2018 ANNUAL REPORT

SASSCAL

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

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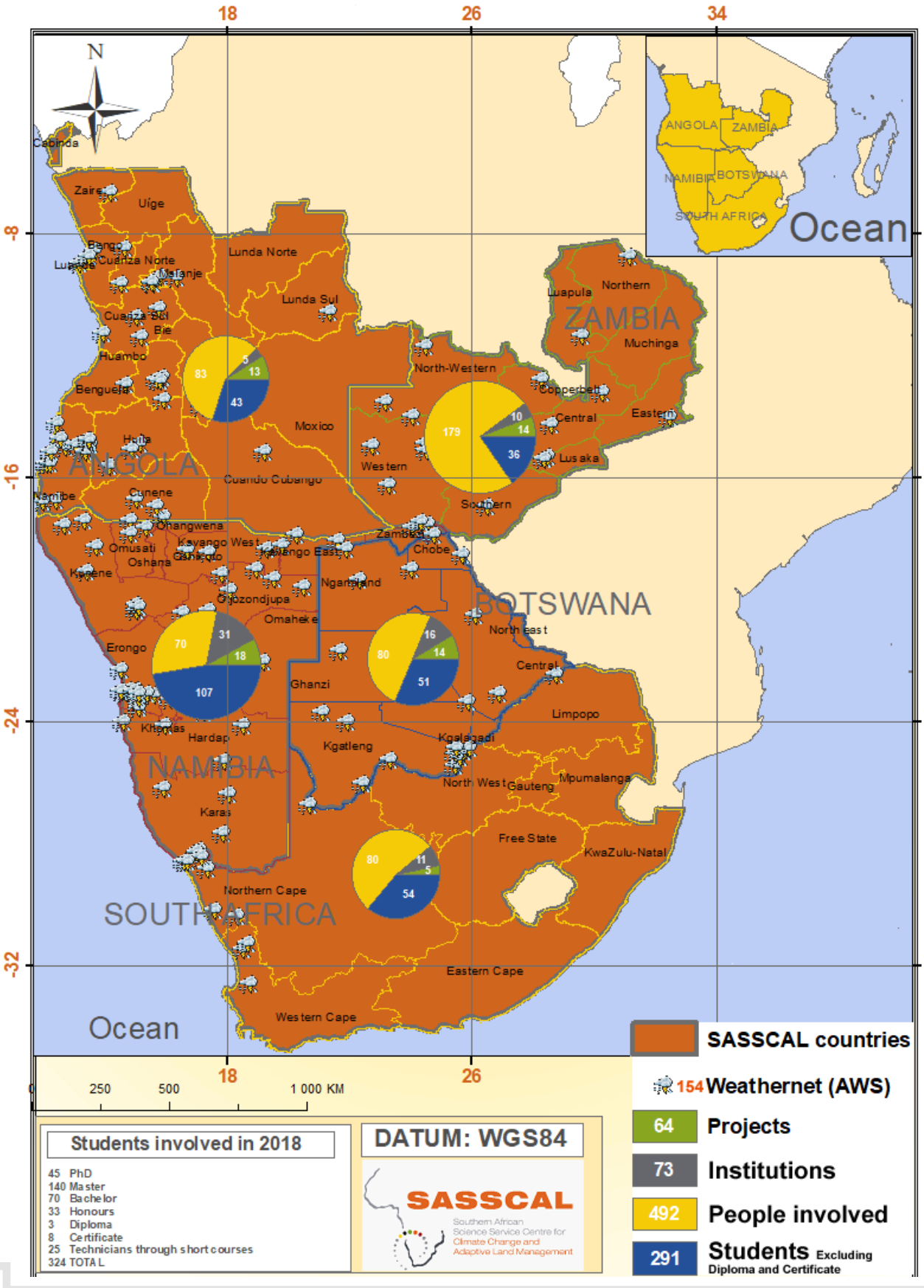
Federal Ministry of Education and Research

Promoting Science for Sustainable Development

SASSCAL 1.0 Achievements



Vision, Mission and Strategic Objectives

Vision

To be a leading regional centre in integrated climate change and adaptive land management science services for an improved quality of life in southern Africa.

Mission

To strengthen the regional capacity to generate and use scientific knowledge products and services for decision making on climate change and adaptive land management through research management, human capital development and services brokerage.

Strategic Objectives

- to manage and coordinate research in adaptation to climate change and for sustainable land management
- to provide products, services and information for decision-making
- to contribute to the creation of a knowledge-based society through academic and non-academic capacity development programmes

Contents

1. Acronyms

AWS	Automatic Weather Stations
BGR	Federal Institute for Geosciences and Natural Resources
BMBF	German Federal Ministry of Education and Research
CPUT	Cape Peninsula University of Technology
CSIR	Council for Scientific and Industrial Research (South Africa)
EC	Earth Observation
ECI	Extreme Climate Index
ED	Executive Director
EFTEON	Expanded Freshwater and Terrestrial Environmental Observation Network
FC	Faculty of Science (Faculdade de Ciência)
FCA	Faculty of Agriculture Science
FCA-UJES	Faculty of Agriculture Science-Jose Eduardo dos Santos University
GERICS	Climate Service Centre Germany
GIS	Geographic Information Systems
GMES	Global Monitoring for Environment and Security
HCD	Human Capacity Development
IPCC	Intergovernmental Panel on Climate Change
IS	Information System
ISCED	High Learning Institute for Education Science (Instituto Superior de Ciências de Educação)
ISO	International Organization for Standardization
ISPT	High Learning Politecnic Institute of Tundavala (Instituto Superior Politécnico da Tundavala)
MANCO	SASSCAL Management Committee
MDGs	Millennium Development Goals
MSc	Master of Science
MSU	Midlands State University
NRSC	National Remote Sensing Centre
NSA	Namibia Statistic Agency
NUST	Namibia University of Science and Technology
OADC	Open Access Data Centre
PS	Permanent Secretary
SAC	Scientific Advisory Committee
SADC	Southern African Development Community
SAEON	South Africa Environmental Observation Network
SANSA	Southern Africa National Space Agency
SFSA	Science Forum South Africa
SASSCAL	Southern African Science Service Centre for Climate Change and Adaptive Land Management
SEACRIFOG	Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations
UB	University of Botswana
UHH	University of Hamburg
UNFCCC	United Nations Framework Convention on Climate Change
UNZA	University of Zambia
UWC	University of Western Cape
WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
WARMA	Water Resources Management Authority
WeMAST	Wetland Monitoring and Assessment Service for Transboundary Basins in Southern Africa
WMC	World Meteorological Organization

2. Message from the Chair of the Governing Board

Mrs Jane Mubanga Chinkusu

> "**Climate change** is an important global issue and is one of the most significant threats facing the world today. There is an **urgent need** for instruments for international cooperation to address global climate change that draw upon evidence and insights found in **research**"

The African continent continues to face considerable global challenges and it is well documented that it will be severely affected by the effects of climate change. Southern Africa is heavily dependent on agriculture and climate change effects continue to threaten the livelihoods of many people in the region. Research has been identified as a key to addressing these challenges. SASSCAL is premised on the pillars of Research, Capacity Development (both human and infrastructure) and Provision of Services. SASSCAL applies a regional approach to addressing these global challenges. This is underpinned by the interconnectedness of resources like food, energy and water.

SASSCAL is thus well suited to continue to make a meaningful contribution to addressing these challenges. SASSCAL continues to be at the centre of science for diplomacy and asserts that environmental sustainability calls for joint global responsibility and cooperation. Researchers, academia, communities and policy makers have a joint responsibility and should mediate trade-offs and explore synergies for the region to make any meaningful progress in successfully tackling global challenges.

SASSCAL will continue to provide regional intervention through research and innovation investments in climate change and adaptive land management. Southern Africa is a region of potential and opportunities, yet poverty remains one of its greatest challenges. The burden of extreme poverty is already heavy. It is estimated that nearly 88 million people (45% of the population) live in extreme poverty across the region. Southern Africa accounts for 9% of extreme poverty globally, even though it only accounts for about 2.5% of the world population.

SASSCAL Member States have continued to provide their support to the regional initiative towards the attainment of its Mandate. Member States will continue to support SASSCAL in its current endeavour of transforming into an international organisation which will go a long way in providing security of investments and assurance for the realisation of the expectations to intervene in the regional livelihoods.

The German Government, through the Federal Ministry of Education and Research (BMBF) has continued to provide financial support for SASSCAL in financing research and capacity development projects in the region. On behalf of SASSCAL, I, in my capacity as Chair of the Governing Board, wish to thank the German people for their most generous support to address a global issue at the regional level. As of 2017, Members States have begun to take responsibility on core funding for operations. It is envisioned that this will be achieved by a 25% annual reduction scale of the German contribution until 2020. Member States will then thus take full ownership for the operation costs. On behalf of SASSCAL, I, in my capacity as Chair of the Governing Board, wish to thank the Member States for their continued support of the regional initiative.

3. Message from BMBF

> "International cooperation is necessary to significantly address the impacts of climate change"

Prof Rene Haak

Knowledge and innovation can and will make a difference in our ability to effectively tackle social, economic and ecological challenges arising from climate change. SASSCAL has positioned itself as a unique institution in the Southern African Region meeting the growing demand for actionable knowledge to face the challenges posed by climate change as a region - through joint investments into research, capacity development, climate services and research infrastructure. Regional integration as well as international cooperation are prerequisites to respond to the quest for sustainable development.

We witness severe droughts in some parts of the Southern African Region these days, while at the same time others suffer from frequent catastrophic flooding. Such events do sorely remind us that rainfall patterns are changing already. They become more variable and less reliable. The reasons are manifold. Some are linked to climate change and essentially caused elsewhere. Others are related to local or regional water management or unsustainable lumbering and land-use practice. And these patterns are linked to livelihoods of people who are equally affected by a changing climate in an existential way and may show even less resilience or capacity to adapt.

None of our countries will be able to rise to these challenges of climate change alone. Our economies, societies and livelihoods are deeply interlinked, just as the climate system does. Climate change - together with other drivers of change like urbanisation or land change – will most certainly have dramatic effects on natural resources in Southern Africa and elsewhere. It will lead to increasing competition between, for instance, areas like food and bioenergy production or land use, biodiversity and nature conservation. We all know that these effects are not and will not be confined to national or even regional borders but impact on global sustainability.

Therefore, BMBF holds the strong conviction that multi-lateral solutions are needed to generate and exchange our climate knowledge, both in our regions and worldwide. SASSCAL was set up in this very spirit, which we are to maintain to guide us in our future collaboration.

4. Message from the Executive Director

> "Countries have Borders, but Climate Change does not"

Dr Jane M. Olwoch

The world today faces a growing set of global challenges that require actions beyond national borders. This is in line with key global programmes such as the United Nations Sustainable Development Goals (UNSDGs) and the Paris Agreement for climate change.

While almost all countries are signatories to the two global goals mentioned above, more effort is required to afford the same commitment or even more to the existing regional programmes that in essence are required for the successful attainment of the aspirations enshrined in the Paris Agreement and the UNSDGs. For the successful implementation of the UNSDGs and putting in place effective responses to support the required climate change action in support of the Paris Agreement targets, science is required to trigger ideas, possible solutions and participation in policy actions by different governance actors at both the local and global levels. Research has the potential to significantly address these global challenges and help establish multilateral governance structures to also address the same challenges.

It is well understood that the final policy authority for tackling global challenges belongs to individual states, while the sources of the problems and potential solutions are situated at the transnational, regional or global level, thus the need for science diplomacy. Science diplomacy has been accepted as a vehicle to strengthen the policy-science nexus at the global level of governance. SASSCAL, a products of a partnership between Angola, Botswana, Namibia, South Africa, Zambia and Germany is a good example of enhancing international scientific cooperation. Member States' cooperation and active participation in the regional initiative is a strong signal reaffirming the global relevance of science as a tool of diplomacy, reflecting a common interest to promote scientific cooperation to address these global challenges. Through the Ministerial Meeting in September 2018, SASSCAL Science Symposium before that, declarations for supporting the institution were re-affirmed while platforms for ideas exchange were realised. This public support accorded to SASSCAL must be followed up with real actions to enable it to reach its potential to be a key support to climate change adaptation and land management in the region. The role of science alone is being questioned if it does not translate into benefits to society. There is a necessary step that SASSCAL commits to, to complete the whole value chain from Science to Policy to Society.

