

Centre for Sustainability Transitions (CST)



Stellenbosch

UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

Annual Report 2021-2022

forward together
sonke siya phambili
saam vorentoe



Contents



Message from the co-directors	4
Brief history	6
Core activities & research areas	7
CST core values	8
Education & training	9
Core research areas	
- Knowledge co-production	10
- Social-ecological resilience	14
- Transformative futures thinking	18
- Finance & resource flows	22
- Political economy & development	26
Cross-cutting activities	30
Appendices	
- Governing board	34
- Staff members	34
- PhD graduates	36
- MPhil graduates	36
- PGDip graduates	37
- Journal articles	38
- Books	40
- Book chapters	40
- Reports	42

Message from the co-directors

The first two years of the new Centre for Sustainability Transitions have been a period of intense institutional transition and turbulence, moving into a growing phase of consolidation, stability and direction. After almost two years of working online and from home during the COVID-19 pandemic, on top of undergoing major institutional reorganization, we transitioned back to the office in early 2022. We kicked off the year with a long-awaited in-person staff retreat held at Fynbos Estate outside Malmesbury. This was the first time several staff members had the opportunity to meet in person and the first in-person staff meeting of our new Centre, and was a special and important moment to reconnect as full beings. It was also an important event to start consolidating and giving concrete direction to the new CST Type 2 centre, which had been approved in 2021 but for which the three postgraduate programmes were only moved over into the CST, and finances were only fully split from our former home in the School for Public Leadership, as from January 2022. At the retreat, we developed a collective set of core values for the CST, building on our individual values, as well as an updated vision for the Centre, which have served as an important foundation for further strategic discussions and planning.

Building on the retreat and the formal institutional changes approved in 2021, 2022 was a year of institutional consolidation for the CST that has resulted in staff-wide agreements on how the CST should manage its teaching and research programmes in an integrated and holistic manner, that uses our slim financial resources in a way that maximises the effectiveness of our staff resources. This institutional consolidation was informed by a clear realisation that global, regional and national shifts are underway that reinforce the strategic positioning of the CST. As Stellenbosch University's lead institution delivering both cutting-edge research and learning programmes about the complex dynamics of sustainability transitions and transformations, the CST is well positioned to respond to these shifts. The combined impact of the 2007/9 financial crisis, the COVID-19 pandemic of 2020-2021, global consequences of the Russia-Ukraine war, the increasingly serious impacts of climate change and the growing number of 'resource wars' (including Ukraine, Sudan, Bolivia) has reinforced the global narratives about a deepening 'polycrisis' and related commitments to sustainability transitions. Global fora such as the World Economic Forum, the annual Congress of the Parties (COP) gatherings, the annual UN-convened climate talks in New York, the annual meetings of the World Bank/IMF and even the annual meetings of the G20 have all reinforced calls for more ambitious climate action commitments. At the same time, the challenge of decarbonization has been linked

to the challenge of persistent inequality, resulting in the rise to prominence of the Just Transition narrative that has been incorporated into many Nationally Determined Contributions (NDCs). South Africa was the first to include the Just Transition in its NDCs, and the first country to propose a Just Energy Transition – Investment Plan (JET-IP), to which CST staff have contributed.

The CST has addressed the need for institutional consolidation against this background. Four options for the longer-term institutional focus of the CST were identified: 'teaching only', with minimal research; divided house – a single institution with two divisions, one for research and one for teaching, with a clear division of responsibilities; 'rounded academics' – an integrated approach where academic staff are involved in both research and teaching on a spectrum where some are more teaching-oriented and others more research-oriented; and 'research only' with minimal teaching. We have opted for the 'rounded academics' option because we feel this model provides the best options for high-quality, cutting-edge postgraduate training by leading researchers as well as world-leading research supported by teams of students, particularly at the PhD level. We also felt this model provides the best financial security in that it assures a relatively steady income stream from student training while at the same time sustaining a substantive external funding stream. This model also accorded with the majority of staff's

desires to develop a balanced set of teaching and research skills which could also be transferable elsewhere. However, in practice this meant paying very careful attention to governance, programme leadership, creating more teaching opportunities for less experienced staff, and support for fast-tracking research experience and publications for early career staff. A key outcome of this decision has been an agreement that the postgraduate programmes and institutional functions of the CST are a collective responsibility that has to be shared amongst all, although the responsibilities can be at different proportions. Emanating from this decision has been a concerted effort to realign existing funds and secure new funds to ensure that academic staff who take on teaching and institutional responsibilities are partly funded from the core funds provided by the University for these purposes. This has diminished their reliance on third-stream funding, and increased job security and the possibility for a larger cohort of staff to build long-term careers at the CST.

Building on our clarified vision, values and institutional model, we successfully applied for one of Stellenbosch University's sought-after strategic fund grants, which fund initiatives that will have a significant impact on the overall vision and strategy of the University, namely to become the leading research-intensive university on the African continent. In our application, we laid out our vision of building a world-leading set of postgraduate programmes at the PhD, MPhil and postgraduate diploma (PGDip) levels, focusing specifically on sustainability transitions, which can serve multiple sustainability-focused centres across campus. Securing these funds has boosted the strategic review and reorganization of the CST's postgraduate programmes to align with the CST's core research areas, limited staff resources, and emerging national, continental and global contexts. The renewed teaching programme builds on the substantive experiences of the past two decades, and will continue to combine rigorous academic study, discussion-learning, place-based learning experiences and explorations of personal interiors. The CST is now well-positioned to tackle the challenges that lie

ahead. The core challenge is creating a sound financial core that will make it possible to consolidate a core group of academic staff that can build long-term research programmes and careers at the CST. At the moment, the CST depends on third-stream funding for the bulk of its income. However, the proportion of core funding from University allocations has been increasing, and this trend needs to continue by growing our postgraduate and research programmes. Creating long-term security for a core set of positions is a precondition for being able to recruit capable senior black academics, who will be essential to the long-term institutional and academic sustainability of the CST. The second challenge is to continue growing our research programmes and profile, especially through rising numbers of peer-reviewed publications. Growing our PhD programme will be a key contributor to this goal. The third challenge is to consolidate the reorganization of the postgraduate diploma and MPhil programmes in order to achieve the goals articulated in the Strategic Fund application. This will include an aggressive marketing and recruitment campaign that celebrates the achievements of our programmes that have not enjoyed a strong public-facing presence before.

In sum, 2021-2022 has been a period of transition, reorganization and alignment at the CST, and a tapering of the strenuous movements of becoming a new departmental-level unit within the Faculty. We have felt keenly what it means to grapple with transitions within our own institution, to build trust, to become clearer, more resource-savvy and entrepreneurial about our own core mission. We remain committed to our funders, some of whom we have been in partnership with over several years, undertaking meaningful and impactful project work across our research areas of complex adaptive systems, socio-technical transitions, human-nature interconnectedness and social-ecological transformations. In meeting our challenges we look forward to greater institutional consolidation; relevant, purposeful research and inspired learning and teaching with CST staff and students.



Prof Mark Swilling



Prof Reinette 'Oonsie' Biggs



Brief history

The inception of the Centre for Complex Systems in Transition (CST) in 2015 was triggered by a National Research Foundation initiative to fund flagship research initiatives at South African universities, and built on Stellenbosch University's rich legacy of research into complexity and sustainability. The CST aimed to foster inter-faculty cooperation on the topics of complexity, sustainability, and transdisciplinary and provided an institutional framework for experimenting with new emerging forms of knowledge production and collaborative action, in response to the complex challenges facing society. The CST was originally based in the School of Public Leadership (SPL), and formed through the merger of the Centre for Studies in Complexity (CSC), and the TsamaHub (Transdisciplinary, Sustainability, Analysis, Modelling & Assessment Hub), which coordinated a transdisciplinary PhD programme. The CST maintained an active relationship with the Sustainability Institute (SI), a non-profit trust, focused on delivering community-based projects in the surrounding community and ecosystems, which provided a deep, place-based context for the CST's teaching programmes.

Between 2015 and 2020, the CST experienced rapid expansion, with researchers securing funding for projects across various fields. The Centre's projects were united by a strong commitment to high-impact transformative research, inspired by complex adaptive systems thinking and transdisciplinary research approaches, and recognition of the profound interconnections between the environment and society. During this period, the staff increased from six to 23 members, and the CST successfully supervised the graduation of 18 PhDs, 50 Masters, and four Honours students. The CST also coordinated the PGDip in Sustainable Development, which graduated 238 students over this period.

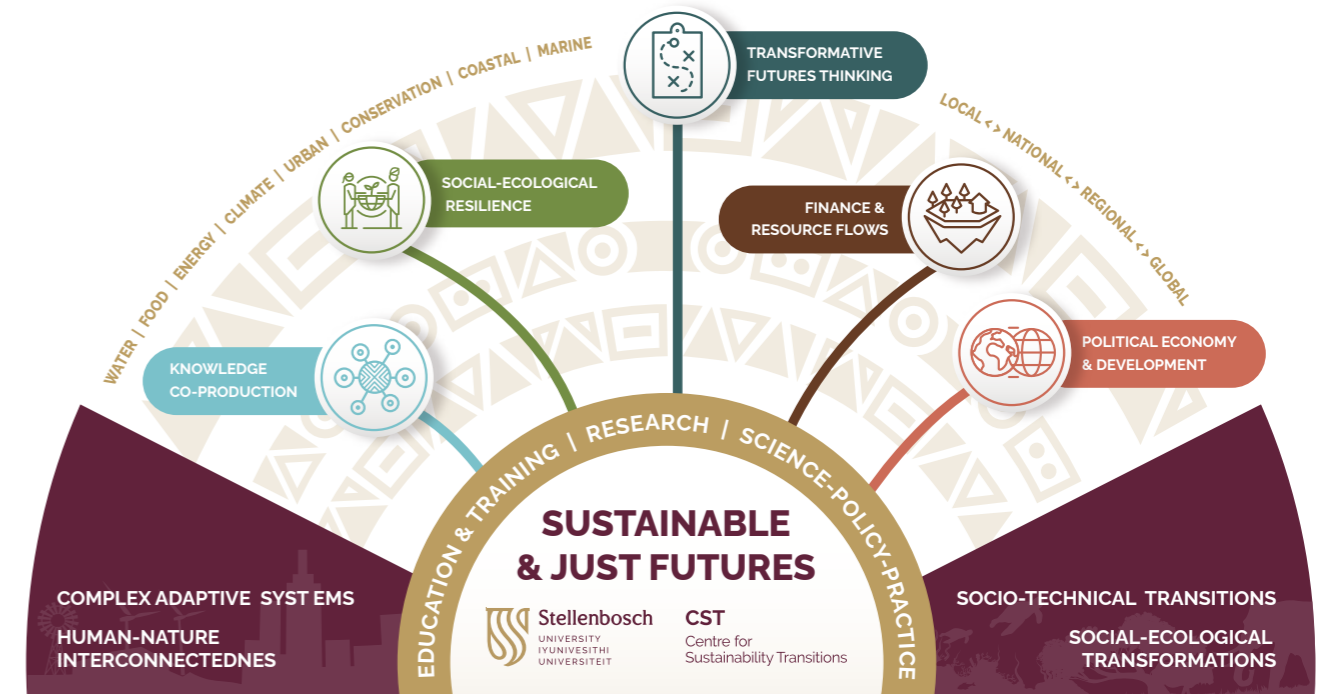
These achievements propelled the CST into a new phase starting in 2021, where it transitioned to the Centre for Sustainability Transitions (retaining its acronym CST), to better reflect its core focus. The institutional shift from a "Type 1" to a "Type 2" centre was officially approved by the Senate in March 2021, while the postgraduate programmes (Postgraduate diploma, MPhil and PhD programmes) were moved into the CST from January 2022. This change elevated the CST to the equivalent level of a department, reporting directly to

the Dean and receiving its own budget, with a mandate to conduct both research and postgraduate teaching. The transition marked the move from a start-up phase to a period of consolidation with a clear vision and set of values.

Today, the CST consists of two core components: the Research Hub and the Teaching Hub. It is co-directed by Prof Biggs and Prof Swilling, who are supported by a Management Committee responsible for advising on strategic and budgetary matters. The centre also benefits from an experienced administrative team. The Research Hub comprised 26 projects with a combined budget of over R20 million in 2022. Simultaneously, the Teaching Hub oversees the Postgraduate Diploma, MPhil, and PhD programmes in Sustainable Development. These degree programmes, with a budget of over R45 million in 2022, had 119 students in total registered for the year. By merging extensive high-impact research projects with well-established teaching programmes, Stellenbosch University has positioned itself alongside leading tertiary institutions worldwide that have launched various sustainability-focused centres and initiatives over the past two decades.



Core activities & research areas



As part of the process of institutional change that took place during 2021-2022, the CST community engaged in a series of discussions to map out our core institutional activities and research areas. Each of these span multiple research projects and people, and are seen as core long-term areas of work and areas of specialist expertise for which the CST is known. This process resulted in the above figure, that conveys the future oriented, and organic nature of our work, grounded in a southern African context.

As highlighted in the figure, the core focus for all work at the CST is to contribute to building sustainable and just futures, at scales ranging from the local, through national and regional, to global. This is achieved through three main areas of activities:

- 1) Education and Training
- 2) Research
- 3) Engagements across the Science-Policy-Practice interface

These activities are focused around five core areas of specialist expertise:

- 1) Knowledge co-production
- 2) Social-ecological resilience
- 3) Transformative futures thinking
- 4) Finance and resource flows
- 5) Political economy and development

The shared and binding conceptual foundation for all of our work is understanding the systems we study as complex adaptive systems where humans and nature are deeply interconnected. Rather than focusing on specific sectors, the strength of our work is a larger systemic focus that integrates across sectors, including food, water, energy, protected areas, amongst others. CST is one of few research centres globally that draws on and integrates theoretical frameworks of socio-technical transitions and social-ecological transformations.

