

Public perception of water re-use: building trust in alternative water sources in Malmesbury, South Africa

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The recent drought in the Western Cape Province in South Africa has been marked as the worst since 1904. The drought impacted severely on the availability of bulk water supply in many parts of the Western Cape Province, particularly the Cape Town Metro and surrounding districts. In order to alleviate water scarcity, wastewater recycling (water reuse) has been identified to have the potential to augment water supplies in the province. This paper argues that although water recycling has the potential to contribute towards alleviating water scarcity, studies have shown that public perceptions greatly influence the outcome of any water recycling scheme. The study collected data using face-to-face interviews, focus group discussions, and the application of the Story with a Gap participatory exercise. One of the key findings is that residents have to trust the municipal competencies and systems, and this can be achieved through meaningful engagement between the municipality and residents. We argue that rolling out a water reuse scheme by starting with affluent areas increases the likelihood of acceptance among low-income communities.

INTRODUCTION

Water resources have become constrained globally due to growing demand for industrial and agricultural use, rapid urbanisation, climate change impacts such as drought and growing urban populations, resulting in high water demand (Cain, 2011; Piao et al., 2010; Bahri, 2012). According to the United Nations World Water Assessment Program (UNWWAP) (2015), the world is projected to face a 40% global water deficit by 2030.

Water scarcity caused by drought is a common occurrence in Southern Africa, and in South Africa recurring droughts have mainly occurred due to rainfall variability (Mason and Tyson, 2000; Wolski, 2018). The country recorded a devastating drought in 1991/92 with far-reaching impacts felt across all sectors of society (Glantz et al., 1997; Vogel et al., 2000). More recently, the Western Cape Province experienced below-average rainfall over the period 2015–2017 (Otto et al., 2018; Joubert and Ziervogel, 2019). This led to the worst drought since 1904 and an unprecedented water shortage (Botai et al., 2017; Wolski, 2018).

The Western Cape Water Supply System (WCWSS), comprising a complex system of six major dams in the Western Cape, was severely affected by the drought, which impacted on towns dependent on these dams. Cape Town, the capital city of the region, was particularly affected by the drought, and at the beginning of 2018 ‘Day Zero’ – the day on which most of the piped water within the city would be shut off and residents would have to get water from communal taps – was predicted. Extreme restrictions on water usage were implemented from August 2017 and water conservation efforts implemented by citizens helped to significantly cut down water usage, thus contributing to averting ‘Day Zero’ (Otto et al., 2018; Arcanjo, 2018; Joubert and Ziervogel, 2019).

Recycling of wastewater is considered in several countries as an attractive alternative to augment water supplies compared to desalination or expensive dams (Tchobanoglous et al., 2011; Menge, 2010). Potable water reuse projects have been implemented in Namibia, Australia, Singapore, and several cities in the United States (USEPA, 2017; Tchobanoglous et al., 2011; Jimenez and Asano, 2008; 2010). In South Africa, the National Water Resource Strategy 2 (NWRS 2) sets out a number of strategies for the management of freshwater resources, including the recycling of wastewater (DWA, 2013). In 2011, the Beaufort West Municipality implemented the first direct potable reuse scheme, after a severe and prolonged drought (Owen, 2017).

The development of water reuse schemes has emerged because of depleted water sources, the need to protect the aquatic environment, and increasing water demand as a result of population growth (Jimenez and Asano, 2008; Rodriguez et al., 2009; Cain, 2011). However, several studies (Po et al., 2003; Smith et al., 2018; 2030 Water Resources Group, 2016) have shown that public perception poses a major challenge to using wastewater as an additional source of freshwater for domestic use.

Trust in water reuse schemes in relation to health considerations is crucial. Trust is a useful intangible resource and framework to be considered because it is at the interface between the public and the municipalities who serve them that trust is either brokered or destroyed (Owen, 2017). Harris-Lovett et al. (2015) argue that the adoption of potable water reuse is based on trust that emanates from societal legitimacy. Societal legitimacy is about erasing scepticism between the municipality as service provider and the community as end users of the water (ibid). They postulate that lack of trust leads to widespread public opposition regarding water reuse (ibid).

