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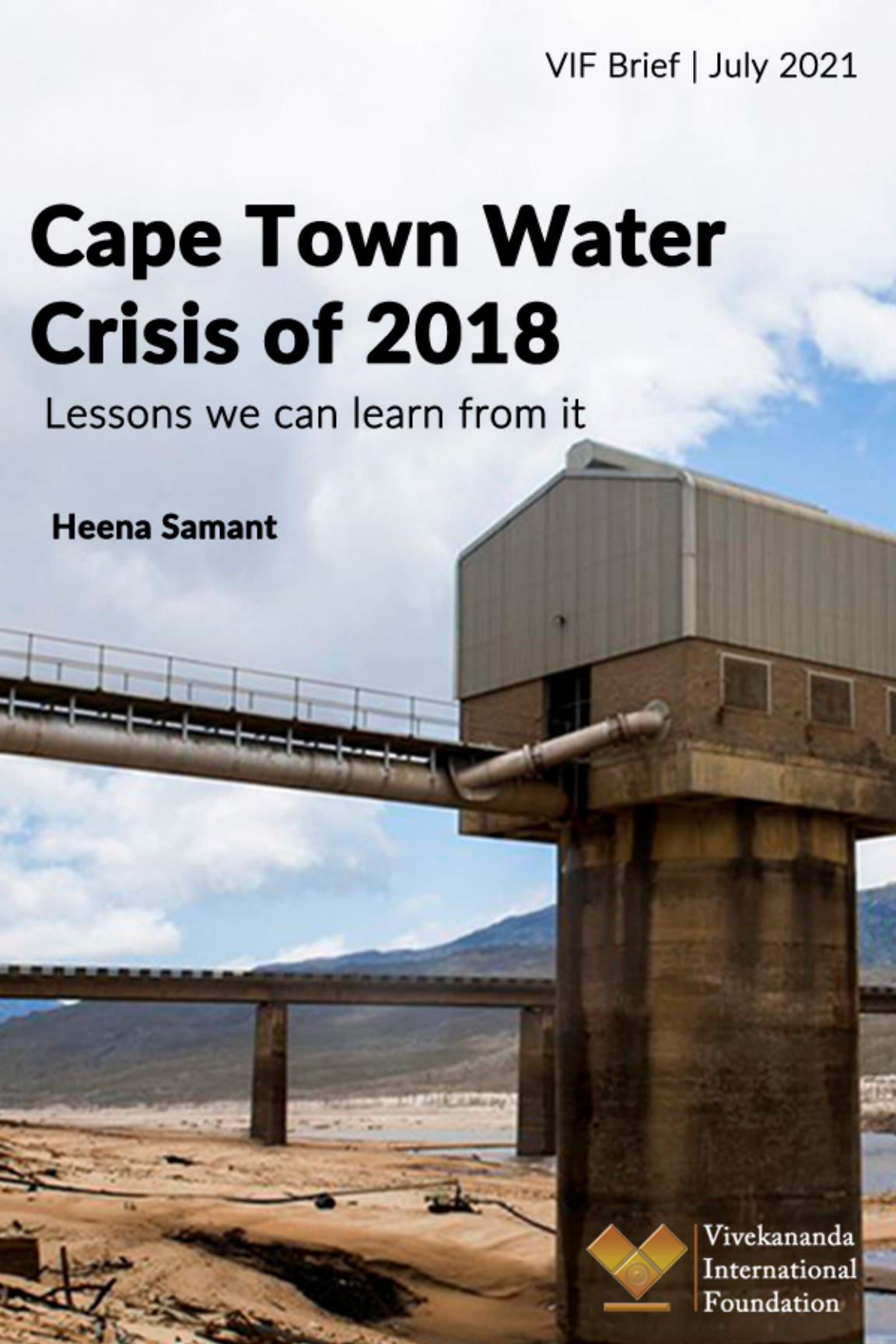
Cape Town Water Crisis of 2018

Lessons we can learn from it

Heena Samant



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Completed M.Phil in Southeast Asian and Southwest Pacific Studies from Centre for Indo-Pacific Studies, School of International Studies, Jawaharlal Nehru University. My M.Phil thesis titled "Lower Mekong River mainstream dams and its various implications 2000-2015" focussed on the dams being constructed on the Lower Mekong River and how that would impact the people inhabiting the region environmentally, economically, and socially. it also focussed on how the construction of these dams are a threat to the Lower Mekong Region's peace and security. Completed Masters in Politics with specialization in International Relations, School of International Studies, Jawaharlal Nehru University. Completed B.A. Hons in Philosophy from Gargi College University of Delhi.

Cape Town Water Crisis of 2018: Lessons we can learn from it

Abstract

A serious water crisis plagued the city of Cape Town in early 2018 to the point that it was on the verge of becoming the first modern global city to run out of water. However, the city never reached to that point because of the strict measures introduced by the central as well as the local authorities of the city and the efforts put in by the people of the city also known as Capetonians. This urban water crisis can be described to be unique in nature because of several reasons which has been discussed in the paper. Although the crisis took place in 2018, it does hold great importance even today and has important lessons to offer. The experiences of city and its people are relevant to many metropolitan cities across the globe.

