
Delaying Day Zero: Fighting back against water insecurity

Marcus Arcanjo

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“Water is the only scarce resource for which there is no substitute, over which there is poorly-developed international law, and the need for which is overwhelming, constant, and immediate.”¹

Introduction

Cities all over the world suffer from water insecurity. Climate change is causing increased average temperatures and sustained periods of dry weather. The demand under these conditions increases, but delayed or non-existent seasonal rainfall reduces supply, therefore placing enormous strain on resources. The hydrologic cycle is intimately linked with changes in atmospheric temperature and radiation balance, meaning that warmer climates result in higher rates of evaporation as well as increased liquid precipitation.² This suggests that frequency and intensity of both extreme droughts and flooding will continue rising in line with average temperatures, therefore placing hundreds of millions of people at risk from a lack of clean water. Cities such as Cape Town are already feeling the full force of these effects.³

April 16th, 2018 was supposed to be the day that Cape Town switched off its taps, the world’s very first *Day Zero*. Residents were faced with the prospect of queueing up for hours at the standpipes to receive their limited daily rations of 25 litres a day, as public access to water was to be denied in the face of extreme drought. Cape Town has implemented drastic coping measures, such as extreme water restrictions, strict fines for overuse and efficient agriculture, to effectively combat scarcity and delay Day Zero in the short term. As a result, the city has now managed to push back it until 2019. Other vulnerable regions, like India, should focus on areas such as water cleaning and storage to increase the efficiency of consumption and reduce pressure on limited resources. Networks for education and climate finance are tools that can help achieve this.

The Cape Town Approach

Cape Town, a coastal city of four million, has suffered greatly over recent years. A ‘once in a thousand years’ drought has plagued the city since 2015. Reservoir levels have been critically low due to a lack of winter rainfall, increasing temperatures, a rising urban population, and a continued uptick in tourism, all placing enormous stress on very limited resources. Recent months provided further uncertainty, as citizens had been preparing for a doomsday scenario. Day Zero was defined as the point at which the dam levels fell to 13.5%, therefore

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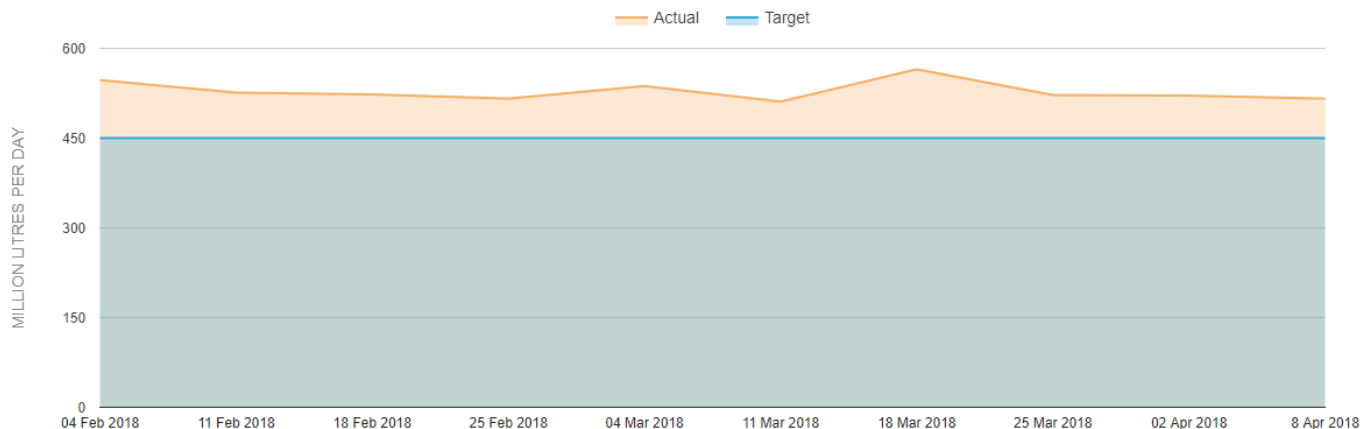
requiring all taps in the city to be shut off and severe water rationing to be implemented.⁴ Residents were to be placed in groups of 25,000 based on their location and would have only been permitted to receive their rations from one location out of the two hundred stations throughout the city. According to the city's website, current levels stand at 21.9%, and as a result, Day Zero has been pushed back to 2019. This comes as a result of a number of resource management techniques.

