SASSCAL GRADUATE STUDIES PROGRAMME INTEGRATED WATER RESOURCES MANAGEMENT

THE REAL PROPERTY.

PROSPECTUS

2022

SASSCAL GRADUATE STUDIES PROGRAMME INTEGRATED WATER RESOURCES MANAGEMENT

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Collaboration and Diversity

Excellence



Acronyms and Abbreviations

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ASAC BMBF BfG	Academic and Scientific Advisory Committee German Federal Ministry of Education and Research Federal Institute of Hydrology
ICWE	International Conference on Water and the Environment
ICWRGC	International Centre for Water Resources and Global Change
IWRM	Integrated Water Resources Management
NUST	Namibia University of Science and Technology
OADC	Open Access Data Centre
RSAP V	Fifth Regional Strategic Action Plan for the SADC Water Sector
SADC	Southern African Development Community
SASSCAL	The Southern Africa Science Service Centre for Climate
	Change and Adaptive Land Management
SGSP-IWRM	SASSCAL Graduate Studies Programme in Integrated Water
	Resources Management
SDG	Sustainable Development Goal
WEF	Water, Energy and Food

1 About SASSCAL

With funding from the Federal Ministry of Education and Research (BMBF), the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL), has established the SASSCAL Graduate Studies Programme in Integrated Water Resources Management (SGSP – IWRM). The SGSP – IWRM is the first step in a process of establishing SASSCAL Centres of Excellence in the region. In SASSCAL's long-term plan, five (5) Centres of excellence are planned: Centre of Excellence in Agriculture and Food Security (Angola), Centre of Excellence in Biodiversity and Ecosystem Health (Botswana), Centre of Excellence in Water Resources (South Africa) and Centre of Excellence in Forests and Woodland Management (Zambia).

This effort is complemented by various stakeholders including regional and international collaborating institutions and universities.

1.1 About SGSP-IWRM

Adequate availability of clean water is indispensable for food security, natural ecosystems and bio-diversity, energy production, health and sanitation hence key for the development of the African societies and economies. While Southern Africa experiences significant precipitation, it is highly seasonal in most countries and the distribution varies between tropical areas in the north of the region and arid and semi-arid climates in southern and central regions (https://www.sadc.int/themes/natural-resources/water/).

The SADC Water Development Framework and its supporting strategies and plans highlights that the concept of Integrated Water Resources Management (IWRM) offers solutions to deal with interlinked biophysical, socio-economic, institutional, and ethical challenges by assessing and managing water resources in space and time through a transdisciplinary and multi-sectoral approach. However, currently, there is limited capacity to support a broad and integrated approach for sustainable water resources management and water security that contributes to sustainable socio-economic development in SADC.

The skills gap, coupled with the increased risks introduced by the impact of climate change is contributing to the vulnerability of the water sector, severely affecting food and energy security and socio-economic stability at household, national and regional levels. Given these challenges, the sustainable, efficient and equitable management of limited water resources has become a major priority.

Table 1: SGSP-IWRM Thematic Areas and Topics



Water and Wastewater Systems and Technology

- Water conservation
- Water systems engineering
- Developmnt and deployment of information and communications technology
 - communications technology applications



Water Security under Climate and Environmental Changes

- Ecological assessment of water systems
- Effectiveness of environmental and social impact assessment processes
- Socio-economic dynamics
- implications
- Transboundary water systems



Hydrology and Geohydrology

- Basic and advanced hydrology
- Integrated surface water/ groundwater interactions/modelling
- Geohydrological, chemical, and biological process analysis Hydrological/hydrogeological modelling and forecasting/simulations



Sustainable Water, Energy and Food Security (WEF Nexus)

- Modelling, analysis of water, and energy food nexus approaches
- Risk assessments and decision support systems for WEF nexus
- Investigation/analysis of agricultural and other land uses on water

1.2 SASSCAL Research Priority Areas

SASSCAL aims to improve the understanding of climate and land management change impacts on the natural and socio-economic environment in southern Africa. To achieve this, SASSCAL defined five priority research areas in the SASSCAL Science Plan 2018 – 2021, addressing a wide range of aspects of climate change and other environmental changes that affect the southern African region. The five priority research areas are centred around, (i) food security, (ii) water security, (iii) biodiversity conservation, (iv) sustainable forests and woodlands, and (v) climate service provision.

Climate service is a cross-cutting topic in all SASSCAL supported research, however, the SGSP-IWRM will address the (i) food security, (ii) water security, and (v) climate service provision priority areas in particular.