Introduction

To imagine a life without water is impossible. This finite resource is the lifeline for the survival and development of human life and livelihood.[1] However, the world today, is facing an acute water crisis. Several factors such as rapid urbanization, population growth, and climate change have been argued to be the main drivers behind this crisis.[2] The World Economic Forum has consistently ranked the global water crisis as one of the greatest threats to human development and likelihood of occurrence.[3] In the past couple of years, the world has witnessed many incidents of water shortages in different cities and states which are a proof that the "global water crisis is real" and must be taken seriously.

One such incident occurred in 2018 in the city of Cape Town, South Africa. This city of four million, became the subject of worldwide attention as it faced the worst water crisis to the point that it was on the

verge of becoming the first modern global city to run out of municipal water. The event was described by the New York Times as an ominous threat said to surpass "anything a major city has faced since World War II or September 11 attacks".[4] There was no doubt about the fact that the city received large global media attention due to the crisis that it was facing but what made it stand out was the way in which the catastrophe was handled and later averted. Today the world remembers the Cape Town water crisis of 2018, as it is famously described, not for the crisis it faced but for the lessons it has to offer for the rest of world to learn from it. To be more specific, there are several reasons which makes this particular crisis extraordinary and those are:

- this urban water crisis posed a serious threat to the city and its people but was averted which means that the city never ran out of water;
- the manner in which the crisis was handled both by the local authorities and the citizens of Cape Town has been impressive as well as inspiring;
- This crisis has some very important lessons to offer for the rest of the world to learn from it;
- It led to the creation of a novel concept termed as "Day Zero" and according to the scientists in the years to come, this would not be a rare event anymore but a more common occurrence.

The paper will focus on the details of this crisis discussing as to how it unfolded and the measures taken that lead for such a serious crisis to be prevented. The paper will also pay a special attention at the role of the citizens of Cape Town also known as Capetonians without whose support and cooperation the city would not have been able to avoid such a serious threat also known as Day Zero.

Background

Cape Town is a rapidly urbanizing coastal city with a population of about four million people in the Western Cape region of South Africa.[5] It is one of the most beautiful cities in the world and is also a major tourist destination.[6] It is also the legislative capital city of South Africa.[7]

Fig 1. Map of Cape Town and the Western Cape Province Source- Mail & Guardian thought LEADER[8]

The city, however, is argued to be one of the most unequal cities in the world as majority of its population i.e., 60 percent is mostly black population who live in the informal settlements and townships far from the main city.[9] Contrary to this, the wealthy and middle-class white populations live in the city center.[10] Before analysing the crisis that unfolded in 2018, it is important to understand the water supply system of the city and the institutions associated with it. The city has been largely dependent on surface waterwhich means that 95 percent of its water comes from six major dams for all its activities.[11] These dams are namely the Theewaterskoolf dam, the Upper Streenbras dam, the Lower Streenbrass, the Berg River dam, the Voelvei dam, and the Wemmershoek dams and they together form as to what is known as the Western Cape Water Supply System.[12] The city witnesses a Mediterranean climate with warm dry summers and wet cool winters and it is estimated that it is during the winter months which does last between May to October

that the city receives around 70 percent of its rainfall.[13] These dams are predominantly refilled during the winter season.

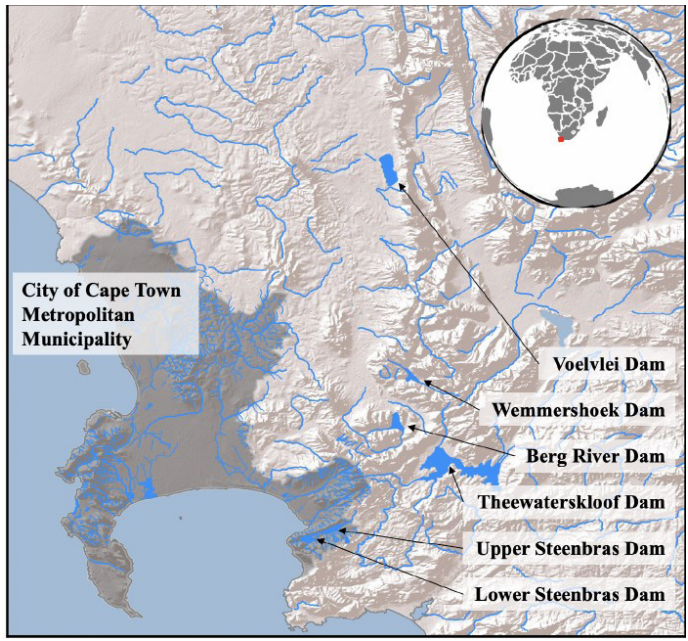

Fig 2. Image of the location of the six major dams of the Western Cape Water Supply System[14]

Water in South Africa is considered a shared responsibility between three institutions.[15] The National Department of Water and Sanitation (DWS) is in charge of bulk and resource management, the responsibility to supply infrastructure and service delivery falls under the local city authorities, and lastly the provincial governments are entitled to provide help and support to the local authorities when required by them.[16] To be more specific, the National Department of Water and Sanitation (DWS) manages water resources that the local Cape Town municipality authorities supplies to the city with the help of the provincial government.[17] It is argued that together the Western Cape Water Supply System (WCWSS) holds around 18 months of supply of water for various purposes, out of which the City of Cape Town (CCT) gets the maximum share which is about 58 percent.[18] It is also asserted that those living in the wealthier neighbourhoods or formal settlements

use about 66 percent of the water allocated to the city while those living in informal settlements use only four percent, thus portraying the level of inequality that exists in the society of the city.[19] The maximum consumption of water allocated to city is done by the domestic sector.