The science diplomacy agenda will remain a priority for SASSCAL as we look to the future with great optimism. We will build on the gains of the success of SASSCAL1.0 to continue our contribution to sustainable development enshrined in the basic understanding that science is global and if we must make strides, science must be supported to cross political boundaries in order to carve effective policies, monitoring developments, and crafting innovative solutions.

5. SASSCAL Governing Board

Membership

SASSCAL Governing Board is comprised of six members representing five Member States and the Funder, namely, Angola, Botswana, Germany, Namibia, South Africa and Zambia and SASSCAL Executive Director as an Ex-official Member.

Mrs Jane Mubanga Chinkusu
Governing Board Member and Chairperson
Zambia: Director – Ministry of Higher Education

Hon Anna Shiweda
Governing Board Member and Vice-Chairperson
Namibia: Deputy Minister- Ministry of Agriculture, Water and Forestry

Prof Dr Rene Haak
Governing Board Member and Funder (representative)
Germany: Head of division 723 BMBF "Global Change" Federal Ministry of Education & Research

Prof Gabriel Luis Miguel
Governing Board Member
Angola: General Director for the National Technology Center-Ministry of High Learning, Science, Technology and Innovation

Mr Felix Monggae
Governing Board Member
Botswana: Deputy Permanent Secretary
Ministry of Environment, Wildlife & Tourism
Alternate - Mr Balisi Gopolang
Meteorologist - Department of Meteorology

Dr Yonah Seleti
Governing Board Member
South Africa: Chief Director: Science Missions -Department of Science and Technology
Alternate - Mr Dumisani Mthembu
Senior Specialist Multilateral Relations - Department of Science and Technology

Dr Jane M Olwoch
Ex-officio Member
SASSCAL Executive Director

Board Activities

Attendance

In 2018, the Board meet four times. The Ordinary Board meeting was held in Kasane, Botswana with 83% attendance, and three Extra Ordinary Board meetings were held in Pretoria and Johannesburg, South Africa as well as in Windhoek, Namibia with attendance of 100%, 100% and 83% respectively.

ORDINARY BOARD MEETINGS	
Members	10th Ordinary Board Meeting 31 July – 2nd August 2018, Kasane, Botswana
Mrs. Jane Chinkusu	✓
Prof. Rene Haak	✓
Dr. Gabriel Miguel	✓
Mr. Felix Monggae	✓
Dr. Yonah Seleti	✗
Mr. Abraham Nehemia (alternate member, Namibia)	✓

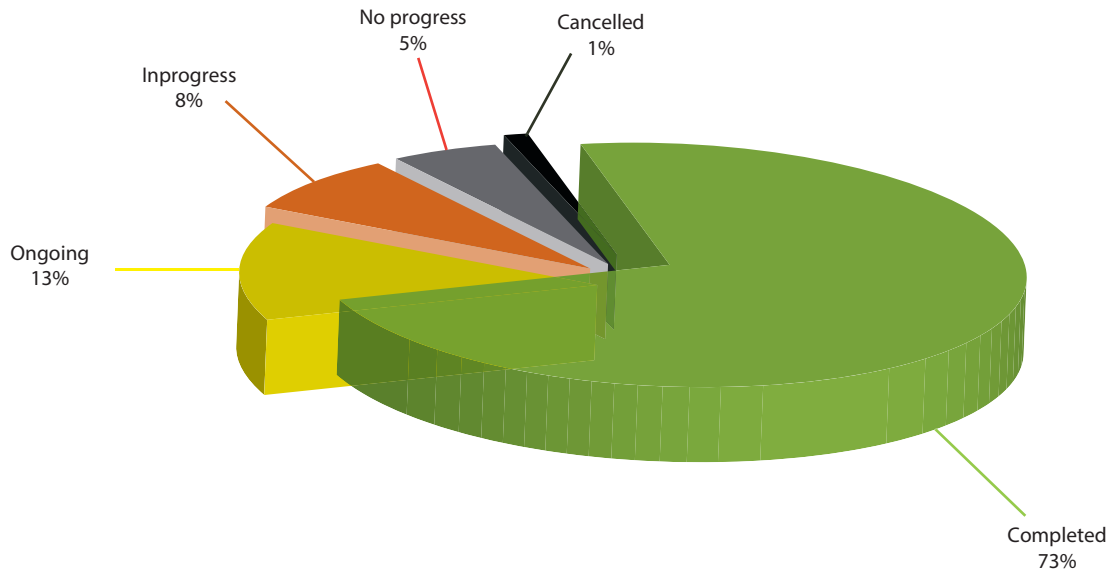
EXTRA ORDINARY BOARD MEETINGS			
Members	5th EOBM	6th EOBM	7th EOBM
	18th - 19th Jan 2018	6th - 7th Sept 2018	19th Sept 2018
Mrs. Jane Chinkusu	✓	✓	✗
Prof. Rene Haak	✓	✓	✓
Dr. Gabriel Miguel	✓	✓	✓
Mr. Felix Monggae	✓	✓	✓
Dr. Yonah Seleti	✓	✓	✓
Mr. Abraham Nehemia	✓	✓	✓

Resolutions and status of implementation: 2018

Out of ninety-six resolutions taken, management implemented seventy resolutions successfully, twelves are still active (ongoing), eight has been partly implemented, five have no progress and one was cancelled as shown by the figures below.

COMBINED RESOLUTIONS OF 2018						
Status	10th Ordinary Board Meeting	5th Extra Ordinary Board Meeting	6th Extra Ordinary Board Meeting	7th Extra Ordinary Board Meeting	Total Resolutions	Status %
Completed	31	26	9	4	70	73%
Ongoing	4	2	2	4	12	13%
In progress	2	5	1	0	8	8%
No progress	2	2	1	0	5	5%
Cancelled	1	0	0	0	1	1%
Totals	40	35	13	8	96	100

Status of Resolutions Implementation



From Left: Mr. Abraham Nehemia - Namibia Alternate Board Member, Prof Rene Haak – German Board Member, Mrs Jane Chinkusu – Board Chair -Zambia, Dr Gabriel Miguel – Angola Board Member and Mr Felix Monggae - Botswana Board Member.

MINISTERIAL CONFERENCE

The SASSCAL first-time Ministerial meeting was held in Windhoek on Friday 21 September 2018. The meeting was held under the theme 'Promoting Science for Sustainable Development'. All Member States line Ministers/representatives and funding partner were in attendance. The meeting was officially opened by His Excellency, Vice President/ Acting President of the Republic of Namibia, Honourable Nangolo Mbumba. In his opening address Honourable Mbumba noted that SASSCAL's initiative is most opportune as it generates the scientific knowledge, techniques and skills that are required to minimise the impact of climate change in the region as a whole. He also informed the delegates that SASSCAL serves as a regional scientific advisory, information services and adaptive land management centre.

Highlighted SASSCAL 1.0 benefits

Angola	Botswana	Namibia	South Africa	Zambia
HCD through 19 engineering and geosciences scholarships, 13 scientific research projects, 18 automatic weather stations, laboratories, 6 biodiversity observatories established	Supported problem oriented research with high potential for impact, improved linkages between research and policy by serving as a linkage agent, establishment of effective knowledge transformation platforms	Successful implementation and completion of 18 projects, implementation of research findings towards national economic emancipation	Harnessing the power of science and technology to address challenges, enhancement of international science profile	Capacity building in climatology and community-based extension services

Front row: From left: 2nd from left Hon Anna Shiweda - Deputy Board Chair (Deputy Minister MAWF), Hon Katrina Hanse Himarwa – Minister of Education Namibia, Hon Maria Do Rosario Sambo – Minister of Higher Education, Science Technology and Innovation Angola, Honourable Nangolo Mbumba - His Excellency Vice President of the Republic of Namibia, Hon Prof Nkandu Luo- Minister of Higher Education Zambia, Her Excellency Tshenolo Modise - Botswana High Commissioner to Namibia, Mrs Jane Chinkusu – Board Chair

Back Row: 4th from left: Dr Wilfried Kraus - German Federal Ministry of Education and Research (BMBF) representative, followed by Dr Thomas Auf Der Heyde Deputy Director General Research Development and Support South Africa

Joint Statements

The Council of Ministers and the Germany representative re-affirmed their commitment to the regional initiative and are in full support of SASSCAL transformation into an international organisation. The Council of Ministers pledged to take ownership of the shared responsibilities of the initiative.

Germany was acknowledged and thanked for its support and funding towards SASSCAL. Member State ministers agreed and pledged to join efforts in pursuit for alternate funding for operations including member country contributions. They further affirmed their commitment to ensure that SASSCAL Treaty is signed in 2019.

6. Scientific Advisory Committee

Prof Moses Chimbari	Chairman - Botswana
Dr Domingos da Silva Neto	Member - Angola
Prof Dr Georg Teutsch	Member - Germany
Prof Dr Heiko Paeth	Member - Germany
Dr Mary Seely	Member - Namibia
Dr Sally Archibald	Member - South Africa
Dr Elijah Phiri	Member - Zambia

7. SASSCAL Management Committee

Dr Jane M Olwoch	Executive Director
Mrs Chipo Chirefu-Toto	Director of Administration and Finance
Dr Joerg Helmschrot	Director of Science and Technology
Mr Chipilica Barbosa	Programme Coordinator Angola
Mrs Chimbidzani Bratonozic	Programme Administrator Botswana
Mr Panduleni Hamukwaya	Programme Coordinator Namibia
Mr Peter Shisani	National Director South Africa
Dr Martin Mbewe	Programme Coordinator Zambia

8. Strategic Engagements and International Conferences

SASSCAL Science Symposium

SASSCAL held its first Science Symposium from 16 to 20 April 2018 in Lusaka, Zambia. With more than 300 delegates in attendance, representing 13 countries, the symposium was hailed very successful in terms of the relevant sessions and quality of presentations. The symposium was hosted by the Zambia Ministry of Higher Education and funded by the German Federal Ministry of Education and Research (BMBF).

Symposium group picture

The overall aim of the symposium was to highlight SASSCAL's key achievements in research, capacity development and service provision and to introduce the SASSCAL 2.0 research agenda to the SASSCAL stakeholders from science, policy, the public and private sector. The symposium was held under the theme 'Science Diplomacy Supporting Climate Change Action in SADC'. The symposium presented a platform for the dissemination of research outcomes from SASSCAL 1.0 research portfolio with specific emphasis on its contribution to climate change action in the SADC region.

The symposium was preceded by a Science Policy Forum which was attended by 75 delegates including the Zambian Minister of Higher Education, members of the diplomatic community, university chancellors and vice chancellors, SASSCAL Scientific Advisory Committee, SASSCAL board members, esteemed academia and the media. The main aim of the forum was to provide a platform for dialogue between policy makers and academia on climate change.

More than 300 delegates from 13 countries attended the symposium. The symposium was officially opened by the Zambia Minister of Higher Education Hon. Prof Nkandu Luo.

Participants	306
Women (registered)	95
Men (registered)	211
Oral Presentations	70
Poster Presentations	+80

Breakdown of the delegates and presentations

The future is very bright for SASSCAL in terms of commitment from member countries, and the governing board and long-term commitment by BMBF. The approval of SASSCAL 2.0 strategy and the science plan will see SASSCAL growing from strength to strength.

Scientific Programme

The scientific programme included plenary sessions and parallel sessions under the sub-themes: Water-Climate-Food Nexus; Biodiversity-Climate-Food Security; Forest Conservation-Climate-Livelihoods; Agriculture-Climate-Food Security; Data, Technology and Infrastructure; Adaptive Land Management; and Capacity Development in SADC.

