



CAPE TOWN'S DROUGHT & WATER CRISIS

RESEARCH BRIEF

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This Brief has been launched in conjunction with Impact Human’s project, ‘Cape Town’s Drought & Water Scarcity’. Information provided here is intended to provide additional insight on prolonged drought, water management, climate impacts, and environmental justice issues in the wider Cape Town, South Africa area in particular. For more media from us on this topic, including podcasts, photography, and interviews, please see our project webpage.

Cape Town's Water Crisis – What Happened?

QUICK FACTS*

In early 2018, Cape Town was on the verge of becoming the first global city to run out of water. The City Government took action to avert what became known as “Day Zero” - the day dam levels fell below 13.5% and the city’s taps would be shut off.

From February 2018, residents have been restricted to use only 50 liters of water per person per day. They were encouraged to take less than 90-second showers, refrain from flushing the toilet unless absolutely necessary, and use hand sanitiser instead of washing their hands. Restaurants, shops, and radio announcements urged customers to save water. Water shortages affected the tourism industry and led to job losses in the agricultural sector.^{1, 2} Some regions in the Western Cape, that rely on agriculture, haven’t seen any rain in four years. They are devastated.

Cape Town is a city surrounded by water. It has experienced a combination of below average rainfall for the past three years, rapid urbanisation, and poor water infrastructure management. This has all led to the current circumstances. The consequences of running out of water are significant. The Chief of Cape Town's disaster operations center described: sanitation failures, disease outbreaks, and anarchy due to competition for scarce resources as among the major risks Cape Town faces.³

Day Zero was initially forecast for April 2018, but through a combination of stringent water consumption restrictions, temporary infrastructure interventions, and late-season rainfall; it’s been pushed back to 2019. In the first week of October 2018, the City reduced water consumption restrictions – downgrading from Level 6B to Level 5. That means people could increase their maximum daily allowance to 70 liters per person.⁴ But with dam levels sitting

Demographic

- Population of Cape Town in 2018: 4,055,580
- Estimated population by 2040 - 6 million

Economic

- Cape Town alone generates almost 10% of South Africa’s GDP
- 79% of businesses describe water shortages as a threat to their operations

Water Reserves + Use

- Dam levels in September 2017: 37.5%
- Dam levels on 15 Oct 2018: 76.2%
- Water usage per week at 15 Oct 2018: 546m litres
- City-wide target usage: 500 million litres
- Usage per week before restrictions: 1.2 billion litre s

¹ Drury, Flora. 2018. “Icebergs and empty pools: Five things Cape Town’s Day Zero taught us.” BBC, 13 May 2018. <https://www.bbc.com/news/world-africa-43989106>.

² WWF-SA. 2017. Scenarios for the Future of Water in South Africa. Accessed Oct 22, 2018. http://awsassets.wwf.org.za/downloads/wwf_scenarios_for_the_future_of_water_in_south_africa_v7_6_pf_1.pdf.

³ Watts, Jonathan. 2018. “Cape Town faces Day Zero: what happens when the city turns off the taps?” The Guardian, 3 Feb 2018. <https://www.theguardian.com/cities/2018/feb/03/day-zero-cape-town-turns-off-taps>.

⁴ Pitt, Christina. 2018. “City of Cape Town relaxes water restrictions, tariffs to Level 5.” news24, 10 Sept 2018. <https://www.news24.com/SouthAfrica/News/city-of-cape-town-relaxes-water-restrictions-tariffs-to-level-5-20180910>.

below 80% at the end of the rainy season, catastrophe has likely only been delayed rather than avoided entirely.⁵

What has led to this point?

The story of Cape Town running out of water is a long told tale. As far back as 1990, the country's Parliament was warning of Cape Town running out of water within two decades.⁶ Water is supplied to Cape Town by six dams surrounding the city, that are all predominantly refilled during the rainy season, from May to August. Below average rainfall, or prolonged drought conditions, put the city at risk. Cape Town experienced drought conditions in the early 2000s, during which water restrictions were put in place. A combination of prolonged drought coupled with the rapid growth of the City over the last ten years has put increasing pressure and demand on the City's water. Why it took the City until their dams were at 30% capacity to do something about this slow-moving crisis is a point of fierce debate.

