Annual Report

forward together
sonke siya phambili
saam vorentoe

2023

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Centre for Sustainability Transitions (CST)

Sustainability transitions and transformations in action

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CST
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Message from the Dean and CST governing board chair

Seeing people reach aspirational milestones is a promising indicator that something is working well. It is especially warming when those people are in your faculty. As Dean of the Faculty of Economic and Management Sciences (EMS), I also fulfil the role of chair of the Centre for Sustainability Transitions (CST) governing board, that constituted itself in 2021. I am privy to the inner workings of this Centre, having a view on research, organisational planning and the many knotty issues that come with being a Type 2 centre. It is a feat to raise third stream funding as primary revenue, publish, teach, supervise, and build sound infrastructure for your institutional entity. The CST has managed this well in 2023 thanks to inspired commitment at every level of leadership. The team of directors, administrators, the management committee and programme leadership have navigated choppy waters to emerge from 2023 with a sense of stability, prosperity and wellbeing.

The CST has attracted funding amounting to R22.8 million, produced 23 publication units and had 125 students enrolled across three postgraduate programmes for the year. These are the more obvious indicators of success that register on any university's dashboard, but they are not the most defining for the CST. What has emerged is the Centre's capability to work collaboratively and deeply to articulate an invigorated identity, a suite of renewed training programmes, and an institutional clarity that holds the planetary crisis in focus.

On behalf of the governing board, we also congratulate CST co-director and SARChI chair, Prof. Reinette (Oonsie) Biggs on her Research in Innovation Excellence Award. Her dedicated work in the field of social-ecological systems earned her this accolade in the Women in Research category at Stellenbosch University's Research Awards in October 2023. The board celebrates all the wins in approach and substance at the CST for 2023 and true to duty, will continue to ask the hard questions and support the gritty processes still underway.

Forward together,
Prof. Ingrid Woolard

Message from the director team

For people who study transitions and transformations, we know there are no punctuation marks to say, "Mission accomplished, change has arrived." As the tenets of our research tell us, change manifests in stages, at different scales, and through collective effort. Reflecting on 2023, there are indicators that tell us that the turbulence of the CST's transition in 2021/2022 is settling into a more regular rhythm. The emergence of new routines and the growing confidence that comes with making explicit, collaborative agreements can be observed in operational processes, evolving cultures and leadership at the CST.

The renewal of our postgraduate programmes has been a strong vector in leading change for our Centre in 2023, supported by a three-year Strategic Fund grant from Stellenbosch University (SU). As part of our process of institution building, we dedicated substantial effort to reimagining our postgraduate programmes, the Postgraduate Diploma (PGDip) in Sustainable Development, the MPhil in Sustainable Development and the PhD in Sustainable Development, to align them with our clarified research agenda, and to place them at the international forefront of programmes in the areas of sustainability transitions and transformations. Through a series of retreats, workshops, hackathons and routine programme meetings, we deliberated thoroughly and collectively to arrive at a refreshed vision for an integrated suite of offerings that articulate the complex dynamics of transitions and transformations in a distinctive and aspiring way, and that are relevant and responsive to a changing world.

Critical research skills were made more explicit across all programmes so that the cumulative effect is a deeper and more structured progression of research and relational competencies and dispositions. The suite of programmes has a coherence and logic that better serves our students and the broader sustainability community.

The CST's research has continued to flourish, contributing to advances in theory and practice. Much of our project work feeds directly into policy processes, both nationally and internationally, and also offers rich opportunities to feed insights back into our teaching in terms of content and approach. Our research outputs in 2023 included 23 academic journal articles and three book chapters. These research outputs covered a wide range of topics, including energy, governance, resilience, biodiversity conservation and social-ecological systems dynamics. Significantly, much of our research is conducted in collaboration with key policy-related institutions at an international, national and local level. These include the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the International Resource Panel (IRP), various government departments at national, provincial and local level, as well as various civil society formations. Conducting policy-relevant research means being close enough to the subject to know what is going on without compromising the academic obligation to 'speak truth to power'. This is not an easy balance to achieve.

The institutional consolidation, and particularly the renewal and alignment of our postgraduate programmes with our research agenda would not have been achieved without the dedication, stamina and growing skill of the CST staff, particularly the three programme leaders – Associate Professor Alta de Vos (PhD programme), Associate Professor Rika Preiser (MPhil programme) and Dr Megan Davies (PGDip programme). The dedicated programme leaders bring care to the mentorship and development of students, along with the institutional administration required for each programme. These roles and the teaching commitments on the PGDip, MPhil and PhD programmes, which involve all staff at the CST, have been supported by the Strategic Fund grant and a dedicated allocation of core funds from the University, a strong and welcome complement to the third-stream funding which is the CST's primary income. The allocation of core funds to the CST that has accompanied the shift to a department-level entity has greatly assisted in stabilising funding for the core group of staff that hold the main institutional responsibilities at the Centre.

