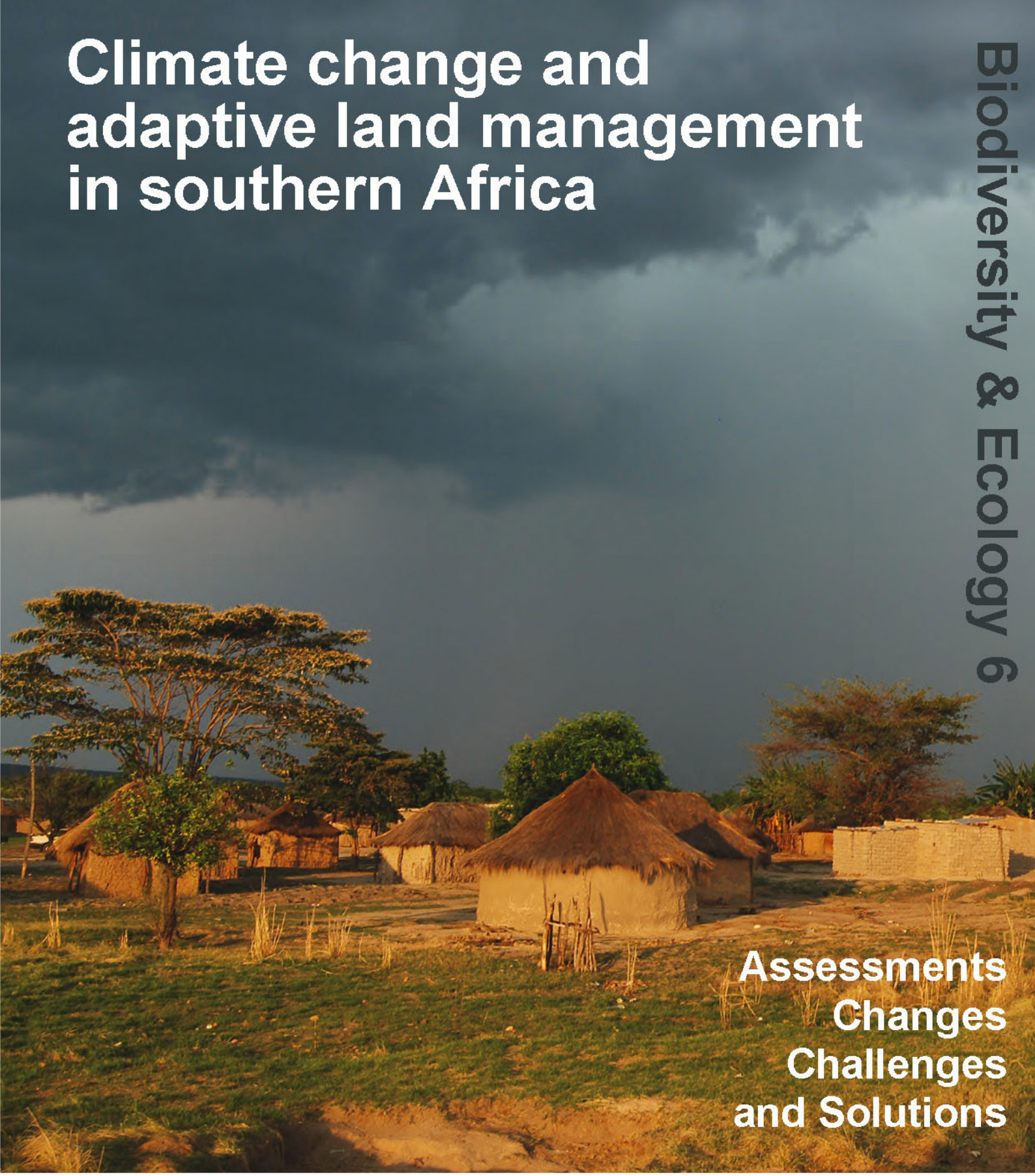
Climate change and adaptive land management in southern Africa

