



# Climate impacts in Southern Africa during the 21st Century



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## Aim of the Report

To explain what we mean when we talk about climate harm and describe the climate harms and threats to human rights that the 1500MW of coal will contribute to.

### EXPERT BIOS:

The late Professor Bob Scholes was a National Research Foundation A-rated scientist and professor of systems ecology at Wits University, where he was the director of the Global Change Institute.

Francois Engelbrecht is a Professor of Climatology at the Global Change Institute (GCI) of the University of the Witwatersrand in South Africa. He served as an invited Lead Author of the IPCC's Special Report on Global Warming of 1.5°C, which was published in 2018, and he is currently an invited Lead Author of Working Group I of Assessment Report Six of the IPCC.

## Summary Findings

1. There is no scientific doubt that the climate of southern Africa is becoming warmer, the atmospheric concentration of greenhouse gases is increasing and the sea level surrounding the continent is rising. Human activities are by far the largest cause of these changes. The principle causes are the global burning of fossil fuels and the transformation of the global land surface from natural vegetation to croplands, pastures and human settlements.

2. The climate will continue to change throughout the 21st century, to a degree mostly determined by human actions and the policies that guide them. Global 'low mitigation futures' that lead to global mean warming well in excess of 3 °C pose much higher risks to the future development of South Africa than 'high mitigation futures' which limit warming below 2 °C; which in turn have higher risks than futures which stay below 1.5 °C, or only briefly exceed it. The latter two futures require urgent and strenuous efforts to reduce greenhouse gas emissions, including by developing countries like South Africa.

3. Southern Africa is particularly vulnerable to climate change because of its geographical location and socioeconomic development state. It is an already warm and dry region, projected to become warmer and drier, and has many demands on its institutions and finances in addition to climate change. Warming in the interior of southern Africa is occurring at about twice the global average rate.

4. Climate change in Southern Africa will include the following:

- A high likelihood that agricultural production in southern Africa, including staple crops and livestock, will be reduced relative to the no climate change case.
- Freshwater availability, already critically limited in southern Africa, will be reduced in future as a result of decreasing rainfall and increasing evaporation.
- The likelihood of long-duration droughts increases in the future because of two fundamental mechanisms resulting from global warming: the strengthening of subsidence over southern Africa, and the poleward movement of frontal systems.
- The number, intensity and duration of heat waves in South Africa will increase steeply in future as a result of global warming. The capacity to perform manual labour out of doors decreases dramatically as the occurrence of heat waves increases. Human mortality increases, particularly in urban areas with inadequate housing, but may in some locations be offset by decreases in mortality as a result of fewer cold spells.
- The risk of severe storms, including intense tropical cyclones and very intense thunderstorms, increases with climate change in southern Africa. As a result, loss of life, injury and damage to infrastructure also increases.
- Thousands of species, many occurring only in southern Africa, are at increased risk of premature extinction as a result of human-caused climate change. This loss has negative consequences for human wellbeing and the economy, as well as weakening the capacity to adapt to climate change.

## Quotes

"The world is committed to further global warming for as long as greenhouse gas concentrations, in aggregate, continue to rise. The degree of future global warming therefore depends directly on international policy and national actions in terms of greenhouse gas emission reductions (climate change mitigation)."

"Over the last several decades, warming in the southern African interior has occurred at about twice the average rate of global warming. Systematic increases in extreme temperature events such as heat-waves and high fire-danger have also been recorded."

"The impacts of climate change on freshwater resources availability in southern Africa are projected to become increasingly negative as the level of global warming increases (or in other words, are worst under low mitigation compared to high mitigation)."

"The risk of multi-year droughts in the winter rainfall region (such as the 2015-2017 Cape Town drought) has already increased by a factor of three due to climate change, and will increase further as global warming intensifies."

"Substantial changes in the number of extreme temperature events in southern Africa can already be detected, and further drastic increases in events such as heat waves, high fire-danger days and oppressive temperatures impacting on human comfort and health can be expected under futures in which climate change mitigation efforts are low or unsuccessful."

"Overall, agriculture as an economic sector (including downstream value addition) in South Africa is already under climate stress. The stress increases with global warming, bearing in mind that temperatures over the interior of South Africa rise at an above-average rate, and the net trend in the region is towards drier soils."

## Key Facts & Stats

- The global mean surface temperature is estimated to have increased by 0.87 °C for the period 2006-2015 relative to the period 1850-1900.
- In South Africa, principally due to habitat loss and degradation, 14% of plants, 17% of mammals and 15% of birds are currently classified as threatened with extinction.
- In 2019, 6.5 million South Africans (11% of the population) were classified as food insecure. The risk of food insecurity, and in particular national food sovereignty, increases in Southern Africa for a 1.5 °C global mean temperature rise, and increasingly so for warming above that level.