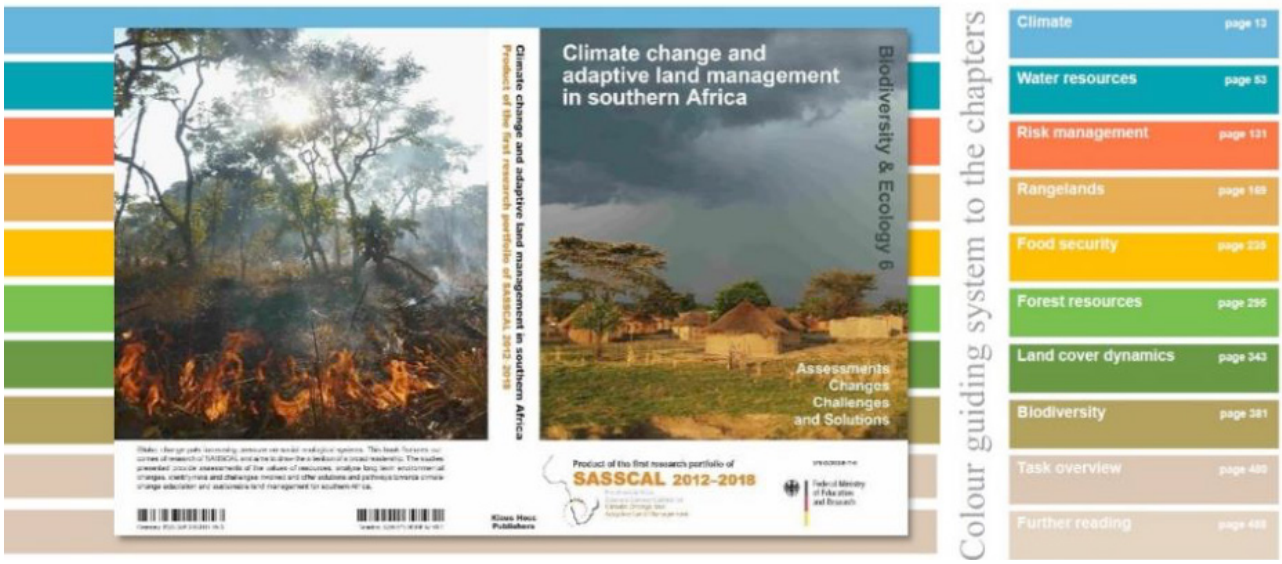
There were three side events held during the symposium as follows;

i. The extreme climate index (ECI) hosted by ARC/XF, SASSCAL and CSIR

ii. SEACRIFOG stakeholder consultation workshop hosted by SEACRIFOG

iii. Launch of the National Hydrogeological map of Zambia hosted by BGR and WARMA

The technical highlight of the symposium was the launch of the SASSCAL book on 18 April 2018. The SASSCAL Book is available on the SASSCAL website. http://www.sasscal.org/research-outputs/



In recognition of the excellent research work results from young scientists, the closing ceremony was marked with awards. The awards were based on the actual research, the findings as well as the presentation skills under the following categories:

- **Best Conference Paper** – José João Tchamba – *ISCED/Huila, University of Évora, Portugal (Award issued in absentia)*
- **Best Conference Poster** – Nkosilathi Bernard – *Botswana University of Agriculture and Natural Resources, Botswana*
- **Best Student Award** – Kefentse Mogwera – *University of Botswana-Okavango Research Institute, Botswana*

Pictured from left are the SASSCAL Board Chair Mrs Chinkusu (Zambia) , SASCCAL Executive Director Dr Olwoch giving awards to Nkosilathi Bernard, Kefentse Mogwera and Mr Chipilica Barbosa who collected the award on behalf of José João Tchamba.

Prior to the main Science Symposium all nodes successfully hosted their mini symposia. SASSCAL ED attended the Botswana and South Africa mini Science Symposia on 20 and 22 March and 5 April 2018 respectively. The SASSCAL Board, representatives from line ministries, MANCO and high-level dignitaries from government, research institutions and the academia participated in these mini symposia.

Participants of the Botswana Mini-Conference

South Africa Science Forum

SASSCAL hosted a vibrant and very interactive exhibition stand at the South Africa Science Forum (SASF). The 2018 SASF was held at the CSIR in Pretoria from 12 to 14 November 2018. It attracted more than 3 000 delegates representing scientists, government officials, industrial leaders, students and representatives from broader civil society. The forum served as a large, open, public platform for debating the "Science and Society Interface". There were also more than 70 exhibitors. SFSA is dedicated to igniting conversations about science that will promote open scientific research and innovation. It also contributed to the conversations around the desire of scientists to have access to shared resources versus the desire of individual entities to profit from their resources. SASSCAL prides itself in providing an access to resources through its OADC.

The SASSCAL exhibition stand created further space for future-shaping conversations. The stand also created a network platform for key science, technology and innovation actors, including senior government leaders, academics, scientists, industry, civil society, and students.

Dr Phil Mjwara, Director General, Department of Science and Technology during his visit to the SASSCAL stand pictured with SASSCAL Executive Director Dr Jane Olwoch and South Africa Node Director Mr Peter Shisani.

Mr Peter Shisani interacting with delegates at the SASSCAL Stand

STRATEGIC ENGAGEMENTS

SASSCAL in collaboration with leading universities in the region developed and launched a programme in Earth Observation, Geo-information Science and Remote Sensing. SASSCAL attended the Botswana launch of this sponsored Regional Postgraduate Programme at the University of Botswana on 12 June 2018. The launch was attended by Ambassadors, High Commissioners from SASSCAL Member States, Government representatives and top management from the Universities in Botswana among others. During the same occasion, the ED also had a high-level meeting with the Vice Chancellor, Deputy Vice Chancellor and Deputy Permanent Secretary (PS) (Higher Education) to share information on future collaborations.

Launch of MSc Programme in Botswana at University of Botswana in June 2018

SASSCAL Management Committee (MANCO) engage in various strategic engagements at the global scale. Strategic engagements are approached as ongoing networking platforms that take time and nurturing towards the development of mutually beneficial relationships. These present a platform for the exchange of information, advice, and referrals among others towards attainments of the SASSCAL mandate. It is envisioned that these strategic engagements also result in opportunities that include identification and establishment of partnerships, brand visibility and the establishment of SASSCAL as a reliable regional science service centre. The reporting period registered many strategic engagements and only a few will be detailed here.

SASSCAL participated and presented its activities at the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) Scientific Advisory Committee (SAC) meeting, held between 27 and 28 February 2018, in Hamburg, Germany. The meeting focused on synergies between the two climate change and adaptive land management regional initiatives. To ensure optimal use of the platform, the SASSCAL ED hosted a side meeting.

SASSCAL participated in the GMES and Africa first Forum held in Libreville, Gabon on 18 to 23 November 2018. WeMAST consortia was invited to participate in the event. The forum engaged stakeholders in discussions around the successful implementation of GMES and Africa. Participants from Earth Observation service and data providers, academia, private sectors in Africa and around the world were also in attendance.

Pictured at the GMES forum : Madame Chantal Thérèse Akouosso (centre), Minister Delegate for Culture HE Helmut Kulitz, Ambassador, Delegation of the European Union to Gabon (Left) and SASSCAL ED, Dr Jane Olwoch

At the same event, SASSCAL participated and hosted an exhibition booth at the first forum of the GMES & Africa Support Programme from 19 to 23 November 2018, in Libreville, Gabon. The forum was held under the theme "Unlocking the Potential of Earth Observation as a Key Driver of Africa's Sustainable Development". The forum presented a communication platform for GMES & Africa consortia that encouraged and promoted the exchange of views and experiences among Earth Observation (EO) professionals and the end-users.

SASSCAL was represented at the Adaptation Futures Conference on 18 June 2018 in Cape Town, South Africa. The conference facilitated international networking and dialogue on climate adaptation. Such platforms are ideal for forging mutually beneficial institutional relationships within the climate change sector.

SASSCAL also participated in the Future Cooperation between Germany and Africa meeting held in Berlin, Germany on 12 November 2018 where the German Minister of Education and Research presented the new Africa strategy to the public. In the same reporting period, SASSCAL participated in a meeting on Science Partnerships for the Adaptation to Complex Earth System Processes (SPACES). The meeting was convened by the Federal Ministry of Education and Research (BMBF), "System Earth" division in Polokwane, South Africa. SASSCAL thus, participated in the Spaces II Kick-off meeting.

WeMAST consortium members at the GMES and Africa 1st forum

9. SASSCAL PILLARS

SASSCAL scientific achievements are presented in line with its three pillars of Research, Capacity Development and Provision of Services and Products.

9.1 RESEARCH

SASSCAL research outputs are embedded in the research programme which was implemented across the Southern African region from 2012 to 2018 through 88 scientific research projects. Year 2018 marked the conclusion of the SASSCAL Research Portfolio in April 2018. Many research projects concluded their tasks, but several publication outputs were recorded.

2018 Publications

The key publication for the year is the SASSCAL book. The SASSCAL Book is a culmination of six years of SASSCAL funded research. It was launched at the SASSCAL symposium in Lusaka in April 2018. The book is entitled "Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions", edited by Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N. and published in the book series Biodiversity & Ecology, Vol. 6, Klaus Hess Publishers, Göttingen & Windhoek. The book is available for download on the SASSCAL website http://www.sasscal.org/research-outputs/

List of selected key publications

Barros da Silva, M.A.P., Fernández, H.M., Baptista, J. Jr., y Teixeira-Pires, G.J.P. (2018) Cálculo de las propriedades geotécnicas a partir de las velocidade transversales obtenidas en la sísmica de refracción. Estudio de caso en la ciudad de Luanda (Angola). Boletín de Geología, 40(2), 101-112. DOI:10.18273/revbol.v40n2-2018006.

Bünge, W., Grönemeyer, J. L., Sarkar, A., & Reinhold-Hurek, B. (2018). Bradyrhizobium ripae sp. nov., a nitrogen-fixing symbiont isolated from nodules of wild legumes in Namibia. International Journal of Systematic and Evolutionary Microbiology, 68, DOI 10.1099/ijsem.1090.002955.

Butchat-Kuhlmann, D., Kralisch, S., Fleischer, M., Meinhardt, M. & Brenning, A. (2018) Multicriteria decision analysis framework for hydrological decision support using environmental flow components. Ecological Indicators 93, 470–480.

Darbyshire, I., Nanyeni, L., Chase, F.M. & Gonçalves, F.M.P. (2018) A synopsis of Rhinacanthus (Acanthaceae) in Angola and Namibia. Kew Bulletin 73, 28

Gröneeyer, J. L., & Reinhold-Hurek, B. (2018). Diversity of Bradyrhizobia in Subsahara Africa: A Rich Resource. Front. Microbiol. 9, 2194.

Gontse K., JE Mbaiwa & OT Thakadu (2018) Effects of wildlife crop raiding on livelihoods of arable farmers in Khumaga, Boteti-Sub district, Botswana. Development Southern Africa (CDSA) journal. Article ID: CDSA 1495061.

Gray, B. & Toucher, M.L. (2018) Investigation into raingauge accuracy at a high-altitude meteorological station in Cathedral Peak. Submitted to Journal of Hydrologic Engineering, under review.

Gronau, S. & Winter, E. (2018) Social accounting matrix: A user manual for village economies. Hannover Economic Papers (HEP), No. 636, 2018, pp. 47.

Gronau, S., Winter, E. & Grote, U. (2018) Aquaculture, fish resources and rural livelihoods: A village CGE analysis. Environment, Development and Sustainability. https://doi.org/10.1007/s10668-018-0212-1

Gronau, S., Winter, E. & Grote, U. (2018) Papyrus, forest resources and rural livelihoods: A village computable general equilibrium analysis from northern Zambia. Natural Resources, 9(6), 268-296. https://doi.org/10.4236/nr.2018.96017

Hamutoko, J.T., Wanke, H., Beyer, M., Gaj, M. & Koeniger, M. (2018) Spatio-temporal variations of hydrochemical and isotopic patterns of groundwater in hand-dug wells: the Cuvelai-Etosha Basin, Namibia. Proc. IAHS 378, 29–35.

