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Citizen Concerns about and Responses to the Water Crisis in a High-Income Suburb in Cape Town, South Africa

ABSTRACT

Water is the lifeblood of human and animal existence. The growth of urban populations places increasing pressure on governments to capture, store, and deliver potable water to city residents. Human-induced changes to the Earth's climate have led to unpredictable rainfall patterns. In Cape Town, South Africa, three consecutive years of below-average winter rainfall (beginning in 2015) severely tested the city's ability to provide potable water to its citizens. The city's taps were on the brink of running dry, prompting residents to implement measures to reduce water consumption. Grounded in the theoretical framework of the theory of planned behaviour, this paper investigates household water circumstances, residents' concerns, and their responses to the drought in the high-income suburb of Newlands. Semi-structured interviews were conducted with 30 household heads. A content analysis of the interview data revealed four key themes: concern about the water shortage, concern for fellow citizens, dissatisfaction with the City's crisis management, and household responses to the drought. An exploration of these themes offers valuable citizen-based insights that may inform the management of future water crises and support citizen-led water management strategies.

Keywords: Cape Town, citizen concern, Day Zero, drought, theory of planned behaviour, urban water management

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INTRODUCTION

Water is an indispensable part of life on Earth. It is consumed directly, used in the production of food and electricity, and plays a critical role in maintaining sanitation and hygiene. Additionally, water supports recreational activities and general economic development. Access to clean, safe, and affordable water is a fundamental human right; however, water is a finite and scarce resource. Only three percent of the Earth's water is fresh, and just one percent is accessible and usable, found in rivers, lakes, and underground reservoirs, while the remainder is locked in ice caps and glaciers (Chaminuka & Nyatsanza, 2013). This vital resource is increasingly threatened by erratic rainfall, recurring droughts, and rapid population growth (Sedlack, 2014).

In May 2017, Cape Town was declared a disaster region due to a severe drought that began in 2015. The city was on the brink of becoming the first major city in the world to run out of water. According to Maxmen (2018), it was the worst drought Cape Town had experienced in the past century. The 2015–2018 drought prompted the municipal government to implement emergency measures to increase water supplies through water augmentation schemes and to urge consumers to drastically reduce their water use. Water supplies had to be stretched to prevent the worst-case scenario, ominously termed “Day Zero.” On this day, most of the city's taps would have been turned off once dam storage levels dropped to a critically low 13.5% (Jacobs-Mata et al., 2018). As Day Zero loomed, Cape Town grappled with numerous drought-related challenges. Fortunately, heavy winter rains returned in 2018, gradually replenishing the city's dams.

Cape Town was not alone in experiencing water scarcity. Across semi-arid South Africa, the Nelson Mandela Bay and eThekweni metropolitan municipalities, along with smaller municipalities and Gauteng province, have either faced or are currently facing water stress (Ziervogel, 2019). Globally, other cities have also endured severe water crises. In 2014, São Paulo, Brazil, faced its worst water crisis in over 80 years, affecting approximately 20 million people (Cathala et al., 2018). Similarly, the State of California experienced a five-year-long drought beginning in 2012, while Australia endured the Millennium Drought, which lasted 15 years (1997–2012). Until recently, water was widely regarded as an inexhaustible resource (United Nations Development Programme, 2006). Today, water crises are a common challenge for cities worldwide. When cities experience water shortages, human comfort and well-being are inevitably compromised.

This paper explores citizens' concerns, their household circumstances, and their responses during Cape Town's drought crisis. Following this introduction, the next section provides a review of relevant literature. The study area, a high-income suburb in Cape Town, and the research methods are then described. The findings from a qualitative interview survey are presented, followed by concluding remarks.

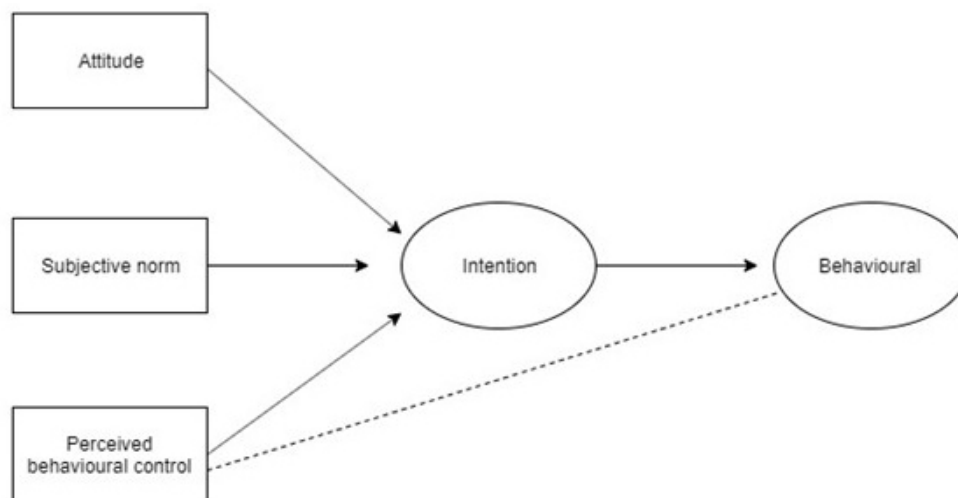
LITERATURE REVIEW

The theory of planned behaviour

Human behaviour and perceptions significantly influence actions. The theory of planned behaviour establishes a connection between beliefs and behaviours, predicting an individual's intention to act in a particular way at a specific time and place (Ajzen, 1991). According to this theory, three components—attitudes, subjective norms, and perceived behavioural control—shape a person's intentions and actions (Figure 1).

