

URBAN WATER USE

Busting myths around urban household water use in South Africa

As large parts of South Africa fight the grip of the current drought it is prudent to reflect on water use in the country's large cities and what could be driving people's water use behaviour. Article by Richard Meissner, Inga Jacobs-Mata and Miriam Murambadoro of the CSIR.



Human behaviour is one of the main forces in the utilisation of natural resources. Nowhere has the way people use water been more illustrative than in the current drought-ravaged Cape Town where calls for more prudent water behaviour has led to the avoidance of the dreaded 'Day Zero', a scenario where the water network would be turned off to 75% of the City and residents would have to collect water from distribution points. This article explores some myths and how these could constitute human behaviour around household water use.

Myth 1: Overflowing dams mean the drought is over
South Africa's frequent droughts have, over the years, played

their part in the way the country manages and conserves water resources. Droughts have been one of the driving forces behind the South African government's water infrastructure programmes aimed at augmenting the country's water resources or to convey water from where it is in abundance to where it is needed (i.e. through water transfer schemes). Large dams have been central to many of these programmes, for example, the Gariiep, Vaal, Loskop, Theewaterskloof and Inanda dams. When our large dams start running dry, and pictures of partially filled dams flash across our television screens, realisation dawns that water is in short supply.

With the current water crisis in the Western Cape we are constantly reminded by the media that the dams supplying water are at critically low levels. The Theewaterskloof Dam has been a predominant feature in these articles. This dam is the largest contributor to Cape Town's water. Pictures of large, almost empty, dams are synonymous with drought and water restrictions.

Conversely, images of dams overflowing are often linked with a sense of water abundance. When the Vaal Dam, South Africa's fourth-largest dam, overflows the picture thereof are captured by the media and beamed across the country. While the public view these pictures, other parts of South Africa remain in the grip of a severe drought.

This was the case at the beginning of 2017, when good rains fell across the Vaal River system. Water flowing into the Vaal Dam increased its level from 26% to more than 100%. This necessitated the Department of Water and Sanitation (DWS) to open some of the dam's 60 sluice gates. Seeing the water flowing from such a large dam could create a sense that the drought is over.

Shortly after the Vaal Dam's sluices were opened, in March 2017, the DWS lifted Gauteng's water restrictions. At the same time, the department asked people not to waste water since the country was still experiencing drought conditions, reflecting a paradox between water's perceived abundance in one area and another region's water scarcity. Calls like these from DWS indicate the role of people's behaviour in water consumption rates.

In an environment driven by constant climate variability overflowing dams are temporary at best. In an environment oscillating between water scarcity and abundance, people's behaviour need to change from a sense that although we have dams to see us through droughts, we cannot continue to use water the way we do. There are no constants, like overflowing dams. The only constant would appear to be that images of overflowing dams drive us towards old water use habits, which are generally wasteful and less mindful of a future looming drought.

Myth 2: Resorting to old water use habits when it rains

A drought is a slow onset disaster with cumulative social, economic and ecological impacts over space and time. For the majority of water users, good rainfall ushers in the end of a drought. However, it is important to emphasise that drought is not necessarily the absence of rain but any deficit from the normal rainfall that occurs months or years. According to the South African Weather Service, a deficit of merely 20% of rain from the norm can result in crop failure and water shortages. A 25% decline in rainfall affects the recharging of surface and groundwater resources. The difference between a 'dry spell' and a longer term catastrophic situation could be a mere 5% less rain.

For the City of Cape Town, officials have indicated that "it will take at least three consecutive winters of above-average rainfall to make a real difference to the availability of surface water". Thus one good rainfall season in the drought-stricken Western Cape

would not equate to the drought being over.

Myth 3: We have plenty of water – we just need more water-supply infrastructure

While there are very few people who still believe South Africa to be water abundant, there is still a continuous debate about whether or not supply-driven approaches such as water augmentation programmes will necessarily solve the problem of water scarcity. The DWS and the City of Cape Town recently published a *Water Outlook for 2018* report. This report summarises the City's stance of augmentation, which includes options such as expansion of groundwater, water reuse, desalination. These measures will not only address the water crisis in the short term, but also make a longer term contribution to Cape Town's water supply.

The City of Cape Town has implemented a diversified augmentation plan to see it through to June 2022, but due to the expense of alternative supply options the projects have only progressed to pilot stage. Table 1 outlines the City's augmentation plans, which together will add 295 ML/day to Cape Town's water supply.

