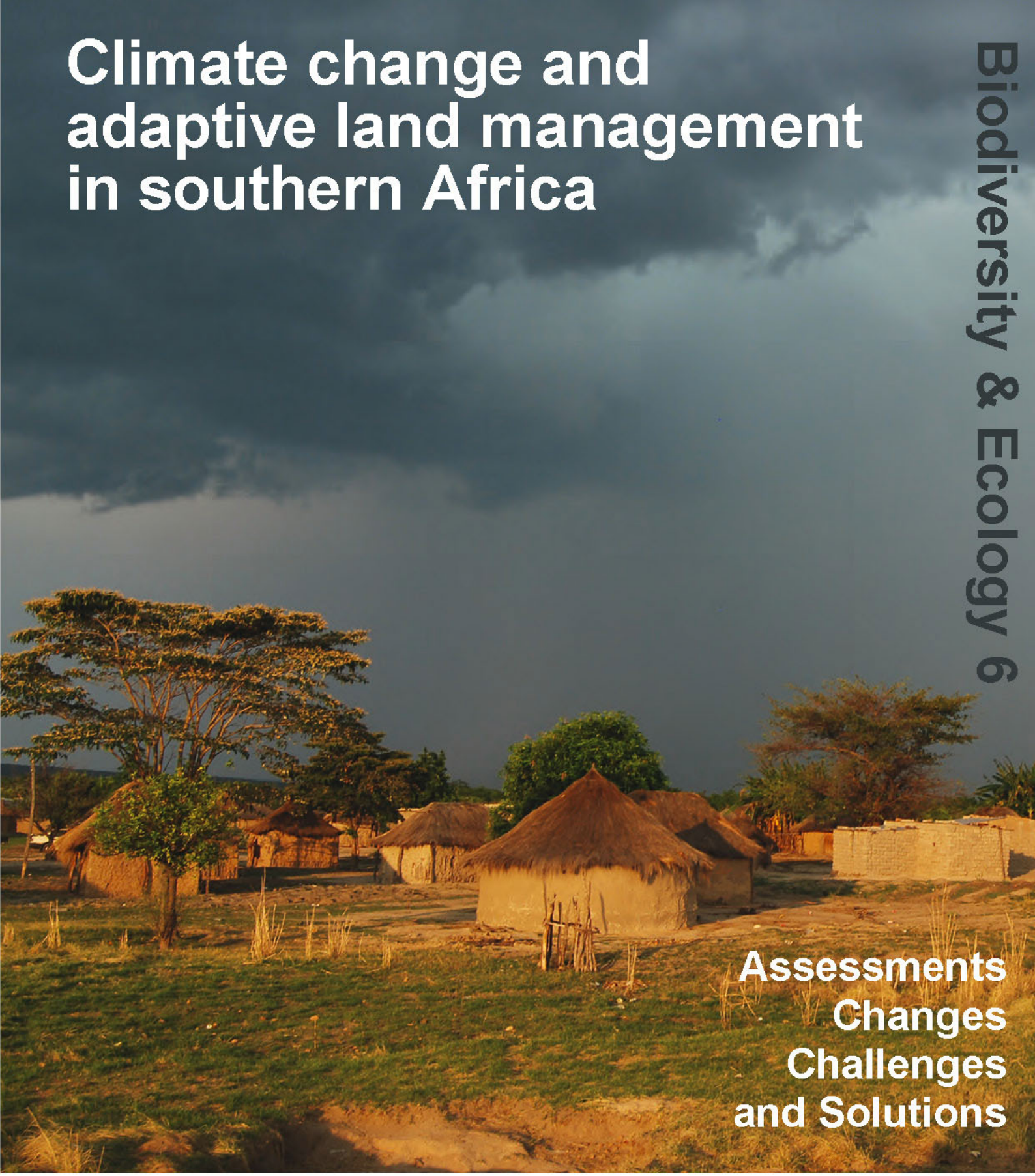
Climate change and adaptive land management in southern Africa

Biodiversity & Ecology 6



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Climate change and adaptive land management in southern Africa

Assessments, changes, challenges, and solutions

Edited by

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Towards an integrated pan-African observation network for long-term climate change monitoring: A web-based tool for collaborative data collection and analysis

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Systematic and long-term observation of relevant environmental properties is a pre-condition not only to detect, understand and attribute climate change, but also for sound decision-making with regards to climate change adaptation, mitigation and food security. In the case of the African continent, there are still major observational gaps, resulting in major uncertainties for most of the key variables of climate change, above all the greenhouse gas balance (Valentini et al., 2014). SASSCAL, in collaboration with a range of partner institutions, is contributing to the closure of these gaps through the EU-funded project 'Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations' (SEACRIFOG). The project (www.seacrifog.eu) aims to develop a road map towards a tailored network of research infrastructures covering the African continent for the long-term observation of climate change and related environmental dynamics. SASSCAL's main contributions include the identification of essential variables and parameters to be captured by that network, an inventory of existing and planned research infrastructures as well as an assessment of corresponding data needs and gaps.