A key element of the theory is the individual's intention to perform a behaviour. Intentions reflect the effort people are willing to invest or the extent to which they are prepared to exert themselves to carry out an action. The stronger the intention, the more likely the individual is to perform and engage in the behaviour. However, it is crucial to acknowledge that actual performance depends, to some extent, on the availability of resources and opportunities (e.g., time, money). These factors collectively represent an individual's actual control over their behaviour. Ajzen (1991) posits that when individuals have the necessary resources and opportunities and intend to perform a behaviour, they are likely to succeed in doing so.

Figure 1. The theory of planned behaviour model



Source: Ajzen (1991: 182)

The theory of planned behaviour suggests three causes of intention (Figure 1). The first is the *attitude towards behaviour*. This is the degree to which someone has a positive or negative stance on the specific behaviour, considering the outcome of performing the behaviour. The second cause, *subjective norm*, refers to the societal pressures to perform or not perform the behaviour. It considers the social environment and whether society thinks they will act or not. Finally, the degree of *perceived behavioural control* is the alleged ease or difficulty of carrying out the behaviour. This may reflect past experiences or obstacles. It is important to note that, depending on the context, in some instances attitudes may make a meaningful contribution to intentions, in others subjective norms and perceived

behavioural control may do so, while in other contexts all three causes can contribute to intentions. Responsible environmental behaviours have also been noted amongst tourists and it can also be applied to the scenario of urban water shortages (Gonda & Rátz, 2024). With this theoretical underpinning, the following sub-sections overview the literature associated with the study.

Brief synopsis of the relevant international literature

A drought is classified as a long period of abnormally low rainfall for which many are unprepared (Allaby, 1994). The South African Weather Service (2018) characterises a severe drought as occurring when an area receives less than 75% of normal annual rainfall. Water scarcity exists when water demands exceed water supplies over long periods of time, which could have been prevented by prudent urban water management (United Nations Development Programme, 2006). The onus falls on governments to ensure that everyone has reliable access to clean, safe, and affordable water.

Over the past few decades, severe water crises have become a regular phenomenon in some major cities and regions across the world. In Australia, the notorious Millennium Drought was caused by hot, dry weather conditions from late 1996 until 2010. In Spain, in 2007/2008, the metropolitan area of Barcelona suffered the severest drought in decades, with little or no rain for 20 months (March et al., 2013). A 100-year record low of only 29 mm of rain fell in the city of Alicante, Spain, between January and August 2014 (March et al., 2014). Similarly, two years of severe drought in 2014 and 2015 saw the city of São Paulo, Brazil, experiencing dam levels dropping to single-figure percentages (Millington, 2018). In cities of the Global North, rebate programmes and the distribution of free plumbing retrofit kits are standard demand-management implementations to encourage households to save water (Millock & Nauges, 2010; March et al., 2014). Stringent regulations for water-efficient appliances are standard in California, where toilets, showerheads, kitchen and bathroom taps, and washing machines may not exceed a specified efficiency level (Mitchell et al., 2017). In Australia, legislation dictates that new toilets must have dual-flush buttons (Dolnicar & Hurlimann, 2010). In São Paulo, the largest city in South America, small water tanks, known as *caixas*, have been required by law for all residences since 1992 (Millington, 2018). Although these regulations may prove effective in reducing household water demand, they may lead to pronounced infrastructure inequalities in the water landscape. Poorer households may struggle to afford a *caixa* or an efficient water toilet, leading to a greater water burden compared to wealthier citizens.

At the household level in Alicante, voluntary rationing, followed by the banning of outdoor water use (washing cars, watering gardens, and filling swimming pools), formed part of water conservation campaigns (March et al., 2013). To encourage water savings in São Paulo, consumers who reduced their water consumption were rewarded with a 30% discount on their water bills between February and November 2014. Water-pressure reductions and water-tariff changes were standard measures to reduce household water consumption. Emergency actions were delayed. The Governor of the state of São Paulo denied that citizens went without water, even as many citizens in the peripheral areas



of the city suffered from water shortages. Only in 2015 did the Governor admit that citizens were living without water, months after downplaying the water shortages. Such political stubbornness has been identified as a factor contributing to citizens' negative experiences of the drought in São Paulo. Citizens demanded transparent management of the city's water supply, which was not met (Millington, 2018).

