Cape Town: the bulwarks are being raised

I have not written anything about the drought in Cape Town and its unfolding disaster since end of May. In my last article, I questioned the various claims of "the worst drought in 100 years" as was referred to the 2016 drought at that time. It has since transpired that Cape Town is now (in 2017) indeed suffering from a crippling drought – or is it? I have, from time to time, briefly commented on various press articles and statements by politicians, officials and experts relating to the drought. In these comments I have generally expressed my concern that firstly, the public is being lied to about what really lead to the current situation (climate change, the "new norm" and various derivatives thereof) and secondly, the public is being treated as fools – especially around claims that something meaningful is being done to address the situation. This is still my general view. I have been clear that the DA (as the government of Cape Town) is to take the blame for this situation and that will cost us all dearly. Now recently, there have been articles appearing in the press and on social media, with the seemingly singular aim of exonerating the DA – both its politicians and its officials. The bulwarks, so to speak, are being raised.

It is interesting to note that two of these articles are of academic origin. Both articles conclude with an explicit whitewash of the DA from all blame. So, if these articles are of academic origin, one would assume that the writers have done their homework? Unfortunately, I do not think so.

The first article is by Mr Piotr Wolski, and was published on the CSAG blog (associated with UCT) on 28 August. In his article, Mr Wolski examines the recent rainfall data for a few weather stations located in the Western Cape. His main analysis however, is based on rainfall data for Cape Town Airport (CTA). Like myself and other authors earlier this year, Mr Wolski bemoans the fact that reliable, long-term rainfall data is not available for his analysis. The fact is that this information is available and until recently it has been freely available to the public via the Department of Water and Sanitation. Sometime during the past 5 years, this data has all been transferred to Weather SA. It is still available to the public but at a price of more than R30 000 per station. If one considers that any decent analysis would have to include a number of monitoring stations, then the cost will quickly escalate to ridiculous numbers. I have previously questioned the motivation for this exorbitant cost. My view is that authorities are deliberately pricing this data so high to inhibit the analysis and verification of the disinformation they spread in order to save their own skins.

Back to Mr Wolski's article. After some intricate and nifty statistical analysis – all of which you can clearly follow in his article – Mr Wolski identifies some key trends and arrives at his conclusions. The first of which is that: "*the above results should make one think hard about anthropogenic climate change as a possible driver of the trend*". Really? One can identify a trend caused by climate change by simply analysing 40 years' rainfall data at a single point? I must confess that I did not know that!

His second conclusion states that: *I have an impression that the results somewhat exonerate the Cape's government, as well as water engineers designing the Cape Town's water supply system from blame for the current water crisis. Water supply systems are usually designed with an assurance rate of 97%, which means that in worst case they may fail only 3% of time. The conditions we experience now seem to be well beyond what one usually plans for.* There you have it folks – Mr Wolski (for one) is standing up for the government!

I'm not going to debate the issue of climate change as a reason for the drought here. Clearly, Mr Wolski is pushing the argument of "this is the new norm so get used to it" that has been pushed down the public throat *ad nauseum*. I suppose it's a matter of if the shoe fits then wear it – but is that the scientific standard that UCT subscribes to? Enough said!

But, it is Mr Wolski's second conclusion that really got my hair standing up. Why so? Well by using the rainfall data of CTA to justify the (imminent) failure of the water supply system and thus exonerate the government and their engineers, exhibits a serious lack of scientific (or any other) logic. In fact, Mr Wolski might as well have used the rainfall data for Upington to prove his point. You see, Cape Town's water supply comes from dams such as Theewaterskloof. This and the other large dams are situated quite some distance (40km+) away from Cape Town and in a significantly different rainfall zones. Apart from some indication of possible increased demand due to low rainfall, the CTA figures have little, if any relevance. To my mind this is a classical case of lies and statistics and then some bullshit to fool the public.

It does not end there. I also want to comment on Mr Wolski's statement that "*The conditions we experience now seem to be well beyond what one usually plans for".* But for that I want to introduce the second article, published on News24 today: "Cape Town water crisis: 7 myths that must be bust" by David Olivier of Wits. I am simply going to focus on one or two of the so-called myths that Mr Olivier wants to bust.

