjoli et al. (2009) identified that stronger relationships should be built between service providers and communities to provide better services. This also was emphasized by the actors in this study suggesting that more engagement and more efforts in understanding community perspectives, and vice versa, would lead to more successful service delivery projects. Success here is in terms of longevity and communities' pride towards the system. The DWAF (1994) supports this in saying communities should be integrated throughout the project so as to develop ownership and responsibility of the system. Both actors and literature support that if the communities feel a sense of ownership toward the sanitation system, they will make efforts to take care of it hence it leading to a longer lifespan and increased sustainability.

The impact of climate change and urbanisation are affecting regions globally. Many regions are likely to experience similar challenges, despite the historical differences, and as such, awareness of innovations and education on the need for alternatives to 10-13 litre flush toilets are essential in increasing sustainability in sanitation services. This study found that actors who developed long term engagements by prioritising education and a platform for community feedback during pilot projects found communities willing to accept innovations and be more involved in its roll-out. This is obviously in the context of eThekweni and informal settlements; however, this can be extrapolated to environments all over the world by including bottom-up approaches that include society within the governance of services. This study found it be key to include such approaches, including education and awareness of new sanitation technologies, in order to support roll-out of more sustainable technologies that reduce water consumption which is essential in slowing down the impacts of global warming. This is particularly necessary in developing countries and in areas experiencing higher impacts of global warming than others, but it is also key for the developed world to also recognise this so there can be a universal effort on reducing water consumption and thus increase global efforts for innovative technologies that decrease water usage.



## 8.1 Recommendations

The findings from this study, despite data being collected in eThekweni, can shed light on and resonate with many other developing countries struggling in providing sanitation for all people, without exclusion to the vulnerable. Therefore, the researcher has a number of research avenues that would be beneficial in improving sanitation provision knowledge for developing countries. One thought is to further research the roles of governance actors in different cities in the Global South and see whether these are similar or differ. Decentralisation of responsibilities in provision has led to a number of increased actors in eThekweni, alongside an increase in knowledge of sustainability and possible solutions. Hence, further research on governance actors and their roles could enlighten sanitation providers in looking at different possibilities to improve service provision. However, for this to work well into the future, there must also be research done on ways to limit corruption as without accountability between actors, the decentralisation of responsibilities can also lead to decreased inclusiveness and sustainability.

In addition to this, as mentioned early in the report, this study contributes to a larger project on sustainability and inclusivity conducted in a total of 5 cities in the Global South. This is with the same interview guide and methodology as this study, thus showing the replicability of this study. Therefore, this study further recommends for this study to be replicated over numerous cities in the Global South, to develop a deeper understand of governance, sustainability and inclusiveness in sanitation in local contexts. This can also contribute to designing governance policy that is more suitable to developing countries, by collating and providing local perspectives in these countries. Finally, it would also be beneficial to include communities in these future studies, to understand communities and their knowledge hubs and transfers. This is important not only to understand the needs of communities but also to understand any bottom-up approaches they may have developed within their environment. The is key in continuing the shift in the role of communities within governance, from passive users to active actors contributing to decision-making. In this aspect, it is also valuable to know the solutions that vulnerable communities have implemented up until this point, as sustainable solutions may be more probable by building up and improving systems that currently exist.

## 8.2 Limitations and Challenges in the Study

A significant limitation to this study is that only the view of experts and top-down participants contributed to the results, no communities or other beneficiaries were interviewed. This may have impacted the bias of the data collection and could be disregarding important aspects of informal settlements in eThekweni. Moreover, there were minimal observations of informal settlements, or any of the environment in the city, including offices of participants. This could have been useful to develop any spatial or physical understanding of how governance actors' lifestyles may differ from those living in communities, and whether this could impact the validity and reliability of the overall results. The communities in informal settlements are a major focus to this study as these are the areas experiencing the consequences from a lack of inclusiveness and sustainability in sanitation, as well as those witnessing changes in the governance of sanitation. This is likely a stark contrast to the participants in this study, none of whom lived in an informal settlement. Therefore, it is important to understand that the researcher may have presented a bias view in the interpretation or analysis of results but has tried to eliminate this with triangulation between interviews and literature, and not using normative language.