Envisaged projects	Volume of water (ML/day)
Short-term and temporary desalination	16
Groundwater abstraction	150
Spring water abstraction	4
Water reuse	125
Total	295

Source: *Water Outlook Report*

According to the Water Outlook report, non-surface water augmentation schemes are a much more expensive source of water compared to rain-fed dams. Even under very poor rainfall conditions such as that experienced in 2017, the volume of water added to the dams was the equivalent of around 720 ML/day. Cape Town will thus, for the near future, remain reliant on its rainfall-fed dams, and thus remains vulnerable to drought. Cities around the country have similar challenges.

Myth 4: As long as I pay I can use as much as I like

According to DWS, the average water tariff for bulk water is R3.84 per cubic metre. This tariff varies widely from R2.78 to R7.26 per cubic metre. This variation is subject to the availability of water, the distance of distribution and the quality of the raw water needing purification. At local government level, the household water tariff differs from municipality to municipality. Table 2 presents three municipalities' water tariffs. This paints a picture of how much residents living in these large metropolitan areas paid for water in 2017/18.

Looking at this table could provide one with the sense that as long as a resident pays for water, and the more he/she pays for the resource, the more water that person can use. This is, however, not the case. The tariff escalates as water consumption increases in a bid to curb excessive water consumption at household level.

Municipality	Volume of water (kl) consumed at household level per month	Tariff Rand/ kilolitre
City of Ekurhuleni	0-6	R0
	7-15	R14.89
	16-30	R18.24
	31-45	R22.69
	46 or more	27.98
eThekweni Metropolitan Municipality	0-6	R16.20 (property rateable values greater than R250 000)
	6-25	R19.14
	16-30	R25.48
	25-30	R39.31
	30-45	R43.24
	45 or more	
City of Johannesburg	0-6	R7.14
	6-10	R7.58
	10-15	R13.17
	15-20	R19.63
	20-30	R26.96
	30-40	R29.22
	40-50	R37.11
	More than 50	R38.72

The availability of water is an important consideration for local authorities. Municipalities can, if forced, introduce a 'punitive tariff' in a bid to compel residents to consume less water. For instance, the City of Cape Town planned to introduce a so-called "drought tariff". Under this tariff the use of 6 kl/month would have increased from R28.44 to R145.98 of the total household water bill. The City Council did not introduce the new tariff after it received thousands of comments against the new tariff's introduction.

The ethical question here is, if a person is wealthy enough to use as much water as he or she can pay for, is it fair for that person to actually do so? We say no, because all human beings and other biological organisms require water for survival. Having more money or no money at all does not doom one's survival, but having no water does.

Myth 5: We save water by using borehole water

Finally, there is the misconception that by using borehole water saves water because it is not generally treated. This perception has been compounded in the past by some municipalities that have promoted the use of borehole water as an alternative to the conventional municipal supply during times of moderate water restrictions.

This has been done in an effort to alleviate the pressure on municipalities to provide sustainable and quality municipal services to all residents within their jurisdictions. The use

of boreholes to supplement, or replace, the conventional municipal supply is becoming more common, especially in new developments outside of traditional city limits. This has, however, led to unrestricted drilling of boreholes in some areas, the use of which is often difficult to manage by local authorities.

While it is not easy to control how much water people extract from their boreholes, groundwater still needs to be used responsibly. Moreover, the unfettered use of this underground resource is often not sustainable given the inextricable linkages between groundwater and surface water. It was found that in 2017 many borehole users in Cape Town were irrigating their gardens after 09:00 despite the Level 3B restrictions enforced at the time. Under the current Level 6B restrictions outdoor use of borehole water is strongly discouraged.

The misperception about the use of groundwater may have originated from the old Water Act of 1956, which drew a clear distinction between public and private water. Under the old Water Act, water from a borehole would ordinarily have been considered as privately-owned water and its use therefore largely restricted. According to the National Water Act of 1998, however, the state is the custodian of all water resources, regardless of its origin, and holds it in trust for the nation and allocates user rights.

Under the 1998 Act, water use for specified purposes is subject to certain thresholds, beyond which a licence must be obtained. Groundwater for domestic use is considered a Schedule 1 use, and therefore requires no water use licence. However, some municipalities have bylaws requiring the registration of boreholes.

These are some of the myths driving people's behaviour when they consciously and unconsciously consume water. Water engineered infrastructure, paying for water, and using borehole water does not equate a right to waste water. These resources only provide us with an assurance of supply.

Droughts are the only constant that influence this assurance of supply. By taking variability and change into consideration, another variable that could positively influence an assurance of supply would be changing human behaviour towards using water sparingly.



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An image of a spilling dam can be construed as a sign that water is available in abundance