TRADE & INDUSTRIAL POLICY STRATEGIES

WORKING PAPER

UNPACKING WATER AND SANITATION ACCESS IN SOUTH AFRICA: A RENEWED CALL FOR MORE ACTION

Shakespear Mudombi

February 2020

Trade & Industrial Policy Strategies (TIPS)
is a research organisation that facilitates policy development and dialogue across three focus areas: trade and industrial policy, inequality and economic inclusion,
and sustainable growth

info@tips.org.za
+27 12 433 9340
www.tips.org.za

Shakespear Mudombi
TIPS Economist:
Sustainable Growth

CONTENTS

1. INTRODUCTION AND BACKGROUND

Water and sanitation are the Siamese twins that form the bedrock of a healthy society. The two are inextricably linked and complement each other. A lack of either has cascading negative implications on the socioeconomic fabric of society. When the population has good access to water and sanitation, it protects them from various diseases, which contributes to healthy lives and enhanced productivity. Water is important in meeting various human and ecosystem needs. Sanitation enables safe and decent disposal of human waste, with a co-benefit of reducing water pollution (DST 2007).

The relevance of water and sanitation to people's livelihoods led to their inclusion in the Sustainable Development Goals (SDGs), particularly SDG 6, which encapsulates the need to ensure the availability and sustainable management of water and sanitation for all. This is in line with South African policies on water and sanitation that seek to ensure universal access to water and sanitation. The National Water and Sanitation Master Plan (DWS 2018: 1) emphasises that "constitutional imperatives, combined with national water and sanitation policy papers, the National Water Act and the Water Services Act, mandate the water sector to: provide universal and equitable access to reliable water supply and sanitation services". The National Development Plan 2030 (NPC 2012) also acknowledges that effective and sustainable management of water supply and sanitation services is essential for community health, development, cohesion, and continued economic activity.

Although many issues affect the water and sanitation sector, this working paper focuses on the access to those services. An in-depth assessment of the progress made in providing water and sanitation services can help inform various stakeholders and decision-makers about the need for renewed effort towards universal access. Against this backdrop, the objective is to meaningfully understand the extent of access and the quality of access to water and sanitation services at the household level in South Africa.

There are various discourses and debates on the provision and access to water and sanitation services. The main discourse relates to ensuring universal access to services associated with the right to basic services, and the agendas of inclusion, just transition, and sustainability. In South Africa, the general access to resources and services remains intricately tied to equity issues. Access to water and sanitation is not equitable. This partly mirrors the country's high levels of economic inequality (ActionAid 2016), which is historically-rooted to the apartheid legacy (DWS 2016). Given this background, national government and municipalities have a crucial role in providing infrastructure and services. The rational being that when the population has good access to water and sanitation, this brings socioeconomic benefits at the household, community and national levels.

The importance of water and sanitation demands a better understanding of the extent of access and the quality thereof. Currently, available statistics underestimate the lack of access to services, as the emphasis has been mostly on the quantity (number of households) while ignoring the quality of the services. To eradicate the gaps in providing these services, it is crucial to understand the past and current states of affairs. Hence, this analysis goes beyond looking at only the number of households using a particular water source or toilet facility and delves deeper in unpacking the different shades of access. Using data mostly from Statistics South Africa and the Department of Water and Sanitation, this working paper uses descriptive statistics to explore access to water and sanitation services at the household level in the country.

2. UNPACKING THE WATER AND SANITATION SERVICE GAPS

Analytical approach

The approach used seeks to understand access to water and sanitation from a systems perspective which embraces access not just as a single metric but one that is multidimensional. The systems perspective helps unpack the different attributes/dimensions of access such as type of water source/ sanitation facility, distance, interruption of service, and rating/ perception, so as to reveal the overall quality of access to the services by the households. Data mainly from the Community Survey 2016 (Stats SA 2016a) was used in the analysis. The analytical approach entails using various descriptive statistics on water and sanitation access, such as frequencies and graphs using R programming (R Core Team 2019). Various steps were undertaken in calibrating access across various dimensions (see Appendix). The key aspect of the analysis was the computation of two alluvial diagrams that give a multi-dimensional view of the overall access to the water and sanitation services by households.

Results

One dimensional view on access to water and sanitation services at the national level

The first step in understanding access to water and sanitation is to assess the number of households using a particular water source or sanitation facility (usage access[1]) and to determine whether the source/facility is improved or not. The categorisation of water sources or sanitation facilities adopted in this paper is based on the criteria used by Statistics South Africa (2017), which is broadly based on the World Health Organization (WHO) Joint Monitoring Programme for Water Supply and Sanitation methodology of classifying improved and unimproved sources/facilities.

Improved water sources are those that are properly constructed which, when used properly, protect the water from outside contamination. Importantly, the WHO Joint Monitoring programme considers protected wells, springs and rainwater collection as properly protected from contamination and includes them as improved sources. However, in the South African context, the Community Survey 2016 data does not indicate whether these sources are protected or not. Drawing from Stats SA (2017), water sources considered in this paper as improved are limited to piped water and water from boreholes.