Biodiversity & Ecology 6



Assessments Changes Challenges and Solutions

Product of the first research portfolio of

SASSCAL 2012–2018

Southern African Science Service Centre for Climate Change and Adaptive Land Management

SPONSORED BY THE

Federal Ministry of Education and Research

Klaus Hess Publishers
Göttingen & Windhoek
www.k-hess-verlag.de

ISBN: 978-3-933117-95-3 (Germany), 978-99916-57-43-1 (Namibia)

Language editing: Will Simonson (Cambridge), and Proofreading Pal
Translation of abstracts to Portuguese: Ana Filipa Guerra Silva Gomes da Piedade
Page desing & layout: Marit Arnold, Klaus A. Hess, Ria Henning-Lohmann
Cover photographs:
front: Thunderstorm approaching a village on the Angolan Central Plateau (Rasmus Revermann)
back: Fire in the miombo woodlands, Zambia (David Parduhn)
Cover Design: Ria Henning-Lohmann

ISSN 1613-9801

Printed in Germany

Suggestion for citations:
Volume:
Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N. (eds.) (2018) Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions. *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek.

Articles (example):
Archer, E., Engelbrecht, F., Hänsler, A., Landman, W., Tadross, M. & Helmschrot, J. (2018) Seasonal prediction and regional climate projections for southern Africa. In: *Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions* (ed. by Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N.), pp. 14–21, *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek.

Corrections brought to our attention will be published at the following location:
http://www.biodiversity-plants.de/biodivers_ecol/biodivers_ecol.php

Biodiversity & Ecology

Journal of the Division Biodiversity, Evolution and Ecology of Plants,
Institute for Plant Science and Microbiology, University of Hamburg

Volume 6:

Climate change and adaptive land management in southern Africa

Assessments, changes, challenges, and solutions

Edited by

Rasmus Revermann[1], Kristin M. Krewenka[1], Ute Schmiedel[1],
Jane M. Olwoch[2], Jörg Helmschrot[2,3], Norbert Jürgens[1]

1 Institute for Plant Science and Microbiology, University of Hamburg
2 Southern African Science Service Centre for Climate Change and Adaptive Land Management
3 Department of Soil Science, Faculty of AgriSciences, Stellenbosch University

Hamburg 2018

Please cite the article as follows:

Helmschrot, J., Thompson, S., Kralisch, S. & Zander, F. (2018) The SASSCAL Data and Information Portal. In: *Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions* (ed. by Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N.), pp. 112-113, *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek. doi:10.7809/b-e.00312

The SASSCAL Data and Information Portal

Jörg Helmschrot[1,3]*, Sylvia Thompson[1], Sven Kralisch[2], and Franziska Zander[2]

1 Southern African Science Service Centre for Climate Change and Adaptive Land Use, 28 Robert Mugabe Avenue, Windhoek, Namibia

2 Department of Geography, Friedrich Schiller University Jena, Germany

3 Department of Soil Science, Faculty of AgriSciences, Stellenbosch University, Private Bag X1, Stellenbosch, South Africa

* Corresponding author: joerg.helmschrot@sasscal.org

The SASSCAL Data and Information Portal is an open online data and information portal that can be accessed freely using any web browser at http://data.sasscal.org (Fig. 1).