The CST made strides in advancing transformation and diversity in 2023, with the hiring of five black staff members and the appointment of the Centre's first deputy director. We were happy to welcome senior researcher Dr Ricardo (Ric) Amansure, who takes the lead on projects around financing the Just Energy Transition. He also forms part of the teaching and supervision team, providing much needed capacity in this area. We also welcomed our first full-time communications manager, Nadine Christians, who has really stepped up our communications infrastructure with the development of a new CST website as well as developing a brand-new intranet. After 10 dedicated years as our PGDip administrative officer and all-round miracle-worker for hundreds of students, Monique Beukes took retirement. We are appreciative of Monique's detail-orientated and caring ways that supported the PGDip for half of its 20-year existence. In October 2023, we welcomed Nontobeko (Ntobsie) Ngcwenga as the new PGDip administrative officer, who stepped in with a big heart and many years of experience at Stellenbosch University. A'ishah Ebrahim joined the CST as the programme learning coordinator within the PDGip in Sustainable Developments. A'ishah's appointment has been invaluable to the programme and her knowledge of the course has been nothing but instrumental. We also welcomed Juliet Leuna-Obioha, who took up the position of project administrator within the Infrastructure and Governance team. Juliet is an accountant by profession and has experience in the banking, education and tech sectors. One other staff shift was the appointment of Nina Callaghan as deputy director, who now works closely with the administrative team and oversees human resources functions. Nina also took up the chair of the EMS Faculty's Transformation Committee, and we are encouraged by how she is helping to connect and represent the CST in larger Stellenbosch University forums.

Institutional work can be myopic and all-consuming, especially in the building phase of institutional development. While our minds are applied to these commitments, our hearts and practice are connected to and enlivened by what is unfolding in the world. The combined impacts of war in Ukraine and Sudan and the genocide in Gaza point to far-reaching geopolitical shifts that polarise narratives, redirect resource flows, and amplify the crisis of global governance. 2023 was also the hottest year on record, with loss and damage due to heat waves, droughts, fires and massive human and animal displacement. Scientists declared 21 species officially extinct in 2023, meaning they are no longer found in the 'wild' or in captivity. It is a sobering and concerning endeavour to study change and try and influence it in more sustainable and just directions. We know that our world in polycrisis needs strong institutions to advance research, policy and action. It is with this in mind that we strive to make our contribution, along with our community of students, partners, funders, policy-makers and practitioners.

Prof. Reinette (Oonsie) Biggs, Prof. Mark Swilling and Nina Callaghan

Prof. Reinette (Oonsie) Biggs

Prof. Mark Swilling

Nina Callaghan

About the CST

Vision

A vibrant, just and sustainable future, that values the diversity and interdependencies between people, places and nature.

Mission

To be a world-leading research and learning institution that inspires and supports science, policy and practice towards a just and sustainable future.

Image credit: Kelvin Trautman | KANDS Collective.

The Centre for Sustainability Transitions is an internationally recognised research, training, and learning centre housed within the Faculty of Economics and Science Management at Stellenbosch University. The Centre brings together research on the complex dynamics of sustainability transitions and transformations which is achieved through education and training, research, and engagements which focuses on five key research themes: knowledge co-production, social-ecological resilience, transformative futures thinking, finance and resource flows, and political economy and development, that inform pressing national, continental, and global sustainability development challenges.

The CST is a vibrant hub for leading scientists and students from diverse disciplinary backgrounds and it fosters collaborations and partnerships with a variety of local and international universities. Our teaching and learning approach emphasises knowledge co-production, enabling the CST to bridge the gap between science, policy and practice. By promoting collaboration, we foster an integrated and impactful approach to research and sustainable development.

Values

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

Our research chairs

Prof. Reinette (Oonsie) Biggs

South African Research Chair (SARChI) in Social-Ecological Systems (SES) and Resilience

It is increasingly recognised that attaining a just and sustainable future requires substantive transformation of our economies and societies, including our underlying paradigms and deeply held assumptions. Globally, social-ecological resilience is a rapidly emerging research area that seeks to contribute to this grand challenge through better understanding of the dynamics of intertwined social-ecological systems (SES). Resilience is increasingly regarded as a key aspect to enabling and navigating transformative change, as systemic transformations entail changes that are fundamentally unknown and unpredictable. The capacity to deal with such unknown changes is a key focus of resilience-building efforts and requires highly interdisciplinary and transdisciplinary knowledge.

As SARChI Chair in Social-Ecological Systems and Resilience since 2016, my aims are to address these needs through theoretical, methodological and empirical research, grounded in a South African and an African perspective. My work is embedded in knowledge co-production and collaboration with local and international partners and networks to advance research and the implementation of resilience-building practices in support of regional and global sustainability transformations. The four key areas of work under my chair include: 1) Advance SES and resilience theory and methods; 2) Analyse and empirically document regime shifts and tipping points in SES; 3) Analyse and facilitate sustainability transformations in SES; 4) Support the development of regional and global SES and resilience research and practice networks.

Through the work of the chair, the CST has become established as a key knowledge partner in the resilience arena and has partnered on a number of large regional development projects. I also co-lead significant international collaborative research efforts and networks, including the Seeds of Good Anthropocenes initiative, the international Programme on Ecosystem Change and Society (PECS), and serve as a coordinating lead author on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Change (IPBES) Transformative Change Assessment.

Prof. Mark Swilling

South African Research Chair (SARChI) in Urban Innovations

I was appointed to this chair during the course of 2023, which forms part of the South African Research Chairs Initiative (SARChI) funded by the National Research Foundation (NRF). The funding covers my salary, bursaries for postgraduate students, and research expenses. A partnership with the African Centre for Cities at the University of Cape Town and the Urban Futures Studio at Utrecht University has been established to take this work forward. The focus of the chair is urban innovations in Africa, and the core team comprises two master's students, a doctoral and a post-doctoral student, all four from historically disadvantaged backgrounds, three of which are women. The aim is to build an open access database of urban innovations in Africa. Postgraduate and post-doctoral researchers will then be invited to select from the database cases that can be analysed in much greater depth.