Travelling to South Africa and arriving the same time as the global COVID-19 pandemic was an unexpected experience. As such, I have felt it important to reflect upon my experiences and how this may have affected my research. The research generally took longer than expected and as most organisations were closed in lockdown, there were delays from contacting interviewees who were no longer in their offices. I found that changing to interviews online, rather than face-to-face, had a drastic impact in the dynamics between the interviewer and interviewee. This is in the sense that people tend to not be as relaxed in front of a screen than in person, myself included, so this may have impacted the response of some of the participants. Furthermore, online interviews in a country with internet load shedding <sup>5</sup>and regular slow connections contributed to challenges too, given the fact that internet is not always constant in households resulting in moments where either mine or the participants internet would lose signal, cut off or cause delays in the interview. This may have impacted how participants were feeling as they may have not been as comfortable talking or expanding on their thoughts. Other than the interviews being directly affected, I found it challenging to carry on with the research being in lockdown. Not being allowed to freely leave the place I was residing for exercise, shopping and exploring, nor being allowed to travel further than 5km of the place I was staying for 3 months, or travel to my home country, was a situation I had to adapt to whilst carrying out the research. Lockdown also resulted in very limited observations of the city I was studying which was an essential reason for travelling there. Without this, I had a reduced understanding of the situation in eThekweni, particularly in how informal settlements fit in the city and, thus, to had to depend more on the contexts described in the interviews and theory. This may have impacted the bias of the results.

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<sup>5</sup> Load Shedding are period through the day where there is intentionally no electricity, in order to protect energy consumption

## 9. Conclusion

This study has considered the perspectives, roles and encountered challenges of a number of key actors within sanitation governance in eThekweni, South Africa. This was in order to understand how the interpretations and experiences confronted with by actor's influence governance decisions, and how this impacts the sustainability and inclusiveness of sanitation services. Governance theories and academic theoretical contributions of key terms and concepts in this study were used to frame the research in the global context.

This research found that current sanitation governance in eThekweni includes a number of different actors, as a result of decentralised governance processes, in order to increase the sustainability and inclusiveness of services through the contributions to knowledge and ideas from a variety of backgrounds and sectors along the sanitation chain. Actors that were found to be essential in the flow of developing new ideas, planning, and implementing sanitation services were: local municipality, academics, private sector, philanthropic organisations and the users themselves.

An interesting finding from this study is that all participants perceived innovative technologies and alternatives to the traditional 10-13 litre flush toilet as the most adequate way forward in providing vulnerable communities with sustainable sanitation. However, a significant challenge found was the lack of inclusion of communities in decision-making by municipalities, private sector and the NGO, thus impacting the acceptance of such technologies by these actors. Hence, a key finding from this study in the shift of sanitation governance is the inclusion of communities and the users in the process of sanitation governance to increase acceptance of new technologies, which inevitably tend to be met with caution. The active participation of users was found to be concurrent with a movement to on-site sanitation systems, to reduce pressure on water treatment plants which are reaching their capacity as population increases. The actors which seemingly had the closest engagement by developing long-term relationships with individual communities were the academic. Time and money were found to be major restraints for the other actors in conducting the same level of engagement, as well as the changes in political leadership swaying the interests in both providers and users.

Overall, by exploring and analysing the local context of eThekweni, this study provides a basis for a comparative study in urban environments, to further understand the roles actors play within governance, and how this impacts sustainability and inclusiveness of international policy and services. Ultimately, this research hopes to provide a basis for governance actors to consider, to increase equality in access to sanitation for all people, to eliminate discrimination and improve quality of life in the Global South.