Climate Change – Prolonged Drought & Weather Variability

An El Niño-triggered drought has affected South Africa's Western Cape since 2015.⁷ According to South Africa's Department for Water and Sanitation, rainfall has been below average since 2016, and some areas of the Western Cape have experienced no rain since 2014.^{8,9}

Research at the University of Cape Town's Climate System Analysis Group found that below average rainfall from 2015-2017 was the main driver of water shortages in Cape Town. That same period also marked the lowest average rainfall since 1933.^{10, 11} By October 2017, the result of this below average rainfall was apparent, with dams in the Western Cape only reaching 36% of capacity.¹²

The Intergovernmental Panel on Climate Change (IPCC) anticipates that areas with subtropical climates, like Cape Town, will experience these types of droughts more frequently because of climate change.¹³ This means less rainfall to meet the needs of a growing population, and increased demand for surface and ground water resources for communities in Cape Town and surrounding areas.

⁵ City of Cape Town. n.d. "Water Dashboard." Accessed Oct 15, 2018. <https://coct.co/water-dashboard/>.

⁶ Baker, Aryn. 2018. "What it's like to live through Cape Town's massive water crisis." Time, Feb 3, 2018. <http://time.com/cape-town-south-africa-water-crisis/>.

⁷ Stoddard, Ed. 2018. "Cape Town 'Day Zero' pushed back to 2019 as dams fill up in South Africa." Reuters, Apr 3, 2018. <https://www.reuters.com/article/us-safrica-drought/cape-town-day-zero-pushed-back-to-2019-as-dams-fill-up-in-south-africa-idUSKCN1HA1LN>.

⁸ Department: Water and Sanitation. n.d. "Provincial Rain: Western Cape." Accessed Oct 15, 2018. <http://www.dwaf.gov.za/Hydrology/Provincial%20Rain/Default.aspx>.

⁹ Andrew Sokolic, interviewed by Jessica Toale at Plathuis, 17 August 2018.

¹⁰ Wolski, Piotr. 2018. "Was the water shortage caused by farmers, city dwellers, or drought?" GroundUp, July 19, 2018. <https://www.groundup.org.za/article/was-water-shortage-caused-farmers-city-dwellers-or-drought/> Accessed 15 Oct 2018.

¹¹ Ibid.

¹² Department: Water and Sanitation. 2018. "Western Cape Province State of Dams on 2018-10-29." Accessed Oct 15, 2018. <http://www.dwaf.gov.za/Hydrology/Weekly/ProvinceWeek.aspx?region=WC> Accessed 15 Oct 2018.

¹³ IPCC. 2014. "Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, <http://ipcc.ch/report/ar5/syr/>.

Urbanization and Water Consumption

Cape Town's population has almost doubled, from about 2.4 million in 1995 to over four million in 2018.¹⁴ This has put intense pressure on the City's water resources. Before stringent water consumption restrictions were put into effect in February 2018, the City was consuming over 1 billion litres of water daily.¹⁵ The majority of this was consumed by upper- and middle-class households who have benefited from urban sprawl-style development, which afforded them low-rise housing, swimming pools, and manicured lawns.^{16, 17}

The Western Cape's urban population is expected to increase by another two million over the next 25 years, reaching six million by 2040.¹⁸ This will undoubtedly amplify existing pressures on vital water resources, unless urbanisation and consumption patterns are changed.

Water Infrastructure and Resource Management

During Cape Town's population boom, from 1995 to 2018, the City's dam storage increased by only 15% via the Berg River Dam.¹⁹ It began storing water in 2007, and has been Cape Town's only significant new water storage infrastructure in the last 23 years.

Despite this, the City's management of its water is some of the best in the world. Overall, municipal water supplies only have about 15% leakage, compared to the world average at 36.6%.²⁰

Response to the Crisis

In response to the acute crisis facing the City, the local government introduced additional water supplies from reservoirs and aquifers outside existing supplies, and planned seven additional desalination, aquifer, and water recycling projects - all in all adding 144 million litres to the water supply.²¹ By August 2018, three new desalination plants were completed, and are estimated to produce 8 million litres of water per day. Unfortunately, these plants were heavily criticised for being too little too late, and only a temporary solution to this growing crisis.²²

¹⁴ Bohatch, Trevor. 2017. "What's causing Cape Town's water crisis?" GroundUp, May 16, 2017. <https://www.groundup.org.za/article/whats-causing-cape-towns-water-crisis/>.

¹⁵ Watts, Jonathan. 2018. "Cape Town faces Day Zero: what happens when the city turns off the taps?" The Guardian, 3 Feb 2018. <https://www.theguardian.com/cities/2018/feb/03/day-zero-cape-town-turns-off-taps>.

¹⁶ De Lille, Patricia. 2-17. "Drought crisis: bad apples ruining the efforts of many water-savers." City of Cape Town, Media Office, Feb 22, 2017. <http://www.capetown.gov.za/media-and-news/Drought%20crisis%20bad%20apples%20ruining%20the%20efforts%20of%20the%20many%20water-savers>.