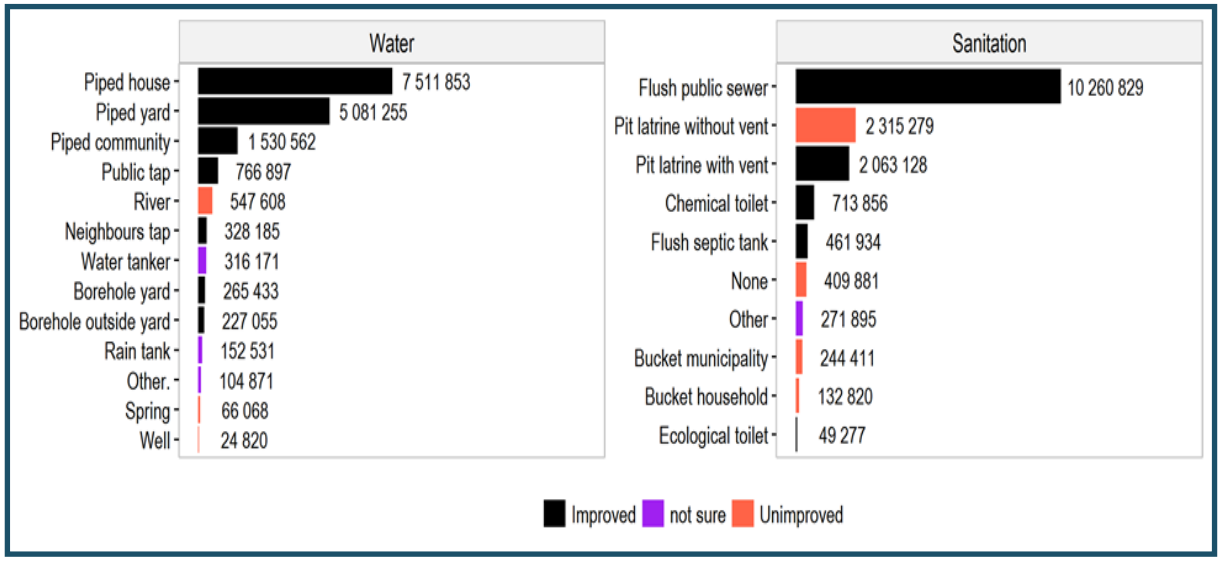
Similarly, for sanitation, Stats SA (2017: 36) used the WHO Joint Monitoring Programme guidelines which consider improved sanitation facilities that prevent human contact with faeces. Thus, in this analysis, these sanitation facilities are considered as improved: flush or pour-flush to piped sewer system or septic tank or pit latrine, ventilated improved pit latrine, chemical toilet, and ecological toilet.

Based on the Community Survey 2016 (Stats SA 2016a) data, households in South Africa totalled about 16.9 million in 2016. Of these, 15.7 million (93%) used an improved water source, while 13.5 million (80%) used an improved sanitation facility.

[1]*Usage access is used in this working paper to refer to a household having access to a particular water source or toilet facility, regardless of the quality of access (i.e. not taking into account distance, location, sharing, or interruption). This is to distinguish it from overall access, which is used to refer to access to the water or sanitation services evaluated across a number of access dimensions.*

Access to improved sanitation tends to be lower than access to improved water sources. The breakdown[2] of the number of households per water source and sanitation facility is shown in Figure 1.

Figure 1: Household access to water and sanitation by source or facility



Source: Author based on Stats SA (2016a)

The most common improved water source used by households was piped water inside the house, with about 7.5 million (44%) households having this, followed by piped water inside the yard with about 5.1 million (30%) households having this. The most common unimproved water source was a river, with slightly over 0.5 million (3%) households.

For sanitation, the flush toilet connected to the public sewer was the most common improved sanitation facility, that was used by about 10.3 million (61%) households, followed by pit latrine with ventilation pipe, used by 2.1 million (12%) households. The most common unimproved sanitation facility was the pit latrine without ventilation pipe which was used by 2.3 million (14%) households. In addition, a notable number of households did not use any sanitation facility and this amounted to 0.4 million (2%) households.

Multidimensional view on access to water and sanitation services at the national level

Having *usage access* to an improved water source or an improved toilet facility does not guarantee good access. There are other attributes/dimensions to consider to ensure good access. For instance, distance is an important dimension because it determines the drudgery and time spent fetching water, a burden that disproportionately falls on women, thereby further compounding gender inequality.

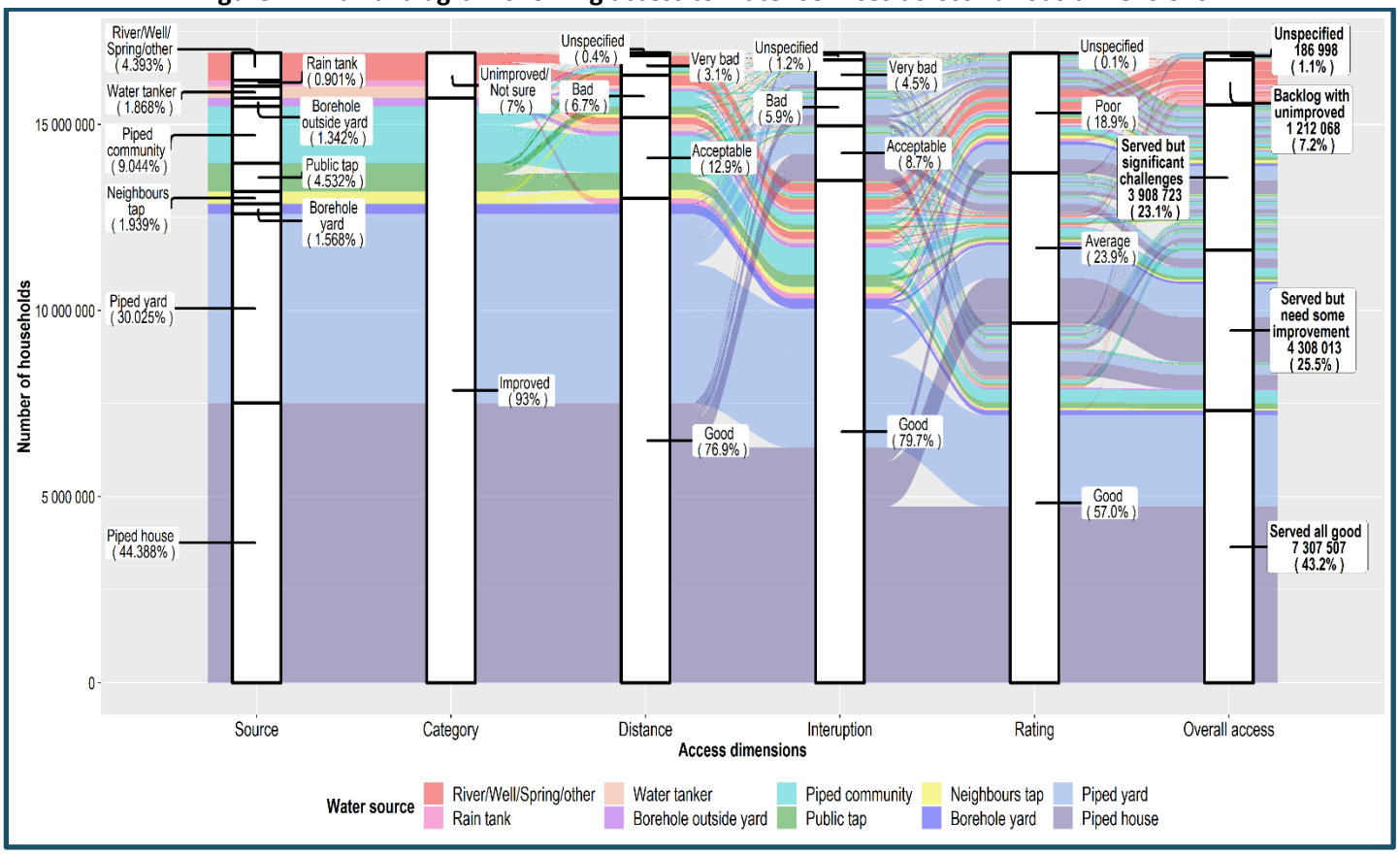
Using the Community Survey 2016 (Stats SA 2016a) data, access to water and sanitation services by households in South Africa is explored across various dimensions. For water services, four dimensions, namely type of water source, distance, interruption of service, and rating/perception, determine overall access. They are defined in Table 1 (see Appendix 1 for more details).