The threat of severe water rationing was seemingly motivation enough for residents to vastly reduce their consumption. Nevertheless, extreme measures are taken. Firstly, the city implemented level 6b water restrictions in February, which requires water usage to be no more than 50 litres per person per day for all activities, including cooking, washing and drinking.⁵ Showers have been swapped for sponge baths and major consumers are facing increased tariffs to dissuade them from over usage.⁶

The city plans to keep this restriction in place for the foreseeable future. Such water-saving efforts combined with positive rain forecasts for the coming winter months slightly ease the pressure. Despite dam levels still being relatively low, weekly increases are providing more comfort. According to current readings, the average dam level across the six dams that supply in Cape Town is 21.9%, an increase of 0.4% from last week.⁷

WEEKLY WATER USE AS OF 09 APRIL 2018

A view of the seven- day average water use in the City, over eight weeks.



Cape Town's Chief Resilience Officer added that the city had managed to reduce their consumption of nearby dams by nearly half, from a billion litres a day to between 500 and 520 million. The goal is to reduce this figure even further to 450 million litres, to provide the best possible opportunity for the reservoirs to replenish during the winter months.⁸ The figure above, from the City of Cape Town website, illustrates how water usage has gradually fallen from the middle of March until present, but still has a way to go to achieve the longer-term objective.

Further initiatives such as the creation of a team of water police have been imposed, to patrol areas of high water usage and fine those that were breaching restrictions and install smart water meters for repeat offenders. Moreover, the city even released the addresses of the one hundred highest usage homes, in the hope that a public naming and shaming would curtail consumption, a truly drastic measure.

By allotting specific quantities of water to separate uses, it allowed the city to become more accurate when tracking. For example, agriculture was restricted to 10% of overall supply. This put pressure on farmers to use water more efficiently but also helped minimise waste and initially pushed Day Zero back to May. Combined with other measures it will now not occur in 2018.

Significant upgrades to water systems are providing further opportunities to save water. City funding has shifted towards projects that will aid desalinisation, water capture and recycling, and aquifer access. In addition, Cape Town is looking for ways to tap into the natural springs that run from the mountains to the sea.⁹ Access is difficult due to buildings and manholes, but the city's water scarcity calls for these types of measures.

Lastly, local institutions have made a strong effort to implement nature-based solutions, in order to improve the quality of water for the citizens downstream. Removing water leaching non-native species of plants, that absorb 38 million litres per year, will increase availability by upwards of 10% according to the Nature Conservancy. In addition, replanting indigenous crops allows for employment opportunity and less restrictive irrigation practices for farmers, therefore increasing the likelihood of reliable harvests and a more stable livelihood.¹⁰

India's Water Struggles

Lack of access to water is a major issue in many developing countries, however the widespread problems throughout India make it a fascinating case study. India supports more than 17% of the world's population with less than 4% of the freshwater.¹¹

Its geography is unique, the vast number of different temperate zones make it incredibly susceptible, causing it to be ranked as the most vulnerable nation to climate change in the world, according to a 2018 study by HSBC.¹²

Coastal regions are threatened by increased intensity and frequency of cyclones and storms. Low lying, heavily populated megacities such as Chennai and Mumbai are regularly flooded and increased migration to these regions from rural areas has resulted in enhanced competition over scarce resources and employment opportunities. Moreover, flood water is often the only water accessible to the public, putting millions of people at risk of contamination and illness.

In desert areas, average summer temperatures are nearing the 50 degrees Celsius mark, making it uninhabitable to the vast majority of people. Historically a 10% decrease in precipitation in southern states caused a 25% decrease in water availability.¹³ Moreover, increased average temperature in northern regions are accelerating the melting of Himalayan glaciers. Heavy summer flows cause the banks to burst and flood mountain villages with little adaptive capacity. Inefficient methods of collection mean that these people are unable to store the excess water for future use.

Studies have shown that rising temperatures put 80% of farms at risk of flooding in the summer.¹⁴ This ruins crop harvests whilst limited water in the winter months cannot sustain farming. 67% of Indians make a livelihood from agriculture, whether from growing crops or from selling them. Without a reliable water supply, more than half a billion people become economically unstable. By utilising capture mechanisms in a similar way to Cape Town, these rural villages would benefit during times of flooding by storing water for the drier months. Similar projects have already been piloted with great success. During a drought in 2009, 45000 water structures were built in Barmer, providing employment for hundreds of people as well as the capacity to hold 1300 million litres during the monsoon season.¹⁵