¹⁷ Western Cape Government. 2005. "Urban Development." State of the Environment Report. https://www.westerncape.gov.za/text/2006/1/14_soer_urban_development_optimised_2005_4.pdf.

¹⁸ Van Zyl, Piet. 2017. "Trends in Western Cape Urbanisation: challenges and Opportunities for the development Industry?" Presentation to Western Cape Property Development Conference. May 4, 2017. http://www.wcpdf.co.za/2017_conference/3%20-%20PietvanZyl.pdf.

¹⁹ Bohatch, Trevor. 2017. "What's causing Cape Town's water crisis?" GroundUp, May 16, 2017. <https://www.groundup.org.za/article/whats-causing-cape-towns-water-crisis/>.

²⁰ Olivier, David W. 2017. "Cape Town water crisis: 7 myths that must be bust." news24, Nov 10, 2017. <https://www.news24.com/Analysis/cape-town-water-crisis-7-myths-that-must-be-bust-20171110>.

²¹ De Lille, Patricia. 2017. "Day Zero: when is it, what is it, and how can we avoid it?" City of Cape Town, Media Office, Nov 15, 2017. <http://www.capetown.gov.za/Media-and-news/Day%20Zero%20when%20is%20it%20it%20c%20what%20is%20it%20it%20c%20and%20how%20can%20we%20avoid%20it>.

²² Pace, Aimee. 2018. "All Cape Town desalination plants online." Capetown etc, Aug 6, 2018. <https://www.capetownetc.com/water-crisis/all-cape-town-desalination-plants-online/> Accessed 15 Oct 2018.

Desalination

Desalination plants pose their own challenges. Most are still powered by fossil fuels. So essentially, a local solution to water scarcity – fueled by climate change – is to add to emissions that cause climate change. Aside from fossil energy consumption, the reverse osmosis membranes the desalination relies on regularly get contaminated with debris, reducing their overall effectiveness. These plants also create a salt by-product that needs to be dealt with in an environmentally responsible way that doesn't negatively impact marine life.²³

Other City Responses

The City introduced a large scale public information campaign, called *Think Water*.²⁴ It is a website that provides information on restrictions and water saving techniques. The City also launched a City WaterMap, to monitor and show individual household consumption levels.²⁵ Increasing access to information on water restrictions and consumption is not all – the City introduced new legislation to ensure all new homes were more water efficient.²⁶

Through a combination of reducing pressure in water pipes, restrictions, and raising tariffs; the City has been successful in cutting its water consumption in half to around 500 million liters per day. While this has averted the possibility of running out of water for now, unless the City maintains its stringent restrictions, or significantly increases its supply of water, the problem will remain in the long-run.

Day Zero: Worse-Case Scenario

In November 2017, the City announced its Day Zero Plan.²⁷ If Day Zero is reached, the City plans to open 200 water collection sites to allow people to collect a maximum of **25 litres of water per person per day**. The City is also assessing the impact water shortages will have on sanitation services. To better plan, Cape Town is working with the Department for Water and Sanitation and law local enforcement to conduct preparedness exercises to ensure the safety of citizens at the these future water collection points.

The impacts of Day Zero would be significant. The City would have to spend R200 million (USD \$14 million) over three months to enact its current Day Zero Plan. It would also lose R1.4 billion (USD \$98 million) in water tariff tax revenue.²⁸ More than 6.5% of businesses in Cape Town are expected to shut down, with more than 11% of businesses expected to send staff home.²⁹

²³ Van Zyl, Werner. 2018. "Global lessons in desalination for a thirsty Mother City." BizNews, Feb 9, 2018. <https://www.biznews.com/thought-leaders/2018/02/09/desalination-lessons-for-mother-city>.

²⁴ City of Cape Town. n.d. "Think Water." Accessed 22 Oct 2018. <https://www.capetown.gov.za/Family%20and%20home/residential-utility-services/residential-water-and-sanitation-services/make-water-saving-a-way-of-life>.

²⁵ City of Cape Town. n.d. "City of Cape Town Water Map." Accessed 22 Oct 2018. <https://citymaps.capetown.gov.za/waterviewer/>.

²⁶ De Lille, Patricia. 2017. "Day Zero: when is it, what is it, and how can we avoid it?" City of Cape Town, Media Office, Nov 15, 2017. <http://www.capetown.gov.za/Media-and-news/Day%20Zero%20when%20is%20it%2c%20what%20is%20it%2c%20and%20how%20can%20we%20avoid%20it>.

²⁷ Ibid.