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Our paper posits that the recycling of wastewater for potable use is an alternative source of water that can contribute to alleviating the problem of water scarcity in South Africa. Whilst noting the importance of addressing public perceptions, we opine a water reuse scheme should be regarded as part of the mechanisms in a circular economy to ensure the sustainable provision of water to humans while maintaining healthy aquatic ecosystems, given that water – though renewable – is a finite resource. The 2030 Water Resources Group (2016) note the multi-dimensional benefits of wastewater and the need for water practitioners to adopt circular economy pathways to manage wastewater from a sustainability viewpoint. They go on to point out that water and wastewater should be seen in an integrated manner.

This paper is based on a study carried out in Malmesbury, Swartland Municipality, with the aim of gauging public perceptions and attitudes towards water reuse following the 2015–2017 drought. According to the Swartland Municipality Water Services Audit Report of 2016/2017, the option of direct potable reuse is considered as part of the potential future water resources in certain towns, including Malmesbury. Malmesbury town and environs (specifically Ilinge Lethu, a semi-formal settlement) were identified as a case study site, to get an overview of the impacts of drought and how this affects people's responses to recycled water vis-a-vis potable for domestic consumption.

METHODOLOGY

This study employed a case study design using a qualitative approach method (Algozzine and Hancock, 2006). The case study design was used for its strength in investigating an empirical phenomenon within a real-life context (Yin, 2003). A qualitative approach was appropriate for this study given that it seeks to understand peoples' perception and attitudes towards water reuse for domestic consumption. The study adhered to the ethical procedures of the University of Cape Town. Data collection involved both primary and secondary data sources. Secondary data involved the physical characteristics of the site, demographics, socio-economics, etc., and was obtained through a desktop review of existing literature, information from municipal websites, media articles, etc. Primary data was obtained from interview sessions and focus group discussions with respondents.

The study identified a wide range of participants, such as schools (involving school heads/principals and teachers), Ilinge Lethu community group, community leaders, religious leaders, media, tourism, small business owners, and residents within Malmesbury town. Participants were selected based on their positions, interests, rights, responsibilities, relationships and levels of influence (Reed et al., 2009; Mayers, 2005). Participants from both the municipality and public needed to fulfil the following criteria: e.g., reside in the case study area, be affected by water scarcity, and be willing to participate in the research. Participants were approached according to their availability, and their ages ranged from 18–60 years. The study had a total sample of 32 respondents. Twenty-six participants were residents and six were from the municipality.

Data collection tools involved the use of a semi-structured interview schedule, with two separate sections administered to municipal officials versus the public. Face-to-face interviews were held with some participants from the public and municipality. Two focus group discussion sessions were held in the study areas; one with municipal officials in the Communications Department and one with participants in Ilinge Lethu. Interviews and focus group discussions were recorded upon consent of the participants.

The participatory exercise, 'Story With a Gap' (SWaG) was applied in Ilinge Lethu during the focus group discussions to gather views on acceptance of recycled water. SWaG is a planning exercise with the sole purpose of demonstrating how residents as a group

can be engaged in the planning of water, sanitation and health activities (Srinivasan, 1990). The SWaG exercise depicts a 'before' scene (problem situation) and an 'after' scene (a greatly improved situation or solution to the problem) and a set of steps to be taken from problem to solution (ibid). The SWaG exercise was explained to participants and adapted in the context of water reuse, after which they gathered together to brainstorm collectively on the problem and solution scenes, and the steps to be taken from problem to solution. Participants nominated one person to write down their views on a flipchart.

Recorded interviews were transcribed and themes emerged based on the information obtained from the interviews, including patterns of meaning that repeatedly came up (Babbie and Mouton, 2001). Data from the SWaG exercise was transcribed verbatim into text. Empirical data were analysed using thematic content analysis (Braun and Clarke, 2008), which involved identification of themes and sub-themes within the data. Thematic content analysis is about finding out something that relates to the participants' views, opinions, knowledge, and everyday experiences (ibid). A validation process was undertaken (Babbie and Mouton, 2001), which involved the presentation of data to participants from the municipality and the public (who were available) for feedback. The data presented was validated by both respondent groups.