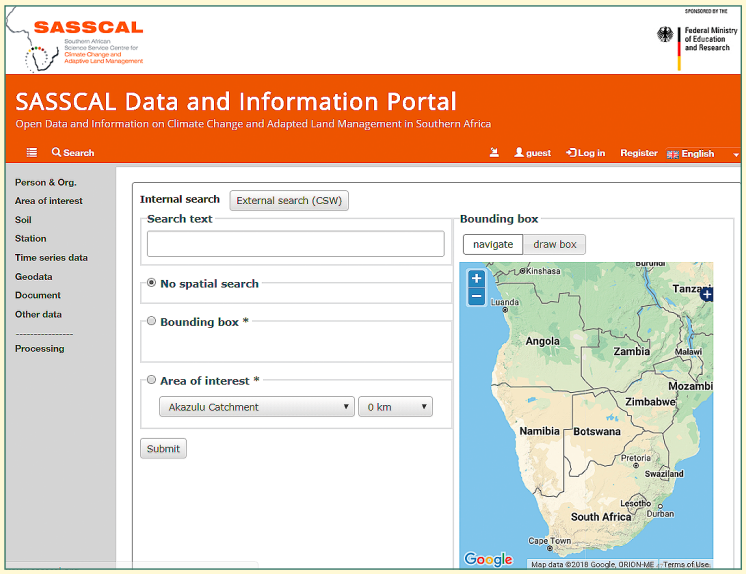


Figure 1: Landing page of SASSCAL Data and Information Portal

As a central data and information hub, the SASSCAL Data and Information Portal allows for the management, analysis, visualisation, linkage, and presentation of various types of resources, including time series data, geospatial data, documents, and others (Fig. 2). Its powerful search functionality is supported by comprehensive metadata records for all resources that the system makes available. The system is fully interoperable, highly user-friendly, and receives high-level acceptance among users from a wide user community, demonstrated by an average of 50,000 page impressions per month.

At the end of 2017, the SASSCAL Data and Information Portal contained data from 640 environmental measurement stations, including more than 700 hydro-climatic time series data records and more than 250 geospatial data sets from more than 70 regional and international organisations, as well as numerous documents. Data are added continuously. Resources can be searched using keywords, temporal or spatial extent, and by means of predefined areas of interest, such as district boundaries or study sites.

Implemented and operated by the SASSCAL Open Access Data Centre (OADC), the SASSCAL Data and Information Portal ensures that the research deliverables resulting from the SASSCAL 1.0 Research Portfolio are hosted and made available according to stakeholder demands. The portal offers a fine-grained user permission control approach which allows the data owner to upload and update data but also permits setting up access permissions.

Notably, the resources hosted by the SASSCAL Data and Information Portal are not limited to the SASSCAL research outputs, but also extend to publicly accessible data from other sources relevant to SASSCAL researchers and stakeholders, including the research community, decision makers and the public.

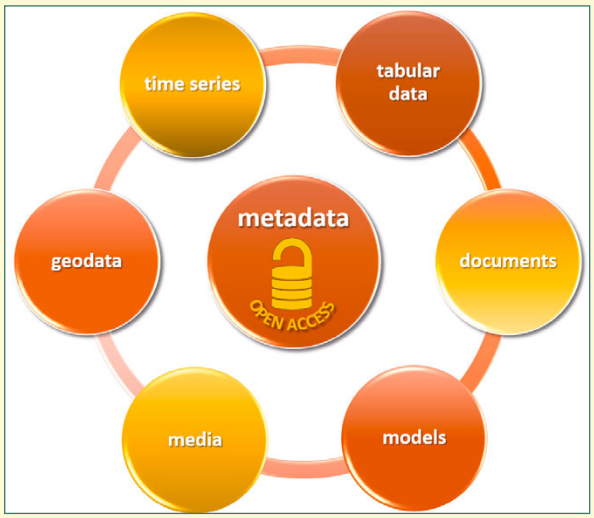


Figure 2: Supported data types of the SASSCAL Data and Information Portal

System architecture and functionalities of the SASSCAL Data and Information Portal

The SASSCAL Data and Information Portal is based exclusively on open source solutions, while ensuring data interoperability and allowing extensibility. The system is based on a three-tier architecture with user frontends and server functionality for database operations (Fig. 3). All data are processed on the server, putting less strain on hardware capacity at the end user's side.

Following a fully open-source approach, the system builds on PostgreSQL/PostGIS databases for data management, an Apache HTTP Server for web services, and a CSW server for metadata representation, and implements the Bootstrap web framework with different JavaScript libraries to create a user-friendly and intuitive graphical user interface. The metadata model is based on ISO standards (e.g., ISO, 2005) and further adheres to specifications of gazetted metadata standards in the SASSCAL countries. A full description of the technical details of the SASSCAL Data and Information Portal can be found in Zander and Kralisch (2016).