From this mix of limited and in-depth case studies, the aim is to develop comparative analyses and conceptual frameworks for making better sense of urban innovations across Africa. At the end 2023 and in anticipation of expanding the chair's research activities in 2024, the African Centre for Cities and CST co-hosted a workshop on City-Level Innovation Ecosystems (CLIE). Case studies from Nairobi, Zimbabwe, South Africa, Tunisia, Egypt, Uganda, Sierra Leone and (for comparative purposes) Bangkok were discussed, with presentations on these cases by leading researchers. Key themes included urban culture mobilisation, the role of the private sector, prioritising social justice, quadruple helix considerations, red tape reduction, hyperlocal place-based scenarios, informal networks of innovators and entrepreneurship.

A number of postgraduate students and early-career researchers attended this important event which consolidated networks required to implement the new orientation of my new chair. I have been involved in urban research in South Africa and Africa for the past three decades, working in close collaboration with Prof. Edgar Pieterse, Director of the African Centre for Cities and Extraordinary Professor in CST. Much of our research over the past three decades has directly influenced the orientation of South African urban development policies. This will continue into the future through our future collaborations with the African Mayoral Leadership Initiative (AMALI) which is an Africa-wide network of mayors.

Prof. Rika Preiser and Tanja Hichert

UNESCO Co-chairs in Complex Systems and Transformative African Futures

The ceremonial inauguration of the UNESCO (United Nations Educational, Scientific and Cultural Organisation) Chair in Complex Systems and Transformative African Futures took place in 2023. The UNESCO Chair was awarded to CST Associate Professor Rika Preiser and CST Research Fellow, Tanja Hichert, academically qualified futures and foresight practitioners. The chair will run for four years until March 2026 and forms part of UNESCO's Global Futures Literacy Network.

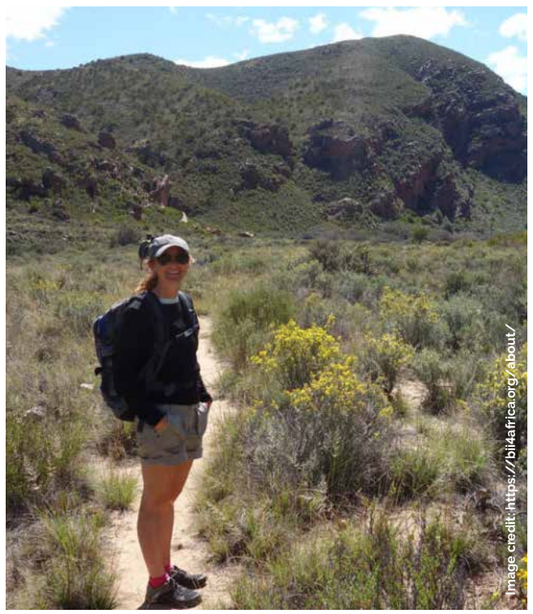
Our chair draws on our collective, in-depth knowledge of complex systems, combined with the conceptual and practical applications of futures studies. Individually, we specialise in theories of complex systems and the practice of futures studies and foresight.

We have developed and will be developing 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.

As part of UNESCO's Global Futures Literacy Network, we will be developing and applying the theories and practices of 'using-the-future' by conducting research and facilitating multi-stakeholder engagements that address the urgent need to develop more inclusive, critical and participatory processes for convening and training students, researchers and decision-makers in looking to, thinking and caring about the future.

We will develop a regional hub where African experts can engage and share insights on how to better respond to the global sustainability challenges that we face in the world today.

A unique characteristic of our chair is that it promotes a transdisciplinary approach by integrating theory and practice by means of appointing co-chairs; one specialised in theories of complex systems, the other in practice of futures and foresight.



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Dr Hayley Clements

African Wildlife Economy Institute Research Chair in African Wildlife Economies

The African Wildlife Economy Institute (AWEI) Research Chair in African wildlife economies work with the AWEI at Stellenbosch University to develop and implement its strategic research programme of unlocking inclusive, diversified and flourishing wildlife economies across the African continent. The AWEI envisions transformed, enhanced and maintained African landscapes – complex systems that deliver biodiversity conservation, climate resilience, inclusive economic opportunities and human wellbeing. The chair is in partnership with Oppenheimer Generations Research and Conservation.

One of the major initiatives of the chair is the Sustainable Wildlife Economies project, which started in 2020 and will run until 2026. This project aims to understand how diverse types of wildlife-based land uses contribute to sustainable land management, socio-economic development and biodiversity conservation. The project brings together stakeholders who work closely with the wildlife ranching industry and national governments. Project participants hope to generate knowledge products and decision support tools that holistically value the contributions of the sector to sustainable development and design programmes that promote inclusive growth within the wildlife ranching sector.

Our teaching and learning

Learning and teaching at the CST is a vital component of the Centre's approach to co-producing transformational knowledge for sustainability transitions and transformations. Sustainability transitions and transformations is an evolving field of scholarly inquiry and practice, and engages full-time students as well as those who are working professionals, practitioners and activists across diverse sectors of society.

The CST offers three postgraduate programmes: the PhD in Sustainable Development, the MPhil in Sustainable Development, and the Postgraduate Diploma (PGDip) in Sustainable Development. The content and approach to teaching, learning and assessment across our three postgraduate programmes is tailored to making sustainability studies relevant to a global audience while being rooted in an African context. At the PGDip level, coursework is designed to be enriching and applicable to a diverse student cohort who are interested in understanding sustainability more deeply, and making change where they are. The MPhil and PhD programmes enable further scholarly training and development for students to explore questions even more deeply, as part of collaborative research approaches.