[2] *The category "not sure" is due to limitation in the data, whereby it was not possible to establish whether a particular source/ facility could be considered improved or not, as the extent of protection or safety could not be known based on the data.*

Table 1: Definition of dimensions of access to water

DIMENSIONS	DEFINITION	
Water source category	Improved	
	Unimproved/Not sure	
Distance	Good	Inside the house or yard
	Acceptable	Less than 200 metres
	Bad	Between 201 to 500 metres
	Very bad	More than 501 metres
	Unspecified	Not specified / Did not know
Interruption	Good	No interruption was experienced
	Acceptable	The interruption was less than two days in total over a three-month period
	Bad	The interruption was between two to seven days in total over a three-month period
	Very bad	The interruption was more than 8 days in total over a three-month period,
	Unspecified	Not specified / Did not know
Rating (based on the respondents' perception of the services)	Good	Perceived as good
	Average	Perceived as average
	Poor	Perceived as poor or no services
	Unspecified	Not specified / Did not know
Overall access	Served all good	If the source was improved and all the dimensions for each particular household were "good"
	Served but need some improvement	If the source was improved and the other dimensions were either "good" or "acceptable" or "average"
	Served but significant challenges	If the source was improved and any one of the dimensions was "bad" or "very bad" or "poor"
	Backlog with unimproved	If the water source was unimproved (regardless of whether other dimensions were good or average)
	Unspecified	If any one of the dimensions was unspecified

Figure 2. Alluvial diagram showing access to water services across various dimensions



Source: Author based on Stats SA (2016a)

Figure 2 gives a multidimensional view of access to water services by households. The figure shows how access varies across different dimensions, which supports the notion that having usage access does not necessarily imply good access. While about 15.7 million (93%) households used an improved water source, only 7.3 million (43%) were in the "served all good" category, i.e. their access to water services was good across all dimensions.

A notable number of households were in the "served but need some improvement" category, which amounted to 4.3 million (26%) households, while households who were "served but with significant challenges" were 3.9 million (23%). Households in the "backlog with unimproved" category amounted to 1.2 million (7%).

For sanitation services, four dimensions, namely type of sanitation facility, location, interruption of service, rating/ perception, determine overall access. Location of the facility is important as well as whether the facility is shared or not, as these have significant implications on the dignity and safety of users, particularly women and children.

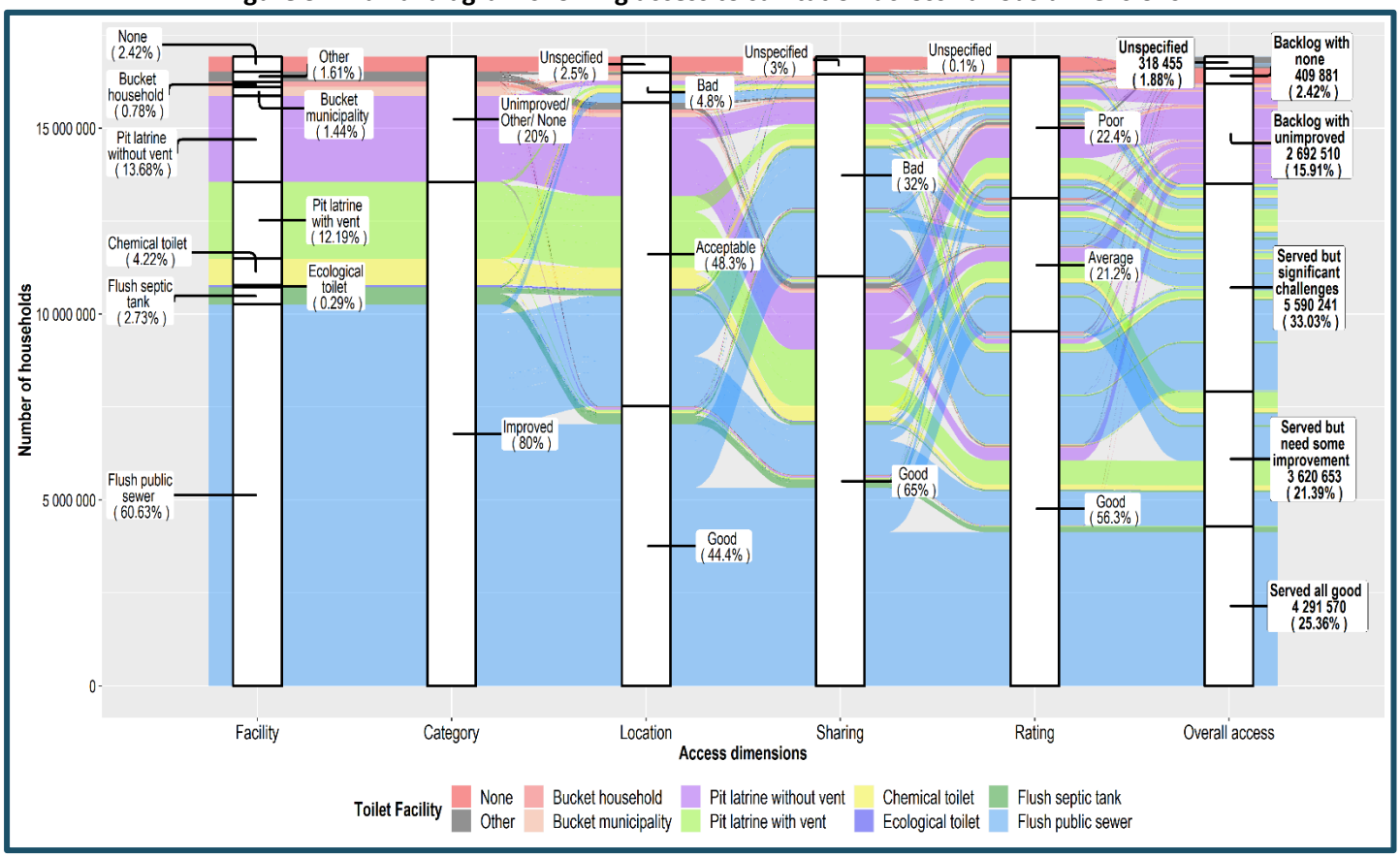
The dimension of access to sanitation are defined in Table 2 (see Appendix 2 for more details).

