

Climate Change Research Group
South African National Biodiversity Institute



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The South African National Biodiversity Institute was established on 1 September 2004 through the signing into force of the [National Environmental Management: Biodiversity Act 10 of 2004](#) by President Thabo Mbeki.

The Act expands the mandate of the [National Botanical Institute](#) to include responsibilities relating to the full diversity of South Africa's fauna and flora, and builds on the internationally respected programmes in conservation, research, education and visitor services developed over the past century by the National Botanical Institute.

SANBI Vision

To be the leading institution in biodiversity science in Africa, facilitating conservation, sustainable use of living resources, and human wellbeing.

SANBI Mission

To promote the sustainable use, conservation, appreciation and enjoyment of the exceptionally rich biodiversity of South Africa, for the benefit of all people.

One of the major priorities of SANBI is to generate appropriate information and knowledge to support the SANBI mission, carried out by its research component, the Research and Scientific Services Directorate (RSSD).

All activities of the RSSD are aimed at reaching the following objectives:

- To discover, describe and study the diversity of southern African plants.
- To serve national priorities as laid out in government policy and international conventions, by researching botanical resources that can assist in meeting basic human needs.
- To explore means for utilising and safeguarding plant genetic and ecological resources for sustainable use in order to stimulate economic growth in South Africa.
- To contribute to the building of botanical research capacity and infrastructure at all levels in southern Africa.

SANBI Climate Change Research Group (CCRG):

The CCRG focuses its attention on projecting the impacts of likely changes in atmospheric composition and climate on the structure, function and biodiversity of southern African ecosystems and endemic species.

How might South Africa's incredible heritage of botanical diversity be affected by climate change? This question is of grave concern as more evidence mounts that the global climate is indeed changing. This SANBI research thrust aims to determine the vulnerability of South Africa's botanical diversity to projected climate change and to help plan possible adaptation measures.

The NBI uses a combination of approaches, based primarily on bioclimatic modeling techniques, backed up by supporting experimental tests both under controlled and under field conditions. Put simply, these techniques match the known distribution of plants to the climate their natural geographic ranges, and then project how these might shift into the future. Changes in soil water availability and altered incidence of frost occurrence are amongst typical factors considered. Additional non-climatic landscape constraints on how species disperse with changing climatic opportunities includes soil texture and depth, and estimates of land use. These approaches rest heavily on the availability of extensive geo-spatial databases suitable for dynamic GIS analysis.

This group is currently developing bio-migration models which are spatially explicit simulation models developed to incorporate species biology in determining how plant distributions will change under expected conditions of climate change.

Species level analysis has indicated that species composition is likely to change in all South African biomes with climate change and some biomes may continue to support a noticeably impoverished species mix. The change in species composition could even lead to major vegetation structural changes in some biomes, notably in the grassland biome where virtually the entire existing biome will be susceptible to invading savanna tree species. The majority of the centres of species endemism in South Africa may show significant deterioration of bioclimate, with more than half predicted to experience bioclimatic conditions completely unlike those of today. Conservation areas of the arid west and central parts of the country are also likely to experience a complete alteration of climate, while those of the eastern and highland regions are subject to less severe change.

With the large and growing databases of plant distributions housed within SANBI, we are well positioned to do this work successfully, and are currently funded by globally important conservation groups such as Conservation International and the WWF. We collaborate with leading scientists from around the world.

A number of publications has been generated from this programme. In January 2000, the Climate Change Research Group (in collaboration with the Botany Department of University of Cape Town) submitted to the National Climate Change Office the final report on the Plant Biodiversity Section of the Vulnerability and Adaptation Assessment Sector of the South African Country Study on Climate Change. This report appeared in popular form in 2001 (The Heat is on...), and a [web version can be viewed on this site](#).

It has become clear that even relatively small changes in climate can have potentially serious adverse effects, especially where ecosystems or their components are already close to their critical thresholds or where a region is less able to implement adaptation measures. For more information on specific research programmes, see the SANBI Climate Change Research Group webpages on the effects of [elevated CO₂](#), enhanced [UV-B radiation](#), changes in water availability and altered incidents of frost occurrence on the indigenous flora and vegetation of southern Africa.