Socio-hydrological context of study area

Malmesbury is a touristic town in the Swartland municipal area, which is in the West Coast District of the Western Cape Province (see Fig. 1). The Municipality is about 50 km north of the city of Cape Town, encompassing an area of 3 700 km². It shares its borders with four municipalities, namely; The City of Cape Town (south), Drakenstein Municipality, Cape Winelands District (south-east), Berggrivier Municipality, West Coast District (north) and Saldanha Bay Municipality, West Coast District (north-west) (IDP, 2017).

The Swartland municipal area has a population of 133 762, of which 61% are younger than 34 years old (Provincial Government of the Western Cape socio-economic profile, 2016). The population is made up of 64.83% Coloured, 18.29% Black, 15.63% White, 0.51% Indian/Asian, and 0.74% other (ibid). Coverage of access to basic services is 92.8% for water supply (piped water), 98.7% for electricity, 96.2% for sanitation and 83.5% for refuse removal (IDP, 2017). The municipal area is divided into twelve wards consisting of urban settlements and the surrounding rural areas including agricultural and natural environments (ibid).

Swartland Municipality falls within the Berg-Olifants Water Management Area and receives the bulk of its potable water from the West Coast District Municipality through the Swartland and Withoogte distribution systems. Malmesbury receives potable water from Swartland Bulk System. Raw water from the Voëlvlei dam (one of the six major dams of the WCWSS, which was impaired during the drought) gravitates to the Swartland Water Treatment Works (WTW). The raw water is pumped through the Swartland WTW and the final treated water from the WTW is then further pumped into the bulk distribution network by the Gouda and Kasteelberg pump stations, located at the WTW (WSDP-IDP, 2019/2020).

The WSDP-IDP (2019/20) report indicates that the drought impacted severely on the availability of bulk water supply to Swartland Municipality, with impacts including water supply problems, shortages and deterioration of quality. The report highlights that water conservation and water demand management (WC/WDM) measures are crucial in lowering future water demand, towards ensuring water sustainability. The augmentation of the West Coast District Municipality's existing water sources, as well as the augmentation of Swartland Municipality's own water resources with groundwater is reported to be critical (ibid).

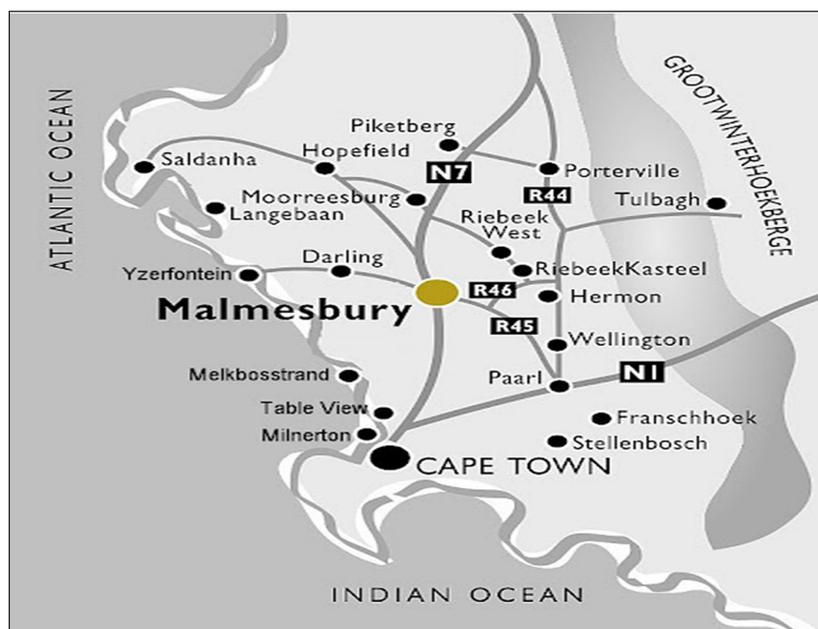


Figure 1. Map of Malmesbury (Source: Conrad, Smit, Murray, Van Gend-Muller and Seyler, 2019)

RESULTS AND DISCUSSION

Drought impacts and effects on attitudes towards water in Swartland Municipality

Several studies (Goldin et al., 2019; Crookes et al., 2018; Otieno and Ochieng, 2004) demonstrate the tremendous impacts of water scarcity caused by drought on the environment and humans globally. Crookes et al. (2018) affirm that the main impacts of drought include, among others, water supply problems, water shortages and deterioration of water quality.