Countdown to Day Zero: the water crisis of 2018

It has been argued that in 2014 the dams of the Western Cape Water Supply System (WCWSS) were in their full capacity.[20] Things took a turn the following year when the city experienced a dry hot summer and extremely low winter rains.[21] The dams were down to 71 percent of their full storage capacity.[22] The year 2016 was a moderately dry year for the city with no chance of recovery.[23] It is estimated that the same year, the water levels in these dams were down to 60 percent and by the beginning of the summer of 2017, the levels of these dams were as low as 38 percent.[24] By the time the year 2018 arrived, the city had only three months of water left for its usage thus moving towards a scenario termed as 'Day Zero'. This was further confirmed by the then mayor of the city Patricia De Lille who around mid-January of 2018 announced that the city had reached a point of no return and it would soon be approaching 'Day Zero' which was identified to be on 21st of April.[25]

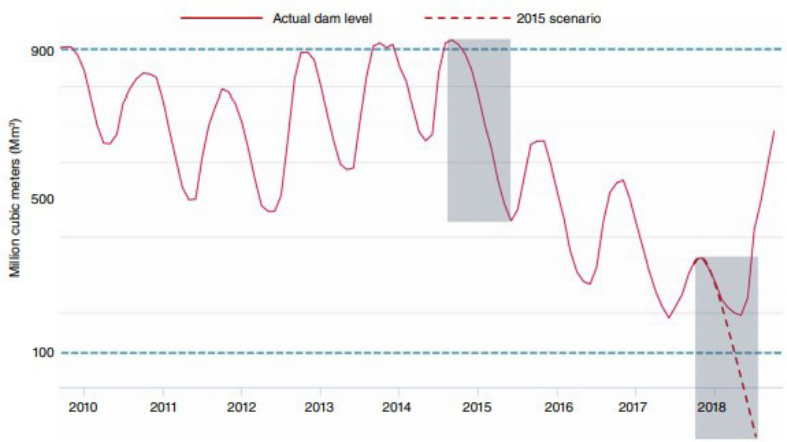

Fig 3. The Western Cape Water Supply System (WCWSS) stores around 900 million cubic meters of water. The above figure shows how the levels of water dropped from the year 2015 onwards till 2018.[26]

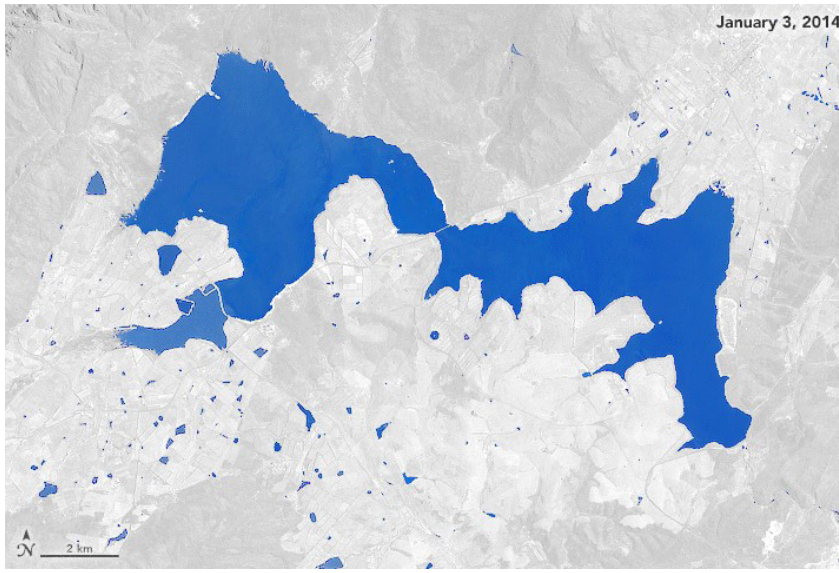

Fig 4. This figure is an animated image of the Theewaterskloof dam that shows how the dam was full in January 2014 and was completed by January 2018. Source- Landsat Image Galary NASA.[27]