Table 2: Definition of dimensions of access to sanitation

DIMENSIONS	DEFINITION	
Toilet facility category	Improved	
	Unimproved/Other/None	
Location	Good	If inside the house
	Acceptable	If in the yard
	Bad	If outside the yard or none
	Unspecified	If it was not specified
Sharing	Good	If there was no sharing with another household
	Bad	If there was sharing or none (no facility)
	Unspecified	If it was not specified
Rating (based on the respondents' perception of the services)	Good	Perceived as good
	Average	Perceived as average
	Poor	Perceived as poor or no services
	Unspecified	Not specified
Overall access	Served all good	If the facility was improved and all the dimensions for each particular household were "good"
	Served but need some improvement	If the facility was improved and the other dimensions were either "good" or "acceptable" or "average"
	Served but significant challenges	If the facility was improved and any one of the dimensions was "bad" or "very bad" or "poor"
	Backlog with unimproved	If the toilet facility was unimproved (regardless of whether other dimensions were good or average)
	Backlog with none	If the household did not have access to any kind of toilet facility
	Unspecified	If any one of the dimensions was unspecified

Figure 3 gives a multidimensional view on access to sanitation services by households. While just over 13.5 million (80%) households used an improved sanitation facility, only about 4.3 million (25%) were in the "served all good" category, that is their access to sanitation services was good across all dimensions. Households that were in the "served but need some improvement" category were 3.6 million (21%), while those that were "served but with significant challenges" were close to 5.6 million (33%). This reveals that the greatest proportion of all households that had *usage access* to an improved sanitation facility faced significant challenges in one way or the other. Households in the "backlog with unimproved" category were about 2.7 million (16%), while those in the "backlog with none" category were about 0.4 million (2%).

Figure 3. Alluvial diagram showing access to sanitation across various dimensions

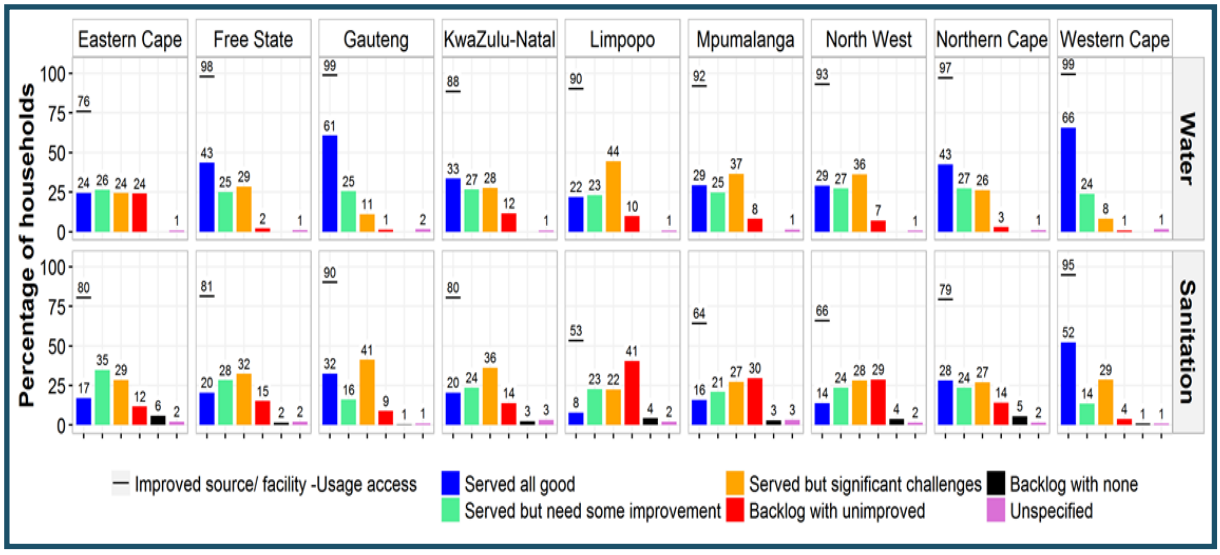


Source: Author based on Stats SA (2016a)

Multidimensional view on access to water and sanitation services at the provincial level

The overall access to services, as depicted in Figure 2 and Figure 3, can also be broken down at provincial level. Figure 4 shows the percentage of households using a particular water source or sanitation facility, juxtaposed with the bars representing the various categories of overall access.

Figure 4. Characterisation of overall access to water and sanitation by province



Source: Author based on Stats SA (2016a)

For water access, the percentage of households with *usage access* to improved water sources was 90% or above in seven out of nine provinces, with the exception of KwaZulu-Natal and Eastern Cape which had 88% and 76% respectively. This shows high access to water services. But, as highlighted, to have a better picture, it is important to also consider the quality of the services. Unpacking the overall access categories shows that Western Cape and Gauteng had the highest overall access to water services.