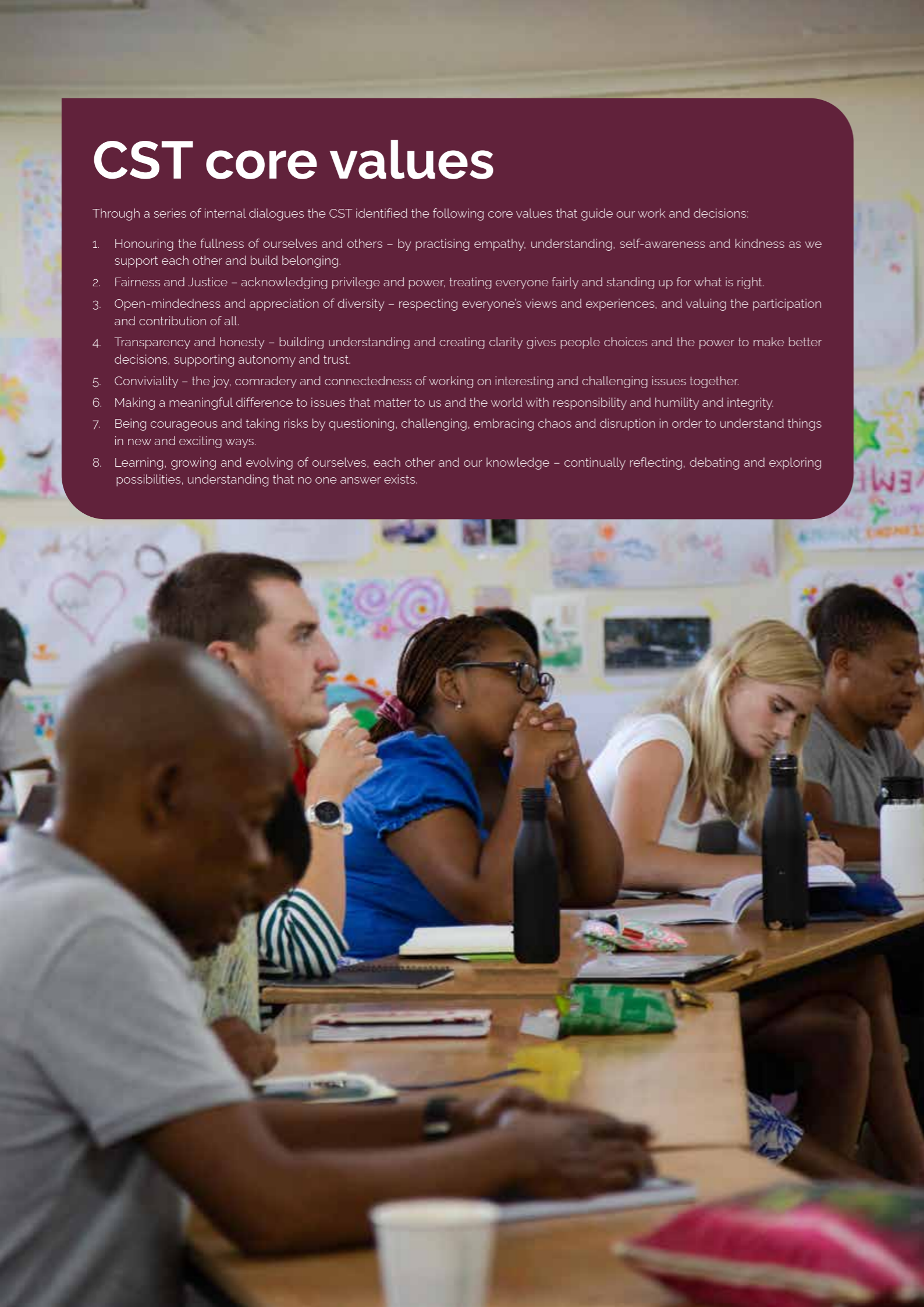
The CST continues to sustain a high level of research output. During 2021-2022, we published 51 journal articles, and contributed to 34 book chapters as well as leading a landmark edited handbook on research methods for social-ecological systems. Highlights include a paper in the journal *Science on Climate Change and the Urgency to Transform Food Systems*, co-authored by Odi Selomane, and a paper in the journal *Nature Sustainability* reflecting on lessons from COVID-19 for Wildlife Ranching in a Changing World, led by Hayley Clements. Other highlights include a special feature in the journal *Ecosystems and People* featuring a 10-year retrospective on the Programme on Ecosystem Change and Society. The report Making Climate Finance Work by CST's energy team was one of the first estimates of the cost of achieving net zero and energy security by 2050. The CST has run a successful colloquium series where students, staff and guests have shared cutting edge research.

Many CST staff are engaged in key global and national dialogues and policy fora. This includes Oonsie Biggs, Nadia Sitas and Odirilwe Selomane who serve as coordinating lead authors in the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) assessments. Mark Swilling who is a Commissioner on the National Planning Commission, Chair of the Board of the DBSA, member of the UN's International Resource Panel and of the World Economic Forums Future Growth Council on the Economics of an Equitable Transition. Hayley Clements received a Mail and Guardian 200 Young South Africans Award, "showcasing South Africa's eminent and accomplished young people" for her work on the African Wildlife Economy. CST Research Fellow Tanya Brody Rudolph, is an international ocean lawyer who has over the past two years co-conceived the International Panel for Ocean Sustainability. Her advocacy and transdisciplinary research aims to bridge the science-policy divide to find new paradigms for ocean governance.

CST core values

Through a series of internal dialogues the CST identified the following core values that guide our work and decisions:

1. Honouring the fullness of ourselves and others – by practising empathy, understanding, self-awareness and kindness as we support each other and build belonging.
2. Fairness and Justice – acknowledging privilege and power, treating everyone fairly and standing up for what is right.
3. Open-mindedness and appreciation of diversity – respecting everyone’s views and experiences, and valuing the participation and contribution of all.
4. Transparency and honesty – building understanding and creating clarity gives people choices and the power to make better decisions, supporting autonomy and trust.
5. Conviviality – the joy, comradeship and connectedness of working on interesting and challenging issues together.
6. Making a meaningful difference to issues that matter to us and the world with responsibility and humility and integrity.
7. Being courageous and taking risks by questioning, challenging, embracing chaos and disruption in order to understand things in new and exciting ways.
8. Learning, growing and evolving of ourselves, each other and our knowledge – continually reflecting, debating and exploring possibilities, understanding that no one answer exists.



Education & training

Education and training within the CST’s postgraduate programmes is a critical component of the Centre’s approach to co-producing transformational knowledge for sustainability transitions. As various global social-ecological crises deepen, a new generation is rising into leadership positions in the public, private, and non-profit sectors that require a transdisciplinary understanding of the various dimensions of these challenges.

While addressing critical problems is of utmost importance, in each of their own ways, the programmes emphasise the exploration of solutions and pathways for transformative change. The CST’s postgraduate offerings are oriented towards diverse audiences of all ages, from recent graduates from multiple specialisations to working professionals seeking to deepen their sustainability knowledge and links to practice, and early career researchers hoping to develop research capacities to support sustainability transitions.

Attaining a postgraduate degree at the CST equips students with a unique set of skills and values, each specifically tailored for whether students are registered in the course work focused PGDip, or going further to benefit from the research skills cultivated in the MPhil and deepened in the PhD. Graduates become thought leaders

and practitioners in sustainability transitions and transformations, capable of integrating knowledge across disciplines, and importantly, co-creating knowledge with societal actors to address pressing sustainability challenges. They learn how to understand and navigate complex transitions for the advancement of human wellbeing and a more sustainable world.

The CST’s postgraduate training offering comprises the PGDip (NQF level 8), MPhil (NQF level 9) and PhD (NQF level 10) in Sustainable Development. The PGDip provides the entry point into this wider research and postgraduate training environment. During 2021-2022, 78 students graduated from the PGDip, 26 from the MPhil programme, and one from the PhD programme. At present, there are 17 PhD students enrolled in the programme.

The MPhil in Sustainable Development has broadened my field of expertise beyond engineering to economics and even social studies. The research made me realise that true problem solving is transdisciplinary and multi-faceted.
- Alboricah Tokologo Rathupetsane, 2022 MPhil Graduate

The PGDip gave me an opportunity to interact with different people with varying backgrounds who are all aiming to do one thing - make the world better. It was inspiring to come together and think of relevant solutions for our times. Through these encounters I also formed meaningful relationships that have opened up more doors of opportunities.
- Chawa Mhango, 2022 PGDip Graduate



PGDip graduates:



MPhil graduates:



Current PhD graduate:



Knowledge co-production

Knowledge co-production is a fundamental research approach embraced by the CST. We firmly believe that knowledge is a collaborative endeavour, requiring the active participation of diverse stakeholders, including researchers, practitioners, policymakers, and community members. Our commitment to knowledge co-production is evident throughout our research process, from inception to implementation. By actively involving knowledge users in problem identification, data collection, analysis, and dissemination, we ensure that our research is relevant, legitimate, actionable, and context-specific. Through knowledge co-production, the CST facilitates the bridging of the gap between science, policy and practice, promoting a more integrated and impactful approach to research and sustainable development.

USAID Resilient Waters

The goal of USAID/Southern Africa's five-year (2018–2023) Resilient Waters Programme is to build more resilient and water-secure southern African communities and ecosystems through improved management of transboundary natural resources and increased access to safe drinking water and sanitation services. Resilient Waters' approach is based on the premise that by building the capacity of and enhancing cooperation between people and institutions at the community, national, and regional levels can help achieve sustainable resilience with inclusive growth in southern Africa. The project focuses on addressing the severe water challenges facing the Limpopo River Basin and Okavango River Basin communities.

The CST is the key knowledge partner in this programme and funding from USAID facilitated successful implementation of various activities in 2022. One of the key activities is the scholarship programme, supporting eleven southern African students to complete Masters and PhD degrees at Stellenbosch University on topics aligned to the programme's focal areas. Four Masters students namely, Romanus Kasino, Reinhold Mangundu, Jeremiah Masaya and Fiona Ngadze have successfully completed their Masters degrees thus far.



Photo credit: Safari Consoler | Pexels

Gender Equality and Social Inclusion (GESI) for sustainable transboundary water resource management

Through a collaborative effort by the USAID Resilient Waters Programme, the Global Water Partnership, the CST, the Climate Resilient Infrastructure Development Facility (CRIDF), the Southern African Development Community Groundwater Management Institute (SADC-GMI), and the Permanent Okavango River Basin Water Commission (OKACOM), this online course aimed to provide professionals engaged in transboundary natural resource governance, particularly in water resource management, with the necessary knowledge and skills to integrate GESI principles into their institutions, programmes, or projects.

The course comprised six modules, each designed to offer a comprehensive learning experience over approximately

two hours. Participants had access to a range of educational resources, including concise video lectures, engaging discussions, illuminating case studies, essential readings, and assessments. By leveraging the expertise of southern African specialists in gender, social equality, resilience and sustainable development, monitoring and evaluation, and transboundary water resource management, the course covered key aspects of GESI, emphasising strategies for mainstreaming GESI within programmes, projects, and transboundary institutions.

Throughout the course, participants were introduced to fundamental GESI concepts and provided with practical tools and approaches for mainstreaming GESI in the context of water resource management. The course placed a specific focus on Southern African examples and case studies to highlight GESI learnings relevant to programmes, projects, and institutions operating within this region. Participants gained the capacity to articulate strategies that contribute to GESI mainstreaming, ultimately working towards effective, sustainable, and inclusive water resource management that prioritises the principle of "leaving no one behind."

Bii4africa project

The Bii4africa project is an initiative by the CST in partnership with the South African National Biodiversity Institute (SANBI) and made possible through the JWO research grant. Led by CST senior researcher, Dr Hayley Clements, Bii4africa aims to bridge the gap between biodiversity informatics and biodiversity conservation in Africa. The project recognizes the critical role of data and technology in supporting effective conservation efforts on the continent. By leveraging advances in data science, artificial intelligence, and machine learning, Bii4africa seeks to empower conservation practitioners and decision-makers with robust, accessible, and user-friendly tools and resources. Dr Clements, with her expertise in biodiversity conservation and informatics, plays a pivotal role in leading the project and guiding its strategic direction. Through Bii4africa, Dr Clements and her team are working towards enhancing the capacity of African institutions and conservation practitioners to harness the power of data and technology, ultimately contributing to more informed and evidence-based conservation strategies across the continent. In October 2022, Dr Clements delivered a captivating talk titled "Building a Biodiversity Intactness Index for Africa" at the prestigious 11th Oppenheimer Research Conference held in Johannesburg. This conference served as a significant platform for sharing groundbreaking research and insights related to biodiversity conservation and its critical importance for Africa's ecological wellbeing. Dr Clements' presentation contributed to the collective understanding of biodiversity conservation strategies in the region, further highlighting the significance of the project's objectives and the impact it seeks to achieve.

Photo credit: Colin Waits | Unsplash

Online short course: anticipatory governance – new ways of sense-making and navigating for uncertainty

The CST, in collaboration with the USAID Resilient Waters programme, developed and launched a free online short course titled "Anticipatory Governance: New ways of sense-making and navigating for uncertainty". The self-paced online course was made available for free on the UNESCO Open Learning platform, from November 1, 2021, to March 31, 2022.

The course drew upon the expertise of CST's researchers in the fields of foresight and futures literacy, social-ecological resilience, and complex adaptive systems. It emphasised the various approaches and tools for exploring how to foster governance capacities to navigate and plan for change and uncertainty. The course introduced the concept of anticipatory governance as an approach to dealing with complexity and future uncertainty by governing in the present in an adaptive and shaping manner.

The course showcased case studies from Southern Africa, demonstrating how these tools have been applied to co-design desirable visions of the future and identify pathways towards socially just and sustainable futures. Within the first three months, the course saw enrolment from almost 650 learners across 38 countries. Additionally, more than 80 certificates of completion were issued.

GIZ-RWP Land Use Management workshop



In support of learning and knowledge exchange in transboundary river basins, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the USAID Resilient Waters Programme co-funded a two-day hybrid workshop to share and learn about best practice in land management guidelines between OKACOM, ORASECOM and Kunene. The workshop was led by OKACOM in partnership with the EU Programme for Transboundary Water Resource Management within the Cubango Okavango River Basin, the GIZ Transboundary Water Management Programme and the USAID Resilient Waters Programme.

The outcomes of the workshop included a comprehensive understanding of current initiatives and best practices in land management, insights into the enablers, barriers, and challenges faced during the implementation of land management interventions, and the exchange of innovative approaches to enhance best practices and transboundary cooperation. The workshop also resulted in the expansion of the compendium of land management guidelines, which can be utilised by River Basin Organizations (RBOs) for effective land management. Additionally, the identification of gaps, needs, and focus areas will guide future initiatives, fostering improved land management practices. The workshop successfully enhanced knowledge sharing among RBOs, fostering collaboration and contributing to the sustainable management of transboundary river basins.



Social-ecological resilience

Research within the Social-Ecological Resilience theme at the CST focuses on understanding the dynamic interactions between social and ecological systems and their capacity to adapt, transform, and thrive in the face of change and disturbances. We investigate the complex interdependencies between human societies and the natural environment, recognising that they are intrinsically linked. Through our research, we aim to uncover the factors that enhance or hinder resilience, identifying strategies to build more resilient communities, ecosystems, and institutions. By examining the feedback loops, thresholds, and tipping points that shape Social-Ecological Systems (SES), we strive to contribute to the development of policies and practices that promote sustainability and safeguard the well-being of both present and future generations.

Current PhD students

- Amanda Manyani: The Emergence, Conceptual and Institutional Development of Social-Ecological Systems (SES) Research
- Bekezela Dube: Assessing Social-Ecological Resilience of Southern African Protected Areas: The Case of the Zimbabwean Component of Kavango-Zambezi Transfrontier Conservation Area
- Blessing Kavhu: Land Use/ Land Cover Change and Surface Water Resources in the Okavango Basin: Exploring the Utility of Machine Learning and Ensemble Modelling in Detecting the Drivers and Impacts of Change
- Caroline Wallington: Exploring Social-Ecological Regime Shifts across Space and Time
- Kate Pringle: Social-Ecological Factors Shaping Pathways to Better Water Futures in South Africa
- Nametso Phonchi-Tshekiso: Exploring Equity Impacts of Large-Scale Land Acquisitions in the Okavango Delta
- Victoria Shifidi: Equitable Water Governance and Politics in the Cubango-Okavango River Basin (CORB).
- Willem Malherbe: Operationalising Resilience: Exploring Definitions, Capacities, and Responses

SARChI Chair in Social-Ecological Systems and Resilience

The work on SES and resilience at CST was initially structured around the core themes of the SARChI chair awarded to Prof Oonsie Biggs in 2015. Under the four main research themes of the Chair, work is carried out through various collaborative projects with both local and international partners, providing a multidimensional and comprehensive approach to addressing the challenges and opportunities in social-ecological systems and resilience. The first theme involves advancing the theory and methods related to SES and resilience. The second theme centres around analysing and documenting regime shifts in SES, which refers to abrupt and significant changes in the structure and function of these systems. Understanding regime shifts is crucial for anticipating and responding to transformative changes. The third theme involves analysing and facilitating sustainability transformations in SES. Finally, the chair aims to support the development of regional and global networks for SES and resilience research and practice. By fostering collaboration and knowledge exchange, these networks contribute to the advancement of research and the implementation of effective resilience-building practices worldwide.



Prof Reinette 'Oonsie' Biggs

Building on these core themes, the SES and resilience research group at the CST has now expanded to encompass a range of related themes led by other researchers at the CST. Through this work, the CST has become established as a key knowledge partner and has partnered on a number of large regional development projects, including the SIDA-funded Guidance for Resilience in the Anthropocene: Investments for Development (GRAID) project, the USAID-funded Resilient Waters Programme, and the Global Resilience Partnership (GRP)-funded Southern African Resilience Academy. In 2020, the Chair was renewed for a further 5-year term and upgraded to a Tier 1 Chair. Several vibrant research and practice communities have been established, and a number of PhD students are being trained in this area.