The Western Cape drought impacted on different stakeholders in Malmesbury, including tourism, small businesses, agriculture, schools, communities and neighbourhoods, in terms of reduced tourism opportunities, low agricultural yields with resultant loss of jobs, dry school fields and reduced household water usage. Water restrictions implied a drastic adjustment in the ways in which people used water, and most people expressed difficulties with coping through these restrictions. Approaches to mitigate the drought were implemented and the municipality embraced a three-pronged adaptations measure – technical, financial and social approaches. Each of these approaches were useful in pushing ‘Day Zero’ forward.

The technical approach looked at four strategies, which included pressure management, flow management, booster pump stations to boost the pressure in the system, and mobile pumps at the Voëlvllei Dam to boost raw water supply. The financial approach involved increasing water tariffs and a fine of 2 000 ZAR to users who were not compliant with water restrictions. Daily water restrictions were set at 50 L per person per day (derived from the City of Cape Town’s water restrictions). However, cases of exemption after applying for more litres were possible based on certain criteria.

The social approach involved a robust public awareness campaign which resulted in a great amount of water being saved. During the drought, posters, inter alia, were distributed to churches, schools and businesses. A drop in consumption rates was a principal indicator to assess the success of the social approach. Cooperation at the interface between the service provider and end-users mitigated the effects of the drought. Aside from the social approach, having technical skills was equally of major importance in averting the effects of the drought. Media, in cooperation with

information from the service provider, played an important role in communicating information about the drought crisis, with the emphasis on saving water. Other hybrid roles involved the works of community leaders as well as religious leaders in educating the community about the need to save water.

The ‘Day Zero’ scenario and the obvious need to save water through water restrictions triggered people to be frugal with water. Knowledge of personal consumption rates was generally limited but the drought enabled people to take stock on their water consumption levels, and devise creative ways of saving water. For some respondents the drought did not change their attitudes in the ways in which they value water; rather it amplified their water thrift, because it was a norm to save water when growing up in water-scarce regions of the country.

Municipal views on recycled water in Swartland Municipality

In an interview with a municipal official at the technical division in the Swartland Municipality, it was noted that the municipality is currently not considering the implementation of a water reuse scheme but there is a possibility of thinking towards that direction. With the onset of the rainy season, the municipality considers that a water reuse scheme is not a priority at the moment. Strategies set out for water augmentation and the fact that people are still saving water post-drought supports this view.

Nonetheless, the decision for a water reuse scheme is reported to be dependent on the decisions around the implementation of water augmentation schemes currently planned. The Municipality has a membrane wastewater treatment works (WWTW), with the current water quality reported as good, which would require a minor additional step to reclaim the water completely for potable purposes and distribute it equitably to the whole town. The municipality perceives no obstruction, politically or administratively, within the municipality with regard to water reuse for potable use, except for a likelihood of financial constraints.

Municipal officials in the Communications Department, unanimously agreed that the municipality has a good communications strategy and asserted that public engagement is regarded as important when planning for a water reuse scheme, regardless of technical and financial feasibility. They noted that

the way in which the municipality handled the drought crisis has cemented the relationship between the municipality and the public and they perceive that the acceptance of a water reuse project would be easier because the public trust them.

