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NORTHERN CAPE PROVINCE  
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## The importance of long-term vegetation monitoring to understand Succulent Karoo vegetation dynamics – a top-to-bottom perspective

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The Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL) is empowered through Section 24 of South Africa's constitution and various biodiversity and environment legislations to act as custodian for the country's natural heritage. These legislations are derived from international agreements, treaties and commitments towards sustainable development such as the Convention on Biological Diversity and the United Nations Conference of Parties (CoP), on biological issues.

At this international level South Africa is committed to the sustainable use of natural resources and to ensure the survival and advancement of species and environments. South Africa reports on a global stage to its progress and interventions that promotes human subsistence in co-existence with nature. These reports can relate to prominent issues of the day such as desertification, climate change, emission standards, ecosystem and species health and others. On a local level government's responsibilities towards responsible environmental use and management can manifest in a number of ways such as local legislation, policy, guidelines and management plans as examples, but with research also being a tool in the toolbox of guidance instruments.

Research organisations in government, parastatals, tertiary education institutions and independent research entities all play a role in framing the context of environment-human relationships and to help understand the nature of these interactions. The intricacies of the relationship of man with the environment can only be understood properly with a sustained close scrutiny of this relationship. Long-term environmental research studies affords us this opportunity with diligent assessment and analysis over time.

The Environmental Research and Development section of the DAERL is involved in such long-term environmental research. One example is an *in situ* long-term vegetation monitoring project on the Goegap Nature Reserve provincial protected area in partnership with the South African Environmental Observation Network (SAEON) and the University of Pretoria. The primary aim of this research in the Succulent Karoo Biome is to inform reserve management actions in line with the reserve management plan, which is a form of local environmental management custodianship. The project has however, due to its extended duration (40+ years), provided valuable contribution on the broader scientific perspective/discussion of the influence of climate and land use intensity on arid ecosystems. Such long-term continuous studies are rare finds globally, since their value has not been understood until recently, when the great impact that humans are having on the earth has become more evident.

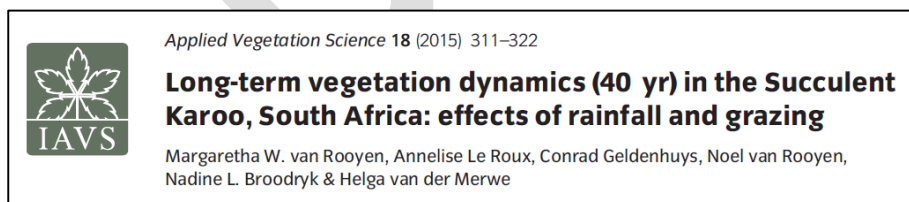
The Goegap Nature Reserve study is not the only long-term research study in the dry Karoo and Richtersveld regions of South Africa. A select few old and new studies and research centres aim to contribute to the body of scientific research evidence that informs local and global change understanding. These include research at the Grootfontein Agricultural Development Institute, research by the University of Hamburg in specific long-term observatories, Tierberg Long-term ecological research site and new sites at the Meerkat National Park.

Possibly the biggest challenge to the successful implementation of long-term environmental monitoring projects are continuity and sustainable funding and resources. It is only through multi-partner collaboration that these projects can be maintained and assured. The benefits and results that sprout from these project only come truly to the fore after many years of diligent dedication. The rewards however are universal and is invaluable to the global challenge of healthy environments, and by default, healthy societies.

Pictures:



1. A long-term vegetation monitoring site on Goegap Nature Reserve



2. Research outputs from the Goegap Nature Reserve long-term vegetation study

### Further reading:

Margaretha W van Rooyen, Annelise le Roux, Helga van der Merwe, Noel van Rooyen & Conrad Geldenhuys (2018) Long-term vegetation change (>20 years) in the plains habitat on the Goegap

Nature Reserve, Succulent Karoo, South Africa, African Journal of Range & Forage Science, 35:3-4, 289-302, DOI: 10.2989/10220119.2018.1498802

Van Rooyen, M.W., Le Roux, A., Geldenhuys, C., van Rooyen, N., Broodryk, N.L. and van der Merwe, H. (2015), Long-term vegetation dynamics (40 yr) in the Succulent Karoo, South Africa: effects of rainfall and grazing. Appl Veg Sci, 18: 311-322. <https://doi.org/10.1111/avsc.12150>

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