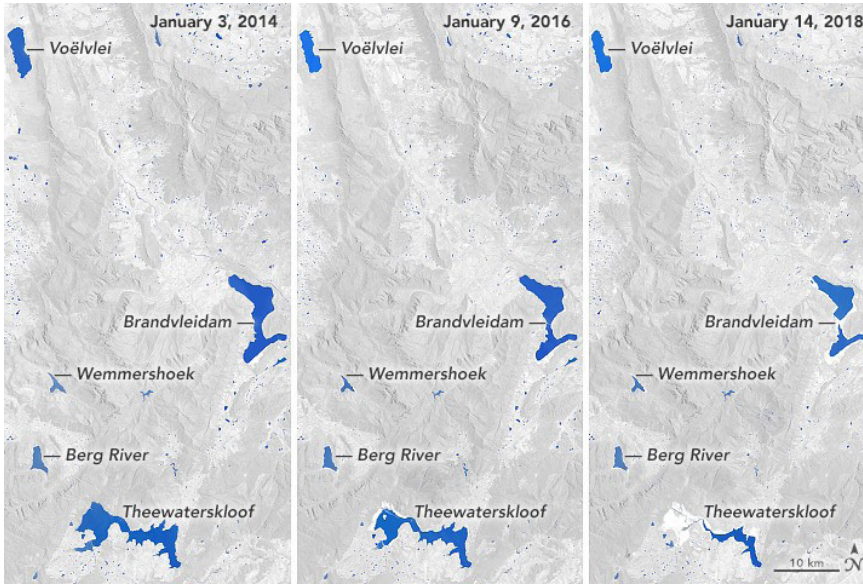

Fig 5. This is an animated image of the dropping of water levels in five of the dams of the Western Cape Water Supply System (WCWSS) between the years 2014 to 2018. Source- Landsat Image Galary NASA[28]

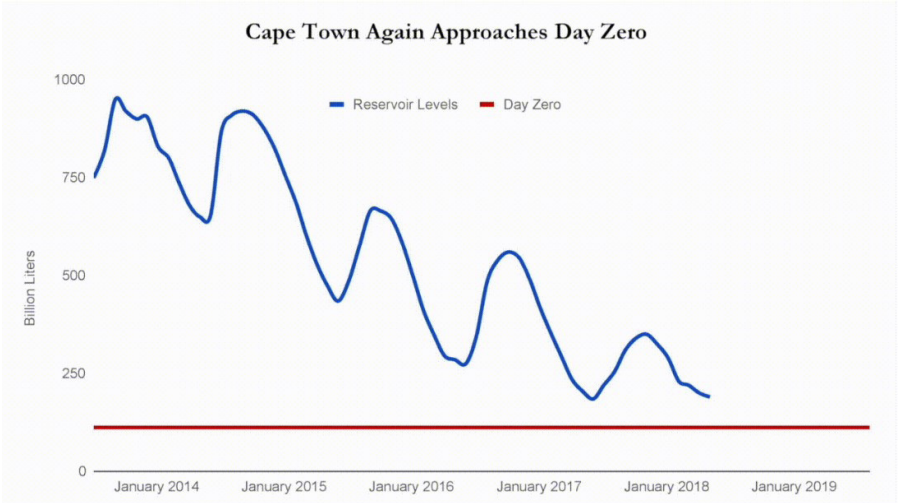

Fig 6. The above figure once again shows that the level of water in the dams of the Western Cape Water Supply System kept falling from the year 2015 till 2018. The image has been created by Lew Blank for his article Cape Town: A Horrifying Look into the Future of Climate Change published in *The Outsider*, an independent student led publication.[29]

Day Zero was supposed to be an estimated day on which the reservoir levels supplying water to Cape Town would fall below 13.5 percent of its capacity.[30] It was not a fixed date as it kept on shifting depending on the dam levels and projected water consumption in the city.[31] On the arrival of Day Zero taps would have been turned off with only vital services accessible to water.[32] Additionally, schools and most businesses would have been closed unless they fulfilled certain criteria such as having their own bore holes, temporary off-main toilets and drinking water.[33] The most important part of such a scenario would have been the fact that the people of the city would have had to collect water from 200 distribution points with a restriction of 25 liters per person per day by queuing up in a line.[34]

According to researchers from Stanford University and the National Oceanic and Atmospheric Administration (NOAA) human-caused climate change made the "Day Zero' drought in the city of Cape Town five to six times more likely.[36] It was also concluded by these researchers that such extreme events could become more common than rare by the end of the century.[37] Piotr Wolski, an associate professor of hydrology

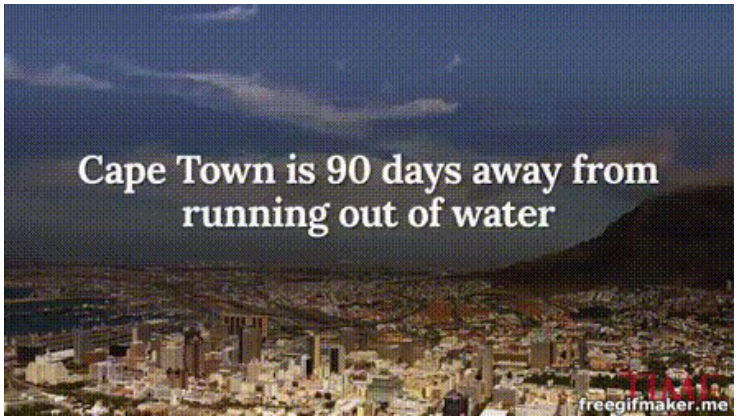

Fig 7- This animated image gives a glimpse of the city of Cape Town when Day Zero was just few days away from reality.[35]

at the Climate System Analysis Group, University of Cape Town, South Africa, described the three year drought as once in 311 years phenomena, something that is very rare and severe.[38]