Generally, domestic water use can be divided into two categories: everyday basic needs and non-essential uses. Everyday basic needs include drinking water and water for washing, flushing toilets, cleaning, and washing clothes and dishes. The irrigating of gardens, filling swimming pools, washing cars, and other outdoor activities are classed as non-essential uses (Koutiva et al., 2017). When households are faced with severe water scarcity and the risk of having their water cut off during a crisis, they may change their water-use behaviour by reducing their daily water consumption and/or placing high water-use activities on hold until water supplies increase. Households may adopt strategies to increase their available water supply by installing rainwater tanks or sinking boreholes. In extreme cases, they may relocate to areas where the water supply is more reliable (Majuru et al., 2016). These water-use strategies can be described as citizen-led resilience, whereby the citizens themselves implement resilient strategies according to their attitudes, capacities, knowledge, values, and water needs (Jupp, 2016). The rise in citizen-led strategies can often follow coercion and/or the threat of implementation of punitive measures, such as fines for excessive water use, by public authorities.

Majuru et al. (2016) emphasise that drought and water scarcity place a considerable burden on households in countries of the Global South. Common strategies they name for coping with water scarcity include collecting water from alternative sources, storing rainwater, purchasing water from shops, and drilling wells or boreholes. They mention that people spend between 30 minutes and three hours collecting water from alternative sources. Households that collect rainwater store it either in large rainwater tanks or in buckets. The most common water conservation practices in countries of the Global North like Australia include ensuring that taps are correctly closed after use, only using a washing machine when full, and using minimal water for cleaning (Dolnicar & Hurlimann, 2010). In countries of the Global South, some common practices include reducing the frequency of bathing and showering, limiting laundry loads, reducing the flushing of toilets to once a day, and even decreasing the intake of fruits and vegetables that need rinsing. Households were also found to cook fewer meals per day and used water for drinking purposes only (Majuru et al., 2016). Reusing bath and washing machine water for mopping floors, flushing toilets, and watering gardens is common in Southern cities too. There is wide support for water-saving appliances, especially in the Global North. The main barrier to using water-saving appliances is the cost of purchasing and installing them. Positive attitudes towards water conservation and water-saving appliances, but not implementing them in practice, were found to be commonplace in Australia (Dolnicar & Hurlimann, 2010). The use of water-saving appliances is prevalent as a coping strategy to reduce water consumption. Wealthier households in the Global South are more likely to implement longer-term water-saving strategies that focus on the quality, quantity, and convenience of accessing water (Majuru et al., 2016). The burden

of water-saving strategies should not fall solely on citizens, as it is incumbent on municipal water authorities to play their role too.

South African literature on potable water issues

In South Africa several laws and policies regulate water use, its management and citizens' water rights. These include the Water Services Act (Act 108 of 1997), the national Free Basic Water Implementation Strategy and the National Water Act (Act 36 of 1998). In the South African Constitution, the Bill of Rights [Section 27 (1) (b)] clearly states that everyone has the right to access sufficient water. Furthermore, principles of environmental protection are mentioned, ensuring the right to an environment that is not harmful to citizens' well-being and to have the environment protected for the benefit of present and future generations (Section 24). The aims of the National Water Act (Act 36 of 1998) echo the Constitution principles achieving sustainable use of water for all consumers. Regarding water scarcity, the National Disaster Management Act (Act 52 of 2002) guides South Africa's response to the risks of drought. The act aims to ensure that progressive action is taken, and improved responses are made to mitigate the impacts of drought rather than reacting to drought after it has taken place.

The Western Cape Sustainable Water Management Plan is a framework developed by the Western Cape provincial government and the National Department of Water Affairs to guide sustainable management of water and it specifically aims to protect water resources and promote water efficiency in the Western Cape province (Western Cape Government, 2018). However, these are only options for consideration in municipal strategies, meaning that despite being put into plans and policy, there is a likelihood that they may not be put into practice. Other activities mentioned in the Water Management Plan's policy document, but not in the immediate to long-term plans, are management of water pressure; monitoring and maintaining water quality; greywater reuse; installation of rainwater tanks; retrofitting with water-saving appliances in commercial, domestic and state-owned buildings; as well as by-laws to enforce the use of water-saving fittings in new developments; appropriate water tariff structures to encourage water-saving behaviour; and awareness campaigns for water conservation by the public. These laws and principles are meant to steer sustainable water-related decisions.

Turning to Cape Town, almost three decades ago the Water Research Commission predicted that water demand in the city would exceed supply by 2007 (Mistry & Spocter, 2018). Since then, options for increasing Cape Town's water supply have been proposed, such as building new dams, exploring transfer schemes, clearing alien vegetation and looking into efficient irrigation practices (Matthews, 2005). Furthermore, in 2014 targets were set for South African municipalities to reduce their water losses by half (Van Vuuren, 2014). Those targets have come and gone. A decade after the predicted shortage, Cape Town encountered a major water crisis with the then mayoress of Cape Town, Patricia de Lille, announcing, in October 2017, that the city would run out of the water by March 2018 (Davis, 2018). According to Patel (2003), long before the crisis, the city managers' complacency had already contributed to inaccurate disaster forecasts. Olivier (2018), however, disagrees with Patel's contention

and argues that the city's lacking preparedness is a myth. Central to his argument is that dams were overflowing in the winter of 2014 and weather forecasts had not indicated that the 2015 drought would carry over into the following year.