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## 11. Appendices

### 11.1 Appendix 1

#### Interview guide for urban sanitation actors

##### Respondent's Information

<b>Country</b>	
<b>City</b>	
<b>Gender of participant</b>	a. Female b. Male
<b>Age of participant</b>	
<b>Number of education years completed</b>	
<b>Discipline (Field of study) e.g. engineering, environmental health, etc.</b>	
<b>Years of working experience in the sanitation sector</b>	
<b>Position</b>	
<b>Years of working in current position</b>	
<b>How would you define yourself in the sanitation sector?</b>	a. Government b. Non-governmental Organisation c. Donor d. Private e. Civil Society Organisations f. Academic g. Other specify.....

**General overview questions**

1. What is the general goal(s) of your organization/institution?
2. What is the specific sanitation goal(s) of your organisation/institution?
3. I would like us to talk about your programmes that focus on sanitation and hygiene. What programmes aiming to improve urban sanitation and hygiene are you implementing and who are the beneficiaries of specific programmes?
4. What would you say about the level of community engagement that you have with them when developing programmes? *[Note: they may mention high, high medium, low medium or low. Probe more to get more details of what they mean.]*
  - a. *Do you approach community development in the designing or construction phase and is this engagement continued after the development finishes?*
5. What local, national, or international agendas or frameworks act as a driver for your work on sanitation? And in reference to the agendas that you use, **what does your organisation see as the primary group (population) of interest in providing sanitation?** What is the reason for your area of focus?
6. Does your organization interact with other sanitation and hygiene providers or stakeholders? If yes, provide details
7. Who are the types of stakeholders that your organization finds most challenging to engage with and why? Please fill-in the text box and provide concrete examples.

Stakeholder	Challenge and reason

8. How do these challenges impact the efficacy of sanitation implementation?
9. Who are the types of stakeholders that your organization finds easiest to engage with and why? Please fill-in the text box and provide concrete examples.

Stakeholder	Reason

10. How does this ability to engage with such stakeholders impact the efficacy of sanitation implementation?

### **Inclusive and Sustainable Sanitation**

11. What comes to your mind when you hear the phrase “inclusive sanitation”? How does your organisation define “inclusion” in urban sanitation?

- a. Does the interpretation influence in any way your organisations guiding principles in providing effective urban sanitation?
- b. Are there any sanitation approaches or solutions that you have developed or implemented which portrays your organisations interpretation of inclusive urban sanitation? If yes, what are they
- c. How does your organisation measure inclusion?

12. What comes to your mind when you hear the word “sustainability”? How does your organisation define “sustainability” in urban sanitation?

- a. Are there any activities or approaches that are put in place to ensure that sanitation and hygiene services you are providing are sustainable? If yes, what are they?
- b. Does the interpretation influence in any way your organisations guiding principles in providing effective urban sanitation?
- c. How does your organisation measure sustainability?
- d. Do you conduct follow-up studies to measure sustainability? What is the period of time that you keep following up on completed urban sanitation projects?

13. What do you see as the **potential opportunities** within the sanitation sector for promoting inclusive and sustainable urban sanitation in **South Africa** or the geographical areas you are working in?

14. What do you see as the potential **barriers (challenges)** within the sanitation sector for promoting inclusive and sustainable urban sanitation in **South Africa** or the geographical areas you are working in?

15. What are the **risks and threats** within the sanitation sector to promoting inclusive and sustainable urban sanitation in **South Africa** or the geographical areas you are working in?

16. How would you say your organisation has responded to Covid-19 and what issues do you think this virus has highlighted for sanitation in eThekweni?

17. Suggest any interventions that you think are examples of “best fit” solutions or practice that can help to promote appropriate urban sanitation, inclusion and sustainability?