Factors influencing public perceptions of recycled water

Affective reactions

Affective (emotional) reactions are tied to the source of recycled water and are associated with the 'yuck' or disgust factor, which is a key concern that is likely to lead to the rejection of or resistance toward recycled water for potable purposes. The 'yuck factor' – a term used to describe the visceral reaction of dread or disgust – is a long-recognised influence on public reactions to water reuse schemes (Rozin and Fallon, 1987; Dishman et al., 1989; Po et al., 2003). The 'yuck factor' was expressed through body language and verbally by most respondents in the Ilinge Lethu semi-formal settlement in Malmesbury and a few respondents in Malmesbury town, who found the idea of recycled water to be scary and disgusting, with accompanying unwillingness to drink recycled water. A study by Wilson and Pfaff (2008) and the Basic Assessment Report by Golder Associates Africa (2012) also showed that the emotional response of 'yuck' was one of the key concerns that emerged around the introduction of the direct potable reuse (DPR) scheme in eThekweni, South Africa. According to a study by Hamilton and Greenfield (1991 cited in Po et al., 2003), the psychological rejection of reclaimed water as filthy and unclean was the reason that the majority of respondents totally rejected the reuse scheme. The effect of this affective reaction is the inability to divorce the final product (clean water) from its contaminated source (human excreta), despite the fact that, scientifically, no trace of the original contagion exists (Smith et al., 2018).

Unwillingness to know about the source of a reuse scheme was expressed by some respondents (both men and women) in Ilinge Lethu, who expressed the 'yuck factor'. The narrative "...that could be proper for the municipality to keep the information for themselves because yeah the thought is the one that is killing us..." resonates with a similar expression with residents from the Zwelile informal settlement in Overstrand Municipality where some respondents preferred not to know much about the source of recycled water, so as to ward off the 'yuck factor' (Owen, 2017).

A few respondents in the Ilinge Lethu community focus group who expressed no real concerns about water reuse – those who likened their experiences of drinking water directly from the river downstream in their community of origin in the Eastern Cape, with awareness of cow dung and even human excrement – believed a water recycling process is an added advantage for cleaning water and all they will be left to do is to boil their water. This narrative had other participants (most of them originating from the rural areas in the Eastern Cape) in the focus group discussion nod in agreement as well as voice out their shift of perceptions to more positive responses. As Rice et al. (2016) note, though the awareness of the real occurrence of de facto (or unplanned) reuse is generally low, there is a greater likelihood of acceptance for potable reuse scenarios with those who are aware that de facto reuse occurs in their supply area.

As mentioned in the preceding extract, boiling of water as an additional step before drinking appeals to some community members. This is likened to participants in the Melbourne Water (1998) focus group in Australia cited in Po et al. (2003) who still showed a preference for bottled water and passing their water through a filter despite their acceptance of recycled water. According to Po et al. (2003), this means that even though water is treated to the highest possible standards, people may still perceive it to be disgusting.

Trust and risk perceptions

Perceptions of risk (health risk in particular) associated with the use of recycled water have long been regarded as a significant factor in shaping public responses (Sydney Water, 2002; Hartley, 2006). The nexus between trust in municipal competencies and risk perceptions is a recurrent theme for most public respondents in Malmesbury. A number of studies (e.g., Mankad and Walton, 2015; Owen, 2017) have found that trust is actually one of the most important factors in assuring the acceptance of water reuse. Malmesbury respondents who expressed trust in municipal competencies in the provision of safe drinking water were nevertheless firm in their response about regular monitoring of the scheme, having regular tests done in a laboratory and, in particular, publishing water quality results to build continuous trust.

The current state of drinking water has garnered approval from most public respondents in Malmesbury, hence their sense of linking such expertise to the success of a water reuse scheme. While this may be so, the Ilinge Lethu focus group feel their drinking water is unsafe, with complaints put forward as "the water tastes like excess bleach and causes stomach problems."

Another water quality concern reported by the community focus group is a "green substance" coming out of the taps inside some households whilst the taps outside these households are void of these 'green substances'. This heightens water reuse fears as they perceive municipal incompetence in providing good quality potable water from the dams let alone providing good quality water from sewage. These 'green substances' are reported by the municipality to be caused by direct contact of sunlight with water in the pipes, causing the formation of algae. Other respondents from this community believe that the taste in the water is chlorine, which according to them does not affect the safety of their potable water. Public respondents who expressed concerns about the use of recycled water also consider a possibility of human error at the level of the technological process, and express fear of health risks as a result.

