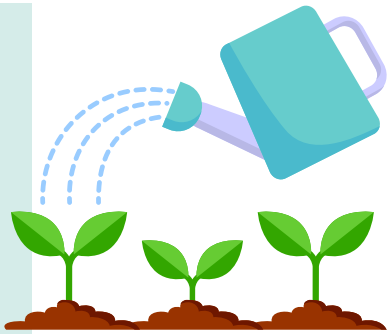
KEY INSIGHTS INTO HOUSEHOLD GROUNDWATER USE

We interviewed 32 residents across Cape Town who all use groundwater from a wellpoint or borehole, and conducted a more in-depth follow-up interview with half of these. Here's what we found:

'DAY ZERO' CHANGED HOW PEOPLE VIEW AND USE WATER

Almost all respondents tried out or adopted new water supply sources and water use habits. This was driven both by a desire to avoid increased cost, to maintain gardens, and to minimise burden on municipal supply in a time of crisis. Many of the water saving behaviours have been abandoned since the crisis ended, but new sources like rainwater and groundwater remain popular.



GROUNDWATER PROVIDES SECURITY, BUT ALSO BIG "UNKNOWNS"

Through wellpoints and boreholes, most respondents have access to more water than they need. However, a majority have concerns about the spread of groundwater use and feel like they don't have enough knowledge. Only one person interviewed has gone completely off-grid, so in general groundwater is supplementing, rather than replacing, municipal supply.

GROUNDWATER USERS WANT TO BE RESPONSIBLE

Most respondents mention that using groundwater means that they alleviate pressure on the municipal supply which was under threat during the Day Zero drought. Several talked about wanting to leave more of that water available for those who do not have the privilege of a wellpoint or borehole, and some were also willing to share their water with others who might need it in a drought.

NEED TO MANAGE GROUNDWATER SUSTAINABLY, BUT HOW?

People have different views of who owns or is responsible for the sustainability of groundwater. More than half are willing to share information about their groundwater usage, but many are worried that a government that has access to it might try to restrict how residents use it. Many see a need for an authority to monitor, but mistrust the ability of current South African government actors.

ABOUT THIS STUDY

There is a lack of knowledge about how Capetonians use groundwater and how they think the resource should be managed. Even finding people to talk to is a big challenge, since there is no public record of who owns wellpoints or boreholes. For this study we relied largely on referrals from one interviewee to the next, and to some extent from participants in previous studies. Half of the 32 interviewees were interviewed a second time, which enabled us to reflect on previous answers and explore some topics more in-depth.

RESPONDING TO A WATER CRISIS

All interviewees were familiar with the 'Day Zero' water crisis. Of the 27 who knew when their borehole or wellpoint was installed, most said it was after 2015 when the drought started (Figure 1). Most interviewees spoke of the drought as an important event in terms of awareness: people's water supply was rarely impacted, but they reduced their *consumption* (10 of 16).

> *We had a timer in the bathroom of like a minute so people could shower, and our shower was over our bath. So then we would keep that water and flush the toilets with that. … But we did use our washing machine, because we'd actually measured how much water came out and it was like 12 litres, which was the same as washing up in a basin. So we carried on using our dishwasher at that time. And then we didn't water our garden anymore. (Interviewee 30)*

Many respondents also harvested rainwater (8 of 16) or collected greywater to flush toilets or irrigate gardens during the crisis (10 of 16), though only a few have kept reusing greywater since the crisis ended (3 of 16). By contrast, rainwater harvesting or groundwater use were not abandoned.

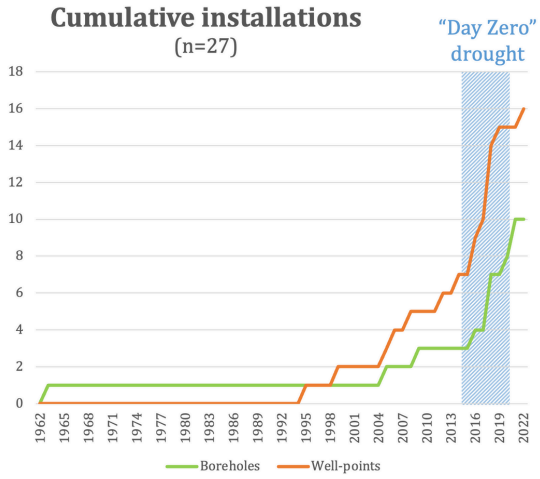


Figure 1. Most respondents started using groundwater during or after the 2015-2018 drought.

VIEWS ON GROUNDWATER AND WATER SECURITY

Almost all use groundwater primarily for irrigating their gardens (31 of 32), and continue to rely on the municipal supply for various other needs (30 of 32) (Figure 2). Gardening and cost-saving are the most important drivers for installing boreholes/wellpoints and stated benefits of having access to groundwater, followed by water security in third place.