For the world this was a unique crisis. Across the globe, people waited to see as to how the city and its people would live with a crisis which had the capacity to destroy their lives and livelihood. For the same reason, this situation got a huge global media coverage. To quote from one of the articles based on the crisis, "The city received considerable attention as a potential harbinger of a future marked by climate change, prompting extensive coverage and analysis."[39] However, things did not turn out to be as predicted and the city never ran out of water. The big question was how? It has been argued that what saved the city from such a disaster was several measures put in by the local authorities and the Department of Water and Sanitation (DWS) and also the effort put in by the Capetonians to save themselves and the city from such a catastrophe. The next section deals with the steps that were taken by the authorities to avert the crisis and also discusses the significant role that the city dwellers played to do the same.

Measures and steps taken to avert the crisis

The city, in order to avoid a disaster of such a large scale embarked on a strenuous journey of a combination of efforts. The terms 'combination

of efforts' means that the steps that were taken to avoid the disastrous situation was actually a consolidation of efforts made by both the authorities as well as the people of the city. From the authority's point of view, it was important to first of all to target the domestic sector which consumed the maximum amount of water that was provided to the city through the Western Cape Water Supply System (WCWSS). They focussed on what is called 'water demand/consumption management and water supply management'. The locals on the other hand, did abide by all the rules and restrictions imposed on them and played a significant role in avoiding the crisis altogether. The first step taken by the authorities was to put restrictions or limit the use of water for every single individual of the city. It has been argued that after a low rainfall in 2015, the city had introduced voluntary restrictions in 2016.[40] Since then there were levels of restrictions that was imposed on the city by the establishment.

Fig 8. Gives the information of the timeline of the level of restrictions introduced by the authorities for the city.[41]

As visible in the chart, level 6B restrictions which was introduced around February 1st after the announcement of the approaching 'Day Zero'. This level of restriction was the most aggressive form of restrictions and also the most significant one that was imposed on the city. It was only after this level of restriction was imposed that the city was able to avoid 'Day Zero'. This section of the paper focuses in detail on the 6B restrictions

and in order to impose such restrictions what other sub-measures were taken by the administration.

Level 6B Restrictions

As per government, level 6B water restrictions were applicable to residents and businesses in the City of Cape Town as of February 1st 2018 which was supposed to be limited to human consumption.[42] Water consumption was supposed to be limited to 50 liters or less per person, per day at home, work, school etc.[43]

Fig 9. This picture depicts a guide to using 50 liters of water as introduced by the local government of Cape Town also known as the City of Cape Town (CoCT). Source- cape{*town*}etc[44]

It was also said that the residential properties who were using more than 10,500 liters of water per month would be fined or will have water management devices installed on their properties.[45] Additionally, commercial properties also had to reduce their usage by 45 percent as compared with pre drought times.[46] Under this restriction, borehole water use for outdoor purposes was discouraged in order to preserve groundwater resources and wellpoints and boreholes were supposed to be registered with the City of Cape Town (CoCT).[47] The municipal drinking water was not allowed for ornamental water features.[48] It was encouraged to use grey water for flushing toilets that too only when necessary.[49] Washing of vehicles with municipal water either privately or at formal/informal car wash was strictly prohibited.[50] Other things which included under this level of restriction was that sports field or any new landscaping was not supposed to be established except if irrigated with non-drinking water and top-up, filling or refilling of swimming pools with drinking municipal water was not allowed.[51]

In order to implement these water restrictions, other additional measures were taken. Those were:

- Water Tariffs- prior to the crisis, all households in Cape Town received 6 Kilo Liters of water under the Free Basic Water (FBW) policy on lines with other parts of the country.[52] However since July 2017, it is argued that all water became chargeable and Free Basic Water (FBW) became available to households which were able to declare themselves as indigent.[53] There was also a revision of the tariff structure. In other words, as a response to the crisis, tariffs was increased significantly from 2016 until late 2018 in order to reduce water demand.[54] It is also argued that a fine was charged which varied between $70 and $700 for households that consumed more water than allocated to them.[55] This brings to the next measure which was the installation of Water Management Devices.

- Water Management Devices- A water management device was equipment that could be installed to a water supply pipe to

impose a set daily limit for water for a property.[56] The way it worked was once the allocated water was used by a household then the water supply would automatically stop and resume only the next day. These devices were not introduced as a result of the crisis but it was a part of city's water strategy since 2007. It has been argued that since 2007, around 250,000 of these devices had been rolled out but only in those households that claimed to be indigent.[57] However, once the crisis unfolded there was a ramification of these devices on non-indigent properties as well as a part of their drought response.[58] As written in a 2019 paper by Robbie Parkes et al that these devices were originally introduced to manage debt and unfixed leaks from indigent houses over many years, the City of Cape Town (CoCT) rolled out these devices throughout 2017 as a part of a voluntary programme whereby indigent households could choose to have a WMD installed without charge, combined with a one-off house leakage fix and an agreement to write off historic water debt.[59] The paper further adds that once the crisis unfolded, there was a shift of strategy of targeting only the indigent households and as a part of Level-4 restrictions, the CoCT targeted the high consumption households as well.[60]