1.3 SADC Water Sector

Climate Change threatens the attainment of these goals as SADC Member States are faced by increased uncertainty in an environment typified by spatial and temporal variability and weather extremes ranging from extended droughts and flooding (SADC, 2021).

The fifth Regional Strategic Action Plan for the SADC water sector (RSAP V) acknowledges that the COVID-19 pandemic underscores the urgent need to ensure adequate access to water, sanitation, and hygiene services in order to improve the resilience of communities for the population in all the SADC Member States.

The RSAP V contends that regional growth in the SADC region will require the ongoing development of large and small multi-purpose grey (engineering) and green (nature based) infrastructure to harness water resources to support developmental activities while also, promoting efficient use and conservation of the available water resources. Water is acknowledged as a catalyst to the development of the key sectors of the SADC Members States.

2 Common IWRM Courses

In support of SASSCAL's research agenda and the expressed needs of the regional water sector for highly qualified professionals, SASSCAL, together with the Namibia University of Science and Technology (NUST) established the SASSCAL Graduate Studies Programme in Integrated Water Resources Management (SGSP – IWRM). The programme is implemented by NUST in partnership with the International Centre of Water Resources and Global Change (ICWRGC) based at the Institute of Hydrology in Koblenz Germany. The SGSP-IWRM is fully funded by the Federal Ministry of Education and Research (BMBF). These common courses will further strengthen the competence profile of the Graduate students contributing toward their cognitive competence (Methodological), functional competence (Individual).



Title	Module 2
Aims	The Water System: Availability and Sustainable Use
	The course will provide students with an understanding of the fundamentals of hydrology (Hydrological Cycle-Precipitation, Evaporation, Soil Moisture, River Flows) and then introduce them to river basin management
Ains	including assessment of the water use sectors water
	resources development, planning and management
	 Introduction to Hydrology- The water cycle: Flows and storages Water Resources Assessment-Surface Water Water Resources Assessment-Ground Water Water accounting, water use sectors, competing uses, drivers of water scarcity, water use efficiency and 6: Water Resources Management and Development River basin planning and management
Topics	D. Blue water and green water
ropics	d Urban water management
	e Virtual water
	7 and 8: Introduction to water systems modelling/Coding and water informatics.
ALC: NO	9: Water-energy-food-nexus management
A STATE OF A STATE	10 [.] Ecohydrology environmental flows water

quality, pollution

Duration

12 days (10 days of lecture and 2 days for group assignment)

Title Module 3

Sustainable Sanitation in a Changing World

Aims

The course will provide students with an understanding of sanitation gap, and the implications on water quality, health, and hygiene. The course provides examples of technological innovations in sanitation and makes a business case sustainable utilization of waste.

1...Overview of the sanitation challenge in sub Saharan Africa, and the implications for water systems, health, and hygiene.

Topics

- 2.Overview of traditional sanitation systems, and alternative sanitation options, including the benefits and drawbacks of both options.
- 3. The policy implications of the above at the national and global levels

Duration

10 days (8 days of lecture and 2 days for group assignment, and field visit)

Title	Module 4 Water and Climate Change: Risks, Impacts, Vulnerability and Building Resilience
Aims	The course will introduce the basic concepts of the changing climate and how this will impact water resources . Furthermore, the course aims to improve understanding of planning for integrated water management in the context of climate change. The course discusses how to assess risks, vulnerabilities and build climate resilient measures
Topics	 Climate Change and the Water Cycle Climate Change Impacts in the Water and Other Water Related sectors Extreme Events: Floods and Droughts Climate Change Risks and Vulnerability and 5. Building Climate Resiliency Adaptation Mitigation GIS and Remote Sensing

Duration

7 Days (5 days of lectures and 2 days for group assignment)

Title	Module 5 Policy, Legislative, and Institutional Framework for Imple an IWRM Approach	ementation of
Aims	The course provides an overview of the policy and legis framework necessary for effective implementation of an approach.	lative NWRM
Topics	 1: Introduction to water and sanitation governance 2: Principles of effective water and sanitation governan 3: Institutional reforms, policy development and good g 4: Integrity and accountability in the water and sanitation principles and practice 5: Policy, legislative and, institutional framework for important of an IWRM approach. 	ce governance on sector: plementation
Duration	7 Days (5 days of lectures and 2 days for group assignn	nent)
		14

Title	Module 6
	Water and Sanitation Financing
	This module outlines the current financing for the water and sanitation sector, the financing gaps, and future needs. The module will elaborate on the analytical tools and data
Aims	to assess complex water and sanitation-related investments, and the business models required to support sustainable operation and maintenance efficiency.
	 Types of water and sanitation - related investments: functions and beneficiaries. Recent trends related to financing water and sanitation. Blended finance for water and sanitation: opportunities
Topics	 4: Innovative business models and contractual arrangements to allocate risks, and support sustainable operation and maintenance efficiency. 5: Financing of water and sanitation sector in practice: lessons learned.
Duration	7 Days (5 days of lectures and 2 days for group assignment)



3 Common Technical Block Courses

NUST as part of the Graduate Studies Programme offers seminars in support of of all post-graduate students, including the SGSP- IWRM students. These seminar series cover the philosophical approaches and research methods that are commonly used to conduct research in the IWRM field.

