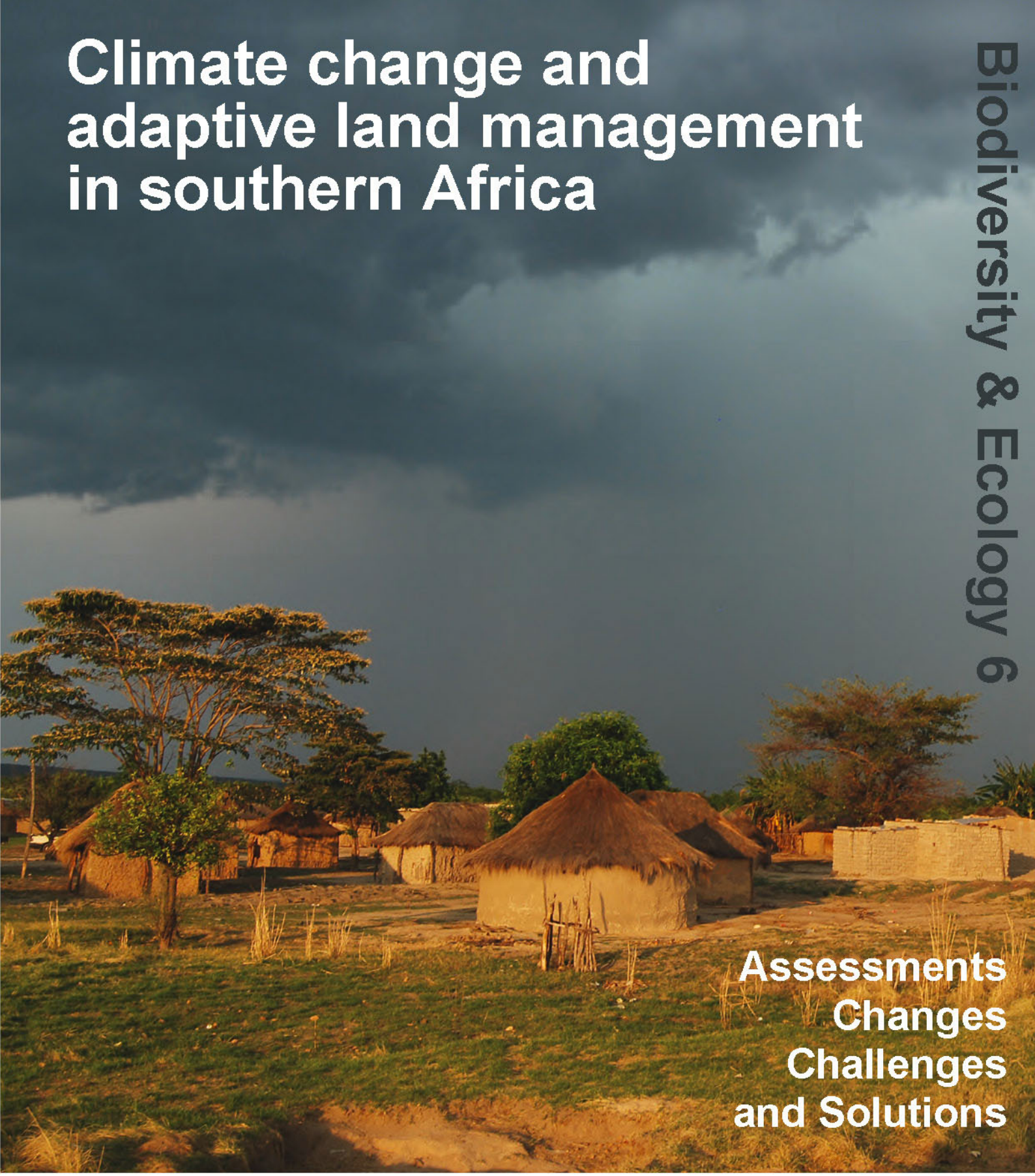
Climate change and adaptive land management in southern Africa

Biodiversity & Ecology 6



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Climate change and adaptive land management in southern Africa

Assessments, changes, challenges, and solutions

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Collaborative Postgraduate Programme in Applied Science in Earth Observation, Geographic Information Systems and Remote Sensing

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The challenge

Capacity-building in the Southern Africa Science Services Centre for Climate Change and Adaptive Land Management (SASSCAL) is an essential part of the initiative's science programme. One of the major capacity limitations identified at the Southern African Development Community (SADC) level is in the field of Earth Observation, Geographic Information Systems, and Remote Sensing. Within Task 303, a collaborative Master of Science degree in Geographic Information Systems, Remote Sensing, and Earth Observation was designed and implemented by four SADC universities: University of Botswana (UB), University of Zambia (UNZA), Cape Peninsula University of Science and Technology (CPUT, South Africa), and Namibia University of Science and Technology (NUST), the coordinating university.