Cape Town uses 64% of the Western Cape's total water supply, followed by agriculture at 29% with non-metropolitan settlements in the province using 7%. Seventy percent of Cape Town's water demand was for domestic use with the balance for the industrial, commercial and institutional sectors (Department of Water and Sanitation, 2018). The cost of water for non-domestic use (such as for commercial and industrial water use) more than doubled resulting in 20% reduction of use in these sectors (Ziervogel, 2019). The domestic use volume was calculated to be approximately 15% for households in informal settlements and 85% by formal domestic households. Thus, focus of the city's water demand management strategy was concentrated the formal domestic household sector, particularly in wealthier suburbs (City of Cape Town, 2018a; Calverley & Walther, 2022). It is the wealthier suburbs of Cape Town that consumed the largest per capita per day share of potable water which speaks to the uneven geography of water consumption in Cape Town (Savelli et al., 2021).

Climate change impacts have undoubtedly impacted negatively on the filling of the rain-fed dams that service Cape Town, with the catchment areas receiving insufficient rainfall since 2015 and the 2017 annual rainfall being only one third of an average year's rainfall (City of Cape Town, 2018a). Olver (2019) has observed that the City mismanaged the water crisis monumentally because of administrative, leadership and political failures. Despite 2015 having demonstrated drought-like conditions compared to previous years, it did not pressure the authorities to diversify water supplies and initiate drought-relief measures. The United Nations' Human Development Report (2006) argues that failures in water management and policy are key drivers of water scarcity where cities indulge in using more water than they have.

In order to secure quick results in reducing water demand, measures such as punitive tariffs for high-volume water consumers, reducing water pressure, installing household flow regulators and engaging with businesses, were initiated (City of Cape Town, 2018a). Communication campaigns via printed media, radio and social media informed citizens about how to reduce their water consumption. Novel strategies to curb high water consumption included personal visits by the mayoress to the offending water users. The City also published in the media the street names where the 100 highest water users lived (Olivier, 2018). The imposition of water restrictions was inevitable.

Level 1 water restrictions were introduced at the end of 2015, with the City setting sights on reducing its collective water consumption by 10% (Collins, 2015). With dam levels sharply declining from 72% in 2014 to 50% in 2015, the City implemented Level 2 water restrictions at the start of 2016. Level 3 was implemented in November 2016 and a further strengthening of restrictions at Level 3B was implemented on 1 February 2017. By then the dam levels were at 39%. Level 4 water restrictions, which were implemented on June 1, 2017, required citizens to reduce their water usage to 100 liters per person per day. A month later, Level 4B limited water use to 87 litres per person per day (City of Cape Town, 2018b). The City called on all residents to use municipal water only for essential purposes

such as drinking, cooking and washing (Western Cape Government, 2017). Level 5 water restrictions came into effect on 3 September 2017 where the capping of water usage at the household level was emphasised (City of Cape Town, 2017). The limit per household was set at 20,000 liters per month for a ‘typical’ family of four. Level 6 water restrictions were imposed at the beginning of 2018 as dam levels reached 31%. On 1 February 2018, Level 6B water restrictions were enforced limiting water usage to just 50 litres per person per day (Felix, 2018). On 23 April 2018, the city’s dams were at 20% capacity, with the final 13.5% being unusable. The situation was dire.

The last level of water restrictions was Level 7, the implementation of the dystopian-sounding ‘Day Zero’. On this day, the Cape Town’s taps would have run dry as dams and bulk water infrastructure would not have been able to deliver potable water (City of Cape Town, 2018a; Maxmen, 2018). Cape Town could have been the world’s first major city to run out of water. Day Zero meant that most residents, businesses and institutions would be unable to access drinking water from their taps. Citizens would have had to collect water from approximately 200 sites around the city. Each person was to be rationed to 25 litres of water per day. Thankfully, the 2018 winter rains arrived in sufficient quantities to stave off Day Zero. Attention now turns to the study area and methods used in the study.

METHODS

The ‘suburbs’ are regarded as the residential spaces of the wealthier cohorts of society in South Africa. The high-income suburb of Newlands, Cape Town, is characterised as a green, leafy suburb with a low density of housing units, with lush gardens and private swimming pools being common features of residences (Ouweneel et al., 2020; Marcus & Spoceter, 2022). Little is known about the concerns and household responses to drought in wealthier suburbs in the South African context because the scholarly focus has largely been on other urban precincts, allowing the wealthy classes to continue consuming vast amounts of resources outside the analytical attention and academic gaze of scholars (Pieterse, cited in Visser, 2013). The legacy of low-density, sprawling suburbs in South Africa is the “antithesis of sustainability as they place a high demand on resources, such as... inefficient use of water and costly service reticulation” (Swilling, cited in Nel, 2016, p. 83). Newlands is one of the wettest suburbs in South Africa, receiving approximately 2000 mm of rainfall per year (Watson, 2015).