The seminars are designed to lay the foundation for good empirical research. Participants become acquainted with a variety of approaches to research problem conceptualization, literature review and research design. Throughout the semester, students will consult with their supervisors to develop their respective research proposals.

3.1 Technical Seminar Schedule 2022



3.2 Postgraduate Research Seminars 2022/2023

Groundwater Management

Driving Innovative Research towards Water Resources Reliability and Sufficient Quality in Southern Africa

Climate change adaptation and water securities: reflection from the C40 cities climate leadership group

Water flows and costs and benefits when managing river systems

Inclusive access to WASH services: strategic and operational changes to ensure that no one is left behind

> Climate and hydrological data standards and data management principles

 Driving Innovative Research towards Secure Water Resource Quantity and Availability in Southern Africa.

Convention on the protection and use of transboundary water courses and international lakes: Perspectives from the SASSCAL Countries

Promoting integrity and accountability in the WEF Nexus: risks, and tools for the Southern African context

Wetlands of Southern Africa: value, threats, and opportunities for protection, restoration, and protection

Sustainable groundwater management in the SADC region



3.3 Research Colloquiums

Research Colloquiums are held once a week until each student has completed their PhD proposal.

Thematic focus

Colloquium 1

Hydrology and Geohydrology

Colloquium 2

Water and waste water systems and technology

Colloquium 3

Water security under climate change and environmental changes

Colloquium 4

Sustainable water, energy and food security

4 SASSCAL RESEARCH CHAIRS PROGRAMME

A regional SASSCAL Research Chairs programme under the theme: Integrated Water Resources Development and Management - Sustainable Water Security in Southern Africa is established. **Two distinct**, yet related Research Chairs focusing on 'Water Resource Quantity' and 'Water Resource Availability' forms part of the programme.

Two post-doctoral candidates support the students and their supervisors in conducting research as part of the Research Chairs Programme.



Scenes from the SGSP-IWRM Launch at the High-Tech Transfer Plaza Select (HTPPS), NUST, Windhoek, 07 April 2022













Meet the 2022 SGSP Candidates

Catherine Tlotlo Kerapetse CLICK HERE: https://tinyurl.com/mvxkdjak



Chiamba Canivete CLICK HERE: https://tinyurl.com/ynypdzar Jimmy Katambo
 CLICK HERE: https://tinyurl.com/wv437b8f



Faith Kudzai Chihumbiri CLICK HERE: https://tinyurl.com/2p8bhscc



Menare Royal Mabakeng CLICK HERE: https://tinyurl.com/3zdhkh2k



Ofentse Moseki CLICK HERE: https://tinyurl.com/2bkyj5xr



Mauricio Clemente CLICK HERE: https://tinyurl.com/ykf6ct7t



Lima Emanuela CLICK HERE: https://tinyurl.com/4hvdnep8

Maria Kanyama CLICK HERE: https://tinyurl.com/4z5c6x8a

VR



Muumbe Lwendo CLICK HERE: https://tinyurl.com/2uswnf8v

Otlaadisa Tafila CLICK HERE: https://tinyurl.com/acpaph29 Sydney Sichilima CLICK HERE: https://tinyurl.com/38a68ru7

ACADEMIC AND SCIENTFIC COMMITTEE (ASAC) MEMBERS

ASAC guides overall committee agenda and strategic direction to ensure long-term goals are achieved. Strategically guiding the implementation of the SGSP-IWRM Science Plan.

Furthermore, ASAC supports the profiling and positioning of the SGSP-IWRM science activities.

• Dr Anna Matros-Goreses (Chairperson), Namibia

- Dr Elijah Ngurare, Namibia
- Prof Jean-Marie Kileshye Onema, Zimbabwe
- Dr Budzanani Tacheba, Namibia
- Dr Mokhele Moeletsi, South Africa
- Dr Kawawa Banda, Zambia
- Dr Piet Kenabatho, Botswana
- Prof Lopes Baptista, Angola
- Dr Luna Bharati, Germany

SGSP-IWRM Secretariat team

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