Kamwi, J.M., Chirwa, P.W.C., Graz, F.P., Manda, S.O.M., Mosimane, A.W.& Katsch, C. (2018) Livelihood activities and skills in rural areas of the Zambezi Region, Namibia: Implications for policy and poverty reduction. African Journal of Food, Agriculture, Nutrition and Development, Vol 18. No 1, 13074-13094.

Luetkemeier, R., Stein, L., Drees, L., Müller, H. & S. Liehr (2018) Uncertainty of Rainfall Products: Impact on Modelling Household Nutrition from Rain-Fed Agriculture in Southern Africa. Water 10, 499. https://doi.org/10.3390/w10040499

Madonsela, S., Cho, M.A., Ramoelo, A., Mutanga, O. and Naidoo, L., (2018). Estimating tree species diversity in the savannah using NDVI and woody canopy cover. International Journal of Applied Earth Observation and Geoinformation, 66, pp.106-115.

Mbaiwa, J. E. (2018) Effects of the safari hunting tourism ban on rural livelihoods and wildlife conservation in Northern Botswana. South African Geographical Journal, 100(1), 41-61.

McBenedict, B., Wanke, H., Hang'ombe, B.M. & Chimwamurombe, P.M. (2018) Detection of Escherichia coli and Harmful Enteric Bacterial Pathogens in Domestic Hand-dug wells in the Cuvelai Etosha Basin of Namibia. Advances in Microbiology 2018, 8, 297-313.

Moller, J.M., Jovanovic, N., Garcia, C.L., Bugan, R.D.H. & Mazvimavi, D. (2018) Validation and downscaling of Advanced Scatterometer (ASCAT) soil moisture using ground measurements in the Western Cape, South Africa. South African Journal of Plant and Soil, 35:1, 9-22.

Namukonde N., Simukonda C. & Ganzhorn, J.U. (2018) Dietary niche separation of rodents and shrews in an African savanna. Biotropica, doi:10.1111/btp.12537.

Noga, S.R., Kolawole, O.D., Thakadu, O.T. & Masunga, G.S. (2018) 'Wildlife officials only care about animals': Farmers' perceptions of a Ministry-based extension delivery system in mitigating human-wildlife conflicts in the Okavango Delta, Botswana. Journal of Rural Studies 61, 216-226.

Pule, H.T., Tjelele TJ. & Tedder M. (2018) The Effects of Abiotic Factors in South African Semi-Arid Grassland Communities on Seriphium plumosum L Density and Canopy Size. PloS One. https://doi.org/10.1371/journal.pone.0202809.

Ramoelo, A. & Cho, M.A. (2018) Explaining Leaf Nitrogen Distribution in a Semi-Arid Environment Predicted on Sentinel-2 Imagery Using a Field Spectroscopy Derived Model. Remote Sens. 2018, 10, 269.

Revermann, R., Oldeland, J., Gonçalves, F.M., Luther-Mosebach, J., Gomes, A.L., Jürgens, N., Finckh, M. (2018) Dry tropical forests and woodlands of the Cubango Basin in southern Africa – First classification and assessment of their woody species diversity. Phytocoenologia 48, 23-50. DOI: 10.1127/phyto/2017/0154.

Röder, A. & Schneibel, A. (2018) Food security or biodiversity – trade-offs and displacement effects in the upper Okavango catchment. World Atlas of Desertification (ed. by M. Cherlet, C. Hutchinson, J. Reynolds, J. Hill, S. Sommer and G. Von Maltitz), pp. 202-205. Publication Office of the European Union, Luxembourg.

Schmiedel, U. & Oldeland, J. (2018) Vegetation responses to seasonal weather conditions and decreasing grazing pressure in the arid Succulent Karoo of South Africa. African Journal of Range & Forage Science, 35 (3&4), 303-310.

Strohbach, B.J. (2018) Making more of vegetation classification results: A Livestock Farming Suitability Index as tool for Land-Use Planning in Namibia. Phytocoenologia 48, 7–22.

Watson, A., Miller, J., Fleischer, M. & de Clercq, W. (2018) Estimation of groundwater recharge via percolation outputs from a rainfall/runoff model for the Verlorenvlei estuarine system, west coast, South Africa. Journal of Hydrology 558, 238–254.

Weber, T., Haensler, A., Rechid, D., Pfeifer, S., Eggert, B. and Jacob, D. (2018) Analysing regional climate change in Africa in a 1.5 °C, 2 ° and 3 °C global warming world. Earth's Future, 6. https://doi.org/10.1002/2017EF000714

9.2 Capacity Development

SASSCAL facilitates the development of capacity at both individual and institutional levels through a value chain approach. SASSCAL ventures into formal institutional and programmatic arrangements for capacity development in the region. These interventions are envisioned to facilitate the production of a new generation of innovative knowledge workers, including fulltime graduate programmes, the provision of scholarships and access to exchange programmes, as well as the establishment of post-graduate programmes and mentoring.

Regional Masters programme in Geo-information Science and Earth Observation

The MSc in Geo-information and Earth Observation continues to grow in terms of launces in various SASSCAL Members States and also in the number of students enrolled in the programme. In June 2018, the programme was launched in Botswana. Furthermore, the programme has admitted 47 students. The table below shows SASSCAL funded students in Member States and their respective universities. Four of the students enrolled at NUST graduated in 2018. The MSc programme has attracted students outside SASSCAL funding. The programme has thus proved to be self-sustainable beyond SASSCAL funding.

Countries	NUST	UB	UNZA	Total
Angola	0	1	2	3
Botswana	0	7	2	9
Namibia	12	1	0	13
Zambia	2	0	8	10
Total	14	9	12	35

Graduation of SASSCAL Funded Students at NUST

SASSCAL students continued to graduate in 2018 including 6 from Botswana, 2 MSc from South Africa and 3 from Namibia. The Executive Director and Human Capacity Development Coordinator represented SASSCAL at the NUST graduation ceremony.

Mr Edward Mukoya Muhoko and Ms Nicodemus Amelia Nauwanga with (standing from left to right) Mr Frikkie Louw, PI of Task 303, Dr Jane Olwoch, SASSCAL ED and Mr Kevin Stephanus, SASSCAL HCD Coordinator

SASSCAL Alumni doing their field work at North West University, South Africa.

Short course training programmes

SASSCAL implements capacity development programmes and initiatives through academic and non-academic platforms. Investment in human capacity development is another key success of the SASSCAL research programme (SASSCAL1.0). Various communities were trained during this reporting period.

The table below shows some of the short courses that were conducted at various levels in response to the demand for short course structured capacity development interventions in the region.

Training	Trainer	Participants	Venue	Country	Number of Participants
GIS, Remote Sensing, Statistics, Plant Taxonomy, Ecological Data Analysis	Dra. Fernanda Lages and Visiting Lecturers	Students and Researcher	Lubango	Angola	118
GIS and Remote Sensing	Mr. Josue Isau	Students and Academic Staff	Huambo	Angola	12
Smart Agricultural Practices	Dr. Fortinato Ambrosio	Communities	Huambo	Angola	20
Demonstration on use of Biofertlizer and Strains	Dr. Ginhas Manuel	Communities	Huambo	Angola	27
Workshops on Forest Management	Dr. Virginia Quartin and her team	Communities	Huambo	Angola	69
Thesis Writing for Graduates and Academic Staff.	Task 349, PI-Prof Joseph Mbaiwa	Students and Academic Staff	Gaborone	Botswana	30
Technology Transfer Workshop (Fruits & Vegetables processing)	Dr Rosemary Lekalake and Naftec	Participants from Kaudwane (5) and Tlokweng (1)	NAFTEC, Kanye	Botswana	6
Technology Transfer Workshop (oil seeds processing)	Dr Rosemary Lekalake and Naftec	Participants from Shaikarawe (6) and Malwelwe (3)	NAFTEC, Kanye	Botswana	9
Testing of Edible Products	Foods and Drugs Commission	1 Technician from Mulungushi University	Foods and Drugs Commission, Lusaka	Zambia	1

Some of the short courses offered in 2018

Training events in pictures

Students and staff who took part in the thesis writing training

Participants of the technology transfer workshop (oil seeds and fruit and vegetables processing) held from 12th-16th February 2018

Participants of the stakeholder feedback meeting for task 316

Demonstration of AWS to teachers and community members in Ramotswa

Impact of SASSCAL HCD programme

There is evidence of the impact of SASSCAL 1.0 in terms of strengthening the regional capacity. A total of 294 students were supported under SASSCAL 1.0 and 218 of these have graduated at different academic levels (3 Diploma, 64 BSc, 33 Honours, 93 MSc and 25 PhD).

While SASSCAL funded students continue to graduate, several are now employed. In Angola for example FCA, FC, ISCED and ISPT are proud employers of SASSCAL Alumni. These are some of the country's leading academic and research institutions. SASSCAL Alumni are well-trained and technically vested with academic accolade including PhD and MSc degrees. These alumni are contributing to the body of knowledge in their respective countries of employment as lecturers and researchers. These young professionals are equipped with scientific and technical tools such as GIS, Remote Sensing and Tele detention, Hydrologic Modelling, Earth Observation and GIS and Remote Sensing Climate Change, Conservation Biology and Biodiversity, Forest Technology and Soil Fertility.

*"**SASSCAL** contributes to the regional knowledge economy by facilitating **capacity development** across multiple levels (individual, organizational and institutional) through implementation of academic and non-academic programmes and initiatives. These interventions are aimed at increasing the region's **adaptive capacity** to deal with challenges brought by **climate change**, thereby repositioning the region for enhanced **sustainable development**."*

***SASSCAL 1.0** impact has been registered even at the Project Investigator's level. One of the Botswana PIs detailed the impact SASSCAL HCD had as follows "I learnt a lot. It was the first time I led a research team from proposal development all the way to the conclusion of the project. It was a challenge to motivate such a large research team, with some coming from other institutions. In the end I developed very valuable people skills, project management skills, financial management skills, supervisory skills, etc. I developed as a Research Team Leader in terms of making sure milestones were accomplished, managing financial resources, managing procurement processes to make sure supplies were available timeously, human resources management and managing researcher's supervision of their graduate students to make sure the students meet milestone targets. Another very valuable lesson I learnt was community engagement from the inception of the project, throughout the project all the way to sharing the results with the communities. I really learnt a lot engaging with the communities. The overall achievement was working with communities and in the end transferring technology to communities and teams that wanted to take up the technology in order to start small businesses"*

9.3 Products and Services

The Open Access Data Centre (OADC) of SASSCAL, in 2018, continues to endeavour to ensure that openly available web-based platforms are put in place in support of climate change adaptation, by making available data, and more importantly, research-based information and knowledge, to support the Southern African stakeholder community with a timely, innovative and reliable basis for well-informed decision-making processes.

To this end, the OADC continues to ensure that data storage systems are put in place to safe-guard data and information deliverables, resulting from the SASSCAL I research projects. But moreover, platforms are put in place to ensure that these quality-controlled data and research products are made available freely to the SASSCAL stakeholders, with intuitive and user-friendly platforms, such as the SASSCAL Data and Information Portal and the SASSCAL WeatherNet.