Academic renewal across the CST's postgraduate portfolio

During 2023, a key strategic priority was to further invest in the renewal of the CST's three postgraduate programmes. Academic renewal across the PGDip, MPhil and PhD programmes focused on a clarification of the driving vision and key audiences across each programme. We critically reflected on the curriculum with an eye on aligning the programme structures with relevant course content and relevant teaching-learning-assessment approaches in support of an enhanced learning experience, greater accessibility and holistic student success. The longer-term goal of implementing a differentiated hybrid-learning format was kept in view, supporting both the University's digitalisation and internationalisation agendas.

The programme renewal entailed a series of workshops and retreats with academic and administrative staff, module convenors and learning facilitators. We also drew on insights from students in the form of student feedback forms, end-of-year reflections and discussion forums, to deeply consider the student learning experience in the renewal proposals. Collaboration with partners within and across faculties and centres at Stellenbosch University, and input from research fellows and external collaborators, helped refine the positioning of our postgraduate offerings and their service to the broader university environment. The strategic renewal effort culminated in a formal submission within Stellenbosch University at the end of 2023, proposing revisions to the PGDip, MPhil, and PhD programmes. These revisions emphasised the CST's strategic focus on sustainability transitions and unique pedagogical approaches.

Starting in 2025, the renewed programme strategies will take effect, marking a new era for the CST's teaching and learning. This includes renaming the programmes from 'Sustainable Development' to 'Sustainability Transitions'. The renewed programmes aim to increase student numbers, diversify and internationalise the student cohort, and ensure sustainable financing for the Centre. This renewal will ensure that our graduates are positioned distinctively within the broader field of sustainability science as thought leaders responding to and driving change, in response to complex local and global sustainability challenges.

PhD in Sustainable Development

The CST's Doctorate of Philosophy (PhD) strives to be a transformative, transdisciplinary and highly networked programme in sustainable development, rooted in African leadership, innovation and excellence that trains global knowledge leaders in navigating grand global challenges towards a sustainable and just future.

Whilst our focus in 2023 was on the programme renewal required to achieve this, we have 17 enrolled PhD candidates who are knowledge leaders and changemakers in a diverse range of trans- and interdisciplinary projects, often leading big national and international workshops and engagements, and working at the cutting edge of their disciplines.

Many of our PhDs grappled with South Africa's energy crisis and the Just Energy Transition, at multiple levels. Alboricah Rathupetsane has been investigating the green industrial policy and the role of the energy grid, Mlondi Ndovela has been collaborating with a large international consortium to develop a model of macro-economic implications of a green energy transition, whilst Erica Johnson and Nomfundiso Jezi had Eskom in their cross-hairs, investigating political institutional dynamics and transition finance, respectively. At a landscape and local level, Kevin Foster grappled with the energy transition in local municipalities, and Thandeka Tshabalala looked into the institutional work required by local government for poverty alleviation in the green energy transition.

Unsurprisingly, resilience and transformation were another big theme our PhDs tackled this year. Caroline Wallington and Martina Tshangela both investigated regime shifts. Caroline used a spatial approach to map ecological regime shifts globally while Martina focused on national socio-political regime shifts and transitions revealed through green policies. Bekezela Dube's research focuses on resilience in conservation systems in the Kavango-Zambezi Transfrontier Area, while Garth Malan looked at the role of the circular economy in building resilience in the Cape Town metropolitan region. Kate Pringle's research highlighted pathways to transformative water futures, whilst Willem Malherbe sought to understand how to operationalise resilience in food systems, particularly through a telecoupled and transformation lens. Keziah Mayer looked to the future, analysing future seeds of stewardship initiatives, linked to the Seeds of the Good Anthropocenes initiative. Amanda Manyani investigated the development and institutionalisation of social-ecological research. Her investigations are poised to prove a critical foundation in an evolving field that is on the move, with many of our students set to be its future leaders.

Many of our students grappled with governance, whether by exploring the water-energy-food nexus in the Atlantis Special Economic Zone (Nontsikelelo Mngqibisa-Gabriel), collaborative urban governance (Amanda Gcanga), focusing on water acquisition in the Okavango basin (Nametso Phonchi-Tshekiso) or by investigating equitable governance and politics in the Cubango-Okavango basin (Victoria Shifidi).

Governance and futures studies are elements of the PhD programme. In 2023, we grappled with designing our programme renewal document, our students tackling the realities of being African PhD candidates and changemakers in society, the shift from independent PhD researchers to building a PhD cohort of excellence, and navigating tricky funding landscapes and pursuing not only exciting but also demanding opportunities.

Image credit: Kelvin Trautman | KANDS Collective.

Dr Blessing Kavhu

2023 PhD graduate

Reflecting on my journey through the CST PhD programme, I am overwhelmed with immense gratitude and honour. Entering the programme with just a bachelor's degree, I embarked on a transformative path that culminated in earning my PhD in a space of four years – a milestone that once seemed as distant as Pluto.

The mentorship I received was pivotal to my growth. My advisors not only provided academic guidance but also encouraged me to think critically and innovatively. Their unwavering support and dedication inspired me to push boundaries and explore interdisciplinary approaches.