In Western Cape, 99% of the households had improved water sources with the following breakdown: 66% of the households were in the "served all good" category, 24% were "served but need some improvement", and 8% were "served but with significant challenges". In Gauteng, 99% of the households had improved water sources, broken down as: 61% of the households were in the "served all good" category, 25% were "served but need some improvement", and 11% were "served but with significant challenges".

Though many of the provinces had high percentages of households with improved water sources, the analysis shows that the overall access is not good. For instance, in Eastern Cape, Free State, KwaZulu-Natal, Mpumalanga, North West, and Northern Cape, the percentage of households which were in the "served but significant challenges" category were between 24% and 37%, while in Limpopo it was very high, with 44% in this category. The province with the highest percentage of households in the "backlog with unimproved" category is Eastern Cape with 24%, followed by KwaZulu-Natal with 12%, while Limpopo had 10%.

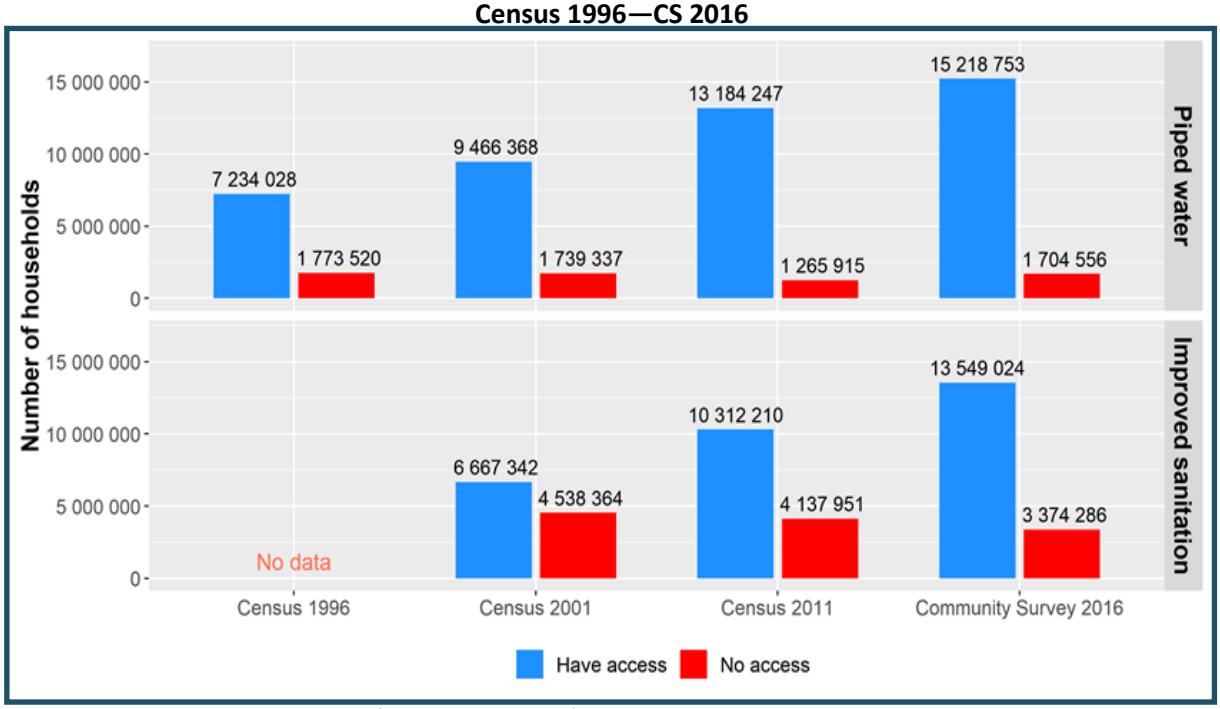
For access to sanitation services, provinces with the highest access were Western Cape and Gauteng. In Western Cape, 95% of the household had *usage access* to an improved sanitation facility, while in Gauteng it was 90%, and the lowest was in Limpopo with 53%. A look at the overall access categories shows that Western Cape was the only province that had most households (52%) who were "served all good", while other provinces ranged between 8% - 32%. Though most of the provinces had households which were "served but significant challenges" in the range of 20% to 30%, Gauteng had the highest with 41%, followed by KwaZulu-Natal with 36%. Backlogs for sanitation were split between backlogs for those with unimproved sources, and backlogs for those with no sanitation facility. Notable "backlog with unimproved" were present in Limpopo with 41%, followed by Mpumalanga and North West with 30% and 29% respectively. It is important to stress that the percentage of households in the ''backlog with none" category was between 1% and 6% across provinces, with Western Cape having the lowest of 1%, Eastern Cape had the highest with 6%, followed by Northern Cape at 5%, and Limpopo and North West at 4%.

Progress in access to water and sanitation over time

A critical look at the progress made over the years shows that the country has made notable progress in providing water and sanitation services. For water, Figure 5 shows that the number of households that have access to piped water (regardless of other access dimensions) has greatly increased, doubling from about 7.2 million in 1996 to about 15.2 million in 2016. However, besides this progress, the absolute number of households with no access to piped water has largely remained unchanged, slightly falling from about 1.8 million in 1996 to around 1.7 million in 2016.

For sanitation, Figure 5 shows that the number of households with access to improved sanitation (regardless of other access dimensions) doubled from about 6.7 million households in 2001 to about 13.5 million households in 2016. However, the absolute number of households with no access to improved sanitation has only seen a decrease from about 4.5 million households in 2001 to about 3.4 million households in 2016.