The first of the myths are that Cape Town saw the drought coming but did not prepare for it. In busting this myth Mr Olivier (rightly) argues that one cannot predict a drought (neither its timing nor its severity) from examining historical rainfall data of the past 40 years. Let's give him a deserved tick mark for that. Then he quotes a study from UCT, which apparently completely exonerates the Cape's government (is this perhaps Mr Wolski's study he is referring to?). The second myth Mr Olivier tries to bust, is that there has been a lack of enforcement to curtail water wastage. The sterling performance of Cape Town to eliminate water leaks is highlighted for this purpose. I will of course agree with that. Cape Town has been doing much better than other cities in South Africa in reducing unaccounted for water. Another tick mark then.

Allow me to explain where these two academics go wrong and thus reinforce the view that the objectives of their articles are not scientific but rather political.

It is fact that no engineer, scientist or city planner can accurately predict a drought. It is also fact that in an arid country like South Africa our annual rainfall is mostly unreliable and varies significantly from year to year. The comprehensive historical rainfall figures, collected from 1904, underline this observation – that is if you can afford to access the data. The unreliability and the annual variance of our rainfall is a significant risk – variability and the inability to predict is the very nature of risk. How do we mitigate this risk? There are two mechanisms used.

The first mechanism to mitigate the rainfall risk is to build dams. A dam (designed for water supply) will typically hold anything between 2 to 4 years' runoff from its catchment area. By storing such significant volumes of water we clearly mitigate our vulnerability to years with low rainfall – even if the period of low rainfall extend over more than one or two years.

The second mechanism to mitigate the rainfall risk is a bit more complex. For every dam, engineers calculate the assured yield of the dam. To explain this concept of assured yield, I will use the following question. **If the dam is full, then how much water can we withdraw from the dam every day and still be sure that the dam will never run empty even if there is a severe (multi-year) drought**? Using the rainfall statistics for the catchment area of the dam (take note Mr Wolski!) engineers can actually answer this question. But, this requirement that the dam must never run empty is a bit too conservative. In practice, we rather calculate how much water can be used every day to be sure that the dam will only run dry (on average) once every

fifty years. The yield so calculated is called the 98% assurance of supply. (Note 98% is on average once every 50 years).

In South Africa, all domestic water supply systems are designed for a 98% assurance of supply. I can hear a collective shout going up: there you have it, in a severe drought the system is designed to fail!!! But no, there is a caveat. The dam will fail, if we continue to use the same quantum of water determined as the 98% assured supply. In practice, each dam has its own set of operating rules. These operating rules are specifically drawn up to protect the integrity of the water supply system (amongst others) when the dam level starts dropping. A dam level dropping below a certain threshold (and this should be relatively high) may signal two conditions: (i) there is a hydrological drought and/or (ii) too much water is being withdrawn from the dam. Irrespective of which of these two conditions is actually responsible for the drop in the level of the dam, the operating rules will prescribe a single action: reduce the volume of water withdrawn from the dam. In the context of an urban water supply system such as Cape Town's this means water restrictions. The timely introduction of water restrictions should ensure that a dam never runs empty even in the severest of droughts. Let's just be clear one year ago Cape Town was still consuming 1 100 million litres a day – with level 1 water restrictions in place! A few months ago the target was set at 500 million litres per day. If restrictions were brought in much earlier, when the dam levels were still reasonably high, a consumption level of 50% more than the current target would probably have been sufficient to avoid total failure of supply.

Now we can return to the articles of our two academics. In light of the above, Mr Wolski's statement that: "*The conditions we experience now seem to be well beyond what one usually plans for"* is completely misguided at best. Mr Olivier's attempt to bust the myth that there has been a lack of enforcement clearly holds no water. Mr Olivier states in his article that in 2014 the dams were overflowing. Somewhere between 2014 and 2016 the dam levels would have started to drop. No action was taken to protect the integrity of the system in line with the operating rules of the dams. In my view both these academics have missed the passing mark.

On the contrary to their arguments, it is the very lack of enforcement that is responsible for the sad state that Theewaterskloof Dam found itself at the beginning of the rainfall season. The circumstances leading up to this dam (and others forming part of Cape Town's supply system) being virtually empty before the onset of what could prove to be a crippling drought are in my view criminal. We are not (yet) dealing with a calamity brought about by climate change. We are not (yet) dealing

with a “new norm” as far as water available to Capetonians is concerned. If there is a new norm, it is the norm that the City of Cape Town, the Western Cape Government and the National Department of Water and Sanitation have collectively “screwed up”. If there is a myth currently being busted, it is the myth of reliable and efficient governance by the DA. My fear is that the busting of this myth leaves us with no hope on the horizon.