In order to integrate these tasks and facilitate a comprehensive consultative process which captures expert input from relevant researchers, SASSCAL developed the 'SEACRIFOG Collaborative Inventory Tool' (http://seacrifog-tool.sasscal.org/). This web-based tool allows for systematic capturing, sharing and visualization of information on variables, observation networks/infrastructures and existing data products as well as subsequent analysis. Registered contributors can access and use the tool to retrieve, add and edit information. In analogy to the identification of the set of essential climate variables (Bojinski, et al., 2014), a broad set of atmospheric, oceanic and terrestrial variables of potential relevance is identified in a first step. These variables are then assessed against their context-specific relevance as well as the feasibility and cost implications of their long-term measurement according to both locally appropriate and globally required standards. For the

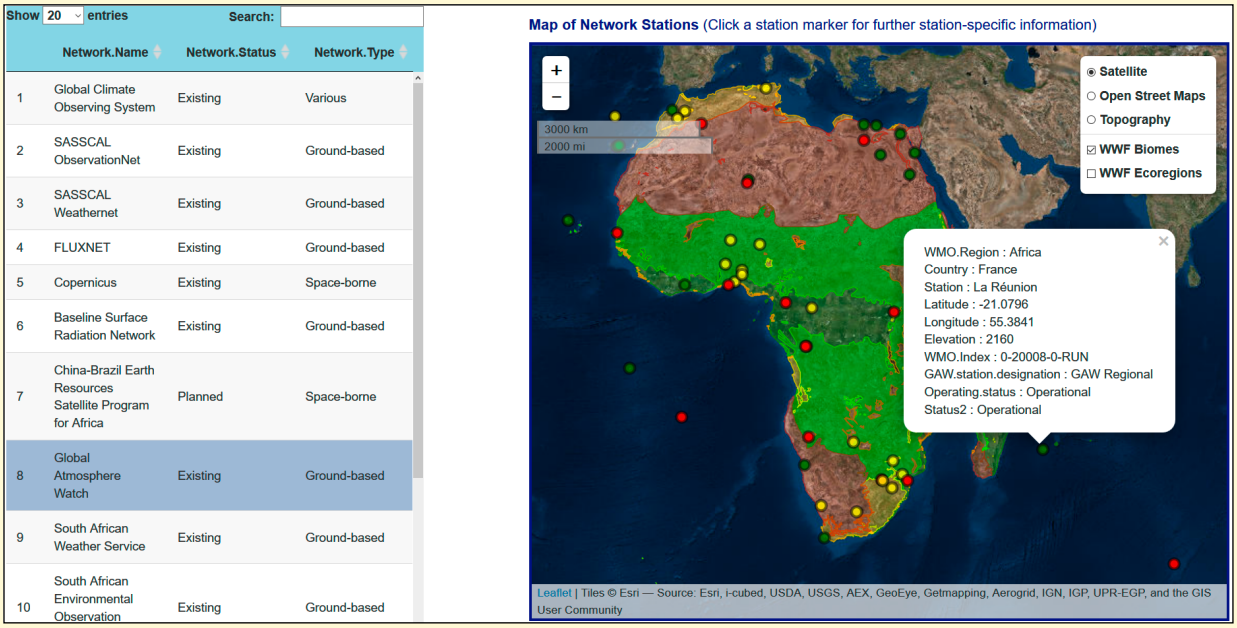

Figure 1: Screenshot of the SEACRIFOG Collaborative Inventory Tool, developed by SASSCAL in 2018.

resulting set of essential variables, existing and planned research infrastructures are identified. These can be both global networks such as the World Meteorological Organization's Global Atmosphere Watch (Fig. 1) as well as regional and local networks such as the SASSCAL WeatherNet (Muche et al., 2018) and the SASSCAL ObservationNet (Hillmann et al., 2018; Jürgens et al., 2018). Where applicable, individual sites are captured, which allows for spatial analysis to determine the geographic coverage with the specific purpose to ensure that greenhouse gas emission hotspots or climate-sensitive ecosystems be captured appropriately.

We consider this web-based tool a promising approach to pool the expertise and facilitate remote collaboration by a large group of environmental observation scientists towards the common goal of designing a regionally appropriate observation network which is fully interoperable with global initiatives. We further expect to draw valuable lessons from this collaborative process to further improve this tool and develop additional functionality. Future possibilities include expanding this approach to other applications and turning this tool into a publicly available resource, e.g. through integration with the SASSCAL Data and Information Portal (Helmschrot et al., 2018).

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