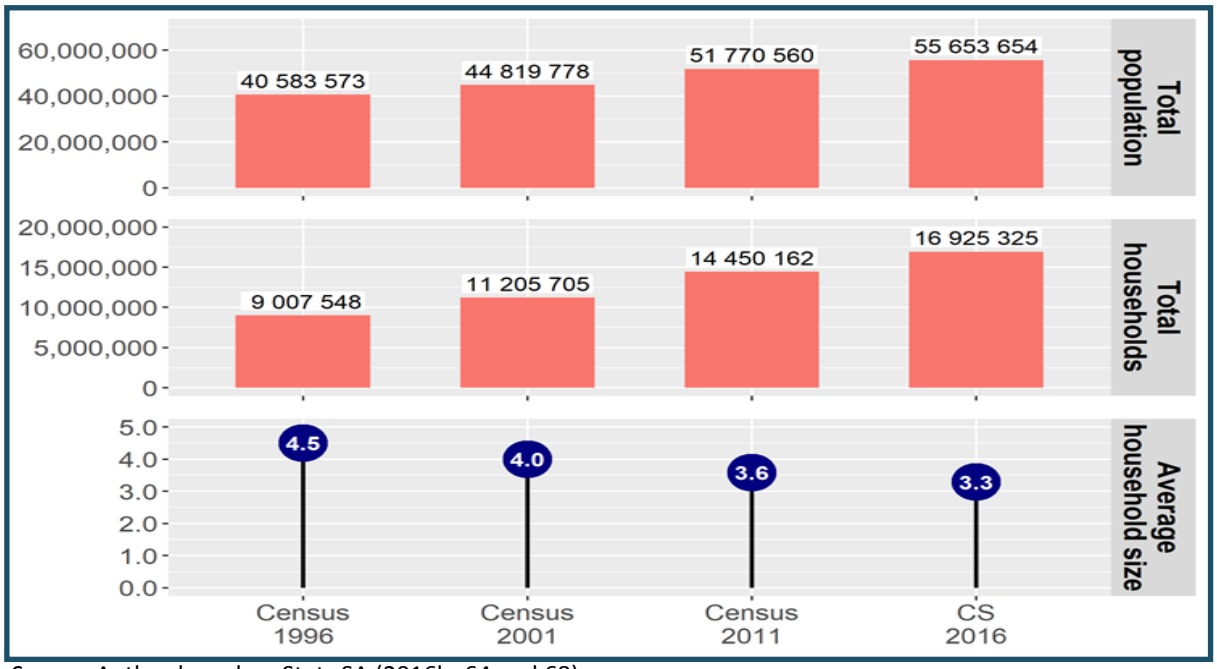
Figure 5. Trends in household access to piped water and improved sanitation: Census 1996—CS 2016



Source: Author based on Stats SA (2016b: 64 and 68)

Figure 5 shows that, while significant progress has been made in providing water and sanitation services, the absolute number of households with no access has been decreasing at a much slower pace. This can be better understood by looking at the population dynamics in Figure 6. While both the total population and the total number of households have been increasing, it is noteworthy to point out that the total number of households has been increasing at a faster rate than that of the total population, as shown by the overall fall in the average household size.

Figure 6. Trends In total population, total number of households, and average household size



Source: Author based on Stats SA (2016b: 64 and 68)

This has important implications for service provision. To keep pace and ensure increased access to water and sanitation at the household level, attention should be paid both to the increased demand as a result of growth in the population as well as the growth in the number of households. Though households might share dwellings and facilities, an increase in the total number of households does, to some extent, translate to an increase in the number of dwellings that require the infrastructure and the services. Nhamo, Nhemachena, and Nhamo (2019) stressed this challenge, noting that population and human settlements keep expanding, while the infrastructure continues to age. This scenario reinforces the notion that tackling backlogs requires the need to embrace them as moving targets, i.e. they are dynamic and constantly changing, with new demand always arising.

3. DISCUSSION AND IMPLICATIONS

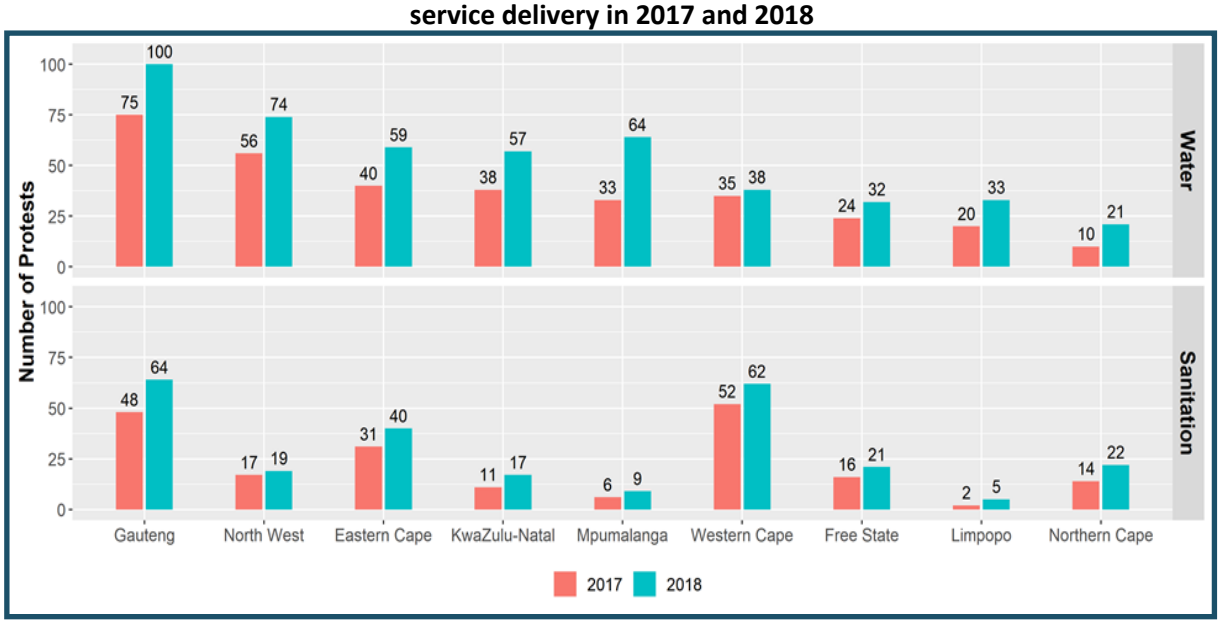
The analysis in this working paper reveals that having the infrastructure is not synonymous with having access to adequate services. Despite the relatively high access to water and sanitation infrastructure in the country, there are still gaps, due to:

- Inadequacy of services – some municipalities are struggling to provide services; this arises due to the failure of support services to compliment the infrastructure that is in place;
- Inappropriateness of services – this is a result of having a particular infrastructure that is not suited to the physical and socioeconomic setting of an area. For instance, the scenario of having the flush toilet as the most common type of toilet in the country is not desirable as the country is generally water scarce (Burger 2015; Mudombi 2018), and this is particularly important in the context of climate change;
- Dysfunctionality of infrastructure – this arises due to lack of maintenance and repair, which results in the suboptimal operation or complete failure of the system; and
- Backlogs as moving targets – this relates to people or households that do not have water and sanitation services. The backlogs can grow due to demand associated with construction of new houses and growth of new settlements associated with population dynamics, as well as failure of infrastructure which aggravates the situation. The expansion of informal settlements is a huge challenge.

Access to water and sanitation services has socioeconomic implications. For instance, the inadequacy of water and sanitation services contributes to the prevalence of service delivery protests across the country (ActionAid 2016; DWS 2017a). At the core of people's grievances are accessibility and reliability issues with regards to service delivery. The protests are mostly done by people who have never been served, or whose facilities no longer work properly (DWS 2017a). Water and sanitation-related protest events have been increasing, with a total of 528 events recorded countrywide in 2017, increasing to 737 events in 2018.

The breakdown by province is shown in Figure 7. All provinces witnessed an increase in both water and sanitation protest events from 2017 to 2018. Generally, there were more water-related protests compared to sanitation related protests. The Gauteng province had the most protests for both water and sanitation, while the Western Cape province had distinctly more sanitation-related protests compared to water related protests.

Figure 7. The number of protest events related to water and sanitation service delivery in 2017 and 2018



Source: DWS, 2019.

Note: On the National Water Services Knowledge System, the data is available for one particular year (i.e. it is not in time series format), so the data for 2017 was accessed in 2018 and while that for 2018 was accessed in 2019. The original source of the data is the Municipal IQ.

Municipalities are essentially in charge of service delivery. Unfortunately, many of them, especially smaller ones, are increasingly losing the capacity to deliver. They lack the resources and capacity to properly operate, maintain and manage the infrastructure as a result of limited budgets and unqualified technical staff. The challenges faced by municipalities are worsened by the high non-revenue water, which is the volume of water supplied by a water utility for which it does not receive income, due to many factors, including leakages and non-payment by consumers (DWS 2015; Mudombi forthcoming).

4. CONCLUSION

Lack of access to water and sanitation services is an additional challenge that coalesces with other grievances to trigger protests, often characterised by violence, with far-reaching socioeconomic implications at the household, community, and national level. While significant progress has been made in providing water and sanitation services in the country since the end of apartheid, backlogs and challenges remain. The analysis highlights that, behind the headline numbers, which ignore the quality of access, unpacking the various dimensions of access reveals a more complex and challenging picture.

Urgent attention needs to be paid to those with backlogs who do not have any facility, followed by those with an unimproved sources or facilities. Then, for those who are already served, the need is to prioritise those who are experiencing significant challenges. For water, this could be due to the distance being too long, or the interruption in services being high, or the services in general being bad. For sanitation, this could also be due to the location not being suitable, or the facility being shared, or the services in general being bad. The households that are served but facing significant challenges need attention as there is a high risk of not having functional sources or facilities, which can force them to revert to using unimproved sources or facilities, thus exacerbating the backlogs.

The key challenges are inadequacy of the services (some municipalities are struggling to provide services); dysfunctionality of infrastructure (lack of proper maintenance); inappropriateness of the infrastructure/services, and backlogs as moving targets. Backlogs in services provision keep on growing due to growth in the population, the increase in the number of households, the expansion of settlements (particularly informal settlements), as well as dysfunctional infrastructure.

These challenges require a combination of solutions that include improved management of municipalities, operation and maintenance of infrastructure, appropriate technological options, stakeholder buy-in and behaviour change. Water efficient/saving technological options, such as next-generation sanitation, need to be widely promoted and adopted. Proper operation and maintenance of infrastructure enhances its lifespan. There is a need to be proactive and continuously improve on asset management so that all the infrastructure is well protected, operated, repaired, and maintained.

One key challenge in assessing progress relates to availability of reliable data. For instance, there are disparities in the number of bucket toilets reported to still exist. Municipalities reported that a total of 80 119 consumer units had bucket toilets while, in the 2016 Community Survey, 377 231 households indicated that they used them (Stats SA 2017). This necessitates the need for a comprehensive monitoring and evaluation programme that can timely alert and accurately inform relevant stakeholders on areas that need attention in terms of provision and accessibility of water and sanitation services.

To avoid a one step forward, two steps backwards scenario, which would erode gains already made, the situation demands renewed effort, coordination and collaboration by various stakeholders, supported by significant resources targeted towards the unserved as well as paying attention to those already served. It is imperative to focus on both the quantity and quality of access to water and sanitation services, as neglect of one will further reinforce the overall backlog. This is particularly relevant with the increasing need to prevent the outbreak of waterborne diseases and the spread of new and less known pathogens and diseases such as coronavirus disease (COVID-19). These demand well-functioning water and sanitation systems that allow proper washing of hands as well as cleaning of contaminated items and spaces. In this regard, embracing the systems and multidimensional view on access to water and sanitation will contribute to improved, appropriate, and sustainable access to water and sanitation services for all.

REFERENCES

ActionAid. 2016. Running on Empty: What Business, Government and Citizens Must Do to Confront South Africa's Water Crisis. ActionAid South Africa.

Burger, S. 2015. South Africa Probing Socially Acceptable Low- and No-Water Sanitation Alternatives. *Creamer Media's Engineering News*, 2015. http://www.engineeringnews.co.za/article/south-africa-probing-socially-acceptable-low--and-no-water-sanitation-alternatives-2015-07-03/rep_id:4136.

DST. 2007. South Africa's Climate Change Technology Needs Assessment. Synthesis Report. Department of Science and Technology (DST).