**This marks the end of the interview. Are there any questions or comments?**

## 11.2 Appendix 2

### Information Sheet

eThekwini, South Africa

*KwaZulu-Natal University and Utrecht University*

#### What is the purpose of this study?

Focused on the challenge of urban sanitation in the global South, this project aims to examine sanitation inclusion to ensure “no one is left behind”, in line with Sustainable Development Goal 6. This study intends to understand eThekwini’s definition of inclusive and sustainable sanitation when developing and implementing urban sanitation programs from stakeholders from a wide range of disciplines and sectors involved in sanitation services in the city. The interviews contribute to identifying common challenges and practices between countries, and those that are context specific. With this in mind, we will focus on five global South urban settings (in Malawi, Tanzania, Zimbabwe, South Africa and Mexico).

#### What will I do if I choose to be in this study?

You will be interviewed for a period of approximately one hour; you will be asked a series of open questions where your opinion and perspective are important to the study.

#### How long will I be in the study?

Once the interview is over, there will likely be no further contact unless you would like to stay updated on the results of the research, you may ask to not be contacted again.

#### What are the possible risks or discomforts?

There will be no physical discomfort or risks possible from this research.

#### Are there any potential benefits?

The data collected in this research could contribute to a framework for increasing the inclusivity and sustainability of eThekwini’s sanitation access and services.

#### Will information about me and my participation be kept confidential?

Your responses will be kept strictly confidential, and digital data will be stored in secure computer files. Any publications based on this research will not include your name or any other individual information by which you could be identified. The project’s research records may be reviewed by departments at the University of KwaZulu-Natal and at Utrecht University who are responsible for regulatory and research oversight.

#### What are my rights if I take part in this study?

Your participation in this study is voluntary. You will not be paid for your participation. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without being penalized.

#### Who can I contact if I have questions about the study?

If you have questions, comments or concerns about this research project, you can talk to one of the interviewers.

Huda Lohiya

Researcher

[h.lohiya@students.uu.nl](mailto:h.lohiya@students.uu.nl)

If you have any concerns about the interviewer, please contact Rebecca Sindall: [SindallR@ukzn.ac.za](mailto:SindallR@ukzn.ac.za)

*Thank you.*



## Participant consent form

### *Certificate of Consent*

I have been provided with an information sheet about the project Sanitation for Urban Inclusion Transformation and Equity, that my interview will contribute towards.

I have been notified that I have the right to leave at any time and I have chosen to be present during this interview today. I have been told that my name will not be used further than this interview and my identity will be kept anonymous.

I give permission for this interview to be recorded by the interviewers recording device, and I allow this to be used for data analysis amongst the projects researchers at UKZN and Utrecht University if need be.

**I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have asked and have been answered to my satisfaction. I consent voluntarily to be a participant in this study**

Print Name of Participant \_\_\_\_\_

Signature of Participant: \_\_\_\_\_

Date \_\_\_\_\_

Day/month/year

# Certificates to begin Data Collection in South Africa



## Zertifikat Certificat

## Certificado Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale  
Promoting the highest ethical standards in the protection of biomedical research participants



### Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

# Huda Lohiya

a complété avec succès - has successfully completed

## South Africa

du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation



Release Date: 2020/02/20  
CID : wL5waE77

Professeur Dominique Sprumont  
Coordinateur TRREE Coordinator



Continuing Education Program (5 Credits)  
Programme de Formation continue (5 Crédits)



Federatio Pharmaceutica Helvetica  
Programmes de formation continue



Continuing Education Program  
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(REV : 20170510)



## Zertifikat Certificat

## Certificado Certificate

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### Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

# Huda Lohiya

a complété avec succès - has successfully completed

## Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation



Release Date: 2020/02/20  
CID : yKcaBdd0

Professeur Dominique Sprumont  
Coordinateur TRREE Coordinator



Continuing Education Program (5 Credits)  
Programme de Formation continue (5 Crédits)



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(REV : 20170510)

### 11.3 Appendix 3

Figure 12 is a diagram to visualise the way the Urine Diversion toilets work.