The study shows that risk perceptions underpin a social representation of water reuse, which is a way in which it is perceived in the public domain and which differs significantly from a scientific understanding. Slovic (1998 cited in Po et al., 2003) notes that the public tends to capture a broader concept of risk, including attributes such as uncertainty, dread, catastrophic potential, etc., into their risk equation. On the other hand, experts define risk in terms of event probabilities and treat subjective factors as accidental dimensions of risk (Po et al., 2003). Experts consider a one-in-a-million risk of getting sick as acceptable, whereas this could be totally unacceptable to the public as that one case could be close to home (ibid).

Experience of critical water shortage

In areas experiencing drought and low water storage levels, acceptance of recycled water may be buttressed by a sense of unavoidability or the belief that it can be a solution to water scarcity issues (Leong, 2015). Earlier studies have shown that the choice for recycled water as a result of critical water shortages is an important determinant of public acceptance of reclaimed water (Dishman et al., 1989; Po et al., 2003; Hartley, 2006; Dolnicar et al., 2011; Garcia-Cuerva et al., 2016). These studies find that awareness or experiences with real water scarcity situations, accompanied by water restrictions, is likely to increase respondents' likelihood of accepting recycled water (ibid). However, real cases have shown that experiencing vulnerabilities in water resources is not in itself sufficient to garner support for the reuse scheme. An example is the town of Toowoomba in Australia, where public opposition (strongly driven by opposition groups) to water reuse had arisen at the core of a well-publicised drought (Hurlimann and Dolnicar, 2010).

The choice of recycled water is perceived differently amongst Malmesbury public respondents. A few public respondents in Malmesbury, although acknowledging their experiences with the drought crisis, perceive water reuse as unnecessary because they perceive water issues will be minimal if water resources can be managed properly. They assert that behavioural patterns towards water will have to change, and that saving more water would not necessitate a water reuse scheme. Among the few who find recycled water unnecessary, some however shifted their perceptions as they considered the need for water sustainability to cater for growing populations and increasing economic activities. Most respondents in Malmesbury, apart from viewing the benefits of recycled water in averting water scarcity caused by climate change, also consider its environmental benefits in contributing towards having healthier communities.

However, as Smith et al. (2018) argue, giving prominence to water supply problems when presenting water reuse schemes as a solution to these presents its own dilemma – if the problem disappears, so too might the support of the scheme. With the onset of the rainy season and with water restrictions lifted, Malmesbury respondents who were concerned about the safety of a reuse scheme noted, however, that given the uncertainty of climatic conditions, they would have no choice but to accept a reuse scheme if it provides water security, because they dread reliving experiences from the recent drought.

Equity concerns

Within the South African context, equity concerns are entrenched as a result of historic racial injustices. A study by Owen (2017) demonstrated that concerns regarding equity in water reuse schemes were typical for all three case study sites; Beaufort West, Overstrand and eThekweni Municipalities. The perception that ‘white/affluent’ communities are better serviced with good quality drinking water opposed to ‘black/poor’ communities deepens trust issues. In Malmesbury, residents are confident that drinking water is from same source, except those in Ilinge Lethu community who are concerned about their water quality. Acceptance of the reuse scheme is possible with public respondents in Malmesbury, with the majority being from the Ilinge Lethu community, if it is rolled out for all residents in Malmesbury. This indicates that equity in the distribution of recycled water within the town increases the likelihood for acceptance of the reuse scheme.

Different uses of recycled water

Studies (e.g., Alhumoud and Madzikanda, 2010; Owen, 2017) have shown that people are generally adamant about not using recycled water for drinking or for cooking purposes. Similarly, Ilinge Lethu focus group respondents express the choice of using recycled water for gardening and washing as opposed to drinking and cooking. The source of recycled water and safety concerns drive these preferences. Other respondents indicated that they would use recycled water even for drinking because of lack of choice while faced with water scarcity, but express that they will have to face the disgust or ‘yuck factor’ at all times. The choice of buying bottled water appealed to some community members because they would not be comfortable drinking recycled water, but also admit that money would be a limiting factor.