Institutional ethical clearance for the study was obtained prior to the start of the data-collection process. A linear snowball sampling method was used, whereby the researchers recruited the initial respondents in the study area, who in turn provided the contact details of the next wave of potential respondents. In total, semi-structured interviews were conducted with 30 adult household heads with the aid of an interview guide. The interviews were conducted in October 2018, four months after Day Zero was postponed indefinitely. Interviews were digitally recorded and then transcribed. The manager of the Newlands spring was also interviewed for his insights into the water-collection activities of citizens at the spring. A thematic content analysis of the transcribed interviews generated

four key themes: concern with the water shortage, concern for fellow Capetonians, criticisms of crisis management by the municipal authority, and the respondents' household responses to the drought. These are the four foci of the next section.

RESULTS

Domestic water consumption is the largest share of overall water demand in Cape Town, meaning that citizens needed to adapt to living with limited water supply to their homes. An understanding of households' water circumstances, their concerns, and their responses during and after a water shortage provides valuable information for improving municipal communication efforts, reducing water demand, and managing water supplies (Jorgensen et al., 2009; Dolnicar & Hurlimann, 2010; Koutiva et al., 2017; Booysen et al., 2019). Respondents' concerns and the accompanying changes in water-use behaviours, along with water crisis management by municipal officials, mirrored what was observed in similar studies in Australia, Brazil, and Spain. Insights gathered from respondents' narratives on their domestic water-use behaviour and their perceptions of the city's water management strategies inform the analysis and discussion of the results. An exposition of each key theme follows in turn.

Concern with and responses to the water shortage

Respondents were required to recall precisely when they began to follow the water restrictions strictly. More than half of respondents (55%) mentioned that it was towards the end of 2017, when Level 5 water restrictions were in place, that the possibility of a water shortage became a reality for them. Only when the authorities launched a broad-based media information campaign about the looming water shortage, warning citizens of the water crisis and actively implementing punitive measures such as issuing fines and publishing the street names in which high-volume water users resided, did the respondent households start to use water wisely. Respondent A recounted that households knew that the situation was dire when they became aware that dam levels were dropping precipitously.

Emotions of fear were often mentioned in the respondents' narratives. Respondent G succinctly stated that "...the higher the level, the more panicky people became." She clarified that as the water restrictions became stricter, households became increasingly aware of a water shortage, coupled with an awareness that winter rains were not arriving. Emotions of helplessness were mentioned too, in the context of water tariffs, water cuts and access to water resources by the elderly. On the topic of water tariff pricing, 52% of the participants agreed that water tariffs were reasonable. Respondent H expressed the consternation that households had no choice but to pay for their water during the episodes of tariff increases: "...what are you supposed to do? You got to pay your account! Otherwise, you won't have water if you don't pay." Respondent F expressed feelings of accomplishment, then defeat mixed with emotions of anger, when describing the issue she had involving her water meter.

She described how a municipal employee ardently insisted that a water-management device be fitted on her property, but her husband refused. She justified the refusal by insisting that the high amount of her water bill was not the result of her family's water usage but due to inaccurate readings of her water meter and incorrect water-use estimations by the municipality:

One month my bill comes to zero rands, the next month maybe four, five thousand rands. So, where does that come in? The council said ok maybe they did an estimate, maybe it's from previous [months]. Then, two months later I get another bill of zero rands, so they don't know what they are doing. We don't know how our water must be because they don't know how to redo the reading, so they can just estimate anything, and we must just accept it.

Respondent H, like several other interviewees, labelled the municipal billing system disparagingly as: 'taking a lot of chances', 'taking advantage', 'making a lot of money out of us', and 'a total rip-off'. In the case of Respondent G, emotions of helplessness were evident when she related the time her water was cut off. She expressed that without water and no warning from the City, her daily water-use activities were disrupted, and this proved to be a huge inconvenience. She explained that she did not think it was reasonable for the authorities to terminate her water supply as a punitive measure. When prompted about how she managed with no water, she replied that she first looked around her house for some water and found a few litres stored in bottles. She explained that she was able to continue her morning routine by only doing 'the necessary' as there would be water at her workplace. Furthermore, she strongly suggested that at least ten litres of water should be stored in each household because if no water is available, panic will set in among the citizenry.

Concerning the arrival of Day Zero, half of participants were convinced it would have arrived at some point. The rest reported that they were unsure or firmly believed that the event would not arrive. Nonetheless, all households made some preparation for this doomsday event by conserving water and stocking up supplies of bottled water. Several respondents (14%) indicated that they had prayed for rain, an activity that was also encouraged by the then mayoress. Thirty-six per cent of the respondents reported that they had some spiritual or cultural beliefs related to water. Respondent I mentioned that although he had hoped Day Zero would not arrive, he decided not to sink a borehole or implement anything that would dent his household budget. Respondent J's household was prepared to relocate temporarily to where water resources were more reliable:

So, the first time, the March one, we were going to, we actually looked for a house to rent. We looked at the stats where water restrictions, where water resources were better like Hermanus and I think Worcester, not permanent maybe like a year or something.