Advancing regional and international transdisciplinary research networks



The CST actively contributes to the development of SES research networks at both regional and international levels. Through its involvement in the Programme on Ecosystem Change and Society (PECS) and the Southern African Programme on Ecosystem Change and Society (SAPECS), the CST has played a significant role in fostering collaboration and knowledge exchange.

In 2022, a new set of cross-cutting PECS working groups was established to address the latest issues and advancements in the SES field. The CST, as the host of the PECS international project office (IPO) and responsible for the PECS website, plays a crucial role in advancing PECS initiatives. The inaugural meeting of these working groups is scheduled to take place in Stellenbosch in mid-2023.

The 2022 SAPECS Workshop, held in October, marked the first gathering of the SAPECS group since the Covid-19 pandemic lockdowns in 2019. This workshop also commemorated a decade since the initial inception meeting in 2012. The workshop served a triple purpose: reconnecting participants, deepening understanding of each other's research, identifying emerging research themes that push the boundaries of SES work in southern Africa, and engaging in discussions to shape the collective vision for the future of SAPECS.

DST/NRF Community of Practice in Social Learning and Sustainable Development in the Berg-Breede

Dr Nadia Sitas, on behalf of the CST was part of the core team organising a workshop series which is part of a larger DST/NRF Community of Practice (COP) in Social Learning and Sustainable Development (SLSD). The Berg-Breede workshop series is intended to deepen our understanding of transdisciplinary practice by exploring the tensions and successes that researchers, students and non-academic partners have experienced through engaging in transdisciplinary or interdisciplinary research in the Berg-Breede catchment and other spaces. From this exploration we hope to develop lessons and tools that can better prepare post-graduates and early career researchers for engaged transdisciplinary research in these complex and sometimes tense settings.

This work resulted in a paper titled "Fostering transdisciplinary research for equitable and sustainable development pathways across Africa: what changes are needed?" which was published in *Ecosystems and People*, two information briefs and an infographic.

An international panel for ocean sustainability

The UN Decade for Ocean Science for Sustainable Development and the ocean "super year" in 2022 collectively provided a unique opportunity to mobilise scientists, politicians, policymakers, civil society, and communities to establish new relationships with the ocean. The concept of an International Panel for Ocean Sustainability (IPOS) emerged within this context, addressing the need to enhance collaboration and knowledge generation across disciplines to inform policy-making in an environment characterized by growing human activities.

The IPOS project is spearheaded by Tanya Brodie Rudolph, a CST Research Fellow and international ocean lawyer, and Dr Françoise Gaill, Scientific Advisor at the French National Centre for Scientific Research and Vice President of the Ocean & Climate Platform. The project has evolved through numerous workshops and discussions in recent years, bringing together experts, scientists, civil society, and other stakeholders. In 2022, the IPOS received significant support from the scientific community during COP27, as well as from European authorities. An article published in Nature Partner Journals - Ocean Sustainability in December 2022, signed by 35 authors, introduced the project and affirmed the necessity of such a panel within international ocean governance.

Photo credit: Victor Bezeira | Pexels



Blue Port Project

Dr Nadia Sitas and Dr Maike Hamann from the CST collaborated with WildOceans, the University of KwaZulu-Natal, and the Council for Scientific and Industrial Research (CSIR) on the Blue Port Project. This initiative aimed to understand the causes and impacts of plastic pollution in the Port of Durban and its catchment areas. Funded by the Water Research Commission, the project aimed to restore ecological health, preserve ecosystem services, and protect livelihoods through participatory modelling and strategic interventions. By coordinating activities with stakeholders from diverse sectors, the project

identified key challenges and opportunities for collective action. Dr Sitas and Dr Hamann played crucial roles in developing a comprehensive understanding of the complex social-ecological systems affected by plastic pollution. This involved participatory mapping and exploring interconnected relationships, feedback loops, and dynamics related to plastic pollution. The Blue Port Project contributed valuable insights and facilitated collaborative efforts towards addressing plastic pollution in the Port of Durban, promoting resilience and sustainable management of the ecosystem.

The Southern African Resilience Academy



The Southern African Resilience Academy is part of the "South-to-South Resilience Academies" initiative led by the Global Resilience Partnership (GRP). The primary objective of this initiative is to foster the production and exchange of resilience and development-related knowledge among regions in the Global South, while also facilitating knowledge transfer from the Global South to the Global North. Presently, there are three Resilience Academies in operation: One is located at the International Centre for Climate Change and Development in Bangladesh, another at the University of the West Indies in Jamaica, and the third is the Southern African Resilience Academy (SARA), which is based at the CST.

SARA's role is to act as a convening and support space for inter- and transdisciplinary researchers and practitioners working across southern Africa to engage around pressing resilience and development challenges in the region. The academy's objectives are to enhance existing expert networks, promote collaboration, and facilitate the co-production of knowledge relevant to policy and practice. Additionally, through its

association with the GRP and other Resilience Academies, SARA endeavours to actively contribute to regional and global policy discussions concerning resilience and development, while also elevating the voice of southern Africa in international forums.

In its inaugural year of 2021, SARA dedicated its efforts to Food System Transformations in southern Africa. Throughout the year, SARA facilitated three impactful events, each dedicated to addressing the challenges and opportunities within food system transformations in southern Africa. Notable among these were an influential independent regional dialogue held in preparation for the UN Food Systems Summit in April 2021, a futuring workshop exploring the "Futures of Food in southern Africa" in September 2021, and a webinar titled "Insights and Actions," aimed at fostering actionable solutions for food system transformations in December 2021. The key themes and recommendations that emerged from the activities and discussions convened by SARA in 2021 were consolidated and presented in two insights briefs, released in September 2022.

In 2022, SARA shifted its focus to the theme of "Building equitable resilience in southern Africa." The academy called for collaborative working group proposals to engage in inter-disciplinary or transdisciplinary research that synthesises knowledge and insights related to this theme. The objective was to address the challenges and opportunities involved in constructing resilient systems that also address societal inequities in the face of global change. The working groups were encouraged to explore various topics or systems of interest, such as food systems, urban systems, stewardship initiatives, resilience measurement, protected areas, and more. Supported by SARA, these working groups convened for a kick-off workshop in April 2022, and met again in October 2022. Each working group is expected to produce at least two knowledge products within 18 months of the initial meeting, namely an academic paper for a special issue and a non-academic product, such as a video, website, policy brief, or policy dialogue, by late 2023.

Supporting transformative adaptation and building equitable resilience to drought for sustainable development

This GCRF-funded project tackles the challenge of drought and its impact on sustainable development. With a focus on African fruit and vegetable exports, the project aims to find fair solutions that enhance the benefits of commercial horticulture while reducing the negative effects of drought on marginalized communities. Through the development of a policy framework in four case study sites—the Breede and Groot Letaba catchments in South Africa, and Lake Naivasha and upper Ewaso Ng'iro catchment in Kenya—the project strives to promote resilient adaptation and sustainable management of water resources in the face of drought challenges.

In light of climate change and other drivers of change, farmers must continually reassess their responses to ensure effective adaptation. The consequences of such changes have wide-ranging effects at

local, regional, and international levels. To gain a deeper understanding of the impact of water scarcity on horticultural value chains linked to the Breede catchment, the CST, in collaboration with futurist expert Tanja Hichert, conducted a series of futuring workshops involving diverse stakeholders. These workshops utilized innovative foresight tools, similar to those employed in the successful workshops that led to the 'Hortgro Vision of the Future' strategy and framework. The goal was to help stakeholders across various farming and associated sectors—including land, water, and climate—to envision healthy, thriving, and equitable futures at both farm and catchment scales, and to identify the necessary steps to achieve them. The workshop outputs will provide strategic options that can serve as "future-fit strategies" for farming in times of uncertainty.

Transformative futures thinking

This theme employs a range of methodologies rooted in the exploration and envisioning of alternative futures, challenging existing assumptions, systems, and paradigms. It embraces the understanding that the future is not predetermined but rather a realm of possibilities that can be shaped through intentional action, choices and imagination that inspires us to make different choices in the present. Multiple futures are therefore always possible. By scrutinising underlying assumptions, identifying emerging trends, and envisioning alternative pathways, we foster an understanding of complex issues and promote proactive and innovative approaches in the present, unlocking new possibilities for transformative change. Given the unique and urgent challenges of the Anthropocene era, the application of this approach becomes even more vital. The need for creative engagement with the future and the pursuit of transformative change is of utmost importance in addressing the complex issues we face in this context.

Current PhD students

- Keziah Mayer: Seeds of Social-Ecological Stewardship: Contributions to a Good Anthropocene

Seeds of Good Anthropocenes initiative

In the Anthropocene, we face new and diverse challenges, such as planetary tipping points, an increasing disconnect between people and nature, and widening inequalities among people. At the same time, technological progress and new social connections are opening up novel and exciting opportunities to address these challenges and could potentially create unprecedented levels of human well-being. Given the Anthropocene context of highly uncertain, high stakes futures, it becomes vitally important for communities, citizens, policymakers, leaders and individuals to have visions of positive, hopeful futures that can help guide our choices and actions towards creating more just and sustainable futures.

Exploring and developing these visions of positive, hopeful futures or "good Anthropocenes" represents the core objective of the Seeds of Good Anthropocenes initiative (<https://goodanthropocenes.wordpress.com/>), an international collaboration led by Prof Elena Bennet at McGill University in Canada, Prof Garry Peterson at the Stockholm Resilience Centre in Sweden, and Prof Oonsie Biggs at the CST at Stellenbosch University. The initiative involves partners from several transition-focused research hubs around the world.

The Seeds of Good Anthropocenes initiative aims to inform and contribute to deep, systemic transformations towards socially and ecologically desirable, just, and sustainable futures. It does this through three primary approaches. Firstly, it focuses on identifying

and establishing connections between initiatives, or "seeds," that currently exist at the margins of society, but hold the capacity to contribute to transformative futures. Secondly, by exploring how different seeds might combine to create a variety of possible, radically alternative, positive futures. Lastly, by exploring potential leverage points and interventions that can enable the emergence and growth of seeds and the evolution of transformative, positive futures.

CST researchers Oonsie Biggs, Rika Preiser, Maike Hamann, Nadia Sitas and CST fellows Tanja Hichert and Laura Pereira, have played a pivotal leadership role in the project since its inception and today several active strands of work are led by the CST and CST partners. It also forms the focus for multiple student and postdoctoral projects at CST. The Seeds project served as a significant source of inspiration for the establishment of the UNESCO Chair in Complex Systems and Transformative African Futures.

The UNESCO Chair in Complex Systems and Transformative African Futures

The UNESCO Chair in Complex Systems and Transformative African Futures was awarded to Rika Preiser and Tanja Hichert in March 2022, in an innovative co-chair format that spans across the academic and practitioner domains. The Chair, awarded for a four-year period, forms part of the global UNITWIN/UNESCO Chairs Programme. This programme involves a network of over 850 institutions in 117 countries, and promotes international inter-university cooperation and networking to enhance institutional capacities through knowledge-sharing and collaborative work.

The UNESCO Chair in Complex Systems and Transformative African Futures will draw on the expertise of the two co-chairholders to integrate in-depth knowledge of complex systems, combined with the conceptual and practical applications of futures studies. Furthermore, it will develop capacities for studying and exploring the nature of complex interdependent social-ecological systems, how change comes about in such systems, and how to create the conditions for ecologically sustainable and socially just futures.

In 2022 Prof Rika Preiser made notable contributions to the exploration of African futures through her involvement in two



Prof Rika Preiser and Tanja Hichert

significant events. Firstly, in April, she co-hosted a workshop titled "Interacting across Difference" at the Peter Wall Institute of Advanced Studies, located at the University of British Columbia. Collaborating with fellow Wall Scholar Dr Hanne De Jaegher, the workshop aimed to delve into the dynamics of interaction and communication within diverse contexts, exploring how individuals from different backgrounds can effectively engage and connect. Later in the year, on December 2nd, Prof Preiser delivered a keynote address at the UNESCO Headquarters in Paris during the UNESCO World Futures Day. Her keynote address focused on the theme of "Imagining Africa's Futures," offering insightful perspectives and expertise in envisioning the potential trajectories and possibilities for the African continent.

Foresight methods for developing strategies towards transformative Science, Technology and Innovation (STI) funding collaborations in Africa

Led by Rika Preiser and Tanja Hichert, this IDRC-funded project aims to explore new global models of resource mobilization and collaboration between international funding agencies and science systems in low- and middle-income countries (LMICs) as 'seed initiatives' towards transformative knowledge required to achieve the Sustainable Development Goals (SDGs). The project, conducted in collaboration with the Institute of Development Studies (IDS) from Sussex University (UK), adopts a Knowledge Systems Innovation (KSI) approach that transcends traditional science, technology, and innovation (STI) frameworks.

On February 15, 2022, the second workshop in the series took place online. Building on the Seeds of Good Anthropocenes methodology and project-specific scenarios developed in the first workshop, held in September 2021, the hosts engaged participants in backcasting and roadmapping as foresight tools to strategize pathways for realizing transformative collaborations and platforms for STI research and funding in Africa.

The final workshop, held on June 28, 2022, involved expert African decision-makers in a collaborative and reflexive process. In addition to Rika Preiser and Tanja Hichert, Dr Odilwe Selomane, a CST researcher, participated as an additional facilitator, contributing valuable expertise and guidance. The objectives of the workshop were to improve decision-making in STI investments, co-design policy recommendations for STI funding, and share project outcomes and experiences regarding the role of foresight methods in shaping funding flows and collaborative platforms. The workshop brought together six high-level scientists and consultants specializing in STI and research funding in Africa. Experts engaged in dialogue, building upon the outcomes of previous workshops to prioritize science funding strategies based on their expertise and experiences.

Transformative changes in invasive species management in South Africa

In this project led by postdoctoral researcher, Dr Julia van Velden, the CST has worked in close collaboration with the Centre for Invasion Biology (CIB) to collect and analyse seeds of success in managing invasive species in South Africa.

On the 4th of May 2022, the CST hosted a workshop in Stellenbosch aimed at exploring innovative initiatives in managing invasive species and their potential to shape the future of this sector. The workshop brought together 19 participants from diverse institutions and fields, including academics, practitioners, and policymakers. The workshop had several key objectives, including identifying common barriers to scaling up ideas, fostering knowledge sharing among practitioners, researchers, and policymakers, and generating optimism by exploring potentially transformative initiatives. These goals were particularly important in an area often characterized by failures and pessimism.

To explore how innovations could spread and transform the invasive species management sector in South Africa, the workshop employed the Mānoa-mash up method. This process involved utilizing a set of 12 "seeds" - small-scale or experimental initiatives related to invasive species management aimed at improving environmental and human well-being outcomes, currently operating outside the mainstream. The workshop results highlighted the value of these "seeds" as a meaningful way to engage with both the exploratory futures of invasive species management in South Africa and the barriers to achieving those futures.

While different groups had diverse visions of the future, they shared common themes. Firstly, participants discussed a future that leverages successful approaches such as public-private partnerships to diversify and restructure funding for management, ensuring that resources align with the true extent and severity of the problem. Secondly, they emphasized the significance of adopting a collaborative and innovative management approach that encourages bottom-up and middle-out initiatives, moving away from the existing top-down, regulation-heavy system that stifles genuine innovation. Lastly, the workshop underscored the need for a fundamental shift in ethos and values among the public and government/management, perceiving invasive species as an opportunity to foster a connection with nature and prioritize restoration, rather than treating it as a peripheral issue championed by a few individuals.

Fostering food system transformation in Africa

Food systems are deeply intertwined with our current economic and energy systems, as well as being impacted by and having major impacts on biodiversity, water and climate systems. Food systems have deep links to identity and culture, as well as being a major source of livelihoods and employment along the food value chain. However, the current food system is highly unequal, with a substantial proportion of people suffering from undernutrition and malnutrition, while other sectors of society suffer from obesity. There are also deep concerns around issues of ownership, power and inequality in the food system. These issues and concerns are particularly stark in the southern African context.