The diversity within the CST community was another key element that propelled my development. Collaborating with peers from various countries and diverse cultural, social, and academic backgrounds broadened my perspective and enriched my research. The supportive staff and inclusive environment fostered a sense of belonging and motivation, crucial during the challenging phases of my PhD journey. One particularly memorable moment was the overwhelming support shown by the massive attendance at my PhD defence – an audience that made me feel like a rock star at a scientific concert!

Another significant chapter was the opportunity to attend an exchange programme at the Stockholm Resilience Centre in Sweden. Connecting with international researchers blossomed into collaborative projects. I am honoured to have co-authored papers with these esteemed colleagues, a testament to the collaborative spirit nurtured at the CST. It is amazing how a coffee chat in Sweden could turn into a research paper.

The CST programme's support paved the way for my Professional advancements post-graduation. Notably, I secured a research position at the renowned Senckenberg Research Institute in Germany, where I delved deeper into my research interests and contributed to global projects. Currently, I am continuing my research career at the University of California in Santa Cruz, USA, drawing from the remarkable transformations I experienced during the CST PhD programme. This journey turned my aspirations into reality, thanks to the mentorship, inspiration, supportive staff, and diverse community that provided not only academic rigor but also the encouragement and resources necessary to thrive.

Looking back, I am deeply grateful for the experiences and opportunities that shaped my personal and professional life. As I continue this journey, I remain inspired by the lessons and relationships forged during my time at the CST. Though it was a wild ride while grappling with the COVID-19 pandemic, the support and encouragement from the CST community made it worthwhile.

MPhil in Sustainable Development

There is a global need for researchers who are skilled in inter- and transdisciplinary, challenge-led methods that respond to knowledge gaps around research and practice related to the sustainability of human-nature interactions. The Master of Philosophy (MPhil) in Sustainable Development integrates theoretical knowledge with practical research skills to foster collaboration across disciplines while engaging diverse perspectives to address complex sustainability challenges.

The MPhil is a multidisciplinary programme designed to develop theoretical and practical skills to prepare students with problem-solving abilities to address pressing social, environmental, and governance challenges. The programme is tailored for students from various academic backgrounds who share an interest in environmental, societal, and sustainability transitions. Challenges related to these areas are multifaceted, and applicants with diverse expertise in natural and social sciences are strongly encouraged to apply. By linking teaching, research, scholarship and advocacy, the programme promotes inter- and transdisciplinary inquiry into the complex relationships between humans and the environment. This programme aims to equip students with the knowledge and skills required to contribute to transformative opportunities in a world facing diverse and rapid changes.

In 2023, 14 CST MPhil students graduated, pursuing a diverse range of research themes, and reflecting the Centre's commitment to sustainability transitions. One study explored **relational governance for sustainability transitions** by investigating the interconnected relationships crucial for lasting change. Another study asked **why South Africa does not grow organic cotton** and examined the challenges in sustainable agriculture, contributing to global discussions on eco-friendly textiles. The topic on **tropical forest fragmentation** provided a global review enriched by African insights, emphasising the importance of local perspectives in environmental conservation. The **Made in Africa Evaluation (MAE) approach** focused on developing new methods for implementing Africa-relevant monitoring and evaluation practices, bridging theory and application in culturally sensitive ways.

Research on integrating climate change into industrial practices was exemplified by the study on **mine closure and rehabilitation strategies**, which aimed to align these practices with just and sustainable environmental goals. The thesis about **trophy hunting as payments for ecosystem services**, explored norms in wildlife conservation, offering innovative insights into alternative economic models.

The diversity of research themes pursued by our students in 2023 demonstrates the success of our postgraduate programme in fostering a comprehensive understanding of sustainability transitions. This range of topics highlights our MPhil programme's ability to equip students with the skills and knowledge necessary to address complex sustainability challenges across various sectors, reinforcing the programme's relevance and impact in local and global contexts.

Amy Murgatroyd

2023 MPhil in Sustainable Development graduate

I graduated from the CST's Sustainable Development MPhil programme (cum laude) in December 2023. There is a special kind of resonance that you have when you meet someone who has been through this training. The individuals that mentored us through those years (shout out to Jess, Vanessa, Mark, Megan, and my incredible MPhil supervisor, Cecile) held us with such warmth and gentleness, encouraging us to be critical of ideas and worldviews but still hold kindness and curiosity towards others and ourselves.

My journey through the PGDip and MPhil programmes ignited my passion for food systems, complexity and systems thinking, and urban systems. I am now working at ICLEI Africa, in the urban systems team. My work focuses on leveraging public food markets for food system transformation, as well as implementing circular economy initiatives related to agriculture and waste management. The fact that I studied through the CST was one of the first things that the hiring team at ICLEI picked up on – I genuinely believe that being a CST graduate sets you apart from others. Now I have my dream job! Who knows, I may be back for a PhD down the line... Thank you to all who make this community what it is!

PGDip in Sustainable Development

The Postgraduate Diploma (PGDip) in Sustainable Development is an honours-level qualification and comprises of eight taught modules that can be completed over one or two years. Many students encounter sustainability concerns in their communities or at their places of work which prompt them to apply to the programme in the hope of making a greater impact and advancing professionally. In 2023, the PGDip welcomed a diverse cohort of 25 new students who joined the programme to strengthen their engagement with current sustainability thinking, research and practice, taking the total number of students registered for the programme in 2023 to 73.