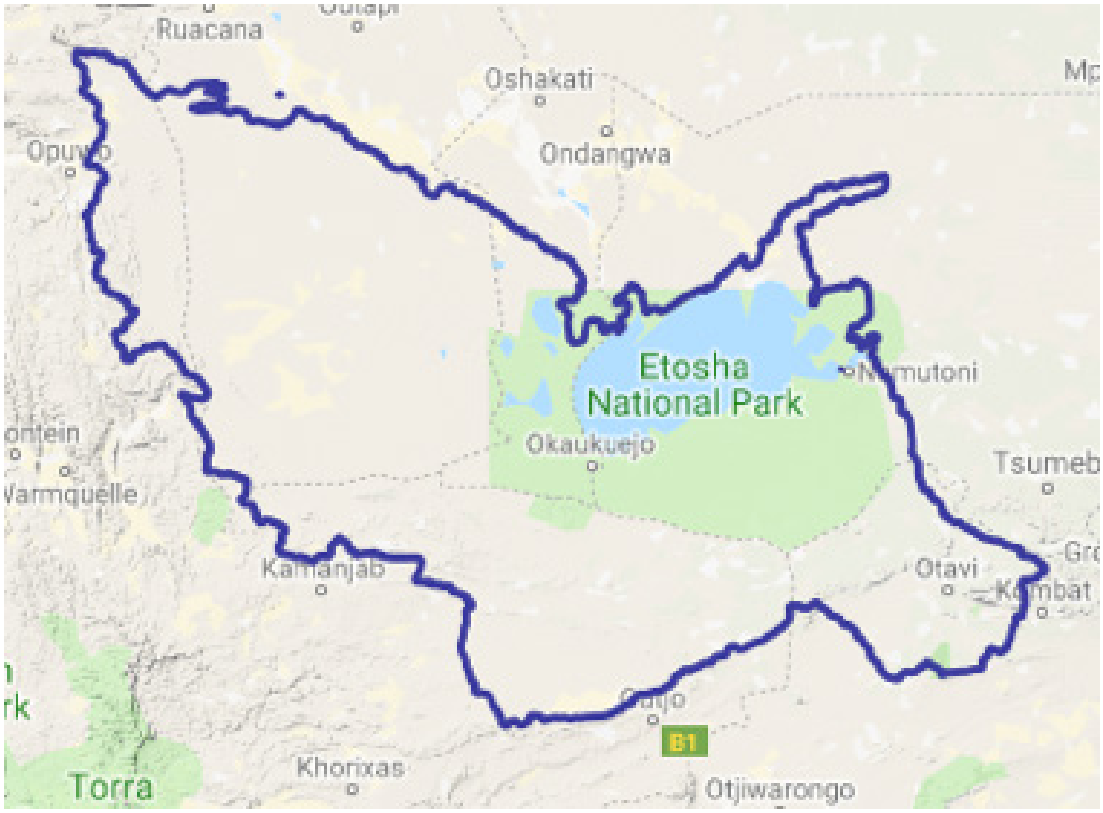
In addition to these platforms, the OADC, in collaboration with leading regional and international partners, addresses the climate change related user requirements, by putting in place innovative mechanisms that present existing and derived data resources as easily digestible products, that are effortlessly assimilated into local, national and regional resource management initiatives.

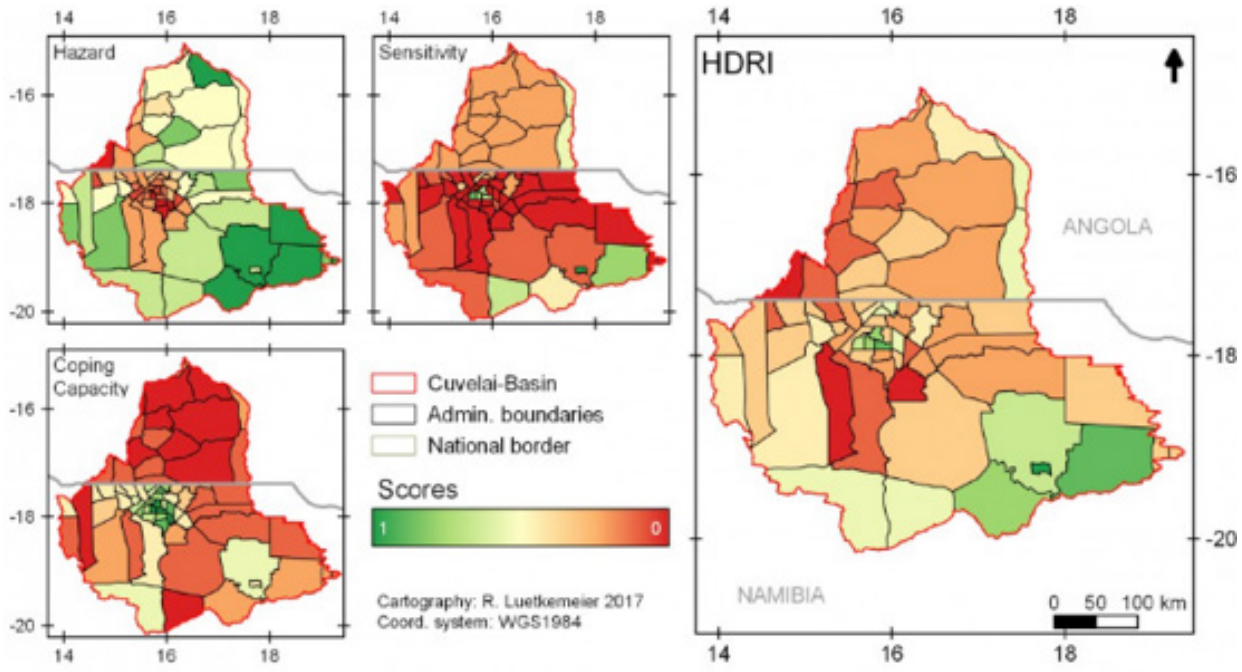
In this line, the Extreme Climate Index (ECI) visualisation tool facilitates the visualisation of ECI data in geographical and graphical formats. For the Miombo Network group, the OADC supported the creation of policy briefs and a website, to share latest findings for the sustainable management of the Miombo forests, the WeMAST project will ensure that freely available earth observation (EO) products are assimilated into products and services that will support wetland management and assessment in southern Africa, and the web-based collaborative SEACRIFOG tool ensured that the identification of essential climate variables and parameters is facilitated with an inventory of existing research infrastructure and the assessment of data needs.

SASSCAL Data and Information Portal

HTTP://DATA.SASSCAL.ORG/

During 2018, the SASSCAL Data and Information Portal was further developed jointly between SASSCAL and



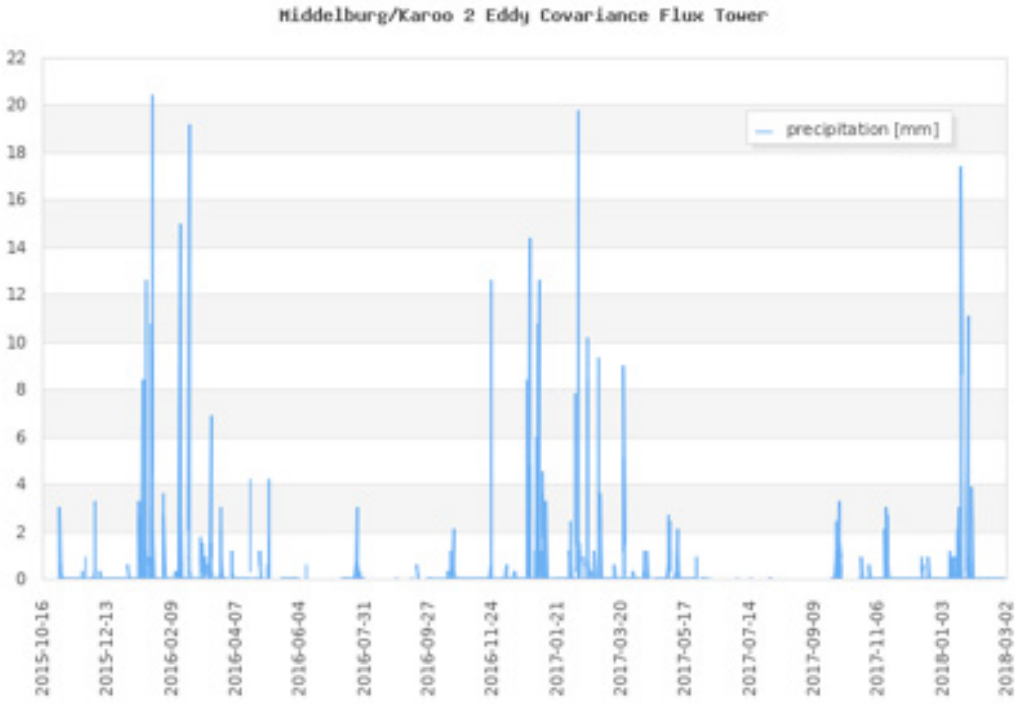


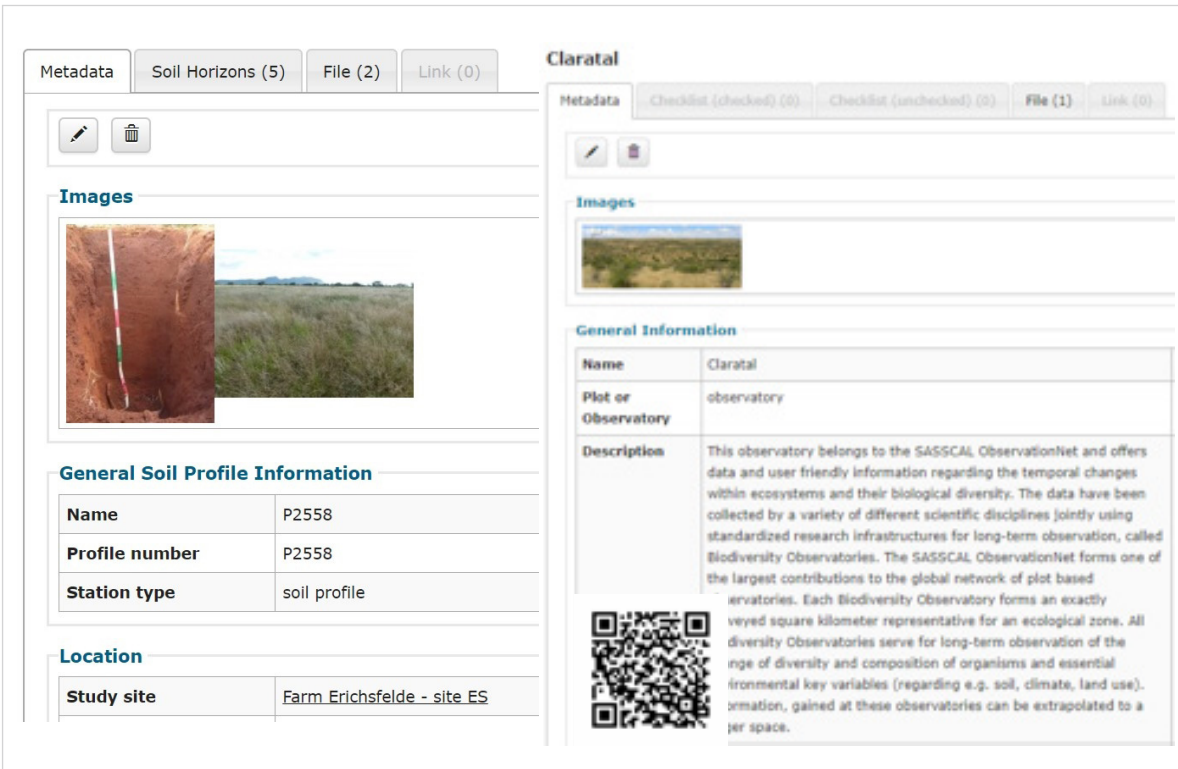
the Geographic Information Science Group of the University of Jena, Germany. Particular attention was given to improve the user experience for SASSCAL's stakeholders, by amongst others, for instance, redesigning the SASSCAL Data and Information Portal landing page. From a data entry perspective, the functionality is also improved to ensure more efficient procedures and moreover to ensure compatibility with regional and international metadata standards.

In April 2018, the SASSCAL Data and Information Portal was officially presented to the public at the SASSCAL Symposium in Lusaka. Consequently, a marked increase was observed in users of the Portal, with user numbers doubling between March and April 2018.

In particular during 2018, research deliverables from SASSCAL I were added into the Portal. These include the SASSCAL Book, which summarises research funded by SASSCAL between 2012 and 2018. Moreover, deliverables introduced into the SASSCAL Data and Information Portal included time series data, environmental data such as soil profiles, information on SASSCAL WeatherNet stations and SASSCAL observatories, various documents, ranging from scientific publications to student thesis, geodata, maps and climatic projections.