At the same time, there exist numerous initiatives that could potentially bring about more sustainable and equitable food systems. Through a collaboration between the CST, McGill University, the University of Guelph, Ensign Global College in Ghana, the Stockholm Resilience Centre, and the Global Change Institute at Wits University, this IDRC-funded project aims to identify key food-related initiatives or innovations - which we call 'seed initiatives', that have the potential to transform food systems in Africa. Postdoctoral researcher, Dr Nyasha Magadzire, is the CST lead on this project which is being conducted in three coastal urban regions of Africa: Cape Town, Accra and Mombasa.

The project seeks to advance foresight methods and support transformative change in developing country contexts by enhancing the ability to identify transformative seed initiatives, developing new understanding of how such initiatives may be supported to develop, grow and collaborate, and supporting networking and peer-to-peer learning among seed project leaders.

Key project highlights for 2022 include the project initiation meeting which was held online in February, the development of the conceptual framework for the project, the first version of the Seeds search strategy guide, and starting the process of identifying food related seeds initiatives in the Cape Town, Accra and Mombasa.



Finance & resource flows

The theme explores the intricate dynamics of financial systems and the movement of resources within the context of sustainable development. Our research delves into understanding the ways in which financial mechanisms and resource allocation influence societal and environmental outcomes. By examining the interactions between finance, resources and sustainability, we strive to develop innovative approaches and strategies for achieving a more equitable and environmentally responsible allocation of resources. Through our research, we aim to inform policy and decision-making processes, fostering a transition towards a sustainable and just future.

Current PhD students:

- Mlonji Ndovela: Macro-Economic Implications of the Energy Transition in South Africa: Results of an Integrated Non-Equilibrium Economy-Climate Model
- Priscilla Jezi: Transition finance: A Conceptual Analysis and Case Study of its Role in Eskom's Just Energy Transition Process.

Making Climate Capital Work: Unlocking \$8.5 billion for South Africa's Just Energy Transition

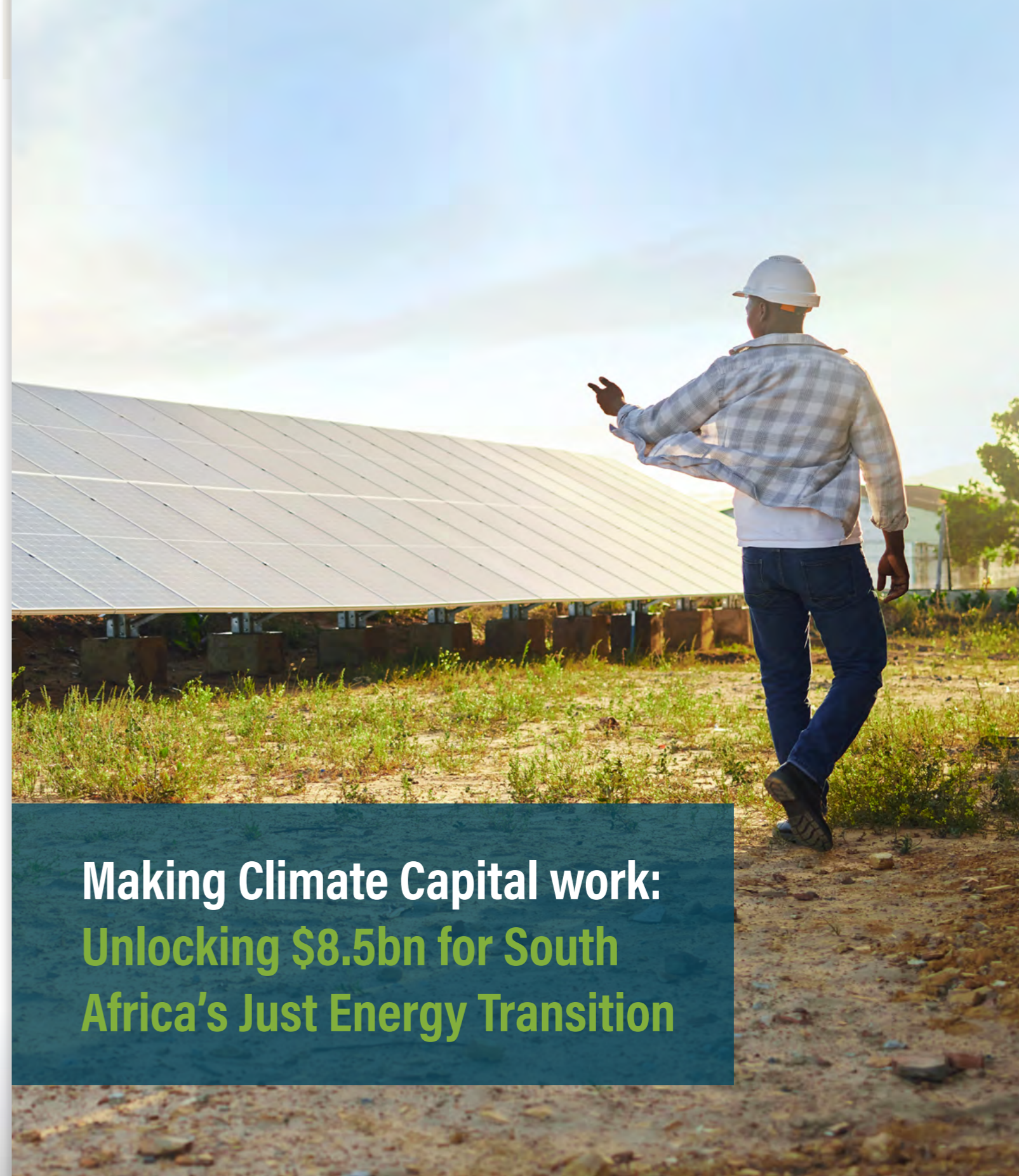
As the World Economic Forum 2022 kicked off in Davos, the Blended Finance Taskforce and the CST convened a working session for Friends of South Africa's Just Energy Transition. The session marked the launch of a joint report outlining the investment requirements for the just energy transition in South Africa, and the role of the \$8.5 billion commitment in accelerating the transition.

The report, which serves as a significant highlight in 2022 for the CST, was compiled by Professor Mark Swilling, Nina Callaghan, Dr Nthabi Mohlakoana, and Erica Johnson from the CST, alongside Eliza Macmillan-Scott, Katherine Stodulka, Mark Meldrum and Mike Kennedy from the Blended Finance Taskforce, with generous support by the Open Society Foundations. Its purpose is to lay out a framework for the investment needs and costs to deliver an ambitious energy transition in South Africa and provide targeted recommendations towards a high- impact, catalytic deployment of climate finance commitments.

The report explores the critical importance of South Africa's just energy transition and the specific outcomes it must achieve. It additionally delves into the capital requirements for the transformation of the energy system and what the \$8.5bn commitment can deliver against these goals. The report also provides a comprehensive set of recommendations to donors to make sure that the pledge to South Africa, and any that follow, are fit-for-purpose.

Key messages from the report

South Africa will require \$250 billion over the next three decades to transform its energy system. This amounts to approximately 3% of the country's annual GDP. The majority of this capital, about two thirds, will be necessary for the development of new energy infrastructure and can be financed by the private sector. The remaining third will require concessional funding, which could be sourced from public entities such as multilateral development banks, development finance institutions, and international climate funds. This funding will be essential to accelerate the establishment of enabling infrastructure like transmission, distribution, and flexibility. Additionally, the report emphasises the importance of grant capital from donors and philanthropy to support a just transition, ensuring that workers and communities dependent on coal are not left behind, while also addressing energy security and affordability concerns. This report further provides a framework and outlines seven core principles for the capital requirement, including transparency, coordination, and the use of catalytic instruments. These principles target the countries that have pledged the \$8.5 billion committed at COP26 and other providers of climate finance. By adhering to these principles, the report suggests that the capital deployed will be tailored to the country's specific needs and priorities, ensuring it is "fit-for-purpose". The success of South Africa's energy transformation is of global importance, as discussions are already underway for climate finance deals in other countries such as Indonesia, India, Vietnam, and Senegal.



**Making Climate Capital work:
Unlocking \$8.5bn for South
Africa's Just Energy Transition**



Photo credit: Karsten Wurth | Unsplash



With thanks to



Catalysing the Just Energy Transition:

On the Potential of Development Finance Institutions



COP27

The 27th United Nations Conference of the Parties (COP27) took place in Sharm-El-Sheikh, Egypt, from 6 to 18 November 2022. This global climate change conference brought together leaders, policymakers, financiers, activists, researchers, and representatives from nearly every nation to address collective climate goals and combat the climate crisis. For the first time, a loss and damage fund was tabled, highlighting the urgent need to address the impact of climate disasters on vulnerable nations. Several CST researchers participated in the COP27 event.

At COP27, CST researcher Wendy McCallum presented the latest research from the Reconfiguring Energy for Post-COVID-19 Development (ReCODE) project, a sub-project of RESET, which aims to explore the role of development finance institutions (DFIs) in renewable energy investments that strengthen socio-economic recovery post the COVID-19 pandemic.

The report, compiled by CST researchers Wendy McCallum, Megan Davies, Nichola Richards, highlights the potential of DFIs and public development banks in financing and shaping just, low-carbon futures. The collaboration with the Development Bank of Southern Africa (DBSA) and the International Development Finance Club demonstrates the Global South's contribution and perspective in this critical area. The report emphasises the need for DFIs to play a crucial role in allocating capital to accelerate sustainable transitions.

McCallum also moderated a panel discussion where DFIs discussed their approach to transition finance. Transition finance aims to facilitate the shift from carbon-intensive practices to more decarbonized operations. This discussion explored the importance of financing mechanisms that support sustainable transitions in production, ultimately leading to a low-carbon economy.

Callaghan co-hosted the 'Climate Justice in Climate Finance' event along with collaborators such as the Blended Finance Task Team and the Open Society Foundation. This event provided a platform for financiers, activists, investors, researchers, and philanthropies to discuss solutions and approaches to reform the current financial system. The focus was on ensuring climate justice and reshaping the system to serve broader interests and address social challenges. The event showcased the potential for a finance conversation that is filled with possibility and courage, going beyond the traditional discussions held at COP27.

South Africa was commended for its leadership and progress since COP26. The Just Transition Framework, facilitated by the Presidential Climate Commission (PCC), and the groundbreaking Just Energy Transition Investment Plan (JET-IP) were highlighted as landmark documents. The JET-IP, a living document, outlines investment priorities and aims to achieve just social outcomes for coal communities and those most impacted by the transition. It emphasizes the development of new industries in hydrogen and electric vehicles, with a priority on building power generation and infrastructure. The JET-IP exemplifies the agency of the global South in making climate finance fit for purpose.

CST is proud to be associated with these developments through its consultations with key governance actors that authored and ratified these seminal documents. CST's role, in partnership with the Blended Finance Task Team, was to influence and support coalition building around finance and governance arrangements that most strongly articulated a just outcome for the transition. CST's research has been referenced in the JET-IP.

Determining the macroeconomic implications of the energy transition in South Africa through the establishment of an integrated non-equilibrium economy-climate model.

The macroeconomic implications of the energy transition refer to the wide-ranging effects that the shift from traditional fossil fuel-based energy sources to renewable and sustainable alternatives have on the overall economy. This transition involves changes in energy production, consumption patterns, investment flows, employment opportunities, and technological advancements.

Understanding these macroeconomic implications is crucial for several reasons. Firstly, it allows policymakers to anticipate and manage potential disruptions and challenges that may arise during the transition. Secondly, it provides insights into the economic risks and opportunities associated with climate change mitigation and sustainable development. Thirdly, it helps identify sectors, industries, and regions that may be most affected by the energy transition, enabling targeted policy interventions and support mechanisms.

To understand the causal relationship between energy transition and its macroeconomic implications, economists and scientists have looked towards integrated assessment models (IAMs) as a way to analyse the interaction of complex systems such as energy, climate, and the economy. This is because presently, there are no models that have managed to compute a variety of mass data from distinct disciplines into one cohesive frame to illustrate the interactions and explain the trade-offs in terms of costs and benefits. Before IAMs, biophysical, financial, and economic problems were analysed separately, the cause-and-effect implications were inferred from separate, unintegrated models and sometimes with incomprehensible results for policymakers. IAMs solved this problem by presenting a more integrated way to draw easily understood results of climate impacts on the environment, oceans, society, and the economy. IAMs presented different approaches in terms of how climate and economic goals could be achieved and yet, be explicit regarding risks, costs, and institutional requirements. As a result, IAMs approach to economy-climate modelling is, to the present day, still viewed as the most appropriate tool to guide policymakers.

Within a joint project between the Centre for Sustainability Transitions and the Environmental Justice Programme at Georgetown University, PhD candidate Mloni Ndovela addresses the absence of an integrated general non-equilibrium economy-climate model for South Africa. A number of energy models have not incorporated macro-economic benefits and pitfalls, as a result, there is inadequate knowledge to understand the potential energy transition benefits and pitfalls in terms of the gross domestic product, unemployment rates, inflation, consumption, and other macro-economic factors. To address this problem, the study aims to use an IEEC model developed in partnership with Georgetown University to simulate business-as-usual and alternative scenarios for South Africa's energy transition within the wider macroeconomic context.

Political economy & development

The energy research team at the CST actively contributes to the core research theme of Political Economy and Development, undertaking a diverse range of research initiatives with the aim of shaping the pace, directionality, and governance of the Just Energy Transition (JET) in South Africa and Africa as a whole. Their focus on governance is reflected in their collaborations with stakeholders from the public sector and non-governmental organizations, resulting in the development of practical analyses and solutions. The team's primary areas of research encompass exploring pathways for energy sector reform, examining governance mechanisms in the energy transition, understanding the role of local government in driving the transition, addressing social justice considerations, analysing energy policies, investigating institutional changes such as the unbundling of Eskom, studying value chains, and assessing how renewable energy can facilitate industrialization. Additionally, they conduct comparative analyses of South Africa's energy transition with other countries in the global South and North, providing valuable insights for informed decision-making and policy development.

Current PhD students:

- Amanda Gcanga: Collaborative Urban Water Governance: A case study of Cape Town
- Erica Johnson: Eskom as a Techno-Political Object in a Contested Institutional Framework
- Garth Malan: A Circular Economy Approach to Increase Resilience in the Cape Town Metropolitan Region
- Kevin Foster: Reconfiguring the Energy Transition for Municipal Sustainability in South Africa
- Nontsikelelo Mngqibisa: Exploring the Water-Energy-Food Nexus: a case study of the Atlantis Special Economic Zone, Cape Town
- Mapula Tshangela: Sustainability transitions and punctuated socio-political regime shifts: Explaining green economy policies in South Africa, 2002-2022
- Thandeka Tshabalala: Strengthening Energy Poverty Alleviation Efforts in South Africa's Energy Transition: Institutional Work Required at Local Government Level

Sustainability transitions:

During the course of 2022, various research projects have contributed to the deepening of our understanding of sustainability transitions, with particular emphasis on the energy transition. Mapula Tshangela's PhD (which will be submitted for examination in 2023) analyses the evolution of South Africa's sustainable development policies during the two-decade period 2002 – 2022. In a report for the International Resource Panel, Prof Mark Swilling developed an analysis of the contradictions between the global commitment to Sustainable Development Goals and the way the global financial system works in practice to reproduce the allocation of capital in ways that contradict the SDGs. The CST energy research team continued to wrestle with the dynamics of South Africa's energy transition as part of wider global energy transition. With funding from the Open Society Foundation, National Research Foundation and the VW Foundation for this work, CST's energy research team has focussed on a wide range of issues including the role of incumbents like Eskom in energy transitions, the policy and regulatory blockages to accelerated coal closure and the roll out of renewables. Erica Johnson's PhD analyses the rise and

fall of Eskom and Priscilla Jezi's PhD analyses the role of transition finance as an incentive for Eskom to pivot from being a provider of coal-generated energy to becoming a promoter of renewable energy. A Masters' Thesis by Nichola Richards brought together the literature on incumbency and applied this to an understanding of Eskom as a promoter of the energy transition, not an obstacle as much of the literature on Eskom tends to argue. The ongoing Masters research work by Nina Callaghan draws on the literature on relational governance to make sense of the role of the Presidential Climate Commission (PCC) as an enabler of the energy transition. Prof Mark Swilling wrote a series of Op Eds during the course of 2022 that tracked the micro-dynamics of the energy crisis and the diverse policy responses from different branches of the government, some more appropriate than others. Finally, in his capacity as Commissioner on the National Planning Commission (NPC) Prof Mark Swilling has established a unique research partnership between the NPC, PCC, National Treasury and the Development Bank of South Africa that will deliver in 2023 two major reports on the investment requirements to achieve Net Zero and energy security by 2050, and water security within a climate change context by 2050. CST researchers support this national policy research initiative.