DWS. 2015. No Drop Report: The Status of Water Losses & Water Use Efficiency in Metropolitan Municipalities. Department of Water and Sanitation, Republic of South Africa.

DWS. 2016. National Climate Change Response Strategy for the Water Sector (Draft). Pretoria: Department of Water and Sanitation, Republic of South Africa.

DWS. 2017a. Draft National Water and Sanitation Master Plan (NW&SMP). Department of Water and Sanitation, Republic of South Africa.

DWS. 2017b. National Water Services Knowledge System. 2017. http://www.dwa.gov.za/wsks.

DWS. 2018. National Water and Sanitation Master Plan. Version 10.1. Volume 1: Call to Action. Department of Water and Sanitation, Republic of South Africa.

DWS. 2019. National Water Services Knowledge System (Protests). 2019. http://www.dwa.gov.za/wsks/DefaultList.aspx?subjectAreaID=10&DataTopicDetailID=52&DisplayTypeId=1&PerspectiveID=0&LvlID=10&DataTopicID=37.

Mudombi, S. forthcoming. Water Sustainability in South Africa: Past, Present, and Future. GEC Policy Paper. Trade & Industrial Policy Strategies (TIPS).

Mudombi, S. 2018. Forward-Looking Approach to next Generation Sanitation and Industrial Development in South Africa – a Briefing. Policy Brief 4/2018. Trade & Industrial Policy Strategies (TIPS).

Nhamo, G, C Nhemachena, and S Nhamo. 2019. Is 2030 Too Soon for Africa to Achieve the Water and Sanitation Sustainable Development Goal? *Science of the Total Environment* 669: 129–139.

NPC. 2012. National Development Plan 2030: Our Future-Make It Work. National Planning Commission, Republic of South Africa.

R Core Team. 2019. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing." Vienna, Austria. https://www.R-project.org/.

Stats SA. 2016a. Community Survey 2016. Electronic database. Statistics South Africa. www.statssa.gov.za.

Stats SA. 2016b. Community Survey 2016. Statistical Release P0301. Statistics South Africa.

Stats SA. 2017. The State of Basic Service Delivery in South Africa: In-Depth Analysis of the Community Survey 2016 Data." 03-01-22 2016. Statistics South Africa.

APPENDIX

1. Determination of overall access to water services

Table 3: Deriving access dimensions for access to water

Variables / Access dimension	Categories used in the analysis	Categories in the data
Category	Improved	Piped (tap) water inside yard; Piped (tap) water inside the dwelling/house; Public/communal tap; Piped water on community stand; Neighbours tap; Borehole outside the yard; Borehole in the yard
	Unimproved/ Not sure	Water-carrier/tanker; Rain-water tank in yard; Flowing water/stream/river; Well; Spring; Other
Distance	Good	Not applicable (i.e. within the house)
	Acceptable	Less than 200 metres
	Bad	201-500 metres
	Very bad	501 metres-one kilometre; More than one kilometre
	Unspecified	Do not know; Unspecified
Interruption time	Good	No; Not applicable
	Acceptable	Less than two days in total over a three-month period
	Bad	Two to seven days in total over a three-month period
	Very bad	Eight to 14 days in total over a three-month period; More than 14 days in total over a three-month period
	Unspecified	Do not know; Unspecified
Rating of service	Good	Good
	Average	Average
	Poor	Poor; No access; Do not use
	Unspecified	Unspecified
Overall Access	Served all good	If Category = “Improved” & Distance = “Good” & Interruption_Time = “Good” & Rating_Services = “Good”
	Served but need some improvement	If Category = “Improved" & (Distance = “Good” OR Distance = “Acceptable”) & (Interruption_Time = “Good” OR Interruption_Time = “Acceptable”) & (Rating_Services = “Good” OR Rating_Services = “Average”)
	Served but significant challenges	If Category = “Improved” & (Distance = “Bad” OR Distance = “Very bad” OR Interruption_Time = “Bad” OR Interruption_Time = “Very bad” OR Rating_Services = “Poor”)
	Backlog with unimproved	If Category = “Unimproved”
	Unspecified	If (Category = "Improved" & Distance = "Unspecified") OR (Category = "Improved" & Interruption_Time = "Unspecified") OR (Category = "Improved" & Rating_Services = "Unspecified")

2. Determination of overall access to sanitation services

Table 3: Deriving access dimensions for access to sanitation

VARIABLES / ACCESS DIMENSION	CATEGORIES USED IN THE ANALYSIS	CATEGORIES IN THE DATA
Category	Improved	Flush toilet connected to a public sewerage system; Flush toilet connected to a septic tank or conservancy tank; Ecological toilet (e.g. urine diversion; enviroloo; etc.); Chemical toilet; Pit latrine/toilet with ventilation pipe
	Unimproved/ Other/ None	Pit latrine/toilet without ventilation pipe; Bucket toilet (collected by municipality); Bucket toilet (emptied by household); None; Other
Location	Good	In the dwelling/house
	Acceptable	In the yard
	Bad	Outside the yard; Not applicable
	Unspecified	Unspecified
Sharing	Good	No
	Bad	Yes; Not applicable
	Unspecified	Unspecified; Do not know
Rating of service	Good	Good
	Average	Average
	Poor	Poor; No access; Do not use
	Unspecified	Unspecified
Overall Access	Served all good	If Category = “Improved” & Location = “Good” & Sharing = “Good” & Rating_Services = “Good”
	Served but need some improvement	If Category = “Improved” & (Location = “Good” OR Location = “Acceptable”) & (Sharing = “Good”) & (Rating_Services = “Good” OR Rating_Services = “Average”)
	Served but significant challenges	If Category = “Improved” & (Location = “Bad OR Sharing = “Bad” OR Rating_Services = “Poor”)
	Backlog with unimproved	If Category = “Unimproved”
	Backlog with none	If Category = “None”
	Unspecified	If (Category = “Improved” & Location = “Unspecified”) OR (Category = “Improved” & Sharing = “Unspecified”) OR (Category = “Improved” & Rating_Services = “Unspecified”) OR Category = “Other