Pricing concerns

Studies have found that perceptions of tariffs influence public decisions around water reuse (Po et al., 2003; Mark et al., 2002). In the Malmesbury case study, introduction of recycled water is perceived by different public respondents to result in tariffs either increasing (because of perceived infrastructural costs), decreasing, or not fluctuating from current tariffs. Those who expect tariffs to

be lower say so because it is recycled water from domestic waste, which they consider to be a less desirable source. This is in line with Marks et al.’s (2002) study which reveals that the majority of people expected to pay less because of perceived low water quality. The authors found that some residents believed that the lower price was a necessary incentive to encourage acceptance of reclaimed water (ibid). There was an overarching sense amongst Malmesbury respondents that low tariffs – although seen as a benefit – are not a prime factor for acceptance, as other factors such as the ‘yuck factor’ and safety concerns related to health are dominant amongst those who express these concerns. This resonates with Owen’s (2017) study where it was shown that reduced tariffs were not perceived as an incentive for acceptance.

Addressing public perceptions

Effective public engagement

Various authors (Smith et al., 2018; Owen, 2017; Russell and Hampton, 2006) aver that there are opportunities at the interface between the municipality and its counterparts, to be harnessed into real workable solutions, when viewed through a socio-technical lens, and towards acceptance of recycled water. The Swartland Municipality claims the process of communicating reuse plans should begin with engaging with the public through an extensive round of public participation, and informing them of the municipality’s intentions and reasons for a water reuse plan. Owen (2017) suggests that officials should provide the public with tangible and visual evidence of water scarcity during a public engagement process. The Malmesbury case study shows that public respondents are inclined to need more visual adverts on the effects of water scarcity and the rationale for recycled water.

Studies, reports and articles (e.g., Po et al., 2003; Chen et al., 2015) have shown that the media, both print and radio, has an influence in shaping public perceptions in any domain, and that in terms of water reuse plays a crucial role in determining public responses to recycled water. A respondent from a local newspaper in Malmesbury opines that the idea of a water reuse scheme would be “great” but is not something which should be communicated lightly considering the source of the water. Balanced media reporting is likely to influence people’s likelihood of accepting recycled water. As Owen (2017) notes, whatever role the media is to play regarding diffusion of information around the scheme, their role should not replace consultation processes where the public is given an opportunity to learn about recycled water, and where their fears around safety issues can be addressed through meaningful engagement with experts, thereby building confidence in the reuse scheme.

Public engagement in decision-making processes is perceived as crucial amongst Malmesbury public respondents. Scholars (Jaspers, 2001; GWP, 2000; Warner, 2006; Sultana, 2011; Tortajada and Joshi, 2013; Morales and Harris, 2014; 2030 Water Resources Group, 2016) affirm that public participation in the water sector plays a pivotal role in the promotion and sustainable management of water resources. Importance has been placed on public participation to achieve optimal social outcomes in decision-making (Morales and Harris, 2014; Lockie and Rockloff, 2005). Hartley (2006) posits that public perceptions in wastewater recycling can only be improved if there is commitment and willingness of the service provider to engage in public participation, which is an element of trust building.

Within the Swartland Municipality, dialogues with regard to public engagement are expected to commence with municipal officials acting at the interface between the municipality and the public (ward councillors), where they will be educated on the water reuse process. Municipal officials in the Communications

Department perceived that buy-in from councillors will result in public buy-in to the reuse scheme. The role of the ward councillor for the Ilinge Lethu community is no doubt acknowledged by community members, but they prefer experts such as engineers and health practitioners to introduce the scheme during public meetings, where they would have access to experts' views on safety concerns. Being informed on all phases of a project is said to build confidence in the scheme. A collective agreement among public respondents in Malmesbury and participants in the community focus group was on the need for public meetings prior to the implementation of a reuse scheme. Informing the public about earlier and current case studies where water reuse has been implemented is perceived by respondents as important as they do not want to be an experimental case.