A key knowledge partner to Eskom

The CST is one of several knowledge partners to Eskom through the Eskom Power Plant Engineering Institute (EPPEI). This partnership enables the CST's research in governance, the JET, power sector reform, industrial policy and transition finance to be shared with the utility in ways that are supportive of the transitions underway. Research outputs from these focus areas are shared with Eskom executives in the JET Office, Strategy and Finance divisions, with utility-wide convenings to socialise ideas and processes that could advance the utility's pivot. A just transition requires a multi-year, multi-scale, multi-actor effort to adopt a strong social compact and achieve a net-zero carbon economy that creates decent jobs. All these elements are critical in dealing with South Africa's triple challenges of poverty, inequality, and unemployment. This is at the heart of our work with Eskom that takes an optimistic view of institutions and the possibilities for change.

In September 2022, the CST hosted Eskom's Strategy Division and Business Intelligence teams at our offices. This gathering served as a crucial opportunity to strengthen the connection between the CST and Business Intelligence, which plays a pivotal role in receiving and disseminating research and information across the broader Eskom group. The strategic nature of this relationship ensures that CST research and outputs have a much wider reach within Eskom, benefiting a broader audience. The meeting reaffirmed the valuable contribution that CST brings to Eskom by offering alternative orientations that add layers of complexity, providing different approaches to the JET within Eskom's scope, particularly in relation to social impact projects, and sharing lessons from case studies in the primary CST research areas.

Demystifying employment in the Just Energy Transition

This ongoing project examines the intricate relationship between the South African energy transition and employment within the coal value chain. It seeks to go beyond simply quantifying the number of jobs that may be lost during the decarbonization process or gained through renewable energy industrialization. The project also prioritises redefining the notion of a job in the energy sector, employing indicators of decent work as a framework to assess how jobs within the renewable energy industry can align with the standards of decent work.

In 2022, the energy team at the CST undertook significant work to advance understanding and promote dialogue surrounding jobs and decent work in the South African energy sector. One key accomplishment was the development of a comprehensive "decent work" framework that took into account the perspectives of various stakeholders in the energy industry. This framework aims to provide a clearer understanding of what constitutes meaningful work and employment within the sector. Additionally, the team created a dynamic map of stakeholders involved in the ongoing debate on jobs and decent work in South Africa, facilitating a more inclusive and informed discussion. Through their research, the CST energy team also identified research gaps in existing studies on jobs and decent work, helping to pinpoint areas that required further investigation and attention.

Shifting policy landscape for the energy transition: procuring renewables in a reformed supply industry

This ongoing project aims to examine the evolving policy environment surrounding the energy transition, with a specific focus on the procurement of renewable energy within a reformed supply industry. Given the changing landscape and the factors driving this transformation, the project centres on studying the shifting policy dynamics in the context of diversifying and opening up the procurement of renewable energy, both at small and utility-scale levels. As the opportunities for participation expand in generation, transmission, and distribution, it becomes crucial to comprehend the processes involved in procuring renewable energy. This understanding is particularly important for South Africa to achieve its goal of constructing 5-6 GW per year in the coming decades, as estimated by experts and the National Infrastructure Plan, to fulfil our energy requirements and accomplish decarbonization.

In 2022, the CST energy team conducted extensive research to construct a comprehensive report on power sector reform and future scenarios for South Africa's electricity supply industry. The research encompassed a thorough review of the history and components of the Power Sector Reform (PSR), detailed analysis of the four scenarios of PSR, and a comparative study of four countries undergoing similar transitions. At the 13th International Sustainability Transitions Conference (IST), which took place in November 2022, the CST convened a special session during the Africa Regional Day to showcase the work done by the CST energy team within this project.

Working towards municipal sustainability in the energy transition - Just Urban Transitions workshop

The CST has supported the continuation of the Just Urban Transition Workshops alongside How We Adapt, the Centre for Renewable and Sustainable Energy Studies (CRSES) at Stellenbosch University and the World Wildlife Fund (WWF). The purpose of the workshops have been to convene key role players and stakeholders in the local government electricity ecosystem to identify key challenges and initiate responses to them. The work engages with the sustainable municipal electricity systems and aims at the long-term vision of just and sustainable grid communities. At a high-level, key issues that have been identified through the workshop process include universal equitable electricity access, a fair distribution of costs within the grid community, and a system that is aligned to human well-being and development outcomes including decarbonization and employment creation.

The third workshop, where the CST became involved, was held on 24 August 2022 and sought to elaborate on critical leverage points for collective action for municipal JETs and prioritise the next steps in addressing these challenges for key actors by identifying areas for collaboration, knowledge sharing, research and expertise and collective problem solving.

Water-energy-food nexus:

Working in partnership with Utrecht University and the University of the Western Cape, supported by funding from the NRF and NOW in The Netherlands, CST has led pioneering research on the water-energy-food (WEF) nexus in Cape Town. Although there is a rapid growth in the global literature on the WEF Nexus, very little attention has been paid to date to the governance implications of the WEF Nexus approach, in particular what it means for government officials who need decision-support tools to manage across institutional silos. 2022 was the second year of this research project, including a PhD on the 'greening' of the Atlantis SEZ by Noni Mngqibisa

and a Mphil on the V&A Waterfront's WEF Nexus management approach. Garth Malan's PhD has been conducted in partnership with a Cape Town-based company called GCX which developed a WEF Nexus decision-support tool that was deployed in the V&A Waterfront. Conducted in partnership with GCX and City of Cape Town, Garth Malan's PhD will generate the first systematic analysis of WEF Nexus-oriented decision-support tools that can be used by any local government in the world. The precursor to this WEF Nexus research was the PhD research by Amanda Gcanga on Cape Town's 'day zero event' in 2018. Her PhD is on the role of intermediaries as facilitators of partnering approaches in resolving complex governance challenges. The WEF Nexus research extends this approach into a wider landscape of intersectional challenges.

The outcomes of the proceedings were incorporated into the Just Energy Transition Partnership Investment Plan (JETPIP) section on local government needs. The workshops have also laid the basis for the institutionalization of ongoing collective local government input into JETPIP investment decisions.

Defining the Just Energy Transition: social programmes in post-apartheid South Africa.

CST has formed a collaborative partnership with the Life After Coal Campaign and the Centre for Environmental Rights to jointly evaluate social programming in democratic South Africa and its potential relevance and replicability for the JET. A sample of social programmes was researched, covering energy, jobs and skills, housing, childhood, SMMEs, agriculture and government services. They were analysed according to a set of criteria to arrive at what were successful and failed elements and what could be improved upon or not replicated for future just transition interventions.

Environmental Justice International Transdisciplinary Conference

In August 2022, the CST participated in the International Transdisciplinary Biennial on Environmental Justice at Lassalle Institute in Switzerland. Under the conference theme of "What is the

value of the future – perspectives to govern the socio-ecological transformation," the CST energy team presented their research findings. Lassalle hosted the CST alongside Georgetown University, US; Leuphana University of Luneburg, Germany; Munich School of Philosophy, Germany; Zurich University of Applied Sciences, Switzerland and Centre for Development and Environment, University of Bern. During the conference, CST showcased its energy research areas, aiming to inspire approaches to socio-economic transformation and sustainability and locate transformation knowledge within a Global South context. The complex dynamics of the South African transition provided fertile ground to explore power dynamics, industrialization, and governance as primary empirical themes. Additionally, CST delivered other papers at the conference, addressing topics such as the role of Development Finance Institutions (DFIs) in the energy transition, the involvement of municipalities and local government in South Africa's energy transition, and the issue of energy poverty and the JET.

Reconfiguring Energy for Social Equity (ReSET)

The CST energy team continues to play an active role in the ReSET project alongside academic partners in Germany, India, and the Netherlands. This international collaboration is aimed at fostering transdisciplinary research insights generated from diverse case studies about whether, and how, the uptake of renewable energy infrastructures might lead to more inclusive, equal, and just societies.

South African Research Chair on Urban Governance and Energy in Africa: Mainstreaming Gender for Energy Security in Poor Urban Environments

The overall rationale for the original research focus of this SARCHI Chair was to stimulate path-breaking research on Africa's urban challenges. Professor Josephine Musango occupied the Chair until end 2021. Dr Nthabi Mohlakoana occupied the chair on an interim basis until her resignation from Stellenbosch University at the end 2022 and in 2023 Prof Mark Swilling was appointed against this Chair until a permanent replacement can be found. The departure of Prof Musango has led to a shift in focus. The key difference will be that a wider lens will be used to address these challenges. The original research focus was largely concentrated around gender and development issues from an urban metabolism perspective. While gender dynamics and urban metabolism will remain key elements of this replacement application, they will be contextualised within a much wider political economy and socio-cultural framework. There is an increased attention among academics, community organisations and policy makers to understand how to shape cities, to improve the quality of life of urban dwellers, while protecting the environment. The diverse issues covered in Sustainable Development Goals on poverty, quality education, energy and sustainable cities all lead to the overriding need to improve the lives of marginalized and poor communities. Surprisingly, little is known globally about how new urban dwellers, specifically in Africa, will access energy, or the implications of energy technology development on resource availability, access to services and environmental impact. The proposed research programme aims to generate innovative new research which explores, develops and advances new theories and evidence-based knowledge about how African cities should confront the societal challenges of population growth, urbanisation, urban poverty and environmental destruction.

The overall research goals for the next five years are as follows:

1. To lead a globally recognized hub of research excellence on sustainable urbanism in the global South, with a special focus on African cities in transition.
2. To transform the nature of traditional academic research processes and outputs through a strong focus on effective



Dr Nthabi Mohlakoana

science communication that nurtures broader audiences (beyond the academy) and vibrant public debate.

These broad goals will be realized through a number of more specific objectives:

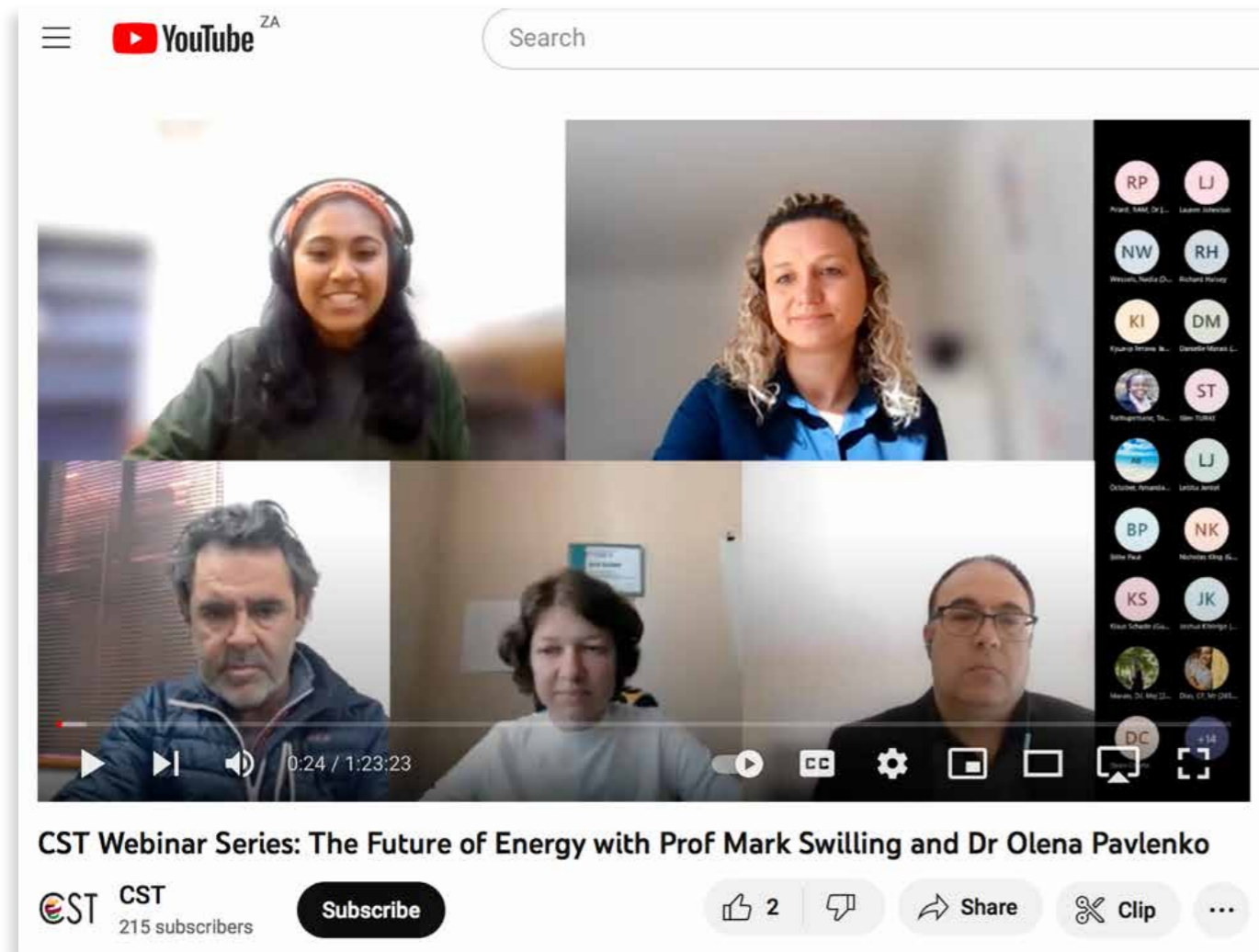
1. To identify and conduct cutting-edge applied urban research on a range of topics, including urban food systems, urban science, sustainable infrastructure, gender dynamics of poor urban communities, with an eye on generating new knowledge and improving development practice.
2. To develop and nurture strong research partnerships and networks in all areas where research is being conducted, but in service of strengthening scholarly links across the global South and across the African continent in particular.
3. To identify and nurture a new generation of urban scholars that are rooted in a Southern epistemic outlook and equipped to conduct rigorous research that has real-world application in the highly complex African urban contexts.
4. To reinforce interdisciplinary knowledges and transdisciplinary research cultures amongst urbanists located, in particular, within Western Cape Universities.

Photo credit: Artyom Korshunov | Unsplash



Cross-cutting activities

CST Colloquium and Webinar Series



The CST Colloquium and Webinar Series has a long history which, like many things, transitioned to the virtual space during the COVID-19 pandemic. However, moving with current trends and with the COVID-19 lockdown restrictions eased, the series is presented in hybrid format – online and in-person – with the full series available on the CST website or YouTube channel. The series brings together scientists, practitioners and societal actors who use the frameworks of complexity and resilience thinking in their daily work to make sense of the complex dynamics of change and transformation.

Research at the CST is largely conducted in collaborative inter- and transdisciplinary teams that draw in expertise from multiple disciplines, as well as from policy, practice and local stakeholders, and the colloquium and webinar series aims to reflect that in the speakers and the content it publishes.

Through knowledge sharing, the CST Colloquium and Webinar Series functions to create shared understanding within the CST across our different research areas; communicate our research to our partners, both within academia and beyond; contribute to important policy conversations with an academic lens; create space for collaboration; learn from external researchers and practitioners through guest lectures; and grow our networks.

13th International Sustainability Transitions Conference (IST 2022): Sustainability Transitions in a Global Context

The Centre for Sustainability Transitions participated in the 13th IST Conference, which took place in November 2022. The IST Conference is the central event of the international transitions research community and is organised annually by various partners on behalf of the Sustainability Transitions Research Network (STRN).