The curriculum in 2023, comprising one compulsory and nine elective modules, promoted inner growth and transformation in addition to delving deeply and broadly into social-ecological change. The PGDip's teaching, learning and assessment approach aspires to nurture students' resourcefulness, self-awareness and creativity, and cultivate an enlivened sense of how positionality, power, justice and equity inform how, where and with whom they act. The 2023 cohort grappled with these broad sustainability concerns, moving from a foundational knowledge of sustainable development and systems worldviews, through a range of sectoral explorations of energy, urban, food and biodiversity transitions. This was complemented by inquiries into the intersection between sustainability and globalisation, governance, political economy and leadership. In addition to the formal electives, students also had the option of participating in an experimental elective that explored indigenous knowledge systems and sustainability.

The CST continued to collaborate with the Sustainability Institute that served as a lively context for teaching and learning for some of the modules. In-person learning was enriched by students' exposure to the Sustainability Institute's experiments in sustainability, as well as a number of immersive fieldtrips across the modules.

For the first time, the PGDip hosted three modules in different learning environments to deepen the learning experience and connect students to a wider range of initiatives grappling with how to effect change, as well as to experiment with using more affordable teaching venues. The Biodiversity and Ecosystem Services module was hosted at a community centre in the Zandvlei Nature Reserve in Muizenberg. This offered a rich context for exploring human-nature connectedness. Students in the Sustainable Economic Policy Options module gathered for a week at RLabs in Athlone to get to grips with entrepreneurship and local economic development that might support sustainability endeavours. The Governance, Globalisation and Development module took place at a venue on Stellenbosch University's main campus and allowed a more acute engagement with the role of institutions in change processes. These new venues worked well and added a wider experience for the students, and the move to alternative venues will continue in 2024.

A lively student community flourished in the PGDip, marked by a sense of solidarity, reciprocity and creativity. This continued to shine through in the spirit of engaged classroom encounters, insightful and deeply personal academic application, and lively social gatherings with staff and students.

At the end of the year, 34 students successfully graduated with a PGDip in Sustainable Development.

PGDip in Sustainable Development

Gcinile Mahlangu

2023 PGDip in Sustainable Development graduate

Prior to graduating with my PGDip in Sustainable Development, I graduated with the following qualifications: Pr Eng, BSc Electrical Engineering from the University of Witwatersrand, and BEngHons in Electrical Engineering from the University of Pretoria. I have vast experience working in the petrochemicals and mining industries as an engineer. My current role requires leading decarbonisation strategies in the mining and energy sector.

Prior to enrolling for PGDip in 2021, my professional experience was geared towards the technical track given my background. In the PGDip programme, I appreciated the in-depth engagements on the history and future of energy transitions, how it interfaces with geopolitics, economics and financing. This programme transformed me into a holistic professional with a deep appreciation for the complexities that exist around technology, nature, society, policy, geopolitics and governance in general. The coursework assignments provided a lot of flexibility for me to explore and challenge myself on a wide range of topics.

When covering the Biodiversity and Ecosystem Services module, I had more appreciation for the fact that we are connected to everything that ever existed. This is the kind of transformative thinking that the programme covers, for one to not miss the forest for the trees.

I would urge anyone that is interested in learning about critical thinking in sustainability to enrol in the programme. It has made me realise the importance of my role in transforming the South African energy sector to ensure that there is a pathway for a sustainable energy transition. The programme was very well organised, open, honest, and tough discussions were held during the in-person contact week. I still miss that. I would also like to give recognition to the CST for putting together an engaging and challenging transdisciplinary programme. I built solid relationships and friendships during this programme and I will always treasure them.

Lukhanyo Qamarhana

2023 PGDip in Sustainable Development graduate

I deem it a great privilege that I participated in the Postgraduate Diploma in Sustainable Development at the Centre for Sustainability Transitions, at Stellenbosch University. The delivery approach was outstanding, as were the skills attained from this transdisciplinary programme. The mode of delivery was conducive for practical learning and it cultivated a desire to explore various worldviews in life. The use of various teaching methods apart from classroom experience, the material used, and the positive and willing attitude of the lecturers was commendable. My experience was truly amazing.

To graduate with a PGDip (an honours-level qualification) was an exciting moment. This is the level and quality of qualification that is desired in my chosen career and my personal development plans. This has prepared me to participate in high-level discussions and planning which is a requirement for my professional work. The course equipped me with skills in which the current global socio-ecological challenges can be viewed, moving away from traditional ways of viewing the world.

This programme provided me with insights on different academic disciplines and offered me opportunities to connect with professionals from these disciplines, which are needed to advance my role in economic development. As a result, I now approach economic development challenges through a complex systems lens. I use this holistic approach in both my professional and personal spaces when resolving problems. The PGDip qualification capacitated me to be innovative, a strategic thinker, more collaborative, and prepared me to solve complex societal problems in a diplomatic way

Fellow takes CST partnership into the classroom

Prof. Andrew Boraine was appointed as CST Research Fellow in 2022. He is a valuable practitioner in our network providing advice and support to projects around institutional governance, partnering and systems change.

When COVID-19 forced all teaching and learning online in 2020, Andrew was a natural partner the CST could call on at short notice. Without fuss and still holding his day job as CEO of the Western Cape Economic Development Partnership (EDP), Andrew crafted an online offering on changemaking and governance illustrated by a few deft case studies and with reference to his personal journey through the process of change in South Africa.

"As a practitioner involved with convening partnerships to drive systems change, I've always believed in building strong relationships with research and educational institutions. Changemaking is more effective when it is supported by evidence, and where there are healthy and mutually supportive relationships between science and society. I was very excited when the opportunity arrived to work with the great team of people at the CST."