According to India's National Determined Contribution (NDC), as per the Paris Climate Agreement, the National Water Mission's key goal is to minimise waste and increase water efficiency by 20%.¹⁶ Unlike Cape Town, much of India's water comes from the ground table, which is depleting at a considerable rate due to wasteful harvesting and damaging agriculture. However, local education initiatives have started to teach farmers, especially those suffering from salinization due to sea flooding, about traditional crops. These varieties can withstand high levels of salt and have a much lower water requirement for growth, increasing the likelihood of a successful harvest even in a testing climate. Moreover, the Watershed Development Programme offers a solution to replenishing groundwater by creating laws that ensure all large houses and hotels must take part in rainwater harvesting. Authors have even

suggested aggressive, nationwide Managed Aquifer Recharge programmes, similar to Cape Town but on a much larger scale.¹⁷

Perhaps where India could learn the most is from the water recycling and cleaning processes that have been effective in Cape Town. India's problem is not necessarily a lack of water, as is the case in South Africa, but more a lack of clean water. The Ganges provides a natural source that could sustain millions, given the correct water management. The National Mission for Clean Ganga is a rejuvenation project backed by the government that aims to build an abundance of treatment plants and separate sewage networks to prevent contamination and pollution.

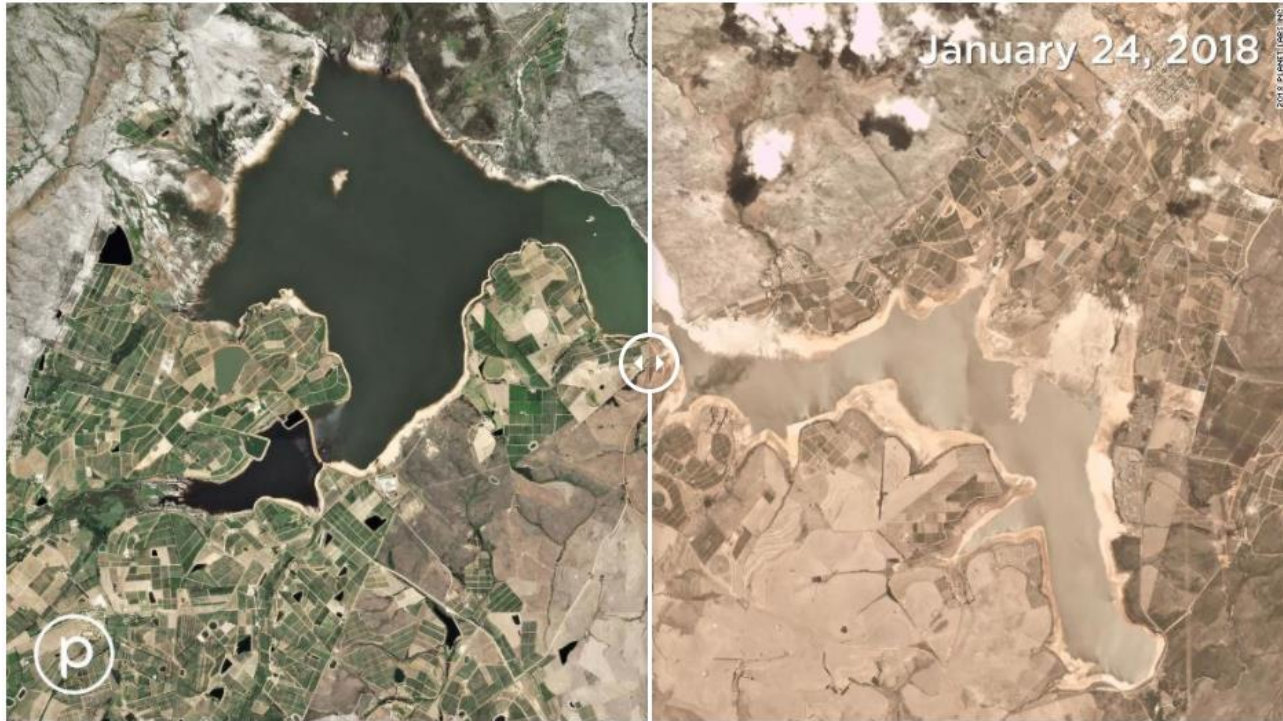
An Uncertain Future

Having considered the positive progress that Cape Town has made so far, it is now imperative to address the issues that the city still faces.