In addition to SASSCAL I deliverables, project deliverables of the ARS AfricaE, OPTIMASS, SEACRIFOG and LLL - Limpopo Living Landscapes have also been made available for sharing on the SASSCAL Data and Information Portal.





Top left various areas of interest have been added to the Portal, that applied to SASSCAL I research projects. Here is the example of the Cuvelai-Etosha catchment; (top right) Drought Risk and Vulnerability Maps for the Cuvelai-Basin, that were a product of SASSCAL Task 016 Determination of water-related vulnerabilities and risks based on water demand analyses; (bottom left) precipitation data from the Middelburg/Karoo 2 Eddy Covariance Flux Tower produced by the ARS AfricaE project; (bottom center) Soil profiles from the farm Erchsfelde; (bottom right) the information on the SASSCAL Observatories is also included in the Data Portal

SASSCAL WeatherNet

HTTP://WWW.SASSCALWEATHERNET.ORG/

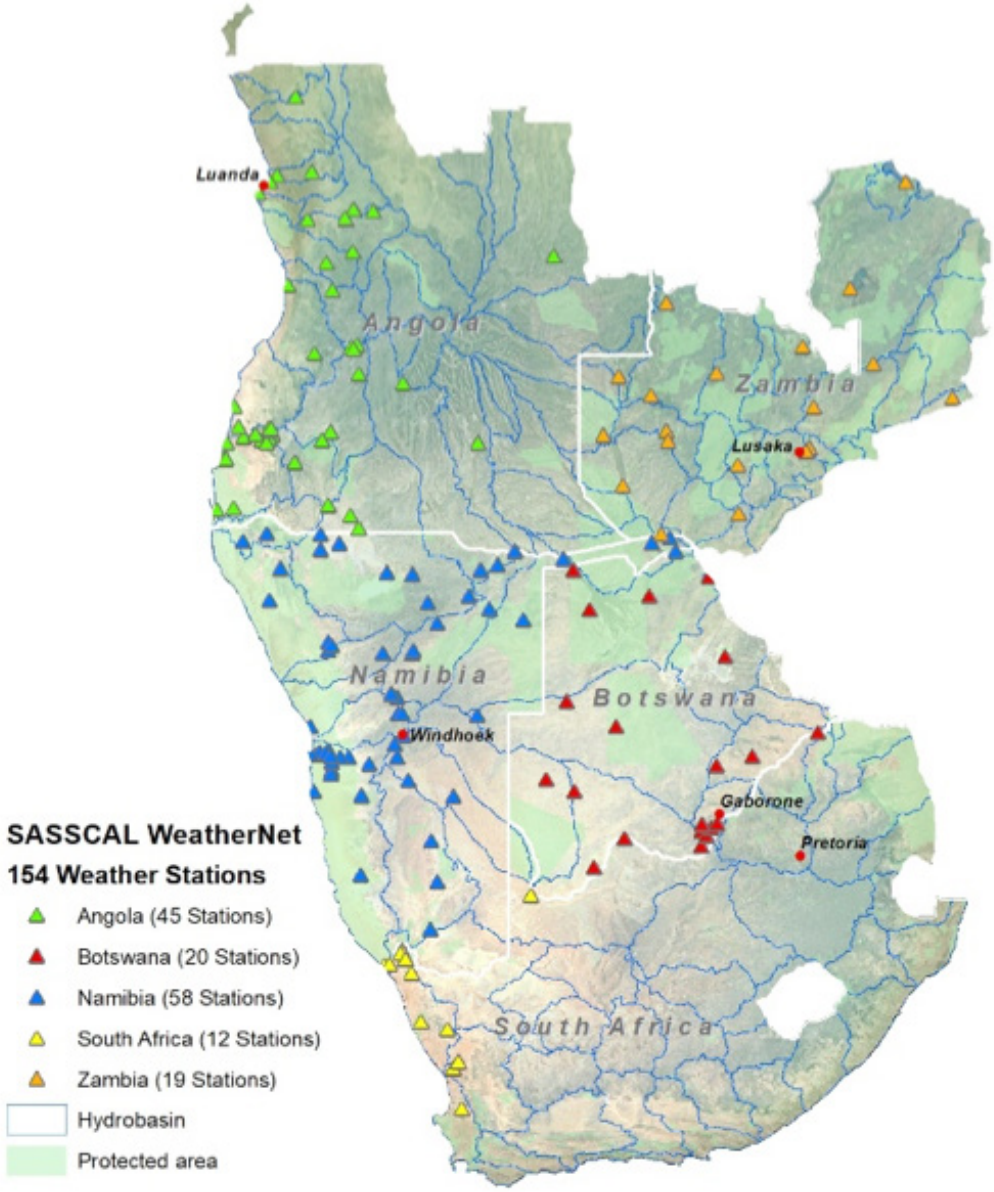
The SASSCAL WeatherNet website, at the end of 2018, provided near real-time weather data for 154 SASSCAL WeatherNet AWS (Automatic Weather Stations), that are spread over southern Africa, providing a true regional coverage.

Mandated National authorities in the SASSCAL countries continue to ensure the smooth operation and transmission of the AWS network in their respective countries, whilst the OADC colleagues ensure that the data transmitted by these stations abides by WMO standards.

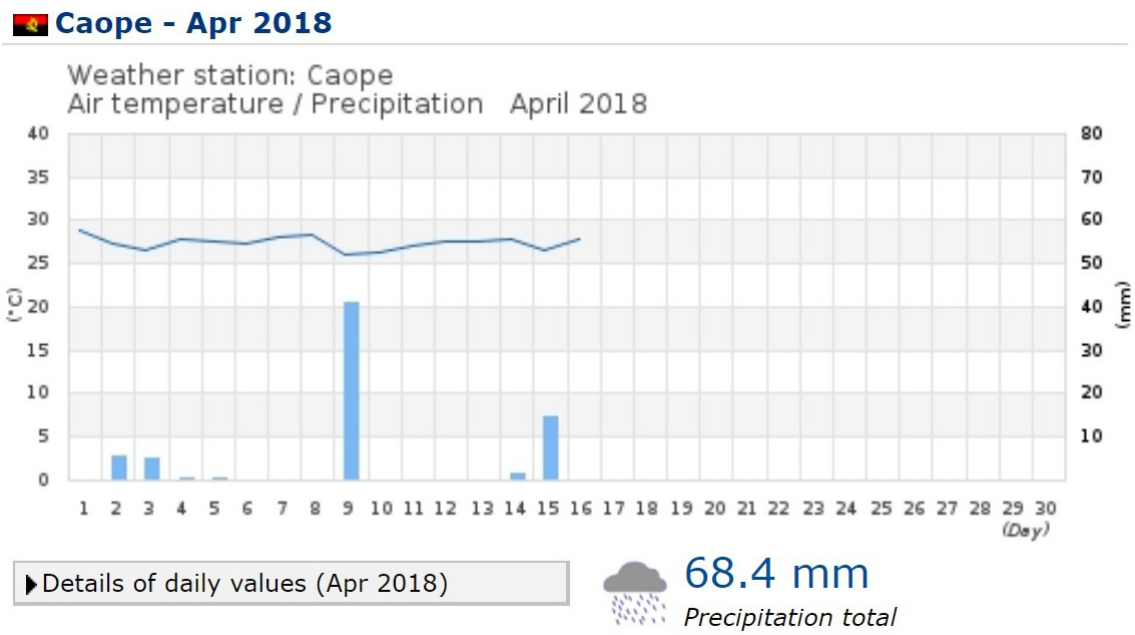
Whilst the SASSCAL WeatherNet website is still being hosted and maintained by the University of Hamburg, first steps have been taken to ensure, that by the end of 2019, this responsibility will fully lie with the OADC colleagues at the SASSCAL Regional Secretariat.

Developments on the SASSCAL WeatherNet page include enhancements of data sheets for every station, which show monthly and annual summaries of precipitation and temperature data in graphical format.

The SASSCAL WeatherNet stations have now also been integrated into the SASSCAL Data and Information Portal.



The distribution of the 154 SASSCAL WeatherNet stations over the five SASSCAL countries, relative to protected areas and hydrological basins;



Graph showing daily precipitation and air temperature data of the Angolan station Caope, in the Data Sheet of the station

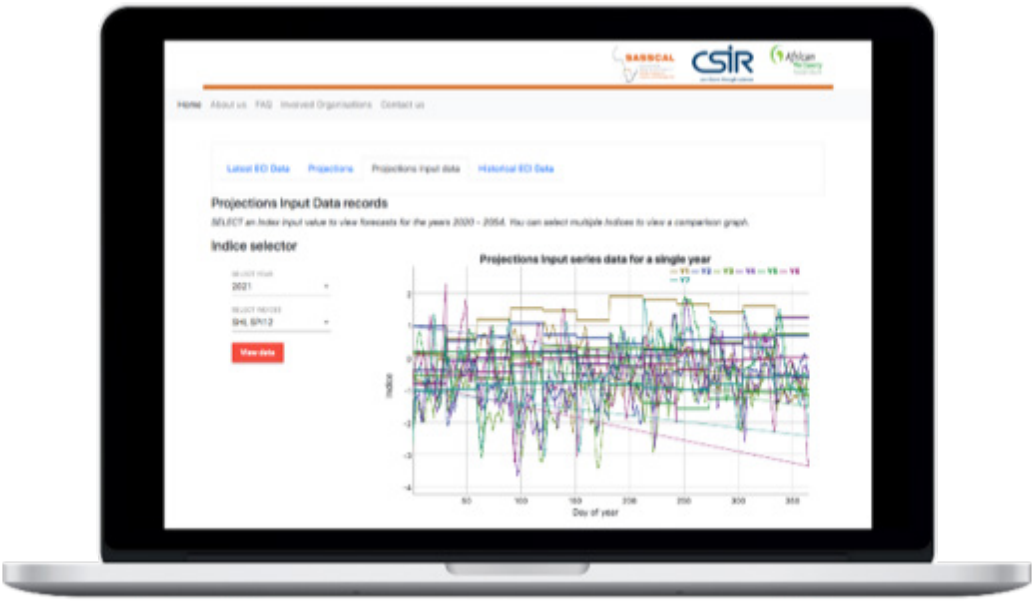
ECI (Extreme Climate Index) Visualisation Tool

HTTP://ECIDEMO.SASSCAL.ORG/DASHBOARD (Prototype)

The ECI Visualisation Tool was fully completed in its prototype form and presented at a side event at the SASSCAL symposium in Lusaka in April 2018.

The Extreme Climate Index (ECI) data that is made available and visualised by the Visualisation Tool, is calculated by the CSIR. SASSCAL created the Visualisation Tool between April 2017 and finalised it in June 2018, to support efforts of the African Risk Capacity (ARC), to create awareness about their Extreme Climate Facility (XCF) financial mechanism. In particular, the angular framework was modernised with a React JavaScript framework.

The success of the Visualisation Tool has prompted interest in further developing the tool.



The ECI Visualiser Tool displays ECI data, which is calculated by combining a rainfall-based and a temperature-based index, SPI (Standardized Precipitation Index) and SHI (Standardized Heat Index), with monthly, daily and sometimes yearly increments. The platform also displays future projections for the abovementioned Indices for the years 2020 until 2054.