Co-hosted for the first time by Stellenbosch University, the conference embraced a novel model that fostered collaboration between three universities: Stellenbosch University, Monash University, and Georgetown University. This partnership created a week-long conference experience that transcended time zones and continents, combining both online and in-person activities. Researchers, academics and practitioners joined IST 2022 online from 21 – 23 November, housed on the virtual platform designed by the South African team, with each university hosting an online conference day. The conference was concluded by three simultaneous, regional hub events which took place on 25 November in Melbourne, Stellenbosch and Washington DC.

The Africa Regional Day took place after COP 27 in Egypt with the focus to review Africa's energy transition dynamics and challenges in light of the outcomes of COP 27. Discussions also took place on topics such as institutional work for energy poverty alleviation, water transitions in the Global South, and transformative innovation policy



approaches to co-creating transitions. The Africa Regional Day also boasted an exhibition which showcased the work done by CST and the Centre for Renewable and Sustainable Energy Studies (CRSES) funded by the European Climate Foundation (ECF). This exhibition was accessible the entire day and centered on the CST's energy work funded by ECF.

Three Stellenbosch University institutions - the CST, CRSES, and the School for Climate Studies collaborated to co-host IST 2022.

CST's involvement in the IST 2022 Conference was a significant contribution to its strategic positioning and brought immense brand value to Stellenbosch University. The conference served as a platform for showcasing the CST's expertise and perspectives on sustainability transitions.

13th International Sustainability Transitions Conference
IST 2022
 Three day virtual conference followed by a one day in-person conference in Stellenbosch, Melbourne and Washington DC
21 – 25 November 2022
STRN

THEME SUSTAINABILITY TRANSITIONS IN A GLOBAL CONTEXT

Keynote speakers:
 Dr Flor Avelino, The Netherlands
 Prof Xuemai Bai, Australia
 Dr Chantal Naidoo, United Kingdom
 Prof Edgar Pieterse, South Africa
 Prof. Benjamin Sovacool, United Kingdom

Register now on:
<https://consultus.eventsair.com/ist2022-conference>

Logos for partner institutions: Stellenbosch University, CST Centre for Sustainability Transitions, Monash University, Monash Sustainable Development, Georgetown University, and Environmental Justice Program.

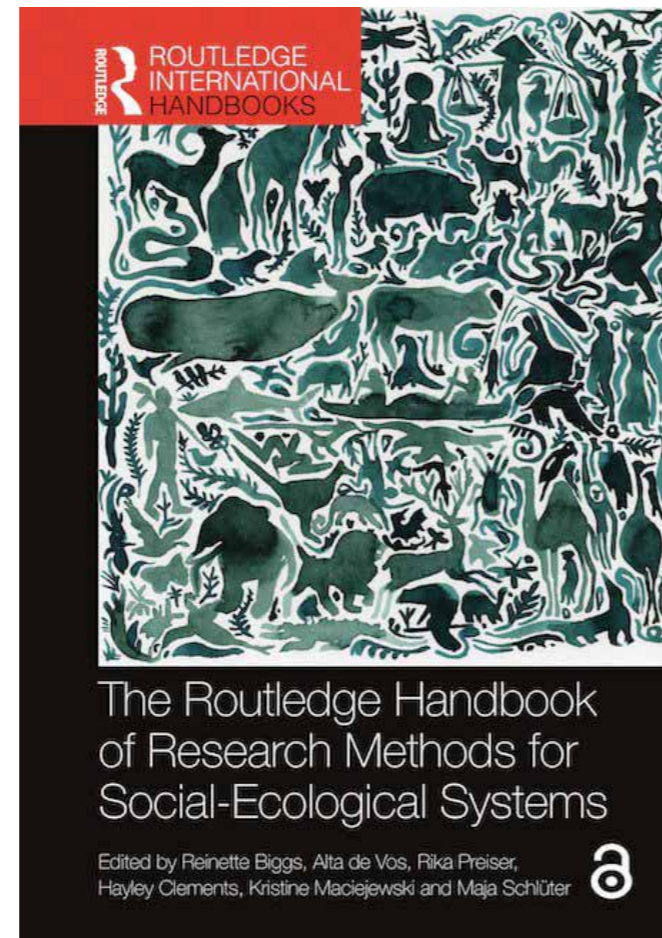
SES hackathon and launch of SES methods website

The SES Hackathon, organised by the CST in collaboration with the Stockholm Resilience Centre (SRC) and Rhodes University, brought together over 50 researchers and students in Stockholm from 23-25 May 2022. The hackathon, which was co-funded by the USAID Resilient Waters Programme, the SARChI Research Chair in Social-Ecological Systems and Resilience, and the Stockholm Resilience Centre, aimed to improve the accessibility of methods related to social-ecological systems by bridging knowledge gaps and promoting collaboration.

Recognizing the diverse nature of the SES field, the hackathon addressed the need for a comprehensive collection of research methods. It built upon the success of the Routledge Handbook of Research Methods for Social-Ecological Systems, authored and edited by CST researchers and collaborators worldwide. To expand the impact of the handbook, a new SES Methods website was developed as a research commons, providing visual resources and teaching activities for a wide range of methods. The website (www.sesmethods.org), was launched in October 2022, in a hybrid event hosted by the CST.

The hackathon played a vital role in populating the website with content. It brought together diverse researchers to collaborate and create resources for the SES Methods website. Participants engaged in group discussions to delve into specific sets of methods and brainstormed innovative ways to present concepts. The hackathon provided a conducive environment for learning and networking, culminating in valuable feedback and suggestions for improvement. Feedback from participants emphasised the hackathon's inclusive and collaborative nature, promoting connections across multiple topics and facilitating knowledge exchange between students and experienced researchers. The event also fostered collaboration between the CST, SRC, and Rhodes University while testing the

effectiveness of hackathons as a strategy for engaging with the website. Building on this success, a guide for organising hackathons worldwide will be developed, ensuring continued growth in collaborative initiatives within the field of SES research.



Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES)

The IPBES, also known as the "IPCC for biodiversity," is an independent intergovernmental body comprising 139-member governments. Established in 2012, it provides policymakers with objective scientific assessments about the state of knowledge of the planet's biodiversity, ecosystems and the contributions they make to people, as well as the tools and methods to protect and sustainably use these vital natural assets.

Two new IPBES assessments were initiated in 2022 with nominations of three CST staff members as coordinating lead authors (out of five South Africans in total). The role of coordinating lead authors is an important and relatively high profile one, as they work

closely with the assessment chairs to lead and convene the overall assessment reports by coordinating a large group of lead and contributing authors, and fellows under each chapter. Prof Oonsie Biggs was nominated as lead author for "Chapter 3: How transformative change occurs," of the Transformative change assessment. As part of the Nexus assessment, Dr Odirilwe Selomane was nominated as lead author for "Chapter 3: Future interactions across the nexus", and Dr Nadia Sitas as lead author for "Chapter 4: Policy and sociopolitical options across the nexus that could facilitate and accelerate the transition to a range of sustainable futures". Both Dr Selomane and Dr Sitas were part of the IPBES Fellows programme and, along with Prof Biggs, have played significant roles in previous IPBES assessments.

Youth Nature Futures for Southern Africa

Over the last few years, IPBES has published landmark assessments reviewing the state of the world's ecosystems.

Amidst troubling reports on the health of our life-supporting ecosystems, these assessments also suggest various methods to build better futures for both people and the planet. But what do these "nature-futures" look like? Visions for nature-futures inspired by the lives and perspectives of young people, particularly those from the Global South, have not yet been adequately explored.

To capture visions of nature-futures as imagined by youth from the Global South, the CST facilitated a series of online events in 2021 with youth organisations and networks operating in southern Africa. These events introduced the IPBES assessments to a variety of youth groups in the region, while providing space for young people to share their stories of environmental change and its impact on their lives. Participants were led through futuring exercises to stimulate discussion on what sustainable and just futures would look like to them.

In addition, a competition was launched to promote the development of artworks and other creative outputs that represent youth nature-futures for southern Africa. In total, sixteen projects were funded to create art that links young people to environmental change and exhibits their hopes and dreams for the future. Projects showcased a variety of artistic expressions, such as murals, poems, songs, dance, creative signage, and recipe collections.





Governing board



Prof Ingrid Woolard
Chair

Dean: Economic and Management Sciences Stellenbosch University



Dr Amollo Ambole

Programme Director: African Mayoral Leadership Initiative, African Centre for Cities



Dr Gaël Giraud

Senior Researcher: Environmental Metrology & Policy Programme, Georgetown University



Prof Lesley Le Grange

Distinguished Professor in the Faculty of Education, Stellenbosch University



Dr Nthabiseng Moleko

Senior Lecturer: Business School, Stellenbosch University



Prof Reinette (Oonsie) Biggs

Co-Director, SARChI Chair



Prof Rika Preiser

Associate Professor



Dr Nadia Sitas

Senior Researcher



Dr Odirilwe Selomane

Senior Researcher



Prof Eugene Cloete
Deputy Chair

Vice-Rector: Research, Innovation and Postgraduate Studies Stellenbosch University



Prof Desta Mebratu

Fellow of the African Academy of Science (FASS), Stellenbosch Institute for Advanced Study (STIAS), and Puffendorf Institute for Advanced Studies.



Prof Karen Esler

Head of the Department of Conservation Ecology & Entomology, Stellenbosch University



Prof Line Gordon

Director & Curt Bergfors Professor in Sustainability Science, Stockholm Resilience Centre, Stockholm University



Prof Sampson Mamphweli

Director: CRSES, Stellenbosch University



Prof Mark Swilling

Co-Director, Distinguished Professor



Dr Nthabiseng Mohlakoana

Senior Researcher



Dr Maike Hamann

Senior Researcher



Dr Hayley Clements

Senior Researcher

Staff members



Nina Callaghan,

Researcher



Robin Foley

Researcher



Dr Joy Waddell

Researcher



Dr Linda Luvuno

Postdoctoral researcher



Dr Nyasha Magadzire

Postdoctoral researcher



Tasneem Jhetam

Junior Researcher



Monique Beukes

PGDip Administrator



Beatrix Steenkamp

MPhil Administrator



Jos Liebenberg:

Temporary financial assistant



Dr Megan Davies

Researcher



Wendy McCallum

Researcher



Dzvinka Kachur

Researcher



Dr Julia van Velden

Postdoctoral researcher



Merin Jacob

Junior researcher



Cornelia Jacobs

Operations Manager



Amanda October

PhD & MPhil Administrator



Carolyn Cramer

Communications Manager



Cindy Taylor:

Temporary Communications Manager

Staff members

PhD graduates

2021

Davies, M.L. South Africa's contested transition to energy democracy: Lessons and struggles from the Renewable Energy Independent Power Producer Procurement Programme.

MPhil graduates

2022

- Carstens, M.** 2022. Exploring Relationality in African Knowledge Systems: A Contribution to Decoloniality in Sustainability Science.
- Dalamakis, G.** 2022. Decolonial Gestures of Heutagogy: A Postqualitative Inquiry into the Potential of Self-Determined Learning in Stellenbosch University's Postgraduate Diploma in Sustainable Development.
- Fourie, J.** 2022. Understanding the Sustainability of Free-Range and/or Grass-Fed Beef in South Africa.
- Geytenbeek, M.** 2022. Facilitating the Development of Nature Connectedness.
- Lee, H.** 2022. Exploring Equity Dynamics along the Seaweed Value Chain in Zanzibar.
- McCarthy, M.** 2022. A System Dynamics-Based Analysis of Charcoal Production from Invasive Alien Plants in South Africa: The Case of the Tsitsa River Catchment.
- Milton, N.C.** 2022. The Role of Food Aid During the COVID-19 Pandemic in Building Community Resilience to Disasters: A Case Study from Stellenbosch, South Africa.
- Ngadze, F.** 2022. Applying the Safe and Just Operating Space (SJS) Framework to Sustainable Development in Zimbabwe.
- Rathupetsane, A.T.** 2022. Just Upstream are Jobs: Mapping South Africa's Wind Manufacturing Potential.
- Richards, N.D.M.** 2022. Beyond Resistance? Exploring Dynamics of Incumbency in South Africa's Power Sector Reform.
- Seibes, W.A.** 2022. Assessing the Prevalence of Energy Poverty and the Impact thereof on Educational Well-Being of High School Students in Windhoek, Namibia.
- Swart, L.** 2022. Exploring the Practical, Social, and Governance Realities of a Water-Energy-Food (WEF) Nexus Governance Approach: A Case Study of the V&A Waterfront in Cape Town, South Africa.
- Van Achterbergh, E.** 2022. Change Contagion: Exploring the Role that Social Interactions Play in Increasing Support for Corporate Sustainability.
- Van Den Bergh, C.** 2022. COVID-19: Insights and Prospects from Shifting Learning Experiences in Stellenbosch University's Postgraduate Diploma in Sustainable Development.

2021

- Alimohammadi, S.S.** 2021. Explorations of inclusive food flows in the City of Cape Town, South Africa
- Bauer, L.** 2021. Investigating the micro-processes of change used by grassroots individuals and organisations to embed sustainability in South African education.
- Bosman, S.** 2021. Understanding the Just Transition: Analysing the frameworks of Justice in South Africa's Energy Transition.
- Hughes, T.** 2021. A 'win-win': pipedream or possibility? A case study of a large food corporate in the South African food system
- Kasino, R.I.** 2021. Putting nature back in the water, energy and food nexus: Exploring opportunities to improve local livelihoods in the Kavango East Region in Namibia.
- Mangundu, R.M.I.** 2021. Exploring the potential of participatory games as an experiential learning approach for responding to SDG challenges in Namibia
- Molapo, R.** 2021. Exploring the experiences of food insecurity among urban poor households in Maseru: A case study of Thibella settlement.
- Morrell, L.E.** 2021. Exploring institutional change in response to the Business Roundtable's 2019 Statement on the Purpose of a Corporation.
- Paterson, M.** 2021. Practical approaches for enabling collaborative and adaptive water management for catchment management agencies.
- Pienaar, M.** 2021. Participatory Guarantee Systems in South Africa: Experiences and perceptions of its members.
- Sihwa, L.S.** 2021. Exploring corporate sustainability as an emerging logic in Zimbabwean listed companies.
- Varghese, E.S.** 2021. Designing guidelines for sustainability in the Built Environment: What we learn from the development of the green building sector in South Africa.

PGDip graduates

2022

- Addison, D.L.
- Badenhorst, K.
- Bird, T.J.
- Boswell, K.J.
- Bragg, S.
- Chimphonda, J.
- Daoussis, A.
- De Villiers, R.
- Dunn, D.D.
- Dyan, S.S.
- Ebrahim, A.B.
- Havenga, E.P.
- Macheli, T.C.
- Maema, N.S.
- Magrobi, J.A.
- Matlakala, M.