She arranged with the school for her children to do distance learning and only attend school during examination periods to which the school agreed as the sanitation conditions at the schools would be 'crazy'. Other preparations people made involved households' decreasing their reliance on municipal water supplies by collecting spring water, purchasing and filling up water dispensers, purchasing and storing bottled water and collecting rainwater. While 59% of the respondents maintained that they were prepared for Day Zero, almost one fifth of households (18%), indicated that they did not have any backup stores of water. However, unprepared respondents added that should Day Zero have arrived



they would have planned to increase their water supplies. Respondent K said: “Look, if it had come, we probably would have [put something in place], because I could have pumped borehole water to these tanks.” Similarly, Respondent D mentioned: “I mean, we would have gone out and got bottled water and we would have survived. Were we prepared? No. Some people must have had massive stores of water hoping it was going to arrive.” He was correct in his assumption about people storing numerous litres of bottled water, as Respondent C described storing approximately 100 five-litre bottles of water. Likewise, two other households indicated that they had large stores of bottled water. Marked differences were evident in the responses regarding whether respondents thought Day Zero would have arrived, whether households considered their household to have been prepared should Day Zero have arrived; and about the preparations made by each household.

Another method by which households prepared for Day Zero was to actively search for information regarding the water crisis. Households primarily mined the Internet for information on the city’s dam levels and how to use their 50-litre water stipend efficiently. One respondent reported having shared ways in which to save water via her lifestyle-related blog with over 2000 followers. Others (7%) have joined water-related social media groups to keep themselves informed, while 20% of the respondent households indicated that although they had not actively searched for information, they had stayed informed by reading the daily news. Respondents also maintained that although Day Zero did not arrive, they would be in a better position to cope with future drought events as they had changed their water-use habits and become more water-use conscious.

Despite the warnings and preparations, some respondents related a particular issue that interfered with their water-saving efforts. One tenth of the residents reported having had a water leak during the drought period. Water leaks, which at times are difficult to detect, could result in hefty water bills. Respondent I complained that their household was unaware of their water leak as it happened when it was raining and only when the rain had stopped did they notice running water near their garage. The leak had occurred under a tree and their municipal water bill came to R16 000. Residents that had experienced leaks commented that the authorities speedily resolved issues with water meters and formally offered each household a rebate. The respondents, however, bemoaned the rebate as not being much.

Concern for fellow Capetonians

Complementing their personal water-saving issues, respondents also revealed their worries for those more vulnerable than themselves. Three out of every five respondents considered the drought to be very severe. Easy access to the springs and habitual water-saving actions were justifications for others to label the drought as less severe and serious. Nevertheless, some respondents expressed apprehension regarding the elderly. Respondent L alleged:

It’s severe in terms of usage but dangerous in terms of the downstream consequences. Look at the spring collection point, for example, old ladies were there in scarfs, the floor is slippery,

they are moving 25-litre containers around, people are ushering to get you in, someone can get hurt, and there were fights.

Respondents also emphasised their grave concern for the less fortunate citizens of Cape Town. They believed that their fellow Capetonians' situations might be bleaker as they may not possess the financial means to purchase water or afford to travel regularly to the spring collection point should their water be cut off. Respondents mentioned that having one's water supply terminated should be situation-dependent as the poor and large households should not be liable to having their water cut off. On the other hand, some felt that if water use was excessive and accompanied by multiple warnings, water provision should be terminated. Residents who strongly opposed water cuts offered alternative measures. Respondent G suggested: "I think pressure should be reduced. It should be a very drip basis [for those] who are not paying and saving water." Respondents mentioned that the City was fining households incorrectly and rationing households that failed to comply with the water restrictions. Residents reflected on and questioned the ownership of water as well as the decisions about who should receive water and who not, given that water is a basic human right. Other residents reasoned that although water is a basic human requirement, households should keep within their means and limits if they could not afford to pay for the water they used.

Many residents reported postponing their visits to the local Newlands spring(s)³ during the height of the drought. Those who continued to collect water usually visited the springs either twice a week or once every fortnight. Residents cited the long queues and regular fights as the main reasons for no longer collecting water at the spring(s). Towards the end of January 2018, one person was arrested following a fight at the Newlands spring(s). As a result, security guards were posted as a safety precaution (Chambers, 2018; Stone, 2018). The manager of Newlands spring(s) noted that fights did not take place at the new water collection point: "Not physical fights but there was a bit of chaos because we were just in the beginning phases of the collection point." He added that he had been called upon to mediate rising tensions among water collectors.