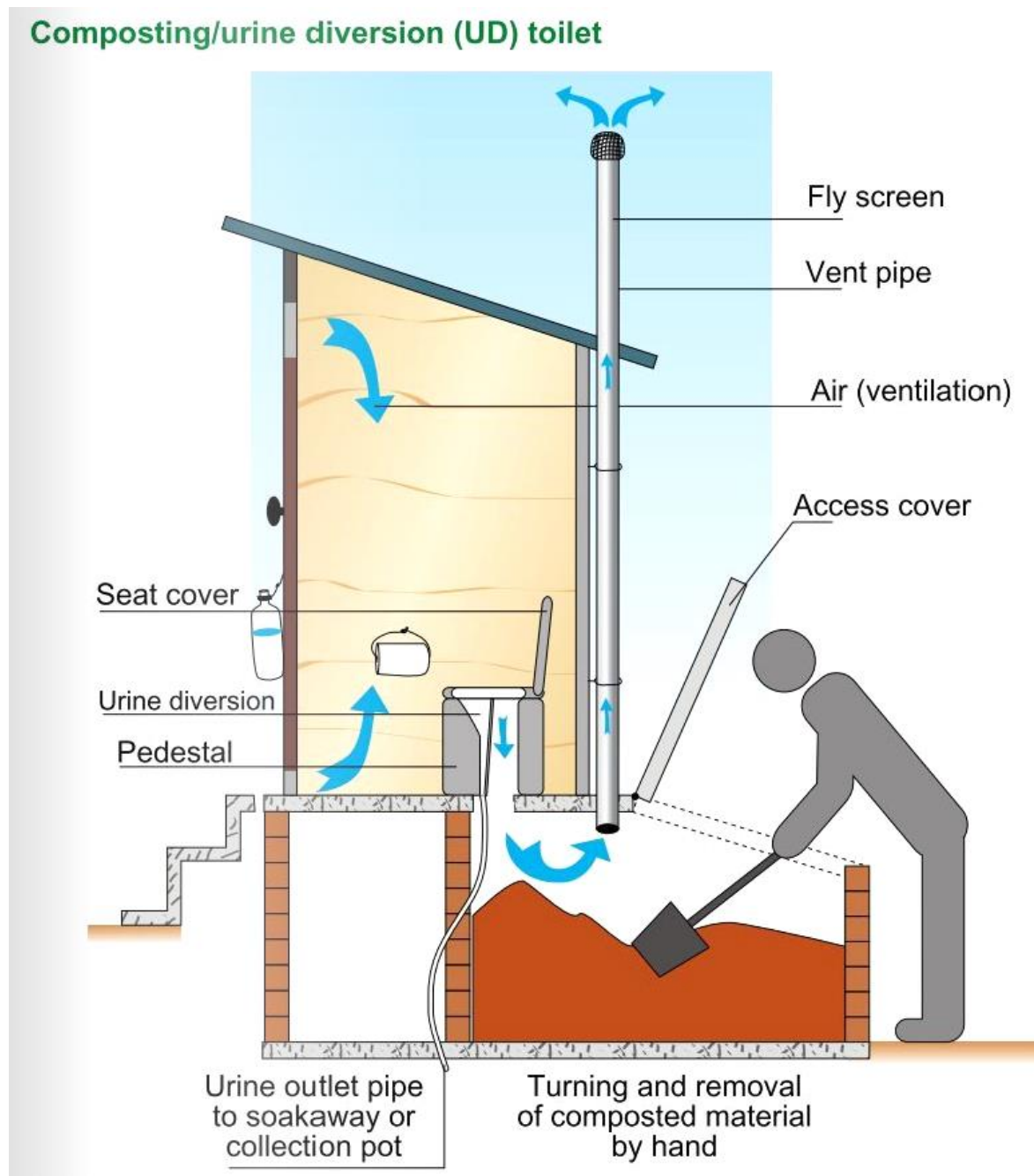


Figure 12: Urine Diversion Technology (DWAF, 2010)