The development of the core curriculum

Nominated members of the four universities developed the curriculum of the collaborative MSc jointly. They adopted a modified Developing a Curriculum (DACUM) process to identify minimum elements of the core curriculum. This process incorporates the use of a focus group in a facilitated storyboarding process to capture the major duties and related tasks included in an occupation, as well as the necessary knowledge, skills, and traits for success in the field. To address the needs of each partner, some specialisations based on their capacity and expertise were included. The process adopted proved effective in that it respected the various national regulations and internal university processes and procedures while also meeting the identified capacity needs in this field (Tab. 1).

The collaborative Master of Science Degree programme

Since the programme's implementation in May 2016, 45 students have been admitted at NUST, UB, and UNZA, 35 of whom are benefitting from SASSCAL Task 303 scholarships that fund tuition fees, stipends, medical insurance, travel and visa expenses, and a modest research grant.

In July 2016, the first programme was launched at NUST with an intake of 14 students. These students are now at the thesis stage and are expected to graduate in 2018 (Fig. 1).

The second programme, launched at UNZA in May 2017, has 22 students (Fig. 2); UB launched its programme in November 2017 and admitted nine students. Table 2 shows the intakes and country of origin of funded students at the three universities. Despite the language barrier and limited capacity to contribute to curriculum development, three Angolan students were admitted to the programme. The curriculum development process at CPUT was delayed due to internal restructuring of programmes but will hopefully be implemented within the next three years. In addition to scholarships, Task 303 also funded equipment; software; and personnel training, including faculty to teach and supervise students at participating universities. This has provided an excellent opportunity for students to benefit from a unique academic experience with an international flavour.

The Master of Science degree awarded will place graduates in a better position to undertake further postgraduate studies at the PhD level or seek employment in HEIs, research institutions and centres, government or non-governmental organisations, or the private (suitable professional) sector.

As one strategy to ensure that this Master of Science programme remains sustainable, the universities will continue to market and promote it to national and regional institutions and organisations. Beneficiary students will be branded SASSCAL alumni and will be an integral part of this promotion strategy.

Table 1: Curriculum structure at NUST, UB and UNZA, showing common and elective courses

Courses	NUST	UB	UNZA	Common (C) or Elective (E)
Advanced Image Processing and Interpretation	x	x	x	C
Advanced Research Methodology	x	x	x	C
Spatial Analytical Methods	x	x	x	C
Advanced Environmental Remote Sensing	x	x	x	C
Advanced Digital Photogrammetry	x			E
(Advanced) GIS for Spatial Planning	x			E
Advanced GIS Programming	x		x	E
Communication of Geospatial Information	x		x	E
Spatial Databases and Web Mapping	x			E
Management of Geospatial Information	x			E
Quantitative Techniques in Environmental Management		x		E
Integrated Environmental Management		x		E
Specialist Directed Readings & Labs		x		E
GIS Modelling & Data Management		x		E
Crop Yield Estimations and Early Warning Systems			x	E
Rapid Forest Assessment and Monitoring			x	E
Spatial Databases			x	E
Web Mapping and Geospatial Web Services			x	E
GIS for Hydrology and Water Resources			x	E
Mobile Computing for GIS			x	E

Figure 1: Launch of NUST programme in Windhoek, November 2016.

Figure 2: Launch of UNZA programme in Lusaka, May 2017.

Table 2: Intakes and country of origin of SASSCAL-funded students

Countries	NUST	UB	UNZA	Other	Total
Angola	0	1	2	0	**3**
Botswana	0	7	2	0	**9**
Namibia	12	1	0	0	**13**
Zambia	2	0	8	0	**10**
South Africa*	0	0	0	1	**1**
Total	**14**	**9**	**12**	**1**	**36**

* Under staff development, one staff member from CPUT, assisted with PhD studies

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