2021

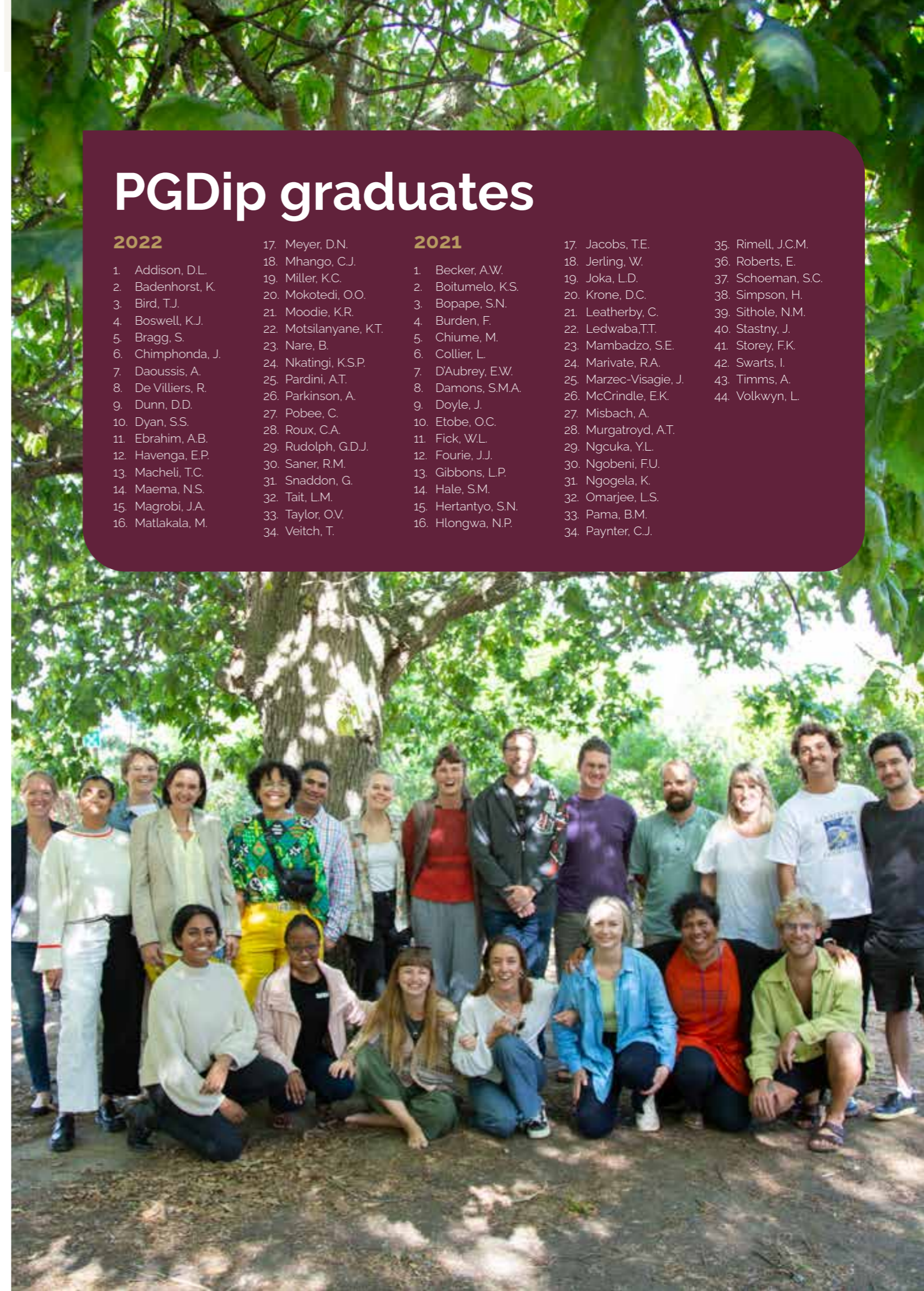
- Meyer, D.N.
- Mhango, C.J.
- Miller, K.C.
- Mokotedi, O.O.
- Moodie, K.R.
- Motsilanyane, K.T.
- Nare, B.
- Nkatingi, K.S.P.
- Pardini, A.T.
- Parkinson, A.
- Pobee, C.
- Roux, C.A.
- Rudolph, G.D.J.
- Saner, R.M.
- Snaddon, G.
- Tait, L.M.
- Taylor, O.V.
- Veitch, T.

2021

- Becker, A.W.
- Boitumelo, K.S.
- Bopape, S.N.
- Burden, F.
- Chiume, M.
- Collier, L.
- D'Aubrey, E.W.
- Damons, S.M.A.
- Doyle, J.
- Etobe, O.C.
- Fick, W.L.
- Fourie, J.J.
- Gibbons, L.P.
- Hale, S.M.
- Hertantyo, S.N.
- Hlongwa, N.P.

- Jacobs, T.E.
- Jerling, W.
- Joka, L.D.
- Krone, D.C.
- Leatherby, C.
- Ledwaba, T.T.
- Mambadzo, S.E.
- Marivate, R.A.
- Marzec-Visagie, J.
- McCrinkle, E.K.
- Misbach, A.
- Murgatroyd, A.T.
- Ngcuka, Y.L.
- Ngobeni, F.U.
- Ngogela, K.
- Omarjee, L.S.
- Pama, B.M.
- Paynter, C.J.

- Rimell, J.C.M.
- Roberts, E.
- Schoeman, S.C.
- Simpson, H.
- Sithole, N.M.
- Stastny, J.
- Storey, F.K.
- Swarts, I.
- Timms, A.
- Volkwyn, L.



Journal articles

2022

1. Anderies, J.M., Cummings, G.S., Clements, H.S., Lade, S., Seppelt, R., Chawla, S., Muller, B. A Framework for Conceptualizing and Modeling Social-Ecological Systems for Conservation Research. *Biological Conservation*. 2022; 275:109769. 13 pages
2. Biggs, R., Clements, H.S., Cumming, G.S., Cundill, G., De Vos, A., Hamann, M., Luvuno, L.B., Selomane, O., Blanchard, R., Esler, K.J., Pereira, L., Preiser, R., Sitas, N., Spierenburg, M.J., et al. Social-Ecological Change: Insights from the Southern African Programme On Ecosystem Change and Society. *Ecosystems and People*. 2022; 18(1):447-468
3. Boatemaa, S., Drimie, S.E., Davids, R.D., Delport, C., Hawkes, C.H., Mabhaudhi, T., Ngidi, M.N., Slotow, R.S., Pereira, L. The Complex Challenge of Governing Food Systems: The Case of South Africa Food Policy. *Food Security* 2022; 14(1):883-896
4. Braczkowski, A., Schenk, R., Samarasinghe, D., Biggs, D., Richardson, A., Swanson, N., Swanson, M., Dheer, A., Fattebert, J. Leopard and Spotted Hyena Densities in the Lake Mburo National Park, Southwestern Uganda. *PeerJ* 2022; 10:e12307:23pp
5. Chapin, F.S., Weber, E., Bennett, E., Biggs, R., Van Den Bergh, J., Adger, W.N., Crepin, A., Polasky, S., et al. Earth Stewardship: Shaping a Sustainable Future through Interacting Policy and Norm Shifts. *Ambio*. 2022; 51:1907-1920
6. Clements, H.S., Child, M.F., Lindeque, L., Lunderstedt, K., De Vos, A. Lessons from COVID-19 for Wildlife Ranching in a Changing World. *Nature Sustainability*. 2022; 5(11):1040-1048
7. De Jaegher, H., Preiser, R. Breaking New Ground through Participatory Sense-Making in Place. *Constructivist Foundations*. 2022; 17(3):190-192
8. Gaill, F., Brodie Rudolph, T., Lebleu, L. et al. An evolution towards scientific consensus for a sustainable ocean future. *npj Ocean Sustain* 1, 7 (2022). 10.1038/s44183-022-00007-1
9. Hamann, M., Hichert, T., Sitas, N. Participatory Scenario Planning: Participatory Research Methods for Sustainability - Toolkit#3. *GAlA-Ecological Perspectives for Science and Society*. 2022; 31(3):175-177
10. Kavhu, B., Mashimbye, Z.E., Luvuno, L.B. Detecting Connectivity and Spread Pathways of Land Use/Cover Change in a Transboundary Basin Based on the Circuit Theory. *Geomatics* 2022; 2:518-539
11. Klein, L., Buckle, P., Nguyen, N., Preiser, R., Ison, R. Growing a Community of Conversation and Understanding: The 2023 Agenda for the Systems Community. *Systems Research and Behavioral Science* 2022; 39(6):1103-1107
12. Klein, L., Buckle, P., Nguyen, N., Preiser, R., Ison, R. Rethinking Agency - The 2022 Agenda for Systems Community. *Systems Research and Behavioral Science* 2021; 38(6):717-720
13. Leadley, P., Gonzales, A., Krug, C., Londono-Murcia, M.C., Millette, K.L., Obura, D., Radulovici, A., Rankovic, A., Essl, F., Selomane, O., et al. Achieving Global Biodiversity Goals by 2050 Requires Urgent and Integrated Actions. *One Earth* 2022; 5(6):597-603

14. Luvuno, L.B., Biggs, R., Stevens, N., Esler, K.J. Perceived Impacts of Woody Encroachment on Ecosystem Services in Hluhluwe, South Africa. *Ecology and Society* 2022; 27(1):4
15. Meacham, M., Norstrom, A.V., Peterson, G., Andersson, E., Bennett, E., Biggs, R., Crouzat, E., Cord, A.F., Hamann, M.H., et al. Advancing Research on Ecosystem Service Bundles for Comparative Assessments and Synthesis. *Ecosystems and People* 2022; 18(1):99-111
16. Mosnier, A., Schmidt-Traub, G., Obersteiner, M., Jones, S., Javalera-Rincon, V., Declerck, F., Thomson, M., Sperling, F., Selomane, O., et al. How can Diverse National Food and Land-Use Priorities be Reconciled with Global Sustainability Targets? Lesson from the FABLE Initiative. *Sustainability Science* 2022; 18:335-345
17. Norstrom, A.V., Agarwal, B., Balvanera, P., Baptiste, B., Bennett, E.M., Brondizio, E., Biggs, R., Campbell, B., Manyani, A., Pereira, L., Selomane, O. The Programme On Ecosystem Change And Society (PECS) - A Decade of Deepening Social-Ecological Research through a Place-Based Focus. *Ecosystems and People* 2022; 18(1):598-608
18. Palacios-Abrantes, J., Bamford, A., Cheung, W.W.L., Foden, W.B., Grey, K., Maciejewski, K., Midgley, G.F., Pereira, L., et al. Managing Biodiversity in the Anthropocene: Discussing the Natures Futures Framework as a Tool for Adaptive Decision-Making for Nature Under Climate Change. *Sustainability Science* 2022; 00:00
19. Pereira, K.S., Gibson, L., Biggs, D., Samarasinghe, D., Braczkowski, A. Individual Identification of Large Felids in Field Studies: Common Methods, Challenges, and Implications for Conservation Science. *Frontiers in Ecology and Evolution* 2022; 10:86403
20. Pereira, L., Boatemaa, S., Cramer, C.M., Drimie, S.E., Isaacs, M., Malgas, R.R., Phiri, E.E., Tembo, C., Willis, J. Leveraging the Potential of Wild Food for Healthy, Sustainable, and Equitable Local Food Systems: Learning from a Transformation Lab in the Western Cape Region. *Sustainability Science* 2022; 0(0):0000-0002-4996-7234
21. Salerno, J., Stevens, F.R., Gaughan, A.E., Hilton, T., Bailey, K., Bowles, T., Cassidy, L., Mupeta-Muyamwa, P., Biggs, D., et al. Wildlife Impacts and Changing Climate Pose Compounding Threats to Human Food Security. *Current Biology* 2021; 31(22):5077-5085
22. Sankaran, S., Preiser, R. Systemic Change Towards Sustainable Development: Innovative and Integrative Approaches. *Systems Research and Behavioral Science* 2021; 38(5):579-582
23. Sitas, N., Selomane, O., Atkins, F., CareCreative, DFeat once, Urban Khoi Soldier, Mac1, Hlongwane, E., Fanana, S., Wigley, T., Boulle, T. 2022. Youth Visions in a Changing Climate: Emerging Lessons from Using Immersive and Arts-Based Methods for Strengthening Community- Engaged Research with Urban Youth. *Gateways: International Journal of Community Research and Engagement*, 15:2, 1-40. 10.5130/ijcre.v15i2.8318
24. Swilling, M., Nygaard, I., Kruger, W., Wlokas, H., Jhetam, T., Davies, M.L., Jacob, M.R., Morris, M., et al. Linking the Energy Transition and Economic Development: A Framework for Analysis of Energy Transition in the Global South. *Energy Research and Social Science* 2022; 90:102567

25. Van Breda, J.R. Using Synergic Methods for Being Methodologically Agile (SM4BMA). *International Journal of Sustainable Development Research* 2022; 8(2):52-65
26. Zhen, G., Van Breda, J.R. Methodological Agility for Doing Transformative Transdisciplinary Research on Sustainability Transitions in the Context of the Anthropocene. *International Journal of Sustainable Development Research* 2022; 8(2):41-51
27. Zurek, M., Hebinck, A., Selomane, O. Climate Change and the Urgency to Transform Food Systems. *Science* 2022; 376(6600):1416-1421

2021

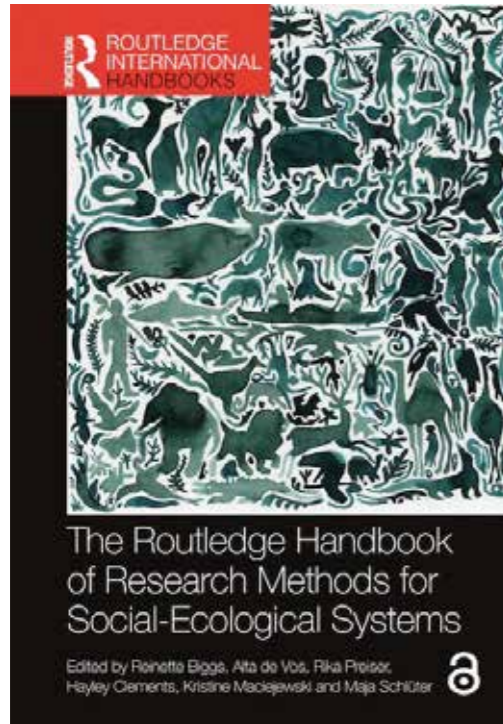
1. Archer, E., Dziba, L., Maoela, M.A., Walters, M., Biggs, R., Cormier-Salem, M., Declerck, F., Diaw, M.C., Dunham, A.E., Failler, P., Gordon, C., Pereira, L., Sitas, N. Biodiversity and ecosystem services on the African continent – What is changing, and what are our options?. *Environmental Development* 2021; 37(100558):1-9.
2. Bloem, S., Swilling, M., Koranteng, K. Taking energy democracy to the streets: Socio-technical learning, institutional dynamism, and integration in South African community energy projects. *Energy Research and Social Science* 2021; 72:101906.
3. Boatemaa, S., Koornhof, H.E. Governance of food and nutrition security in Eswatini: an analysis of government policies and reports. *Agriculture and Food Security* 2021; 10(45):1-10.
4. Clements, H.S., De Vos, A., Bezerra, J.C., Coetzer, K., Maciejewski, K., Mograbi, P.J., Shackleton, C.M. The relevance of ecosystem services to land reform policies: Insights from South Africa. *Land Use Policy* 2021; 100:104939, 1-10.
5. Downing, A.S.D., Wong, G.Y., Dyer, M., Aguiar, A.P., Selomane, O., Aceituno, A.J. When the whole is less than the sum of all parts - Tracking global-level impacts of national sustainability initiatives. *Global Environmental Change-Human And Policy Dimensions* 2021; 69:102306, 1-14.
6. Funder, M., Wlokas, H., Jhetam, T., Olsen, K.H. Corporate community engagement professionals in the renewable energy industry: Dilemmas and agency at the frontline of South Africa's energy transition. *Energy Research and Social Science* 2021; 81:102249, 1-9.
7. Hoffman, J., Davies, M.L., Bauwens, T., Späth, P., Hajer, M., Arifi, B., Bazaz, A., Swilling, M. Working to align energy transitions and social equity: An integrative framework linking institutional work, imaginaries and energy justice. *Energy Research and Social Science* 2021; 82:102317, 1-10.
8. Kavhu, B., Mashimbye, Z.E., Luvuno, L.B. Climate-Based Regionalization and Inclusion of Spectral Indices for Enhancing Transboundary Land-Use/Cover Classification Using Deep Learning and Machine Learning. *Remote Sensing* 2021; 13:1-24.
9. Kavhu, B., Mpakairi, K.S.M. Spatial Monitoring and Reporting Tool (SMART) in Mid-Zambezi Valley, Zimbabwe: Implementation challenges and practices. *Conservation Science and Practice* 2021; 3(9):e492, 5 pages.
10. Odume, O.N., Amaka-Otchere, A.B.K., Onyima, B.N., Aziz, F., Boatemaa, S., Thiam, S. Pathways, contextual and cross-scale dynamics of science-policy-society interactions in transdisciplinary research in African cities. *Environmental Science & Policy* 2021; 125:116-125.
11. Pereira, L., Asrar, G.R., Bhargava, R.B., Fisher, L.H., Hsu, A.H., Jabbour, J.J., Nel, J.L., Selomane, O., Sitas, N., Trisos, C.T., Ward, J., van den Ende, M., Vervoort, J., Weinfurter, A. Grounding global environmental assessments through bottom-up futures based