A TYPICAL 15 MM CONNECTION WMD

Fig. 10 shows two images of the Water Management Devices.[61]

- Water Pressure Reductions- the idea behind this was to reduce pressure in water pipes with the onset of the devastating water situation in Cape Town. It is argued that by doing this, the city saved around 50 million liters of water per day.[62] Other benefits of this step included decreased water loss through leaks and also reduced frequency of pipe bursts.[63]

- Communication Campaign- this campaign was an initiative of the local authorities of Cape Town also addressed as the City of Cape Town (CoCT). The purpose of such a campaign was to encourage water conserving behaviour among the citizens of Cape Town. They introduced a large-scale public information website called Think Water which provided information on restrictions and water saving techniques. This website also provided information on the current dam levels and is active till present day.

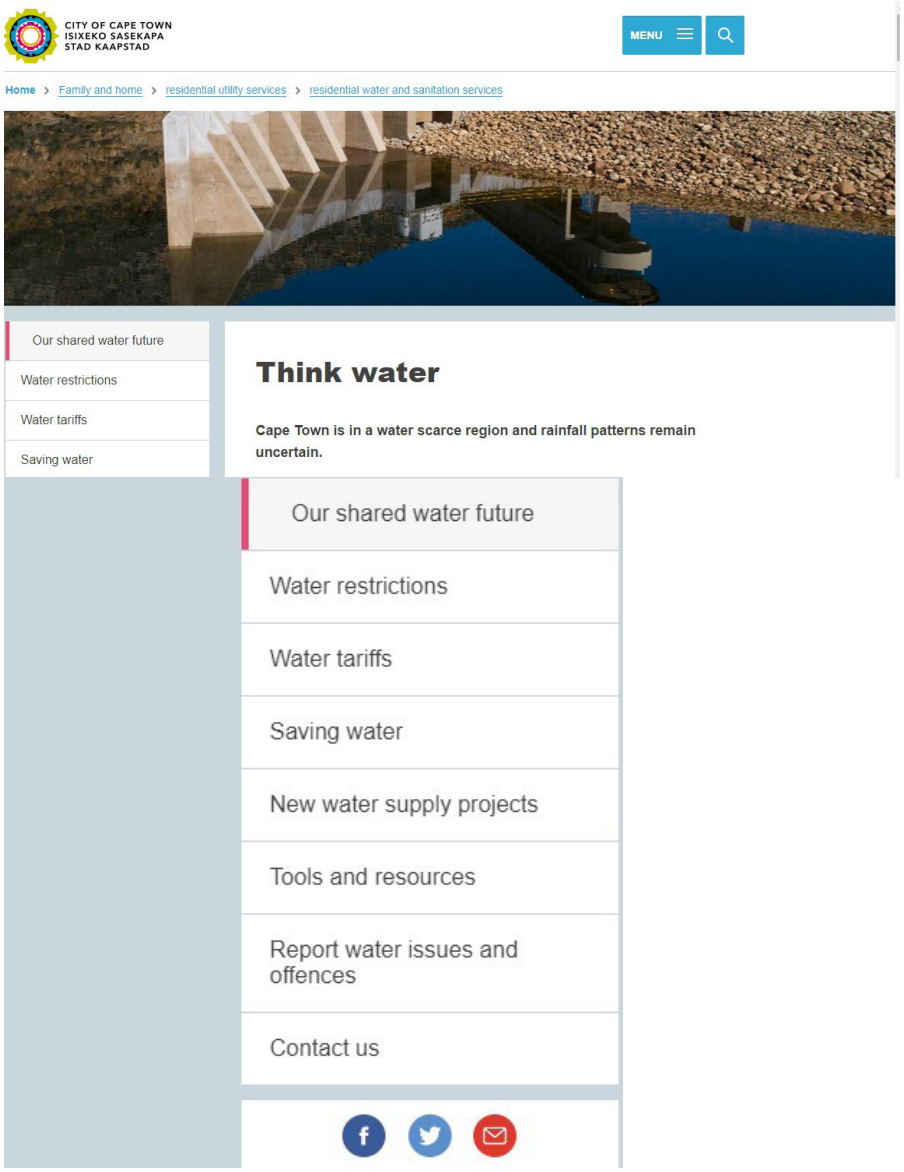

Fig- 11 the above images shows how the Think Water website.[64]

Additionally, messages providing tips on how to save household water were published across various channels like from radio advertisements to billboards across the city including airports and highways and also flyers in water bills.[65]

Fig 12: shows an image of the international airport of the city.[66]

Fig 13: Another image of water saving message at the Cape Town International Airport.[67]

Fig 14: this image is a sign in the middle of a highway to keep the residents aware of the city's water conditions.[68]

Not only this, even for tourists, the government introduced guidelines to use water mindfully.

Fig 15: shows a message specifically for the tourists who were visiting the city at that time from the local government.[69]

Additionally, the city launched a city Water Map to monitor and show the citywide household consumption levels.