Respondents expressed displeasure over how the City prepared for the water crisis. Respondents expressed opinions about how the municipality should have constructed desalination plants before the onset of the crisis as well as capturing other water resources such as springs around the city. Respondent M revealed that he had moved to Cape Town five years previously and he recalled the garden-related water restrictions and warnings. He opined that if the City was aware of the scarce water conditions, the available water resources in the area and on Table Mountain should have been proactively tapped. Other residents echoed these sentiments, lamenting that other countries also have limited freshwater supplies, yet they manage to successfully supply all their citizens. These expressed

³ There were three well-known springs in Newlands. By October 2019 there was one. The city closed the Kildare Road spring on 23 May 2018 by covering the spring with concrete. This was due to disruptive traffic congestion and complaints from nearby residents about the noise made by visitors collecting water at all hours of the day and night. In February 2018, the city re-routed the Newlands spring from its location at South African Breweries, to a place 700 metres down the main road next to the Newlands municipal swimming pool. The new location was cited by Mayoral Committee Member for Safety and Security, JP Smith, to be easier to access and have more parking for water collectors (Robins, 2018; Cape Argus, 2019).



personal concerns regarding the water shortage were extended to fellow Capetonians who may or may not have been in a more vulnerable position than themselves.

Water-crisis management by the City

During the height of the drought, participants indicated that the municipal authorities carried out ambitious campaigning to alert households to the water shortages. The intensive publicity about the drought, more specifically the number of days left until Day Zero, the water restriction levels, images of the dry dams, pictures of citizens with buckets and bottles queueing at the spring(s) and slogans calling on residents to take shorter showers, were the messages respondents reported to stand out for them. Communiques on billboards along highways as well as information given in their rates and taxes bills impressed Respondents G, L and M. Then again, Respondents A and C commented on the flood of drought-related pamphlets in their letter boxes which resulted in their overlooking important information. Respondent O stated that the City made it relatively clear how the new water tariffs structure worked, and Respondent P mentioned that if there was blame regarding water consumption, the onus was on the residents for not doing their homework. Respondent J mentioned that her husband used their monthly water bills to compile water-consumption graphs for their household to impress on their children how much water the household was consuming. This would undoubtedly have assisted in cultivating a culture of wise water-use awareness among the children.

Regarding the opinions about the general communication efforts of the City, it was surprising that many respondents complimented the authorities for frightening residents about the drought. Respondent Q commented: “Putting fear into everybody for Day Zero actually did a lot more good than harm. I think it was needed to let everybody take it seriously.” Respondent R added that the warnings and media attention concerning people at the spring(s) were effective in alerting residents in the area: “It was very scary for kind of middle-class people who are not used to the idea of queueing up for anything so I think their scare tactics have been effective.” Other respondents commented about the success of the notices in most public places that urged citizens to save water. The timing of these drought warnings, however, was widely criticised by the respondent households. The late implementation of drought warnings was often mentioned in the respondents’ descriptions. Many added that, as a result, they felt fearful and helpless, and that they lost trust in City management.

Despite the warnings given and messages sent by the City, the unfair measures to recover shortfalls in revenue due to declining water demand were pointed out by the respondents. On the topic of water billing, respondents mentioned that the City was fining households unfairly and that water-billing systems were not functioning correctly. Approximately half (52%) of participants did not have any issues with the punitive water tariffs. The reasons they offered were that the water tariffs did not incur huge expenses on household budgets nor affect them; that water infrastructure and maintenance require funds; and that the price of water was low compared to international prices. Respondent N added that the tariffs should have been higher as the aim was to encourage households to consume

less water. Respondent D expressed the sentiment that the City should have increased water tariffs years ago. One third of the respondents disagreed, arguing that the water tariffs were too high. The rest of the respondents were unsure of their opinion on the water tariffs. Participants, whether they were impressed with or frustrated by the City's drought-management strategies, noted that there is always the prospect of better strategies to manage drought. Consequently, many participants made recommendations about how the authorities should handle the next water crisis should another arrive in the future.

Household circumstances during the drought

Severe drought conditions had prompted the respondents to adjust their current water-use habits. Respondents disclosed that although they had always used water responsibly, during the drought they became more aware of their water consumption and were moved to use water more wisely. Respondent J said: "Before the drought, we never done the buckets', now we are very strict with water." Most residents also associated their new water-saving habits with placing buckets under water appliances such as showers and taps to collect extra fresh water and greywater from bathing for re-use. Water collected in these buckets was reported to be reused for watering gardens, doing handwashing and for washing dishes, fruit and vegetables. Similar initiatives were reported in Mistry & Spocter's (2018) study on water use in Kuils River. Newlands' spring water was mainly used for drinking, cooking and washing dishes, while water collected from rainwater tanks was used for irrigating gardens, topping up pools, washing cars, flushing toilets and mopping floors.

Respondent U stated that the main reasons for adopting a rainwater tank were deep uneasiness about the drought and the limited availability of freshwater resources at the time. Respondent F, on the other hand, purchased a rainwater tank as she felt vulnerable and expressed her concern that the City was not managing water resources carefully. Respondent V expressed great difficulty with conserving water but highlighted that their contribution to minimising household water demand was: "We made a lot of effort saving water, like trying to catch all the water from the washing and use those [sic] for the toilets, it's a painful process, but we are trying to do our part."

