



26 January 2018

Seasonal Forecasts under the current drought conditions in the Western Cape

The South African Weather Service (SAWS) has noted with regret reports attributed to Western Cape Premier, Helen Zille that the province “finds itself facing a crisis because SA Weather Services (sic) got their predictions all wrong”. The Premier’s statement is disingenuous and extremely opportunistic coming as it does in the midst of a water crisis.

Zille goes on to claim that “The South African Weather Services (sic) have said to me their models don’t work anymore, in an era of climate change”. We view this in a very dim light as the Premier only had one briefing from SAWS and already draws conclusions on our work. This is regrettable as SAWS would not comment on policy makers and the lack of action on advice that we have given. SAWS has had discussions with the Premier and respectfully requested her to refrain from casting aspersions on the work of the Service. The Weather Service has further more offered the Premier access to all weather information and resources to enable her to speak from a position of knowledge rather than speculation. Now it seems this offer was not taken up.

SAWS is tasked with providing timely and accurate scientific data in the field of meteorology to the South African population. The organisation plays a vital role in South African public life, not just as a provider of key services, but also in empowering citizens to adapt to the effects of ever changing weather patterns. SAWS is in a unique position to provide valuable *meteorological drought* monitoring and outlook support information to society. The organisation hosts a comprehensive data bank of climate variables across the entire country, including the Western Cape Province.

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Most rain in the Western Cape Province falls during winter months (April to September), and very little rainfall is received during summer months. Rainfall in the Western Cape Province is often modulated by the passage of cold fronts. These cold fronts are systems that develop over the Southern Ocean, and the cross-continental passage of these fronts are important for Cape Town's rainfall. As global weather systems propagate northwards during winter months, more fronts pass over the southern continental tip of Africa. Since cold fronts form part of a highly variable eastward propagating wave pattern of air flow over the Southern Ocean, the frequency of the cross-continental passage of cold fronts across the Western Cape province is currently difficult to predict at a seasonal time range (one to three months in advance), and more research is required. This is in contrast to South African summer rain that is modulated by the flow of moist tropical air from the equatorial regions, and which is significantly influenced by the El Niño Southern Oscillation (ENSO) – note that ENSO events have very little influence on the rainfall of the Western Cape Province. The predictability of the phase of the ENSO (El Niño or La Niña), which is characterized by changes in sea-surface temperatures in the equatorial Pacific Ocean, makes seasonal predictions more reliable for the summer rainfall region than for the winter rainfall region where rainfall is influenced by highly variable Southern Ocean circulation.

According to the South African Weather Service (SAWS) observations since 1921, the average rainfall in SAWS' rainfall district 4 (this rainfall area includes Cape Town area) is 820 mm per year. Over the past three years, annual rainfall totals of 549 mm for 2015 (2nd driest year since 1921), 634 mm for 2016 (14th driest year since 1921) and 499 mm for 2017 (driest year since 1921) were recorded. This implies that two of the driest years recorded since 1921 have occurred in the past three years, which makes the Cape Town drought exceptional. It should, however, be noted that these low rainfall totals are not necessarily indicative of a drying trend in the Cape Town area, since 1112 mm was recorded in 2013, making 2013 the 6th wettest year since 1921, while 853 mm of rainfall which is above the average was also recorded in 2014.

Historical statistics play an important role in defining averages, and in setting upper and lower thresholds for expected rainfall totals. According to the SAWS District Rainfall data record (1921 to 2017), SAWS' rainfall district 4 area receives an average of 820 mm of rain per year. Most rain (77%) falls during the months April to September, with only 23% of the rain falling in the months October to March. The likelihood for summer rain in the Cape Town area is therefore slim. However, the monthly District Rainfall record could be used to estimate the probability for rain to occur in the summer months. For example, the District Rainfall record can provide a good estimation of what rainfall was observed in history, and which can then be used to establish the percentage likelihood of a certain rainfall total range to reappear in 2018, based on a 97-year historical record. For example,

from the rainfall records it is extremely unlikely that rainfall totals will exceed 150 mm for the months January, February and March 2018, since it never happened in history. For April 2018, however, there is a 44% possibility for the monthly rainfall total to fall in the 51-100 mm range, while there is a 58% possibility that rainfall totals for April 2018 will not be higher than 100 mm.

The SAWS seasonal prediction issued at the end of January 2018 does not indicate significant rainfall during the 2018 autumn season for the south western parts of the country. However, the far north eastern parts of South Africa are expected to receive above-normal rainfall during the 2018 immediate late summer and early autumn. It is important to note that informative seasonal predictions for the winter rainfall region will only become available in April and May. During this period, all factors will be considered to formulate the best possible outlook for the winter rainfall regions.

The Western Cape Province will remain dry for the next two weeks, with the exception of some periods of light rain in areas along the south coast. Further, the next two weeks may see better rainfall conditions developing over the summer rainfall regions (central and eastern parts) of the country as the atmospheric conditions have become favourable.

In the short term, southwestern parts of the Western Cape (including Cape Town) are expected to remain rain-free for the remainder of this and next week. The eastern parts of the Western Cape do, however, stand a chance of some precipitation during Friday (26 January 2018) and Saturday (27 January 2018). Elsewhere, there are good rainfall prospects over the central and eastern parts of South Africa during the next 7 days. Please note that there will be a risk of localized flooding in places where good rainfall is expected.

The South African research community and SAWS are working hard to improve the seasonal forecasts in the country. This includes, amongst others, studying the effects of increased spatial resolution on the skill of models, influence of the stratospheric variability on predictability and the effects of local oceans on predictability as well as improving the physics and dynamics in models.

SAWS has demonstrated great success in the short-term forecasting of rainfall events for the Cape Town area. This is achieved through the daily weather forecasting model simulations that are performed on the SAWS super computer facilities, in conjunction with the interpretation of forecasts by highly experienced and committed weather forecasters.

The Premier must appreciate that she is not a Meteorologist nor a Scientist, therefore we would be interested to know who her sources on climate change and the role of weather services are. We trust that the Premier will avail herself and her team of advice and access to credible information provided by this competent service and will stop making unwarranted comments about the scientific work of the South African Weather Service and frankly all scientific communities, including engineers providing information to her and other policy makers. Blaming the weather, or climate and the Weather Service is a cop-out for policy inaction and ineptitude in implementation of multidisciplinary research and reports that have long pointed to the water challenge in the country, the Western Cape and in Cape Town.

Please refer to the Background Note for further detail.

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