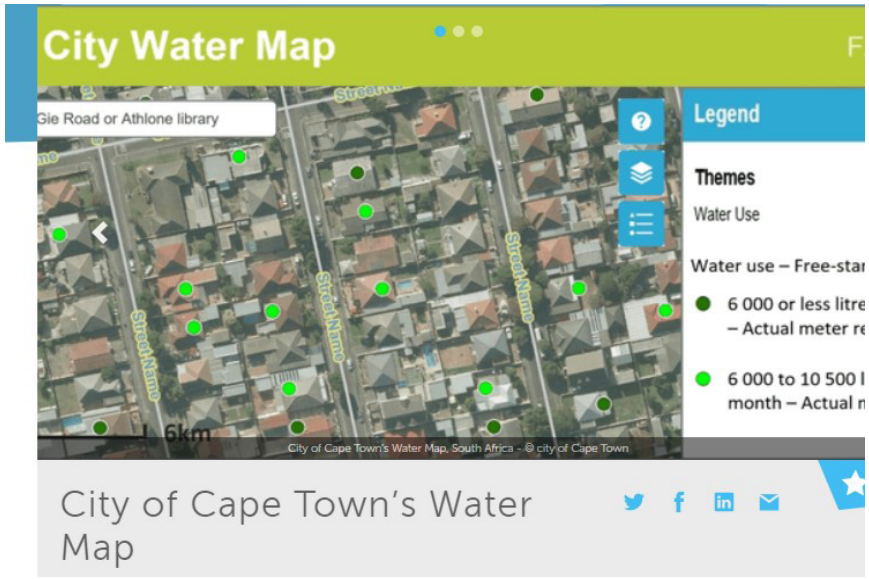

Fig 16: This is what a city water map looked like.[70]

This map however has been discontinued as of January 2019. This step was also one of the most controversial ones as many people thought that it was invading their privacy.

- Role of the citizens of Cape Town also referred to as Capetonians- it has been argued that when the city had reached a point when the future looked grim for it, the natives of the city played a very significant role in bringing their consumption levels down. According to Gina Ziervogel and Leonie Joubert in their book titled Day Zero: ONE CITY's RESPONSE TO A RECORD-BREAKING DROUGHT, the citizens of Cape Town were actually pulling their weight in terms of cutting their water use.[71]It was observed that once the city ramped up its efforts to avoid the arrival of Day Zero, the citizens also started changing their

behaviour and that behaviour was phenomenal.[72] This has been believed to be one of most effective methods which helped in avoiding Day Zero situation in the city.[73]The Capetonians joined hands together to share water saving tips online and also through radio shows.[74] Apart from these, tips like not to boil food but to bake it or grill it, and use of paper plates rather than normal plates was also suggested.[75] It was also encouraged to take short showers and once done to collect that water also known as 'greywater' and use it later for flushing. Slogans such as "If its yellow let it mellow, if its brown flush it down" became very popular among the citizens of the city and was practiced not just in the households but also in restaurants, cafes, and offices. Small initiatives like use of hand sanitizers instead of water at these public places was also encouraged. It is said that the citizens of Cape Town became Water Wise.[76]

Fig 17- A sign to use water inside a public restroom only when necessary.[77]

Apart from these major and important initiatives, other measures like the use of few mobile applications such as TapOff and DropDrop were also introduced.[78] Additionally, it has been argued that the municipal authorities as a part of their immediate response to the crisis diverted

water from the agricultural sector for the city.[79] There was also a creation of water police in order to patrol areas of high-water usage and fine those who were breaching the restrictions.[80] On the supply management side, the CoCT focussed on temporary desalination plants, extracting groundwater from the aquifers of the city, people also queued in the natural springs to collect water, a lot of focus was also given on the significance of rainwater harvesting.[81]

Impact

It is argued that these measures and behavioural change were extremely effective as the daily average water consumption of the city reduced from 1200 million liters in February 2015 to 500 million liters in February 2018 which is more than 50 percent.[82] In fact, this campaign of saving the city from Day Zero has been described to be one of the most effective drought campaigns of the world. Another important outcome of such a campaign was that the relationship of the citizens of the city with water changed and they became water wise. These efforts along with the final arrival of winter rains eventually pushed back Day Zero indefinitely.

While these were the most important and positive outcomes of the campaign, the city at the same time was under a lot of stress.[83] It impacted a variety of different aspects of society from public health to tourism, agriculture, other parts of economy and government finances as well.[84]It was estimated that lower crop yields during the crisis caused an economic loss of about $400 million in addition to tens of thousands of jobs.[85]It is also estimated that around 30,000 jobs were lost during the time of the crisis many of which were the livelihoods of the migrant workers and other vulnerable populations.[86]

Situation Now

At present, no water restrictions are in effect from November 1st 2020.[87] However, the website which is still in existence does urge to use water responsibly.[88] As far as water tariffs are concerned, the lowest (no restriction) tariff is in effect from 1st November 2020.[89] As of June 15th 2021, the dam levels are as follows:

Current Dam Water Levels - 15/6/2021		
Major dams	**Storage**	
	Ml	**%**
	Capacity when full	**15/6/2021**
Berg River	130 010	86.5
Steenbras Lower	33 517	60.8
Steenbras Upper	31 767	57.8
Theewaterskloof	480 188	80.4
Voëlvlei	164 095	61.0
Wemmershoek	58 644	60.6
Total Stored Ml	898 221	673 011
% Storage		74.9

Fig 18: shows the levels of dams as per 15th June 2021.[90]

The website still encourages the use of alternative water sources such as grey water, groundwater, rain water, treated effluent, boreholes and wells.[91] The website also lists its various new water supply projects that has been introduced in order to increase and diversify the city's water supply.[92] Those are:

- Groundwater extraction[93]
- Water reuse[94]
- Clearing of invasive alien vegetation[95]
- Berg River Augmentation[96]
- Temporary and permanent desalination[97]

- Spring water extraction[98]
- Lourens water extraction[99]
- Water demand management[100]

The city also introduced a Cape Town Water Strategy which provides a road map towards a future in which there will be sufficient water for the city.

This water crisis forms the basis of what many urban cities around the world may experience in the future. As mentioned in one of the articles written by Marcus Arcanjo that "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 people thought Day Zero would be the catalyst for global water crisis and mass chaos. While this may still occur, vulnerable regions can indeed learn a vital lesson from Cape Town. Under extreme pressure, Cape Town endured and has brought attention to the issue, highlighting its importance on the international stage."[101] It also made the people of the city realize the importance of a single drop of water. In order to illustrate this, some of the statements of the citizens of Cape Town selected from various documentaries made on the concerned subject indicate their identification with the crisis. In one such documentary, a person says "I think that what's happened over the last twelve months is that our attitude towards water has changed irrevocably. We have actually learnt that getting water and being able to turn on a tap and the water is there, that's a 'privilege'."[102] Another statement includes "I think Cape Town is like a wake-up call for the world. The rest of the world should wake up and say okay this is how it is going to be which is there is not enough water and rainfall is going to be erratic. Hence, we are in trouble and everyone is in trouble."[103] Hence, the Cape Town water crisis of 2018 has some important and valuable lessons to offer for the rest of the world to learn from it. Those lessons have been mentioned in the next section.

Lessons

1. It has been very appropriately mentioned in a paper written by Johan P. Enqvist and Gina Ziervogel that "a water crisis is therefore not simply about too much or not enough water, but often a governance crisis where the institutions put in place have failed to build resilience and adapt to changing conditions."[104] This thought is extremely relevant in today's time and scenario and also portrays as to what went wrong in Cape Town. Cape Town water crisis showed the world what happens when a city is dependent on a single source of water to feed its people and other purposes. It is only when the crisis reached its peak that the government decided to diversify water resources. Hence, it is important for cities and countries for that matter who are facing water shortages or are bound to face such a situation to diversify their water resources and no be dependent upon a single source.

2. Big cities around the world are in need of attention as far as water availability is concerned. Worldwide, population in the big urban cities is going to increase especially in the developing nations. Hence, it becomes important to re-think about how and what are the ways in which water could be made available to each and every citizen of these cities.

3. As mentioned above that Day Zero would not have been delayed indefinitely without the help and cooperation of the people of Cape Town. Hence, it is necessary to educate and make the people of a city or a country aware about the situation of water. This awareness should not just be about the situation of water in their country but also about what is happening around the world. It is also important to bring water conservation and the methods to conserve water into the daily conversation of the people. It is believed that the communication strategy that the City of Cape Town embarked upon helped people become aware about the situation of water in their city and made them realize as to how important it was to save a single drop of water. It changed the

behaviour of people towards water on a daily basis. Thus, a very important lesson is to use water judiciously in our daily lives. One should not wait for a catastrophe like Day Zero to occur to change one's behavior towards water.

4. This three year of anemic rainfall which eventually culminated into a drought has been described to be a once in 311 years phenomena. Another prediction that was done was that this type of drought will not be an uncommon occurrence anymore but a more common one. Since Cape Town has already experienced and has been able to come out of it successfully, it has shown the world as to how to be prepared if such a crisis knocks at their doorstep. It is an example from which the world can learn and not repeat the same mistakes.

Conclusion

The Cape Town water crisis stresses on the fact that water is a scarce resource, one that should be used wisely. It serves as an example of what the fate of many cities around the world would look like in future. At the same time, it gives solutions and raises awareness about what a city or a country should do or should not do to avoid such kind of catastrophe. Threats like a pandemic and climate change depends a lot on people's behavior. How people behave, what rules they follow, how much they feel for our environment, what efforts are they making at individual levels in order to deal with several impacts of climate change are some very important questions to ponder upon. And the crisis that hovered the city in 2018, does answer these questions. If at the height of the crisis, the people had not changed their behaviour and not cooperated then Day Zero was inevitable. We, as individuals, are equally responsible to save the planet and its resources. Additionally, educating the masses as to where we stand in terms of our resources is also important and what would happen if the planet runs out of the resources that its left with. This could make a huge difference. Nevertheless, the water crisis of Cape Town was a unique incident which will be remembered in the years to come.

End Notes

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