

# NEWS IN FOCUS

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RODGER BOSCH/AFP/GETTY



Bare sand and dead tree trunks stand in a nearly empty reservoir near Cape Town, South Africa.

## PUBLIC HEALTH

# Cape Town scientists prepare for ‘Day Zero’

*As water crisis brews, researchers plan to modify studies and prioritize public health.*

BY AMY MAXMEN

**P**anic about the looming water crisis in Cape Town, South Africa, strikes Jodie Miller unpredictably during otherwise ordinary days. “I was making cupcakes this weekend and burned my finger on the pan, and whipped it under the tap,” says Miller, a water scientist at Stellenbosch University in Cape Town. “What will we do when no water comes out?”

The city’s government estimates that “Day Zero” — when Cape Town becomes the first

major city in the world to run out of water, as reservoirs dip too low to deliver a potable supply — will come on 12 April. The city is experiencing its worst drought in the past century. And with less than 80 days before taps are likely to be shut off for all but essential services, scientists are scrambling to determine how the crisis will affect their research — and their daily lives. Information about the amount of water that universities will be able to draw from municipal or private sources, and for how long, is almost non-existent. Local researchers are also concerned about how the water crisis

will affect their staff and the city as a whole.

“Science needs a functioning ecosystem,” says Musa Mhlanga, a cell biologist at the University of Cape Town. “This is very, very serious.”

Cape Town is now in its third year of severe drought, which has slashed the supply of surface water on which the city relies. But for many residents, the idea of Day Zero became real only on 18 January, when their mayor announced, “We have reached a point of no return.” Until then, the city had hoped that voluntary actions to conserve water would stave off a crisis until winter rains began ▶

► and new wells and water-treatment plants came online. But Cape Town's reservoirs have drained faster than predicted: households and businesses have not conserved water as much as the government had hoped during the current dry summer.

According to Cape Town's disaster plan, what water remains in reservoirs on Day Zero — when their levels drop to 13.5% of capacity — will go to hospitals and informal settlements that already rely on communal taps. Most of Cape Town's nearly 4 million residents will have to collect allotments of water from 200 distribution points — a situation that the mayor fears could lead to anarchy.

As recently as 18 January, the University of Cape Town said that, at this stage, it “is not facing the risk of any research activities having to be curtailed as a result of the water crisis”. But researchers there and at other nearby institutions aren't so confident. They're anxious to know whether they might have access to municipal water after the shutdown; although some researchers might be able to import tanks of water from other parts of the country, cost and availability could make that approach difficult to sustain. “The University of Cape Town and its sister institutions are in deep discussions with the city of Cape Town to get clarity” about how much water they will receive, says Valerie Mizrahi, an infectious-disease researcher at the University of Cape Town.

#### UNDERFUNDED AND UNDERPREPARED

Kevin Winter, who directs the university's Water Task Team, which manages water use across its campuses, lists several reasons why institutions are underprepared for the crisis. Faculty members are just returning to campus after the summer break, as the situation

pivots from hopeful to dire. And although universities have considered water-saving strategies in the past, including water-recycling systems, Winter says that tight budgets have made it difficult to apply those plans. For instance, in recent years, universities responded to student protests demanding free education by agreeing to hold their fees steady despite inflation. “It's not simple to say, give me two to three million dollars towards pipes and pumps and geological surveys,” Winter says. “We are scraping our way through a crisis that might have been averted if we had had the means to do so.”

Now, scientists across Cape Town are drawing up contingency plans for their labs. The first step is estimating how much water they will require for basic needs, such as caring for lab animals. Experiments that use less water will be favoured over those requiring more, and at least one biomedical researcher is arranging to move some studies to foreign labs. Many principal investigators are weighing the risks of running experiments that could expose people to fire or chemical injury at a time when water is limited.

Cape Town is a hub for research on HIV and tuberculosis, and medical care associated with those studies will continue. But the water crisis could curtail community outreach on public-health issues. Linda-Gail Bekker, deputy director of the Desmond Tutu HIV Centre, says there would be consequences to interrupting her group's efforts to provide reproductive-health services to young women at high risk of teenage pregnancy and HIV. Bekker worries

that her staff will be unable to work if they must wait in long lines each day to collect water for their households. “I plan to get ahold of the mayor's office this week to see if we can figure something out,” she says.

Robert Wilkinson, director of the Wellcome Centre for Infectious Diseases Research in Africa at the University of Cape Town, spoke to *Nature* from a supermarket where shoppers were snatching up bottled water before it could reach the shelves. Earlier that day, he and his colleagues had discussed how to cut back their clinical trials once Day Zero arrives. Participants would continue to receive medical care, but research would be curtailed; the scientists might request fewer samples of bodily fluids to save the water that would be needed to process them, even for storage.

Wilkinson says that if water is scarce, the urgent priority is to maintain health. “I immediately think about the potential for water-borne illnesses if people — particularly people in poor living conditions — aren't able to maintain personal and institutional hygiene,” Wilkinson says. He also worries about the city's economy, which is reliant on tourism and agriculture.

Then there is Miller, who felt another flash of anxiety recently as she dumped a jug of recycled water on her bare, dirt yard. “It just sat there,” she says. “The water didn't sink in because the land is so parched.” She thought about how droughts and fires can give way to landslides and floods when rain comes. And she considered how pipes can crack when plumbing lies dry for too long. “To be honest, I can't wrap my head around what's happening — a major metropolitan city running out of water,” Miller says. “There are enormous ramifications to this.” ■

or to factors related to the applicant, such as gender.

Past studies have looked at gender inequalities in grant funding, but most examined grant programmes that didn't separate their application pool as the CIHR programmes did. Some also didn't consider other factors, such as whether research fields had different ratios of male to female scientists<sup>2</sup>. The new analysis, which took into account applicants' research areas and age — a proxy for career stage — allowed the study authors to draw “more robust conclusions”, says Holly Witteman, a health-informatics researcher at Laval University in Quebec City, Canada, who led the study.

Witteman and her colleagues calculated that, of all the applications submitted to CIHR grant programmes between 2011 and 2016, 15.8% were likely to be successful. And in the conventional grant programmes, the success rate for male applicants was 0.9% higher than the rate for female applicants. When the team analysed the CIHR grant programme that

came out of a 2014 decision by the Canadian Institutes of Health Research (CIHR) to phase out conventional grant programmes, in which reviewers evaluated both the science and the investigator. Instead, the CIHR started one programme that focused its evaluation on the applicants and another that focused mostly on their research. This created a natural experiment that allowed the scientists to analyse the outcomes of nearly 24,000 grant applications and to test whether funding differences were due to the quality of the applicants' research

#### FUNDING

# Gender bias tilts success of grant applications

*But it goes away when reviewers focus on the science.*

BY GIORGIA GUGLIELMI

Women lose out when reviewers assess the researcher, rather than the research, according to a study on gender bias. But training reviewers to recognize unconscious biases seems to correct this imbalance, despite previous work suggesting otherwise.

The findings were first posted in December on the bioRxiv<sup>1</sup> preprint server and are currently in review at a journal. They

came out of a 2014 decision by the Canadian Institutes of Health Research (CIHR) to phase out conventional grant programmes, in which reviewers evaluated both the science and the investigator. Instead, the CIHR started one programme that focused its evaluation on the applicants and another that focused mostly on their research. This created a natural experiment that allowed the scientists to analyse the outcomes of nearly 24,000 grant applications and to test whether funding differences were due to the quality of the applicants' research