²⁸ Watts, Jonathan. 2018. "Cape Town faces Day Zero: what happens when the city turns off the taps?" The Guardian, 3 Feb 2018. <https://www.theguardian.com/cities/2018/feb/03/day-zero-cape-town-turns-off-taps>.

²⁹ Tshane, Tebogo. 2018. "Cape's water crisis to have ripple effects." Mail & Guardian, Feb 2, 2018. <https://mg.co.za/article/2018-02-02-00-cape-water-crisis-to-have-ripple-effect>.

Human Impacts

Cape Town's water crisis has had notable economic and social impacts. Job losses in important industries, like tourism and agriculture, have been significant. Tourism is reported to directly employ more than 217,500 people in the Western Cape, and contributes more than R18.4 billion (USD \$1.27 billion) to the economy.³⁰ However, an informal study found that revenue from tourism had fallen in January and February 2018, typically busy months.³¹

The 2018 restrictions that cut 60% of water usage for irrigation resulted in the loss of 37,000 jobs in the Western Cape Province. An estimated 50,000 people have been pushed below the poverty line due to job losses, inflation, and increases in the price of food since the crisis began.³² By February 2018, the agricultural sector had incurred R14 billion (USD \$1.17 billion) in losses due to water shortages.³³

Access to Water

While the City prides itself on bringing water to 100% of households, this is actually defined as either access in the home or within 200 yards of said household.^{34, 35} Around 146,000 households are estimated to be in informal settlements around Cape Town.³⁶ Those residing in these households are forced to collect water outside their homes, but are considered as having access to water by the local government. While these households consume relatively small amounts of water, recent shortages have put pressure on economic opportunities here, like opening a car wash or other businesses. It brings into sharp relief the stark inequalities that exist in living conditions and consumption patterns in and around the City.³⁷

Conclusion & Recommendations

Cape Town is not the first, nor will it be the last city to suffer severe water shortages. Another eleven major cities around the world have or will experience water shortages, affecting almost 160 million people.³⁸ More than one billion people live in water-scarce regions, and as many as 3.5 billion could experience water scarcity by 2025 if steps are not taken to conserve water.³⁹

³⁰ Goodman, Levrune. 2018. "Important of tourism in Western Cape." Wesgro. Accessed 15 Oct 2018.

http://www.wesgro.co.za/pdf_repository/Importance%20of%20tourism.pdf.

³¹ Drury, Flora. 2018. "Icebergs and empty pools: Five things Cape Town's Day Zero taught us." BBC, 13 May 2018.

<https://www.bbc.com/news/world-africa-43989106>.

³² WWF-SA. 2017. Scenarios for the Future of Water in South Africa. Accessed Oct 22, 2018.

http://awsassets.wwf.org.za/downloads/wwf_scenarios_for_the_future_of_water_in_south_africa_v7_6_pf_1.pdf.

³³ Phakathi, Bekezela. 2018. "Farmers lose R14bn as Cape drought bites." Business Day, Feb 7, 2018.

<https://www.businesslive.co.za/bd/economy/2018-02-05-farmers-lose-r14bn-as-cape-drought-bites/>.

³⁴ Western Cape Government. 2018. Socio-economic profile: City of Cape Town 2017. Accessed Oct 15, 2018.

<https://www.westerncape.gov.za/assets/departments/treasury/Documents/Socio-economic-profiles/2017/c>.

³⁵ ISMAPS. N.d. "Struggle for dignity in Cape Town's informal settlements: The facts." Accessed Oct 30, 2018.

<http://ismaps.org.za/desktop.html>.

³⁶ Ibid.

³⁷ De Lille, Patricia. 2-17. "Drought crisis: bad apples ruining the efforts of many water-savers." City of Cape Town, Media Office, Feb 22, 2017.

<http://www.capetown.gov.za/media-and-news/Drought%20crisis%20bad%20apples%20ruining%20the%20efforts%20of%20the%20many%20water-savers>.

³⁸ Drury, Flora. 2018. "Icebergs and empty pools: Five things Cape Town's Day Zero taught us." BBC, 13 May 2018.

<https://www.bbc.com/news/world-africa-43989106>.

³⁹ World Resources Institute. n.d. "Water." Accessed Oct 30, 2018.

<https://www.wri.org/our-work/topics/water>.