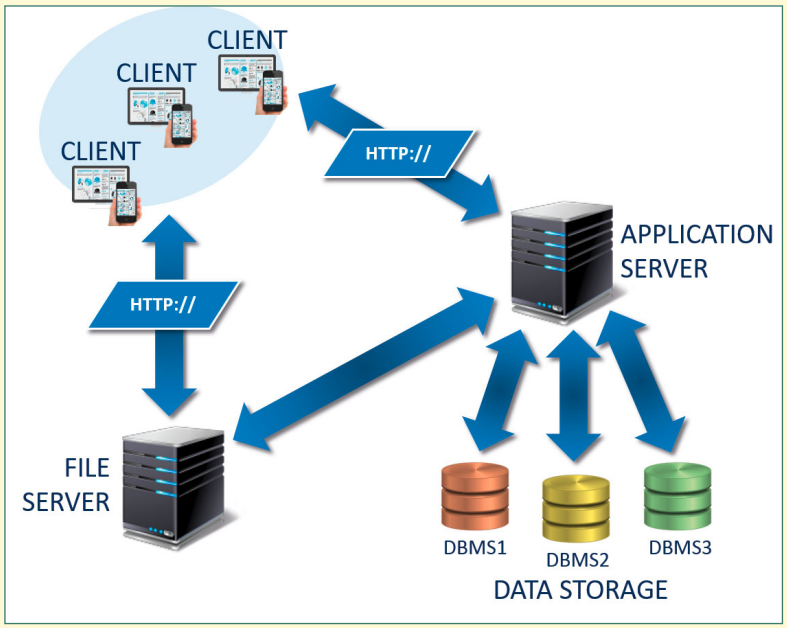


Figure 3: SASSCAL Data and Information Portal architecture

In its current version, the SASSCAL Data and Information Portal offers a wide range of functionalities. Advanced gap analysis for time series data, visualisation, and manual and automated import/export tools for various data types have been implemented, as have sophisticated web mapping functions for geospatial data exploration. Geospatial data and metadata are provided through standardised web services.

Outlook for the SASSCAL Data and Information Portal

The SASSCAL Data and Information Portal architecture serves the SASSCAL objective in developing and operating a regional resource and data hub for southern Africa. Its current functionalities already ensure that it can host data and information from any relevant research project. To allow for the consideration of new user demands, the data portal will be continuously enhanced in the future. For example, it will cater to the integration of additional data processing and analysis tools; advanced hydrological, climate, and other environmental models; and offer a link to other SASSCAL data products, such as SASSCAL WeatherNet (Muche et al., 2018; www.sasscalweathernet.org) and the SASSCAL observations net (Hillmann et al., 2018; www.sasscalobservationnet.org). The integration of advanced filter and search tools, documentation, and online help functions will ensure a seamless and intuitive user experience.

The SASSCAL Data and Information Portal aims at providing open online data and information resources, but at the same time intends to protect the intellectual property rights of the scientific and research community. Providing user functions for data access, but also for uploading new data, it serves as a flexible one-stop solution for data management, data exchange, and dissemination of research results.

References

Hillmann, T., Muche, G., Josenhans, K. & Jürgens, N. (2018) Online presentation of the SASSCAL ObservationNet. This volume.

ISO (2005) International Standard ISO 19115 Geographic Information—Metadata—Part 1: Fundamentals (ISO 19115-1:2005); ISO, Geneva, Switzerland.

Muche, G., Kruger, S., Hillmann, T. et al. (2018) SASSCAL WeatherNet: present state, challenges, and achievements of the regional climatic observation network and database. This volume.

Zander, F. & Kralisch, S. (2016) River Basin Information System: Open environmental data management for research and decision making. *ISPRS International Journal of Geo-Information*, **5**, 123.