10. Global Partnerships

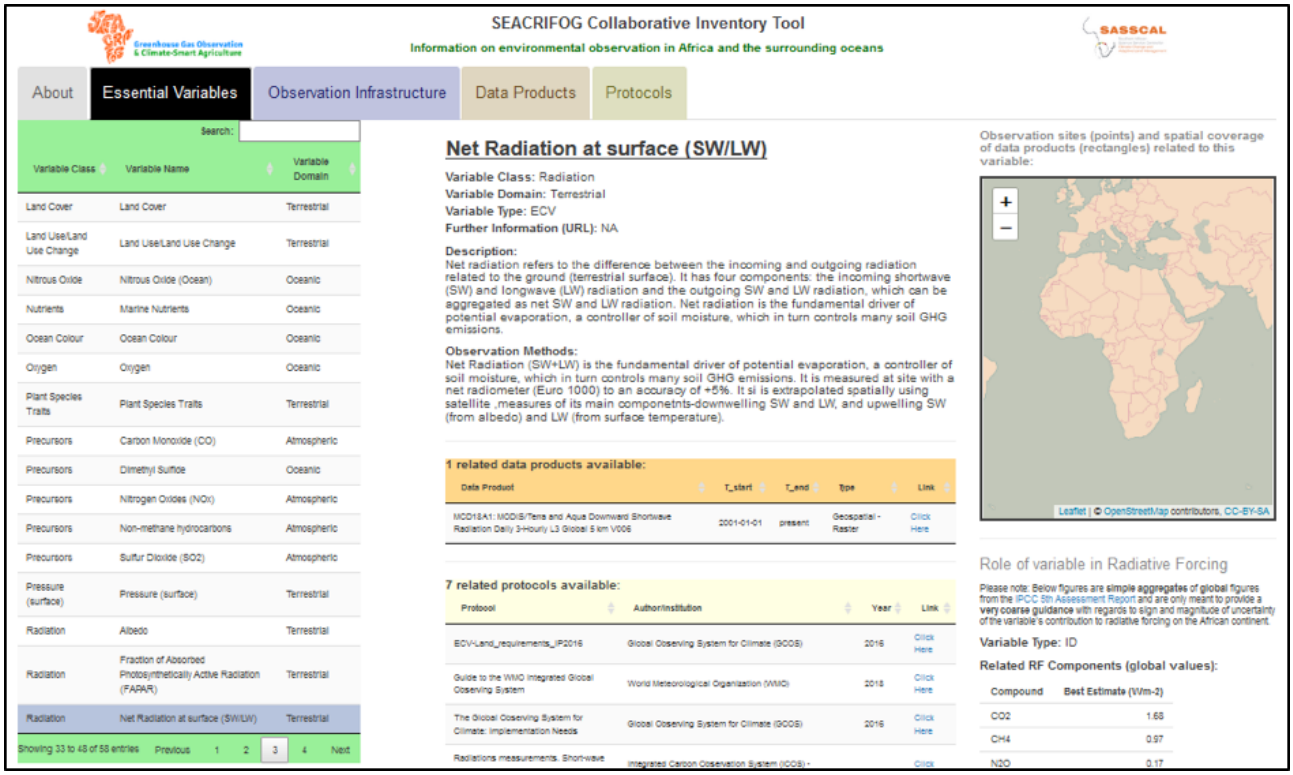
SASSCAL continues to actively identify and establish formal structures and links to science diplomacy through establishing global partnerships by signing science cooperation agreements. SASSCAL successes lie in its realisation of its main scientific gains of science diplomacy of advancing knowledge and ensuring scientific capability. In this reporting period, progress was made in the following global /regional partnerships.

SEACRIFOG

SASSCAL is an implementing partner of the EU-funded project 'Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations' (SEACRIFOG). SEACRIFOG is implemented over a three-year period (February 2017 to February 2020) by a consortium of 16 African and European partner organisations. The project aims to design a fully interoperable integrated observation network for climate forcing and underlying environmental dynamics on the African continent. SASSCAL is involved in the SEACRIFOG project in line with various work packages and provides critical project contributions towards the design and technical harmonisation of environmental observations across the African continent. In the following, the project highlights with SASSCAL involvement in 2018 are presented.

Development of the Web-Based Collaborative SEACRIFOG Tool

SASSCAL's main contributions to the SEACRIFOG Project included the identification of essential variables and parameters to be captured by that



Screenshot of the web-based interactive SEACRIFOG Collaborative Inventory Tool, specifically developed by SASSCAL for the SEACRIFOG Project. The tool offers contextualized information on the SEACRIFOG outcomes, more specifically on i) the essential variables to be observed to quantify climate forcing across the African continent; ii) existing and planned observation infrastructures in Africa and their respective location and coverage; iii) relevant existing data products and their spatial and temporal coverage and iv) an inventory of existing observation protocols relevant to the measurement of environmental variables in Africa.

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 web based 'SEACRIFOG Collaborative Inventory Tool'. Initially intended for internal use to facilitate the systematic capturing, sharing and visualisation of information on variables, observation infrastructures and existing data products, it was further extended to serve as open a resource to inform interested researchers and the general public about the findings of the SEACRIFOG Project. The SEACRIFOG Tool web app was developed using the R Shiny framework. The data is stored in a PostgreSQL database. The tool is hosted by SASSCAL and can be accessed at https://seacrifog-tool.sasscal.org/.

SEACRIFOG Annual Project Meeting 2018

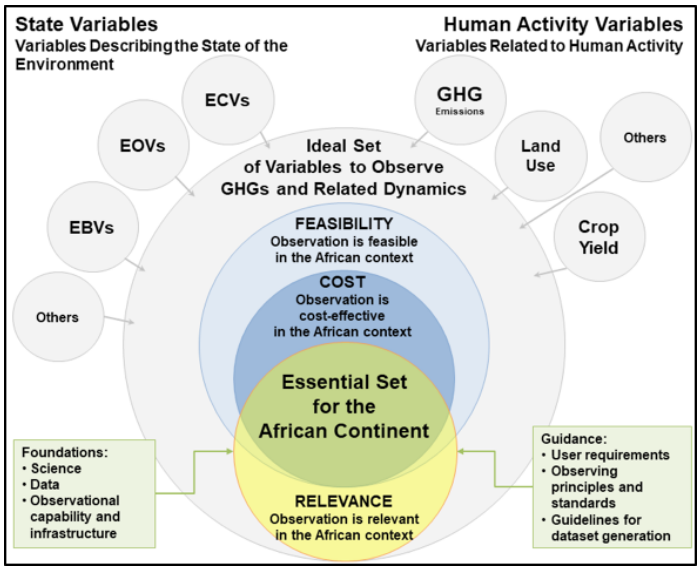
The SEACRIFOG consortium meets annually to present the findings from the various work packages and coordinate the way forward. The first full annual SEACRIFOG project meeting took place at the Ocean Science Centre Mindelo (OSCM) in Mindelo, Cape Verde, from 18th to 20th June 2018.

SASSCAL participated in the at the Annual Meeting From SASSCAL's perspective, a priority for the meeting was to discuss and obtain direct feedback by the project consortium on the 'ideal' and 'mandatory' variable sets to be considered by SEACRIFOG.

SEACRIFOG Consortium representatives at the first SEACRIFOG Annual Project Meeting in Mindelo, Cape Verde.

SEACRIFOG Deliverable 4.1: Identification of Key Variables for Climate Change Observation Across Africa

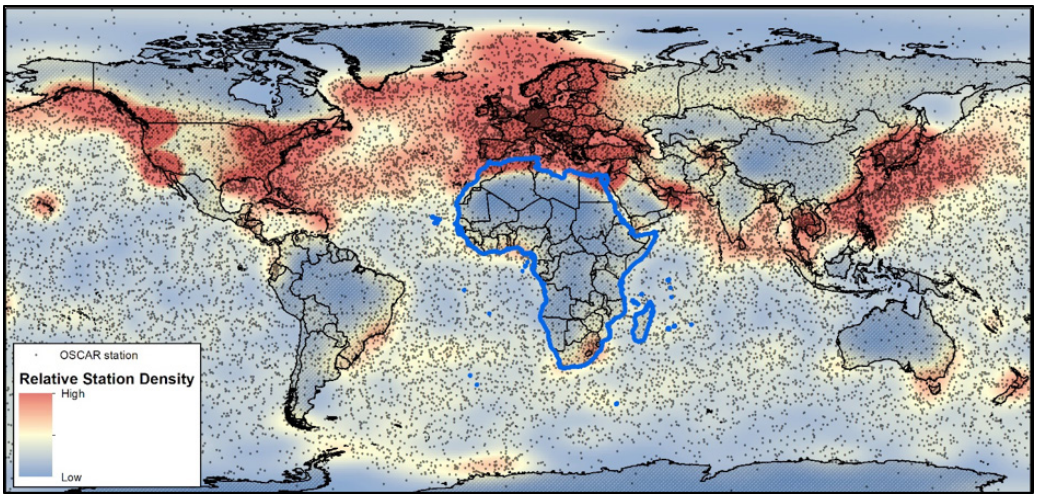
The SEACRIFOG Deliverable 4.1, titled "Identification of Key Variables for Climate Change Observation across Africa" and prepared under the lead of SASSCAL, was submitted in July 2018 and approved by the EU in August 2018. In line with the SEACRIFOG Work Package (WP) 4 objective of improving technical harmonisation and data quality in environmental monitoring and experimentation, this deliverable presents 'a minimal dataset of mandatory climatic parameters and ecological and land-use assessment criteria, together with an 'ideal' set of criteria'. The primary aim was to identify the essential variables to be observed systematically in order to sufficiently capture and quantify anthropogenic climate forcing as well as its interlinkages with agricultural production and food security in Africa and the surrounding oceans. The identification of these 'ideal' and 'mandatory' variable sets was accompanied by a comprehensive consultative process inviting the input from numerous experts in the field of environmental observation through the Collaborative SEACRIFOG Inventory Tool described above. The process resulted in a set of 58 essential variables, which served as the point of departure for various project tasks. The deliverable report is accessible. https://www.seacrifog.eu/fileadmin/seacrifog/Deliverables/2018.08.18_SEACRIFOG_Deliverable_4.1_doi.pdf.



Conceptual framework describing the approach used to define the set of essential variables to be measured in order to quantify climate forcing across the African continent. Published in López-Ballesteros et al. (2018).

SEACRIFOG Publication in Environmental Research Letters

In early 2018, the project consortium decided to prepare a manuscript presenting the preliminary project findings for submission to a scientific journal. A corresponding paper, titled "Towards a feasible and representative pan-African research infrastructure network for GHG observations" was submitted to the journal "Environmental Research Letters" in May 2018 and published in August 2018.



Worldwide distribution of environmental observations listed by the World Meteorological Organization as in April 2018, demonstrating the relative scarcity of environmental observations in the global South and particularly the African continent. Figure created by SASSCAL and published in López-Ballesteros et al. (2018).

The publication presents the initial project results, including the set of essential variables (see section above), an assessment of existing observation infrastructures, as well as the process of identification and engagement of key stakeholders. Major parts of the publication are based on SASSCAL's work in line with the SEACRIFOG Project. The publication can be accessed https://iopscience.iop.org/article/10.1088/1748-9326/aad66c.

South African Carbon Connections Workshop

From 10 to 14 September 2018, the South African Environmental Observation Network (SAEON) hosted a workshop on carbon flux research to guide the establishment of flux research in South Africa under the Extended Freshwater and Terrestrial Environmental Observation Network (EFTEON). The workshop took place at Didima in KwaZuluNatal in South Africa.

Field visit to a SAEON observation site in the grasslands of the Drakensberg Mountains at Cathedral Peak.

SAEON is among SASSCAL's consortium partners in the SEACRIFOG project. The SEACRIFOG consortium participated in this workshop. The workshop focused on obtaining an overview of the South African research landscape on carbon fluxes and cycles and mapping the interests of major research stakeholders in order to integrate these considerations in the design of the upcoming EFTEON infrastructure. Corresponding lessons and protocols can be applied when establishing research infrastructures in other African countries in order to achieve a high degree of harmonization of environmental observation across countries.