A Realistic Perspective

Cape Town is far from in the clear. Despite the resource management methods in place, the city has acknowledged these are short term stalling strategies. Residents are still having to abide by life altering restrictions, often only being able to wash once or twice a week. Businesses that can afford to pay the fines for overuse may be inclined to break the guidelines until more serious repercussions are imposed. Most importantly, even with Capetonians cooperating, water security for the coming months and years is heavily reliant on winter rainfall – something that is entirely uncontrollable. Should the rains fall below average levels for the third year in a row, resource management strategies alone are unlikely to be enough and Day Zero could occur early in the New Year.

Furthermore, although average dam levels are slowly rising, certain individual reservoirs are continuing to empty. Theewaterskloof dam has breached the 10.5% level, and considering the last 10% of any dam is typically very difficult to utilise. The image below shows the satellite comparison between January 6th 2011 and January 24th 2018, with the photo from this year looking dangerously barren.



The Voelvlei dam is also sitting around 14%. If these levels drain much further, the city will be unable to draw from these reserves, creating a situation where fewer dams have to supply more people. This would likely bring Day Zero closer.

If the drought persists much longer, there are worries that the stress and difficulty of the situation could manifest into physical violence between Capetonians. ‘Water wars’ are not uncommon. Bangladesh and India are regularly engaged in disputes over claims to sections of the Ganges with both parties threatening to break the Teesta Treaty, tensions often escalate when access to resources become literal life or death scenarios.¹⁸

Education and Finance

Education is a valuable tool. Although climate change has become a hot topic, many people are unaware of how it manifests or what measures they can use to combat it. For example, a study of Indian farmers found that despite them all recognising seasonal changes and how these changes impacted the crop yield, they were uninformed about what action was best to take.²⁰ Adaptation and resilience education should take precedence, the ability to recognise potential threats and change processes accordingly is an asset to ensure longevity.

Finally, for Cape Town, India and many other vulnerable regions, financing resilience efforts is an enormous obstacle. Cities may have grandiose adaptation strategies in mind but without securing funding they will remain nothing more than a pipedream. As an example, 82.6% of surveyed Indian farmers proposed the construction of small dams to facilitate irrigation needs.¹⁹ However, this is hugely expensive and unrealistic without financial aid. The obvious starting point is with governments, promoting more efficient distribution of a limited budget and giving preference to schemes that promote sustainability must become top priority. India has already taken a proactive approach in this regard, providing subsidies for climate initiatives such as small-scale irrigation, resilient agriculture and local sanitation projects, whilst dramatically reducing funding for environmentally detrimental endeavours, like mining and the construction of fossil fuel plants.

Fortunately, global initiatives by international organisations are creating networks for both the transfer of knowledge and access to funding. Cape Town has indeed benefitted from the recently launched Greater Cape Town Water Fund, established by the Nature Conservancy. This organisation has set up more than 30 funds in a bid to boost water security.²¹ Moreover, engineering firm Arup, in collaboration with The Rockefeller Foundation, The World Bank and many more, have developed the City Water Resilience Framework that will pilot projects in vulnerable cities. The aim is for the framework to become a resource that other cities have access to and can learn lessons from in terms of responsible investment, and knowledge of urban water systems to help them achieve the sustainable development goals.²²

Conclusion

Rising temperatures as a result of climate change are exacerbating water insecurity, but delaying Day Zero represented an important milestone for climate resilience in developing countries. Many thought Day Zero would be the catalyst for global water crises and mass chaos. While this may still occur, vulnerable regions can indeed learn a vital lesson from Cape Town. Under extreme pressure, Cape Town endures and has brought public attention to the issue, highlighting its importance on an international stage.

Cape Town was supposed to be the first to experience Day Zero, and will unlikely be the last. Currently, Spain, India, Morocco and Iraq are all suffering water crises from rapidly shrinking reservoirs. Whilst water insecurity remains a very real threat, running dry is not yet an inevitability. A combination of resource management, seasonal rainfall and substantial strides in education and climate finance could see Day Zero deferred in the longer term.

However, a shift in thinking is required. Proactivity beats reactivity, and it is paramount to implement forward planning to ensure sudden emergencies do not cause hysteria. Early recognition of potential threats allows for gradual changes to resource management, rather than immediate and lifestyle changing alterations at the last minute. As more cities prove their resilience, it provides a learning opportunity for others to follow, which is promising for the future.

Marcus Arcanjo holds an MSc Development and Security from the University of Bristol and a BSc Econ Business Economics from Cardiff University and is a Research Fellow at the Climate Institute.

Notes

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