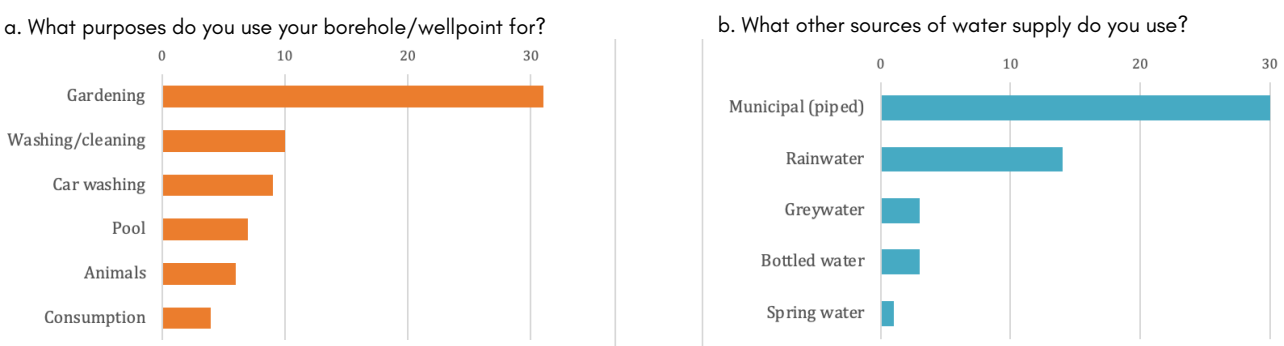


Figure 2. How and why people use groundwater, alongside other water sources.

In follow-up interviews, respondents explained that they find it unnecessary to use treated, potable water for gardening (7 of 16). All but one interviewee still uses municipal water, and only two respondents drink their groundwater. In other words, groundwater does not replace municipal water, but offsets some of their uses (mainly outdoor uses in summer months), providing a way for households to diversify their supply and be more resilient to future droughts.

> *It's not currently top of my mind to be off the grid with water. I am pretty happy with the municipal supply of water, the quality of it, and the availability of it. It's really just a matter of having some resilience to be able to deal with situations, because we will get another drought and I'd like to not be subject to that. (Interviewee 12)*

Wellpoints and boreholes give most respondents access to more water than they can use, and supply issues are rare (Figure 3). Despite this, most respondents have concerns about the growing popularity of using groundwater in Cape Town, and feel like they do not have enough knowledge about the groundwater that they are using (18 of 32). In follow-up interviews, many saw wellpoints/boreholes as potential threats to a shared resource (7 of 16) and reiterated the importance of not wasting groundwater (5 of 16), with only a handful seeming confident that groundwater itself will not run out (3 of 16).

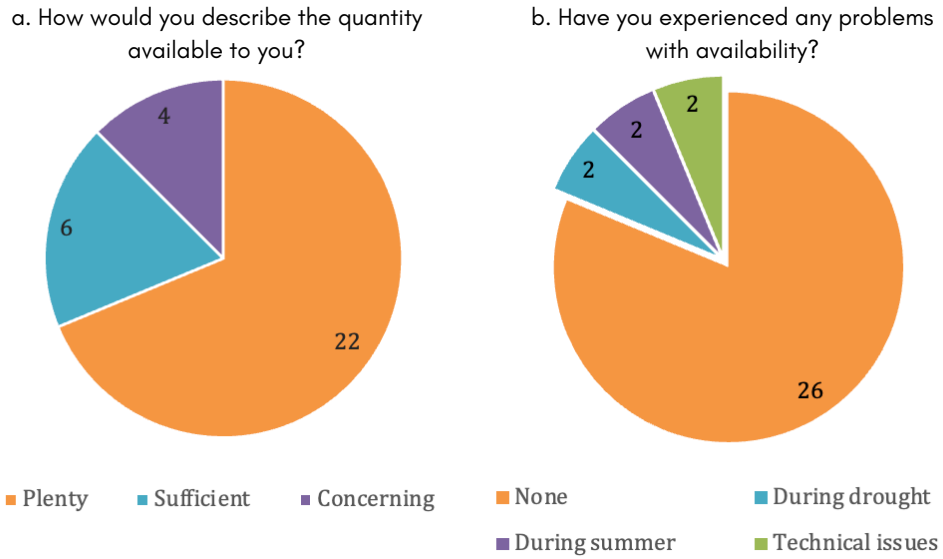


Figure 3. Interviewee's views on water availability.

Costs for putting in a wellpoint or borehole vary considerably, from ZAR 1,500 to ZAR 500,000. Most respondents (29 of 32) felt that this was money well-spent, and no one described it as costly to run their wellpoint/borehole.