International Data Week 2018

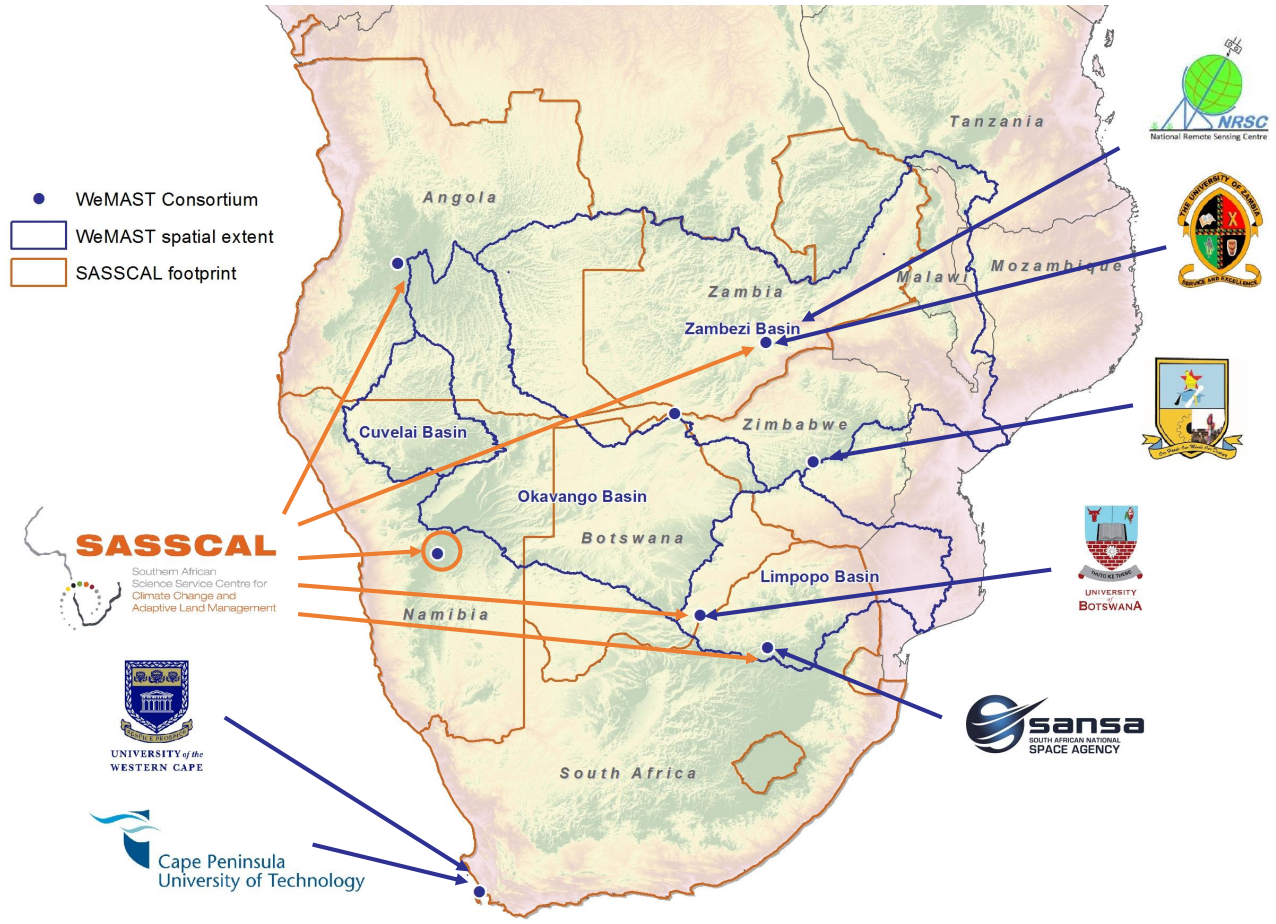
The International Data Week (IDW) 2018 was held from 5 to 8 November 2018 in Gaborone, Botswana. Hosted by the Botswana Open Science and Open Data Forum, IDW 2018 brought together data scientists, researchers, industry leaders, entrepreneurs, policymakers and data stewards from all disciplines and geographies across the globe. Altogether, it was attended by more than 700 delegates. The central element of the IDW 2018 was the SciDataCon 2018, the scientific conference addressing the frontiers of data in research.

SASSCAL Participated in the SciDataCon 2018. In line with the session 'Applications and utilization of data in understanding the effect of changing weather and a warming climate over Africa', SASSCAL gave a presentation titled 'Reducing the uncertainty of the African greenhouse gas budget: Observational gaps and needs', through which SASSCAL provided an overview of SASSCAL's work done to date in line with the EU-funded SEACRIFOG project. Subsequent to the conference, SASSCAL was invited to submit a practice paper to the peer-reviewed open access Data Science Journal. The paper is to be published in 2019 and will form part of the high-profile Special Collection for SciDataCon 2018.

WeMAST

HTTP://WEMAST.SASSCAL.ORG/

The WeMAST (Wetlands Monitoring and Assessment) project is a project funded under the Global Monitoring for Environment and Security (GMES) and Africa Support Programme between the Africa Union and the European Union, in the area of space science & technology and a key priority under the EU-Africa partnership. GMES and Africa aims to promote development of local capacities, institutional, human and technical resources for access to and exploitation of Earth Observation (EO) based services on an operational basis for sustainable development in Africa.



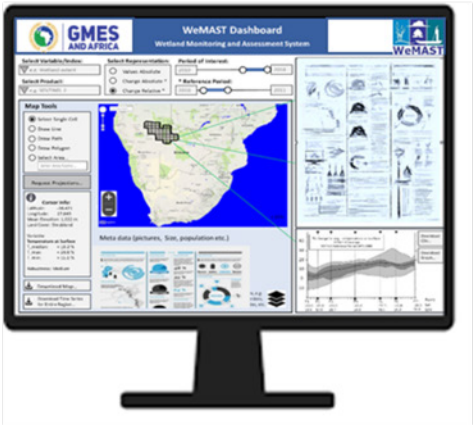
SASSCAL leads a consortium of the University of Botswana, Cape Peninsula University of Technology Midlands State University, National Remote Sensing Centre (NRSC) of Zambia, South African National Space Agency (SANSA), University of the Western Cape and University of Zambia. In support of the project's research component, one PhD and one MSc student are enrolled at the University of Western Cape (UWC), one PhD and two MSc students are enrolled at the University of Zambia (UNZA), two MSc students are enrolled at Midlands State University (MSU) and one student is to be enrolled at the University of Botswana (UB).

Prior to the roll-out of the WeMAST project, a GMES Due Diligence process was conducted by the African Union in Windhoek, Namibia, at the SASSCAL offices.

The purpose of the exercise was to ensure the existence of SASSCAL administration and finance processes and procedures. The WeMAST project was officially launched on 09 October 2018, in Windhoek, Namibia, with an Inception Workshop.

Members of the WeMAST consortium at the Inception Workshop

- **Wetland inventory**
  - Wetland extent, type, status
- **Flood mapping**
  - Flood dynamics
- **Vegetation Phenometrics**
  - LAI & NDVI
- **Inland water quality**
  - Algal blooms & total suspended matter
- **Land use and changes**
  - Land use & changes within the basin



Data
Information
Maps
Statistics
Trends

The WeMAST portal will make available different data products that will ensure efficient wetland monitoring and assessment.

During 2018, the WeMAST consortium has taken first steps to design and develop an integrated Earth Observation (EO) based platform for wetland assessment and monitoring that will support better management of selected transboundary river basins.

WeMAST is implemented on transboundary river basins in southern Africa, with special emphasis on the Cuvelai Basin, Okavango River Basin, the Limpopo River Basin and the Zambezi River Basin.

The platform will integrate existing and openly available EO data products and tools, such as the Copernicus services (including Sentinel Imagery), Modis imagery and Landsat imagery, to implement a sustainable and open wetland management system.

Miombo Project

The Miombo project was implemented from July 2017 to June 2018 and as part of the institutionalisation support to regional key stakeholders that SASSCAL was providing to the Miombo Network, the Resource Mobilisation Concept, Dissemination and Promotion Strategy and the Institutionalisation Guidelines for the Miombo Network Secretariat were prepared. The documents will serve as guidelines for the inception activities of the establishment of the Miombo Network.

In addition, the Miombo network webpage, two Policy Briefs (Promoting sustainable timber harvesting in Miombo through improved silviculture and Land use planning; a tool to minimize the environmental and social impacts of agricultural expansion in southern Africa) and one Policy Analysis were jointly developed and published. To this end, SASSCAL also provided support by designing the Miombo Network logo and producing a Miombo Network map.

Resource Mobilisation

In line with the organizational long-term vision, the institution has embarked on a mission to mobilize resources for sustainability. In this reporting period a total of €1 200 000.00 was granted by African Union Commission, for a project that focuses on Wetlands Assessment and Monitoring Platform for Transboundary River Basins in Southern Africa (WeMast). The WeMAST project will be implemented over 36 months - July 2018 to June 2021. The geographical scope covers Angola, Botswana, Namibia, South Africa, Zambia, Zimbabwe and Mozambique.

The World Bank's Integrated Landscape and Forest Management Multi-Donor Trust Fund granted USD70 000 to finance the Miombo project. The objective of the project was to leverage the knowledge acquired through integrative Miombo research, linking biological, ecological, social and economic disciplines and to provide a scientific basis for the conservation and sustainable use of the Miombo woodlands in Southern Africa. The Miombo project was implemented from July 2017 to June 2018.

11. Administration and Finance

Recruitment

The reporting period registered 9 recruitments for the following positions

Director Administration and Finance	System Administrator
Contract and Fundraising Officer	Human Resources Officer
Finance and Admin Assistant	Administrative Secretary
Human Capacity Development, Coordinator	Marketing and Communication Officer
Programme Coordinator, Namibia National Node	

Staff development

Professional staff development is vital for the success of any organization and can help to ensure that staff maintain and enhance their knowledge and skills needed to attain the organisation's Mandate. Training and development can also help to ensure that staff are compliant with the latest regulations as well as increase employees' confidence within their respective roles. SASSCAL provides a conducive environment for staff development and the table below shows the training programmes attended during the reporting period.

Training Programme attended
Purchase, Procurement & Inventory Management
Fundraising Training
Sage VIP Classic and SAGE VIP Premier Training
Excel on Steroids
Photography Training for 2 staff members

Team Building

Team building is important not only for the immediate experience of the activities performed by the team, but also for the group skills, communication and bonding that result and provide high-impact learning experiences for the team. Team-building programmes provide realistic experiences that empower individuals to contribute to common goals. The success of any organisation depends on the ability of individuals to build effective teams. SAASCAL believes in the benefits of team-building programs that enable staff at all corporate levels to work as true team players. The SASSCAL Regional Secretariat and the Namibia Node held their team building on 6th of December 2018, at Lake Oanob Resort, Rehoboth, Hardap region. Some of the activities of the day are shown on the pictures below.

RS and Namibia Node team building 2018 in pictures

FINANCE

Statement of expenditures

		Twelve months ended 31 December 2018 €	Twelve months ended 31 Dec 2017 €
Income			
Income received from BMBF(KfW)	(a)	3,246,214	4,051,984
Other income	(b)	1,282,218	851,274
Total Income		4,528,432	4,903,258
Expenditure			
Personnel Costs		1,055,929	1,193,766
Travel & Subsistence		102,559	45,610
Workshop & Meetings		253,665	107,746
Board Meetings		34,063	37,084
Consumables		21,105	19,942
Service and Utilities		188,026	155,544
Rent and Rates		83,893	101,863
Training and Capacity Development		11,475	23,548
Furniture & Equipment		21,259	3,495
Transport		-	-13,871
Hardware & Software		39,869	7,937
Bank Charges		12,307	12,383
World Bank Policy Briefs		5,865	-
Administration Fees NEA		18,504	54,164
Research and Symposium		1,225,158	1,160,620
Administration Fees (RS)		19,259	-
OADC Upgrade		55,656	-
Total Expenditure		**3,148,591**	**2,909,831**
Surplus/ (deficit) of income over expenditure		**1,379,841**	**1,993,427**

NOTES

- SASSCAL Funding from BMBF through KfW Contract with SASSCAL for Research, Operations and Investments
- Other income comprises of Member State contributions, Income from other sources such as African Union, World Bank, CSIR and European Union funded projects

Notes

SASSCAL
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WWW.SASSCAL.ORG

Annual Report 2018

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