

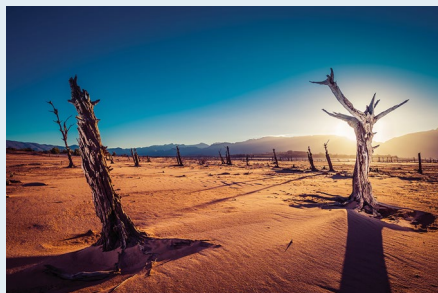
SNAPSHOT

Running dry

For the past several months, one thing has been on the minds of Cape Town residents: Day Zero. Referring to the date when the municipal water supply will be turned off, drought-stricken Cape Town — once praised for its water conservation policies (<https://go.nature.com/2H4T96I>) — threatens to be the first modern city to have its taps run dry. So far, stringent water restrictions have kept Day Zero at bay, postponing the date from mid-April to mid-July, and now to at least 2019. However, with collective dam levels that feed the city perilously low at 21.5% capacity (<http://coct.co/water-dashboard>) — the final 10% of which is unsafe for human consumption — the situation remains extreme in South Africa's Western Cape.

The primary reason for the water crisis is simple: an absence of precipitation. Three years of extremely low rainfall between 2015 and 2017 (which is expected to occur only once every 300 years) preceded crippling drought conditions across the Western Cape. “Unfortunately, the drought was the most severe in the region of the dams and catchments that supply Cape Town” explains Piotr Wolski, senior research officer at the University of Cape Town, South Africa. As water reserves rapidly diminished due to a lack of rain, dam levels ultimately declined from 100% peak storage capacity in 2014 to its present 21.5% capacity (as of 9 April 2018).

Amidst fears of an almost imminent Day Zero, Capetonians slashed their water use by half in an unprecedented act of water conservation. To prevent the taps running dry, emergency water restrictions limited daily use to 87 l per person, later decreased to 50 l; for context, in the UK the average daily water use is 150 l. Agriculture has also been sacrificed, with dramatic cuts in agrarian water use and the donation of rural water key to the slowdown in declining dam levels. However, such measures offer only a short-term respite, with longer-term water security a persistent threat until winter rains refill reservoirs, or new infrastructure — for example desalination plants or



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facilities to extract groundwater — reduces reliance on seemingly variable rainfall.

Indeed, although droughts are a natural phenomenon, the severity and rarity of the Cape Town drought has inevitably raised questions regarding the role of anthropogenic climate change and whether such events may become more frequent in the future. Wolski comments that “there is a lot of research indicating an increase in drought frequency and intensity, but for southern Africa, there is also strong multidecadal (natural) variability that needs to be considered”. Nevertheless, there is consensus that increasing temperatures and shifting rainfall patterns may amplify drought across Southern Africa (A. Dai, *Nat. Clim. Change* 3, 52–58; 2013), and such events in Cape Town may thus be harbingers of what is to come.

However, it is not just climatic factors that impact drought occurrence; a complex array of socio-political factors also play a role. “Population growth and urbanization have increased water demand beyond the carrying capacity, but the problems manifest during periods of prolonged drought, as we have seen in Cape Town” notes Arjen Hoekstra, professor of water management at the University of Twente, Netherlands. The political situation in the Western Cape is further believed to have compounded the present crisis (<https://go.nature.com/2HBuOTi>), with water mismanagement (specifically the misallocation of water to agriculture) and poor planning (for example, the failure to release funds for disaster declarations and

improved water infrastructure) amplifying water deficits.

While Day Zero may have garnered international attention, it is not just Cape Town that is at risk. “Many cities in southern Africa have been in a similar situation: last year it was Maputo, Mozambique, and two years ago it was Gaborone, Botswana” notes Wolski. Indeed, four billion people presently live under conditions of water scarcity for at least one month of the year (M. M. Mekonnen and A. Y. Hoekstra, *Sci. Adv.* 2, e1500323; 2016), and countless other cities have seen similar threats to their urban water supply. In 2010, it was claimed that Mexico City would run out of water, and in 2015, Sao Paulo's Cantareira reservoirs were below 5% capacity. Los Angeles, Istanbul, London, Beijing, New Delhi, San Diego and many others are all at risk (M. Flörke et al., *Nat. Sustain.* 1, 51–58; 2018).

But Day Zero is not inevitable, in Cape Town or elsewhere. Water needs to be used sustainably, with Hoekstra proposing that “reducing municipal water demand, not only by households, but by all urban water users, is the primary measure needed to ensure future water security”. Lessons need to be learnt, and Cape Town should serve as a cautionary tale for the rest of the world: act now, not when water shortages are already underway.

On a more positive note “Capetonians have learned the value of water, and water saving hardware will now put them in a very good position to tackle any drought”, states Wolski. With projections of more frequent drought, this may soon be a reality, but Capetonians have already demonstrated to the world that effective water conservation efforts are possible, and that Day Zero can be held at bay in the face of climate change. □

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