

## **Cape Town is about to run out of water – how did this happen?**

[By Michael Le Page, \*New Scientist\*, Feb 14, 2018](#)

As I fly south towards Cape Town, I pass over hundreds of kilometres of parched land, with not a speck of green in sight. Closer to the city, green fields start to appear and the city itself is full of lush parks and gardens. If it wasn't for the massive posters at the airport, you wouldn't know that this is a city about to run out of water.

In fact, the situation is so bad that, on 1 February, residents were told to use no more than 50 litres a day per person. If the rains don't refill the city's reservoirs, the taps will be shut off in May: Day Zero.

Cape Town's problems are partly down to bad luck. Rainfall in the area, which the city relies on for its water, is highly variable and the past three years have been among the driest on record. Climate change might have made this more likely, but no one knows for sure (see below: 'Is climate change to blame?').

The underlying cause, however, is simple: in several parts of South Africa, the supply of water hasn't increased in line with growing demand. It has been clear since at least 2002 that, if nothing was done to increase supply, there would be massive water shortfalls. Cape Town was going to run out of water sooner or later; the drought has just made it sooner. While politicians may be happy to blame climate change, the dire situation is much more a result of institutional incompetence and alleged corruption.

Until now, the tight water restrictions have been a nuisance, but manageable. They mean having the shortest of showers and not always flushing the toilet.

Many thousands of people have installed boreholes so they can water their gardens or top up swimming pools. But most groundwater isn't drinkable without treatment – there is a distinct sulphurous odour to the borehole water from one of the homes I visit.

The situation will worsen dramatically on Day Zero, when the city will start to turn off the taps to a million homes – currently estimated as 11 May. The idea is that places like hospitals and commercial districts will still get running water, but millions of people will have to pick up their 25-litre-a-day rations from just 200 collection points.

Many are sceptical about whether this will work in practice. How will the traffic be managed? What about those who don't have cars, or live in building without lifts? What about ill or older people, who can't carry that much water? The answers aren't clear.

Some people and businesses are planning to leave the city until the crisis is over. Most don't have that luxury. As always, the poor will be hardest hit, with many farms already laying off workers and tens of thousands of jobs at risk if the situation continues.

Now the city has to wait for the rainy season, which starts in April and peaks in June. No one knows what it will bring: the seasonal forecasts are no more reliable than tossing a coin.

Even good rain might not bring immediate relief. Large parts of the reservoir beds have dried out, says water resources expert [Anthony Turton](#), who lives in Cape Town. These “sponges” will soak up a lot of water before the reservoirs fill with usable water – how much is unknown.

## **Government failure**

So, how did it come to this? “It’s a failure of the state,” says Turton. “It’s happening in various places across the country.”

The South African government’s [own 2002 water strategy](#) warned that several parts of the country faced large shortfalls in coming years. “Particular attention will therefore have to be given to ensuring adequate future water supplies to [the main metropolitan centres],” the strategy said. A [2007 report on the water supply to Cape Town](#) and surrounding areas projected that, even in the best-case scenario, demand would exceed supply no later than – wait for it – 2018.

One reason so little was done is that under South Africa’s constitution, the national government, rather than provincial or city authorities, is [responsible for major water infrastructure](#). But South Africa’s Department of Water and Sanitation has run up huge debts due to mismanagement and alleged corruption and is in complete disarray, according to a [November report](#) by the [South African Water Caucus](#), a network of organisations working on water issues recognised by the DWS. “This is an incredibly corrupt country,” Turton says.

Instead of investing to boost Cape Town’s water supply, the department cancelled plans to raise dams higher.

Meanwhile, Cape Town’s leaders decided to rely on limiting demand rather than increasing supply by, for instance, extracting and treating groundwater. “They had been advised to make some investments,” says Mike Muller at the University of Witwatersrand in Johannesburg, who oversaw the [last major water project](#) in the Western Cape when he ran the national water department from 1997 to 2005. “They basically said, ‘we are so good at managing our water we don’t have to’.”

South Africa needs to change its entire approach to water management, says Turton. Rather than hoping to store enough river water behind dams to cope with droughts, it needs to turn to [recycling](#), [desalination](#) and groundwater storage, he says.

Turton estimates that recycling Cape Town’s waste water could supply as much as 400 million litres (ML) a day – more than half of the city’s current needs. At present, the city only reuses a tiny fraction of its water and only as “grey” water for plants, rather than treating it to drinking standard. “Water is an infinitely renewable resource,” says Turton.

Desalination plants that create drinkable water from the sea and groundwater could also supply the rest of the city’s needs during drought years. But during years of plenty, Turton stresses, water should be pumped back underground, ready for when it is next needed.

This is the approach [adopted by Perth in Australia over the past decade](#). Faced with declining rainfall and emptying reservoirs, it has built major desalination and water treatment plants, and is pumping some of the treated water back into the local aquifer.

[Kirsty Carden](#), who studies water management at the University of Cape Town, agrees that the city shouldn't keep relying on dams alone. "We have to build in some resilience."

But recycling and desalination aren't cheap, she points out, and Cape Town has had many other urgent problems to address, such as housing the million people living in poverty. "These people are already collecting water in buckets as a daily part of their life," says Carden.

Delaying investment in other water sources, however, could prove to be a very costly mistake for the city. "They didn't do what they should have done and they ran into trouble. Serious trouble," says Muller.

Only in May last year did city authorities finally accept that they couldn't just keep trying to cut water use and hoping for rain. The mayor unveiled [plan B in August](#): "to augment the system using a number of technologies and sources by up to 500 MI/day over the months ahead".

"We are doing absolutely everything in our power to help Team Cape Town to avoid Day Zero," said Peter Flower, the city's director for water and sanitation [in a statement](#).

In the first phase of the plan, groundwater was supposed to provide 100 MI/day, with another 100 MI coming from temporary desalination plants. Yet six months on, plans have hardly advanced and almost no extra water has been produced.

In theory, it should be possible to ramp up desalination very quickly, for instance by bringing in [ships equipped to do the job](#). But so far construction has started on just four small plants, which will produce only tens of millions of litres a day. It will take years to ramp up groundwater extraction, says Turton, not least because of the time it takes to get planning permission.

Cape Town is almost out of time. Its fate is now largely down to the vagaries of the weather. If the rains don't come, the taps go off and the city enters uncharted territory.

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### **Appendix: Is climate change to blame?**

Global warming has probably made Cape Town's water crisis a bit worse, but it isn't the main cause, as some reports have suggested.

Computer models predict that South Africa's Western Cape will get less rain as the planet warms, and indeed there has been a slight decline in rainfall over the past 50 years. However, it is less clear how rainfall is changing in the mountains that supply almost all of the water to Cape Town and farms in the area, says climate scientist Mark New at the University of Cape Town, as records for the region are limited.

It may be that global warming made the current drought more likely, but there is no clear evidence of this, he says. However, the warming is increasing water losses from evaporation, meaning less water reaches taps even if rainfall remains constant. This is a factor in the current crisis, but by how much isn't clear. New is working to answer that question.