Residents appeared to place considerable aesthetic value on their gardens. Most residents reported having not watered their garden with municipal water at all during the drought with a few residents lamenting that their lawns died during that period. Other residents, however, reported about watering their lawns with greywater from their showers, 'detergent water,' 'kitchen water' and water from rainwater tanks. Others opted to limit their irrigation practices to pot plants. Respondents also spoke of increased investment in drought-resistant plants. Dramatic changes in water-use behaviour due to the water crisis have created a 'new normal' in households. For example, hitherto the limiting of the number of toilet flushes was not normal practice but it was reported to have become common practice in many households.



The significant adjustments to water-use practices engendered a variety of drought-related experiences. Living in areas where there are springs, dams, aquifers and rivers nearby made some respondents' drought experiences more manageable. Respondents also mentioned that owing to their water-saving efforts and water-saving appliances they had been given peace of mind during the drought. After describing their household's water-saving ways and water-saving appliances, Respondent N confirmed that: "We are quite comfortable like we've got a nice set-up in the house." Respondent R expressed disquiet over the illegal abstraction of water from the Liesbeek River which flows through Newlands: "We live across the road [from the river] and at night we have bakkies pulling up catching river water, they would put a pipe into the river and would pump it into a tunnel with drums." According to Section 22(1) of the National Water Act (Act 36 of 1998) it is not permissible to abstract water from a river without a licence. Respondent R added that a few neighbours mentioned the idea of a sharing group of those who had boreholes and those who did not. She expressed a deep anxiety for her neighbours without a borehole.

Most respondents (62%) reported that 50 litres per person were enough for daily water-related activities. Participants expressed their satisfaction with their considerable efforts in saving water. Others, however, identified many difficulties. Respondent E conveyed: "It is enough to survive but I mean you gotta get rid of all your frills, bells and whistles like you just have enough to drink!" Residents had to examine their water-use habits and the realization set in that water for personal consumption was all that mattered and that they had to forego the green gardens and washing of vehicles amongst other water-consumption activities. Overall, the respondents were quite willing to do so. Respondents also mentioned that their experiences of the drought had brought a behaviour change to be conscious of water saving that would continue in the future.

CONCLUSIONS

Cape Town faced a near-disaster as dam levels dropped to dangerously low levels following three consecutive years of dry winters. Citizens were compelled to reduce their water consumption to 50 litres per person per day. Using the theory of planned behaviour as the theoretical framework, this study examined citizen concerns and responses to the water crisis. This theory is particularly suited to exploring citizen resilience to drought by analyzing water conservation practices and the adoption of water-saving appliances in households.

Respondents' willingness to drastically reduce their water consumption during the severe crisis (their behavioural intention) was influenced by three factors: (1) Attitudes towards the drought; (2) Subjective norms – their perception of what others think of the drought (family members, neighbours and city management), as well as adherence to water restriction guidelines; and, (3) Perceived control – their assessment of the ease or difficulty of complying with stringent water restrictions or using water-saving appliances.

Although the study focused on a small segment of the city's population, a significant finding was that respondents placed a high moral value on water, with some referring to it as "the new gold." Spiritual and environmental values were strongly linked to water conservation. Households managed to comply with water consumption restrictions while maintaining personal hygiene standards by showering, flushing toilets, and washing clothes less frequently. In outdoor activities, respondents demonstrated a deep aesthetic appreciation for their gardens, replacing potable water with reused water and using stored rainwater to fill pools.

Public education campaigns about the drought proved to be strong motivators for reducing water consumption. Respondents believed they contributed positively to the city-wide goal of reducing water usage. As a result of continuous water-conservation messaging during the drought, it is unlikely that excessive water consumption will return.

Respondents expressed concern for fellow citizens during the crisis and criticized local, provincial, and national governments for their lack of preparation, which they identified as a key factor behind the severe shortages in Cape Town. Dissatisfaction was also directed at the late implementation of alternative freshwater supply infrastructures and the perceived unreasonableness of water tariffs. To promote sustainable water consumption, future efforts should target barriers such as cost by subsidizing water-saving appliances and providing rebates for households that achieve significant water savings.

Media coverage of the water crisis and Day Zero spurred swift citizen action. Respondents reported reducing water use after seeing warnings about low dam levels and water restrictions displayed on billboards, in public places, on the Internet, and in daily news reports. This widespread publicity created a sense of urgency, prompting households to address water-related risks and improve their water resilience through behavioural changes.

As the study was conducted in a high-income suburb, it was assumed that respondents had the financial means to install rainwater-collecting tanks and drill boreholes to access water for household use. Families implemented numerous water-saving measures to reduce their consumption. This experience underscored the finite nature of Earth's resources. Renewable resources must be consumed sparingly and at a rate that allows for renewal. Population growth presents a significant challenge for resource management, raising concerns about the future provision of resources, including water quality and availability, food production, livelihoods, and overall quality of life.

Cape Town residents came perilously close to experiencing dry taps. It is hoped that the lessons learned during the crisis, particularly about water-wise habits, will endure. By the end of winter 2020, the dams were full again, but the memory of the drought remains a sobering reminder of the importance of sustainable water management.

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