Andrew was a hit with our students, a natural in front of the online classroom and a new ally to the PGDip. The CST drew on Andrew's experience in the field for the redesign of our Globalisation, Governance and Development module in 2022/23. Module convenor, Nina Callaghan, was excited to bring four decades of practical experience into the classroom, alongside emergent theories. "Andrew knows how to read the room and where to pitch the content, but the magic isn't only in this deep relating. He has done the work and worn multiple hats as a governance actor and changemaker, so it's this knowledge that students really responded well to. Applied knowledge and practical toolkits are something young changemakers are hungry for," Nina reflected.

In 2023 Andrew co-convened the five-day governance module with Nina. This meant designing, resourcing, teaching and marking for a class of nearly 50 students.

"Having the opportunity to think about ways in which theoretical frameworks and practical case studies can be combined into something that students can really get their teeth into and use was an exciting challenge. I also appreciated the chance to catch up on my own reading, and to evaluate my own practice through new lenses. And of course, engaging with students is always helpful in shaping new ideas," said Andrew.

It has been an enriching and meaningful collaboration that has left a lasting mark on the programme, testament to the incredible talent and influence of the calibre of people supporting the CST as research fellows and associates. It appears Andre enjoys it too, returning as a module co-convenor in 2024.

Short Courses

MOOC: Anticipatory governance: new ways of sense-making and navigating uncertainty

CST project team: Tanja Hichert, Prof. Rika Preiser, Dr Joy Waddell, Prof. Reinette (Oonsie) Biggs

The CST, in partnership with the United States Agency for International Development (USAID) Resilient Waters programme in Southern Africa, relaunched their free online short course, **Anticipatory governance: new ways of sense-making and navigating uncertainty**. The self-paced course was available for free on the UNESCO Open Learning platform until 31 January 2024.

Drawing on the expertise of several CST researchers and research fellows – Tanja Hichert, Prof. Rika Preiser, Prof. Reinette (Oonsie) Biggs and Dr Joy Waddell – in the fields of foresight and futures literacy, social-ecological resilience, and complex adaptive systems, the self-paced course highlighted approaches and tools to foster governance capacities that explore, envision, and plan for change and uncertainty. The short course introduced the concept of anticipatory governance as an approach for dealing with complexity and future uncertainty by governing in the present in a way that is adaptive to or can shape uncertain futures.

Over 300 participants enrolled in the course while 50 participants received certificates at the end of the enrolment deadline. This is on the back of 1 000 registered participants from 38 countries when the course first launched in 2021.

The course was aimed at practitioners, researchers and managers, to help them identify key participatory foresight and futuring tools that can improve decision-making and the governance of complex systems. Case studies from southern Africa showcased ways in which these tools have and can be applied to co-design desirable visions of the future, and to identify the diverse pathways for navigating towards socially just and sustainable futures.

SES Methods hackathon

CST project team: Dr Julia van Velden, Prof. Alta De Vos, Prof. Reinette (Oonsie) Biggs and Prof. Rika Preiser

The SES Research Methods website is an open source, community-contributed effort to improve the use and understanding of research methods for social-ecological systems. This website, developed under CST leadership in 2022 and 2023, aims to provide accessible content on commonly used SES methods, generated by experts in the field.

To expand the resources available on this site, and facilitate an expanded community of practice, we hosted an online 'hackathon' event, which ran over three sessions in October and November 2023. The event was modelled after the successful 'hackathon' held in-person at the Stockholm Resilience Centre the previous year but was modified to run asynchronously to allow for flexible participation by students, senior academics and practitioners. The event was attended by 28 participants, with the aim of developing new content for the website, either individually or in small groups, which drew on the research methods experiences of the participants.

The hackathon allowed for discussion on various issues including reflexive and transdisciplinary practice and facilitated network building across institutions and thematic areas. This resulted in exciting contributions to the website, and the connections forged have resulted in a series of webinars on researcher reflexivity.

The SES Research Methods website and hackathon series are a collaborative effort from the PECS working groups on methods.


Image credit: Kelvin Trautman | KANDS Collective.

Research and policy engagement highlights

At the heart of the CST lies a steadfast commitment to shaping sustainable and equitable futures. The Centre's mission is rooted in a comprehensive exploration of the intricate dynamics underpinning sustainability transitions and transformations. Through an integrated approach spanning education, research, and collaboration across the science-policy-practice nexus, we strive to catalyse meaningful change towards more just and sustainable futures.

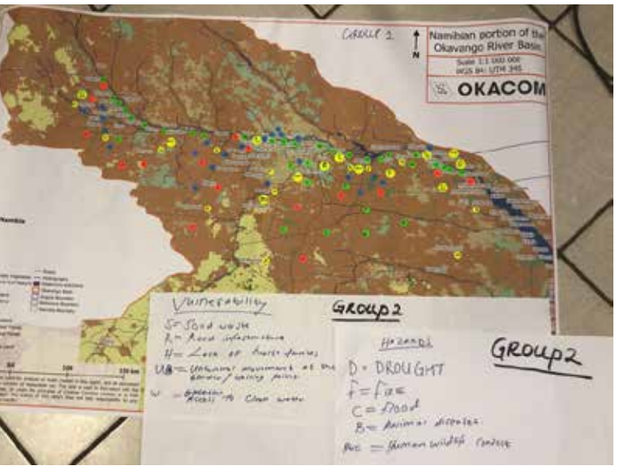
The CST delves into a diverse array of research themes, each shedding light on critical facets of sustainability. Through exploration of these themes, the Centre endeavours to address sustainability challenges across a spectrum of domains, including water, food, climate, urbanism, conservation, coastal and marine ecosystems. Efforts span geographical scales, from local communities to the global stage, as we work towards effecting change at every level.