- on local practices and perspectives. *Sustainability Science* 2021; 16:1907-1922.
12. Pereira, L., Kuiper, J.J., Selomane, O., Aguiar, A.P.A., Asrar, G.R., Bennett, E.M., Biggs, R., Calvin, K., Hedden, S., Hsu, A., Jabbour, J., King, N., Köberle, A.C., Lucas, P., Nel, J., Norström, A., Peterson, G., Sitas, N., Trisos, C.T., van Vuuren, D., Vervoort, J., Ward, J. Advancing a toolkit of diverse futures approaches for global environmental assessments. *Ecosystems and People* 2021; 17(1):191-204.
13. Preiser, R., Biggs, R., Hamann, M.H., Sitas, N., Selomane, O., Waddell, J., Clements, H.S., Hichert, T. Co-exploring relational heuristics for sustainability transitions towards more resilient and just Anthropocene futures. *Systems Research and Behavioral Science* 2021; 2021:1-10.
14. Schneider, F., Tribaldos, T., Adler, C., Biggs, R., De Bremond, A., Buser, T., Krug, C., Loutre, M., Moore, S., Norström, A.V., Paulavets, K., Urbach, D., Spehn, E., Wülser, G., et al. Co-production of knowledge and sustainability transformations: a strategic compass for global research networks. *Current Opinion in Environmental Sustainability* 2021; 49:127-142.
15. Sellberg, M., Quinlan, A., Preiser, R., Malmborg, K.M., Peterson, G. Engaging with complexity in resilience practice. *Ecology and Society* 2021; 26(3):1-33.
16. Shumba, T., De Vos, A., Biggs, R., Esler, K.J., Clements, H.S. The influence of biophysical and socio-economic factors on the effectiveness of private land conservation areas in preventing natural land cover loss across South Africa. *Global Ecology and Conservation* 2021; 28:e01670.
17. Shumba, T., De Vos, A., Biggs, R., Esler, K.J. Typologies of collaborative governance for scaling nature-based solutions in two strategic South African river system. *Global Ecology and Conservation* 2021; 28:e01670.
18. Thiam, S., Aziz, F., Boatemaa, S., Amaka-Otchere, A.B.K., Onyima, B.N., Odume, O.N. Analyzing the contributions of transdisciplinary research to the global sustainability agenda in African cities. *Sustainability Science* 2021; 16(6):1923-1944.
19. Wessels, N., Sitas, N., O'Farrell, P.J., Esler, K.J. Assessing the outcomes of implementing natural open space plans in a Global South city. *Landscape and Urban Planning* 2021; 216:104237, 1 - 13.
20. Bennett, E., Biggs, R., Peterson, G., Gordon, L. Patchwork Earth: navigating pathways to just, thriving, and sustainable futures. *One Earth* 2021; 4(2):172-176.
21. Di Minin, E., Clements, H.S., Correia, R.A., Cortés-Capano, G., Fink, C., Haukka, A., Hausmann, A., Kulkarni, R., Bradshaw, C.J.A. Consequences of recreational hunting for biodiversity conservation and livelihoods. *One Earth* 2021; 4(2):238-253.
22. Hebinck, A., Selomane, O., Veen, E., De Vrieze, A., Hasnain, S., Sellberg, M., Sovová, L., Thompson, K., Vervoort, J., Wood, A. Exploring the transformative potential of urban food. *NPJ Urban Sustainability* 2021; 1(38):1-9.
23. Lynch, A.J., Fernández-Llamazares, A., Palomo, I., Jaureguiberry, P., Amano, T., Basher, Z., Lim, M., Mwampamba, T.H., Samakov, A., Selomane, O. Culturally diverse expert teams have yet to bring comprehensive linguistic diversity to intergovernmental ecosystem assessments. *One Earth* 2021; 4:1-10.
24. Zurek, M., Hebinck, A., Selomane, O. Looking across diverse food system futures: Implications for climate change and the environment. *Q Open* 2021; 1(1):1-39.

Books

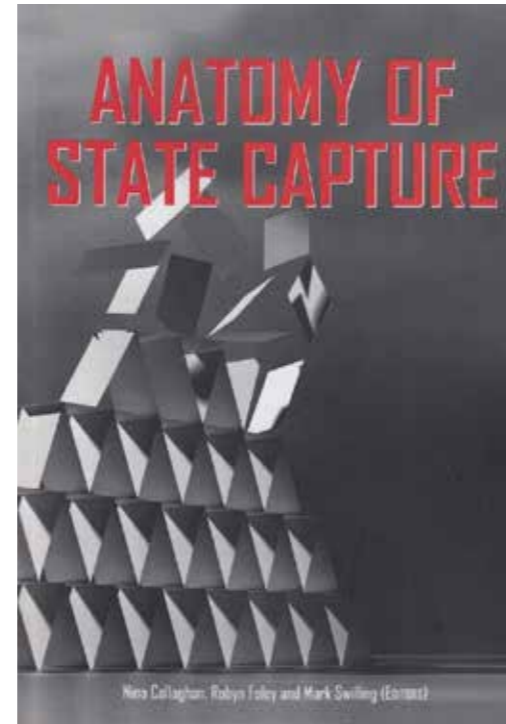
2022

Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. The Routledge Handbook of Research Methods for Social-Ecological Systems. Routledge, Abingdon, United Kingdom 2022:494 pp



2021

Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021



Book chapters

2022

- Biggs, R., Clements, Hs., De Vos, A., Folke, C., Manyani, A., Maciejewski, K., Martin-López, B., Preiser, R., Selomane, O., Schluter, M. What are social-ecological systems and social-ecological systems research? In: Biggs, R., De Vos, A., Preiser, R., Clements, Hs., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abington, United Kingdom, 2022: 3-18
- Biggs, R., Clements, Hs., De Vos, A., Maciejewski, K., Preiser, R., Schluter, M. How to use this handbook. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 64-79
- Boulton, J., Preiser, R. Action Research. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 217-227
- Chapin, F.S., Biggs, R., Sitas, N., Folke, C., Kofinas, P. Cross-scale social-ecological stewardship for navigating toward a more sustainable and just futures. In: Gunderson, L.H., Garmestani,

- S., Allen, R. (eds.) Applied Panarchy: Applications and Diffusion across Disciplines, Island Press, Washington, USA, 2022: 3-344
- Clements, H.S., Esler, K.J., Henry, Daw., Mograbi, P.J., Norström, A., Reynolds, C. Ecological Field Data Collection. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 95-104
- De Vos, A., Maciejewski, K., Bodin, Ö., Norström, A., Schlüter, M., Tengo, M. The practice and design of social-ecological systems research. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schlüter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 47-60
- De Vos, A., Preiser, R., Masterson, V. Participatory Data Collection. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 119-130
- Drimie, S.E., Magner, C., Pereira, L., Charli-Joseph, L., Moore, M., Olsson, P., Siqueiros-Garcia, J.M., Zgambo, O. Facilitated

- dialogues. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 136-145
- Hamann, M.H., Johnson, J.A., Chaigneau, T., Chaplin-Kramer, R., Mandle, L., Rieb, J.T. Ecosystem service modelling. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 426-435
- Hichert, T., Biggs, R., De Vos, A. Futures analysis. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 148-160
- Hichert, T., Biggs, R., De Vos, A., Peterson, G. Scenario development. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 163-172
- Lade, S., Anderies, J.M., Currie, P.K., Rocha, J. Dynamical systems modelling. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 359-368
- Maciejewski, K., Baggio, J. Network analysis. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schlüter M (eds) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 321-329
- Preiser, R., Garcia, M.M., Hill, L.B., Klein, L. Qualitative content analysis. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 270-280
- Preiser, R., Schlüter, M., Biggs, R., Garcia, M.M., Haider, J., Hertz, T., Klein, L. Complexity-based social-ecological systems research: philosophical foundations and practical implications. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 27-42
- Schluter, M., Biggs, R., Clements, H.S., De Vos, A., Maciejewski, K., Preiser, R. Synthesis and emerging frontiers in social-ecological systems research methods. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 453-472
- Sitas, N., Ryan, P., Schultz, L. Systems scoping. In: Biggs, R., De Vos, A., Preiser, R., Clements, H.S., Maciejewski, K., Schluter, M. (eds.) The Routledge Handbook of Research Methods for Social-Ecological Systems, Routledge, Abingdon, United Kingdom, 2022: 83-91
- Sitas, N., Selomane, O., et al, Chapter 5, Assessment Report on Diverse Values and Valuation of Nature, UN Environment Programme.
- Swilling, M. & Callaghan, N. 2022. State-Owned Enterprises in South Africa. In: Oqubay, A., Tregenna, F. & Valodia, I. (eds.) The Oxford Handbook of the South African Economy. Oxford: Oxford University Press. DOI: 10.1093/oxfordhb/9780192894199.001.0001

- Van Velden, J.I. Contrasting safari and bushmeat hunting in Southern Africa Conservation and development issues. In: Stone, L.S., Stone, M.T, Mogomotsi, P.K., Mogomotsi, G.E.J. (eds.) Protected Areas and Tourism in Southern Africa, Routledge, London, United Kingdom, 2022: 259-276

2021

- Callaghan, N., Foley, R.C., Swilling, M. Anatomy Of State Capture: Introduction. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 1-31.
- Callaghan, N., Foley, R.C., Swilling, M. Final Reflections By The Editors. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 391-400.
- Callaghan, N., Foley, R.C. Capturing The Message. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 217-234.
- Callaghan, N., Swilling, M., Jacob, M.R. Africa and Covid-19. In: Pieterse, J.N., Lim, H., Khondker, H. (eds.) Covid-19 and Governance: Crisis Reveals, Routledge, Abingdon, United Kingdom, 2021: 264-283.
- Callaghan, N. State Capture at Denel. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 151- 168.
- Foley, R.C. Bosasa's Monopoly Money. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 191- 212.
- Foley, R.C. Stealing from the poor: State Capture at SASSA. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 241-262.
- Foley, R.C. The Real Rogues that Ruined SARS. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 305-324.
- Johnson, E.L. Between Liberalisation and State Capture: A Deeper Look at the Case of Eskom. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 97-114.
- Kachur, D. How State Capture went Nuclear. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 329-350.
- Maciejewski, K., Currie, P., O'Farrell, P.J. Social-Ecological Connectivity in Global South Cities. In: Shackleton, C.M., Cilliers, S.S., Davoren, E., Du Toit, M.J. (eds.) Urban Ecology in the Global South, Springer, Cham, Switzerland, 2021: 347-361.
- Pereira, L., Lavery, C., Moyo, B., Selomane, O., Sitas, N., Sitas, R., Trisos, C.T. Wakanda Phambili! African science fiction for reimagining the Anthropocene. In: Kemp, S., Andersson, J. (eds.) Futures, Oxford University Press, Oxford, United Kingdom, 2021: 297-310.
- Sitas, N., Selomane, O., Hamann, M.H., Gajjar, S.P. Towards Equitable Urban Resilience in the Global South Within a Context of Planning and Management. In: Shackleton, C.M., Cilliers, S.S., Davoren, E., Du Toit, M.J. (eds.) Urban Ecology in the Global South, Springer, Cham, Switzerland, 2021: 325-341.
- Swilling, M., Madonsela, S. Towards a Political Economy of South African Rackets. In: Callaghan, N., Foley, R.C., Swilling, M. (eds.) Anatomy of State Capture, African Sun Media, Stellenbosch, South Africa, 2021: 39-57.

Reports

2022

1. Chesterman, S., Hamann, M., Norström, A. GRP & CST (2022) Insights for Food Systems Transformation from Southern Africa. Outcomes of the Southern African Resilience Academy. Global Resilience Partnership (GRP), Stockholm, Sweden, and Centre for Sustainability Transitions (CST), Stellenbosch University, South Africa.
2. Chesterman, S., Hamann, M., Norström, A. GRP & CST (2022) Insights for Food Systems Transformation from Southern Africa. Overview of Southern African context. Global Resilience Partnership (GRP), Stockholm, Sweden, and Centre for Sustainability Transitions (CST), Stellenbosch University, South Africa.
3. Kachur, D. 2022. Russia's Resurgent Interest in Africa: The Cases of Zambia and Tanzania. SAIIA Report
4. Krug, C., Londono-Murcia, M.C., Obura, D., Radulovici, A. Expert input to the post-2020 Global Biodiversity Framework: Transformative actions on all drivers of biodiversity loss are urgently required to achieve the global goals by 2050. 2022: 182 pp
5. Martin, A., O'Farrell, P., Kumar, R., Eser, U., Faith, D.P., Gomez-Baggethun, E., Harmackova, Z., Horcea-Milcu, A.I., Merçon, J., Quaas, M., Rode, J., Rozzi, R., Sitas, N., Yoshida, Y., Ochieng, T.N., Koessler, A.K., Lutti, N., Mannetti, L., and Arroyo-Robles, G. (2022). Chapter 5: The role of diverse values of nature in visioning and transforming towards just and sustainable futures. In: Methodological Assessment Report on the Diverse Values and Valuation of Nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Balvanera, P., Pascual, U., Michael, C., Baptiste, B., and González-Jiménez, D. (eds.). IPBES secretariat, Bonn, Germany.
6. McCallum, W. Davies, M., Richards, N. & Hoffman, J. 2022. Catalysing the Just Energy Transition: On the Potential of Development Finance Institutions. Reconfiguring Energy for Social Equity. Centre for Sustainable Transitions, Stellenbosch University and Urban Futures Studio, Utrecht University.
7. Shackleton, S., Cobban, L., Hoffman, T., Methner N., Sitas, N. 2022. How enduring partnerships can build sustainable and just landscapes.
8. Shackleton, S., Cobban, L., Hoffman, T., Methner N., Sitas, N. 2022. How can funders better support transdisciplinary research for equitable and resilient landscapes?
9. Sitas, N., Hamann, M.H., Achieng, T., Waddell, J., Clements, H.S., Selomane, O. CST 2022 Youth Nature Futures for Southern Africa. Report. Centre for Sustainability Transitions, Stellenbosch University, Stellenbosch, South Africa.
10. Swilling, M., Callaghan, N., Mohlakoana, N., Johnson, E., Macmillan-Scott, E., Stodulka, K., Meldrum, M., Kennedy, M. Making Climate Capital work: Unlocking \$8.5bn for South Africa's Just Energy Transition. Report. Blended Finance Taskforce and Centre for Sustainability Transitions, Stellenbosch University, Stellenbosch, South Africa.
11. Quale, L., Bredin, I., Myeza, N., Sitas, N. State Of Strategic Water Source Areas. Monitoring and Reporting Framework, and Information Platform. Status Quo Report Institute of Natural Resources NPC, DOI: 10.13140/RG.2.2.28405.45288.

2021

1. Biggs, R., Pringle, C., Sitas, N., Clements, H.S., Dube, B., Hamann, M.H., Malherbe, W., Manyani, A., Preiser, R., Selomane, O., Waddell, J. Fostering Capacity To Navigate Shocks, Change And Uncertainty. Resilience Policy Brief. Centre for Sustainability Transitions, Stellenbosch University, Stellenbosch, South Africa.
2. Swilling, M., Mebratu, D., Cartwright, A. 2021. A Trip to 2030: Fostering Leadership and Transformative Change for Economic Diversification in Central Africa. UNECA Report. Centre for Sustainability Transitions, Stellenbosch University, Stellenbosch, South Africa.



CENTRE FOR SUSTAINABILITY TRANSITIONS

*Stellenbosch University, Private Bag X1, The Stables at 19
Jonkershoek Road, Stellenbosch, South Africa*

+27 21 808 9607 | www0.sun.ac.za/cst