However, whether the investment actually saves them money compared to municipal supply seems to depend on the size of one's garden and how much water is required to sustain it. One respondent with a 680 m2 property (below the median of 880 m2) said:

> *I've spent quite a lot of money doing this and yeah, there's no way I'm ever going to get my money back, forget about my labour or anything. There's no ways I'm gonna, I mean, how long does it take to get 25,000 rands worth of water out? (13)*

Barely half (15 of 32) of all households could tell us how much water they used, with estimates ranging from 40 to 35,000 litres per week, though almost all (29 of 32) use more groundwater during the dry summer months. Half of respondents have tanks to store groundwater (sometimes also used for rainwater), capacity ranging from 566 to 30 000 litres. Six respondents had participated in sharing groundwater with neighbours: three only in the past and three through regular transfers according to written or verbal agreements.

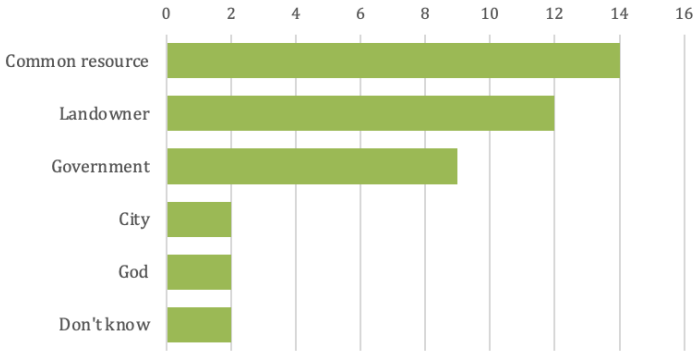
IMPACTS ON AND RESPONSIBILITIES FOR COLLECTIVE WATER RESILIENCE

Several interviewees expressed concern about future droughts in Cape Town (6 of 16). Most of our interviewees (10 of 16) think that households using groundwater helps to alleviate this threat by reducing demand for municipal water. A few even describe it as a civic duty.

The predominant view is that groundwater is a common resource, that the City of Cape Town is responsible for (Figure 4). Some instead place ownership and responsibility on the landowners, or see it as shared between several actors with users more directly responsible, and the government as responsible for "overseeing" and "monitoring" what users do.

> *It's just like a kind of citizenship consciousness of [...] not expecting the City of Cape Town to do it all. But saying, look we can do something because we maybe belong to a certain wealth bracket, and therefore we can afford to do that. So I think that's to me the role that we have to play if we can. And I don't think all communities and all people and all households can put boreholes down, it's way beyond the cost. (12)*

a. Who 'owns' the groundwater in Cape Town



b. Who is responsible for the sustainability of groundwater?

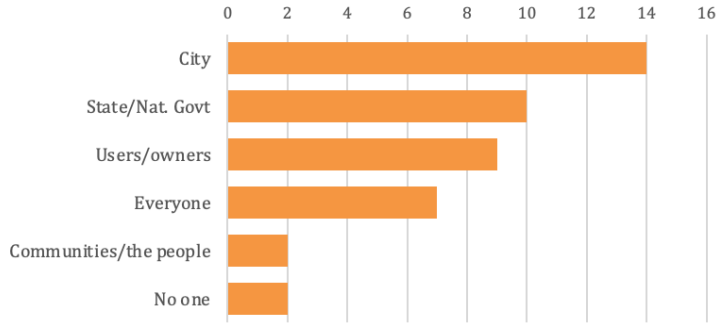


Figure 4. Views of ownership of and responsibility for groundwater vary among Stage 1 respondents.

However, the relationship between households and authorities is complicated. Out of 32 respondents, 12 had a wellpoint/borehole that was not registered with the City, 7 did not know the status of theirs, and 13 had registered theirs, although several complained about not hearing back after submitting the paperwork. Most follow-up interviewees said they would share data from their borehole/wellpoint to help monitor usage and/or groundwater levels (9 of 16). However, several worry that the government will try to control groundwater use (6 of 16) and would want to know what the information would be used for (5 of 16).

> *The problem is that everybody's scared. As soon as you start to register ... they're going to come up with a tax on it, or yeah. It's another scheme. (13)*

ACKNOWLEDGEMENTS AND NEXT STEPS

This study is part of the Water Stressed Cities project, a collaboration between the University of Cape Town and Cardiff University, funded by the Government of the United Kingdom through UK Research and Innovation (Grant number MR/X022943/1). This brief was prepared by Johan Enqvist. Thanks to those who participated in this study for helping to build up a picture of how groundwater is used and perceived in Cape Town. The project team is currently conducting a second round of interviews, with a focus on extending the spatial coverage and diversity of respondents. If you use groundwater at home, or know someone who does that might interested in participating, please email anna.taylor@uct.ac.za