Starting dialogues about a recycling project earlier appeals to some residents due to uncertainty in climatic conditions. In some instances, upgrading to recycled water is perceived as long overdue because of water scarcity, and some respondents urged the municipality to act sooner rather than later, even with the recent rains, so that people can adjust their attitudes around recycled water timeously. Owen (2017) suggests that information about water scarcity and risk management should generally be communicated to the public before a crisis arises, and through ongoing engagements, and that it is then likely that doubts about the water reuse scheme may be averted. Different informative platforms on recycled water have been suggested by respondents: transport places, community meetings, TV adverts, churches, classrooms and other public spaces.

Non-conventional projects such as water reuse schemes require hybrid approaches to harness other role-players, such as community herdsmen, religious leaders (Owen, 2017; 2020) and businessmen, in advancing the scheme. Gaining trust from the community is perceived by public respondents themselves to be a difficult task, but they note that continuous engagement and education around the reuse project is likely to build people's trust in recycled water. Municipal leadership is perceived by public respondents as instrumental in driving "doubted programmes" such as recycled water and is a recurring theme highlighted as fundamental amongst residents and municipal officials.

Safety assurance from experts

Public respondents in Swartland Municipality emphasise the publication of water quality results to gain trust in water reuse, and this should form part of the agenda for public meetings about the water reuse scheme. Different avenues and tools suggested as to where results should be published include: municipal website, municipal Facebook page, municipal newsletters, municipal notice boards, municipal bulk SMS, pamphlets, clinics, libraries, radio (as an effective and immediate way of communicating) and the weekly newspaper. Participants in the Ilinge Lethu focus group expressed the same views in being informed about water quality results using different platforms. Using the SWaG exercise, the starting point is 'lack knowledge about recycled water' and the end point is 'to be well informed about recycled water'. The steps from problem to solution proposed are: (i) to know how the water will be made clean; (ii) to know on time about the water quality; (iii) to know the percentage of chemicals that will be used and how harmful they are; (iv) for the community to be educated on the topic of recycled water; (v) for each household to be provided with a pH tester to ensure safe water quality; and (vi) education on recycled water and information on the water quality in particular should be communicated through workshops, pamphlets, and advertised on television, municipal letters and social media like Facebook.

Data from the SWaG exercise amplifies the importance of water quality results being made known to the public, and more

importantly, providing the assurance of safe water quality. This highlights further the importance of public engagement that is inclusive in influencing public acceptance in recycled water.

Monitoring for safety in the water quality is a post-implementation strategy, and the Swartland Municipality acknowledges that water quality results should be made public. Municipal officials suggest another round of public engagement after implementation of a water reuse project, and to keep informing the public about water quality results in a language which can be interpreted through the aforementioned avenues.

CONCLUSION

This paper has posited that the recycling of wastewater for potable use is considered as an alternative to the problem of water scarcity in South Africa and should be regarded as one of the mechanisms in a circular economy to ensure the sustainable provision of water to humans while maintaining healthy aquatic ecosystems, given that water – though renewable – is a finite resource.

We have argued that different perceptions around a water reuse scheme which have arisen in the study are not uncommon, as shown by other studies. The Malmesbury case study is a hypothetical scenario but with potential for becoming an actual experimental case given the likelihood of the implementation of a water reuse scheme in the area. The Malmesbury case study has shown that residents are interested and are willing to participate in discussions pertaining to water reuse.

Further, this study has focused on one of the major drivers for the adoption of a water reuse scheme, the recent Western Cape drought, and investigating residents' perception of recycled water from a point of lived experiences of water scarcity. We show that although the drought is a potential driver for acceptance of recycled water, it is not in itself sufficient to secure acceptance of a water reuse scheme. There is therefore an inclination to rather introduce a water reuse scheme as a means to ensuring sustainability of water resources to meet up with increased future water demand in a predominantly touristic town.

Equity dynamics in the social fabric of the end-users, (see extracts above) largely shapes perceptions around trust, and consideration for introducing the scheme should proceed by first targeting affluent communities – with their acceptance, there is an increased possibility for acceptance by poorer communities. It inevitably makes a huge difference when dignity is reinforced, and particularly so in a previously unfair social landscape. Effective public engagement is necessary as it presents opportunities to address public perceptions, which are likely to shift people's views in a way that recycled water is not perceived as a threat but rather a solution to ensure water sustainability.

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