Water scarcity has broad and significant impacts, including lower economic growth and food insecurity. In urban areas, it can create new poverty traps and aggravate inequality between the rich and the poor.⁴⁰ In many areas, water shortages disproportionately affect women and girls, who are largely responsible for collecting water when it is not available in the home. This increases their risk of sexual violence and being pulled out of school.⁴¹

Sub-Saharan Africa is particularly vulnerable to climate change and its impacts. Rising temperatures and weather variability are already reducing agricultural yields, cutting water availability, expanding desert areas, endangering animals, and increasing the prevalence of diseases like malaria.⁴²

Recommendations

The City of Cape Town's response to the crisis has been largely a short-term fix. Its water shortages must be seen as a long-term crisis that requires long-term and socially equitable solutions. Weather variability is here to stay. This short brief recommends the following actions and policies:

- *Stronger Water Governance* –
 - Cape Town has developed a number of mechanisms to monitor and respond to the acute water crisis. These need to be institutionalised, perpetuated, and linked to national and regional government structures with a shared understanding that water shortages are a long-term issue the City will face. This will help the City and the national government better manage their resources and serve citizens.
- *Investment in Water Infrastructure* –
 - City governments that have plans to make their cities more resilient to climate change by diversifying their water supplies should not delay in making these investments. Climate change is moving more rapidly than previously predicted. Cape Town had a series of plans for boreholes and desalination plants, originally due to kick in after 2020. They had to accelerate these plans because of the water crisis.⁴³
- *Significantly Reduce the use of Fossil Fuels* –
 - The IPCC recommends a serious reduction in the emissions of greenhouse gasses (GHGs). South Africa is reliant on coal for 92% of its total energy

⁴⁰ IPCC. 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_en.pdf.

⁴¹ Reuters. 2016. "Over 17 million women and girls collect water in Africa, at risk of rape and disease." Reuters, 2 June 2016. <https://www.ndtv.com/world-news/over-17-million-women-and-girls-collect-water-in-africa-at-risk-of-rape-and-disease-1414704>.

⁴² Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, R. Tabo and P. Yanda, 2007: Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge UK, 433-467.

⁴³ Watts, Jonathan. 2018. "Cape Town faces Day Zero: what happens when the city turns off the taps?" The Guardian, 3 Feb 2018. <https://www.theguardian.com/cities/2018/feb/03/day-zero-cape-town-turns-off-taps>.

needs.⁴⁴ Cape Town needs to reduce fossil fuel emissions significantly. It doesn't make any sense for a nation and city so severely impacted by climate change to be actively contributing towards its cause.

- *Planning and Development* –
 - While the City of Cape Town introduced new legislation to encourage water efficiencies in residential buildings, more could be done to ensure that commercial and public buildings also increase their standards. In cities like Cape Town that have urban sprawl, city planners should focus on using space more efficiently, and encouraging people to live in more densely populated areas.
- *Water Consumption Restrictions* –
 - Current restrictions have been successful in delaying Day Zero. In households, these have had a positive impact of raising awareness about water consumption.
- *Public Information Campaigns & Water Conscious Tourism* –
 - City governments should work with relevant authorities and institutions to coordinate long-term public awareness campaigns to raise awareness on water consumption behaviour, while mitigating the negative economic impacts of water shortages. For instance, the Western Cape's Tourism body, Wesgro, launched a My Water Footprint App as part of their #WaterWiseTourism campaign, so visitors can monitor their daily water usage.⁴⁵ Visitors collect offset "flow coins" through the application, and can then use them to support local water saving projects.
- *Water Smart Industry and Employment Opportunities* –
 - Cape Town has the opportunity to become a leader in commercialising low-water technologies for industry and agriculture, and to promote training and jobs in these industries.⁴⁶ Investing in the development of these technologies and industries not only will make the City more resilient to climate and water issues, but also has the potential to address Cape Town's entrenched poverty and inequalities.

Addressing Cape Town's water crisis will require a long-term policy agenda that takes into account the co-benefits of: climate resiliency and mitigation, emissions reductions, community engagement, and fostering social equity. Right now, the world is watching to see just how Cape Town will rise to the new reality of water scarcity in a climate-changed world. What Cape Town does can serve as a learning opportunity for future cities and communities also running towards their own Day Zeros.

⁴⁴ The World Bank. n.d. "Electricity production from coal sources (% of total)." Accessed Oct 30, 2018. <https://data.worldbank.org/indicator/EG.ELC.COAL.ZS?locations=ZA>.

⁴⁵ Wesgro. 2018. "Wesgro launches first known water-offset tool to boost #waterwisetourism." Wesgro Media Team, Apr 18, 2018. http://www.wesgro.co.za/news?NewsID=WJpt6bZe_7

⁴⁶ WWF-SA. 2017. Scenarios for the Future of Water in South Africa. Accessed Oct 30, 2018. http://awsassets.wwf.org.za/downloads/wwf_scenarios_for_the_future_of_water_in_south_africa_v7_6_pf_1.pdf