In the following sections we highlight key projects under each theme – acknowledging that most projects fit under multiple themes.

KNOWLEDGE CO-PRODUCTION

Resilient Waters programme

CST project team: Dr Nadia Sitas, Prof. Reinette (Oonsie) Biggs, Dr Joy Waddell, Prof. Rika Preiser, Dr Hayley Clements, Dr Maike Hamann, Dr Linda Luvuno, Dr Odirilwe Selomane, Dr Kristi Maciejewski, Prof Scott Drimie, Blessing Kahvu, Bekezela Dube, Victoria Shifidi, Nametso Phonchi, Luke Symonds-Mayes, Fiona Ngadze, Irene Mhlanga, Johanna Ithindi, Reinhold Mangundu, Jeremiah Masaya, Romanus Kasino



The Resilient Waters programme, supported by USAID, ran for five years from 2018 to 2023 with the objective of building 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. To achieve this objective, the programme collaborated with regional institutions, including river basin organisations and transfrontier conservation agencies, national governments and communities to build more resilient institutions, develop more robust information systems, and promote practices that enhance sustainable natural resource management.

The CST was one of the consortium members of the programme and supported the work as a key knowledge partner. The project was one of the biggest projects to date at the CST. Dr Nadia Sitas was the CST lead working closely with Prof. Reinette (Oonsie) Biggs as the principal investigator for the CST. The project involved and funded many CST staff over time. It also supported a large number of postgraduate students, including four PhD and seven master's students over the course of the project.

The work focused on three main aspects:

1. **Knowledge co-production for social-ecological resilience.** Work led by the CST included the co-development of several multi-stakeholder resilience action dialogues and a webinar series to discuss resilience-related work in the region. The CST facilitated several intersectionality and gender, equity and social inclusion workshops for researchers and practitioners in southern Africa. The CST also contributed to the implementation of participatory mapping to determine risk and vulnerability hotspots in Angola, Namibia and Botswana, and co-led a workshop on integrating land and water challenges for transboundary governance in the Limpopo, Okavango, Orange-Senqu and BuPuSa river basins. The project also provided support for ensuring participation of African experts at an SES methods 'hackathon' in Sweden in 2022 linked to the SES Methods website and project.
2. **Strengthening capacities.** This primarily focused on the supervision and training of 11 southern African postgraduate students (four PhD and seven Masters). It also included the development of two online training courses hosted on the UNESCO Open Learning platform: **Mainstreaming GESI for transboundary water resource management** and **Anticipatory governance**. Further capacity strengthening was provided by the facilitation of ARIES for SEEA and Wayfinder training for researchers, practitioners and decision-makers in South Africa. Additional support was provided through two proposals that were funded to continue work and ensure sustainability of the project outcomes, namely the Southern African Resilience Academy and Ukama Ustawi.
3. **Co-creating accessible knowledge portals and learning materials.** Two online portals were developed to facilitate access to resilience-related materials. The Southern African Resilience Hub provides links to webinars, tools, stories and other resources exploring resilience practice in southern Africa. The SES Methods website provides a repository of training resources on SES methods including overviews, case studies and exercises and is based on the *Routledge Handbook of Research Methods for Social-Ecological Systems* (Biggs et al, 2022). The project also covered the open access costs of the handbook to enhance accessibility of the knowledge products co-created through the programme. The website aims to facilitate knowledge exchange and co-learning beyond the project lifespan.

The Southern African Resilience Academy

CST project team: Dr Maike Hamann, Prof. Reinette (Oonsie) Biggs, Prof. Alta de Vos, Dr Nadia Sitas, Dr Odirilwe Selomane, Dr Hayley Clements, Dr Julia van Velden, Dr Nyasha Magadzire, Prof. Laura Pereira

The Southern African Resilience Academy (SARA) was a project coordinated by the CST and led by Dr Maike Hamann and Prof. Reinette (Oonsie) Biggs. SARA formed part of the "South-to-South Resilience Academies", an initiative of the Global Resilience Partnership. Within the areas of sustainable development, resilience and global change, the majority of knowledge production is driven by the Global North. This is especially challenging when considering the harshest impacts of climate change and other global social-ecological dynamics disproportionately affect people in the Global South. The overarching aim of the resilience academies is to address this imbalance, supporting and uplifting knowledge co-production and exchange across regions in the Global South, and facilitating knowledge transfer from the Global South to the Global North.

Within this context, SARA's role was to act as a convening and support space for researchers and practitioners working across southern Africa to engage with pressing resilience and development challenges in the region. The academy's goals were to strengthen existing expert networks, expand collaboration, and facilitate the co-production of policy and practice-relevant knowledge. From early 2022 until the end of 2023, SARA supported eight working groups comprised of a diversity of experts, including researchers and practitioners ranging from early-career to established professionals. These working groups synthesised regional knowledge under the theme of **Building equitable resilience in southern Africa**. Each working group focused on different topics and systems within this broad theme, ranging from informality to telecoupling and urban food systems, to conservation systems.

Over the span of two years the groups convened three times for in-person workshops in Stellenbosch, South Africa. Each group developed an academic paper for a special feature in the scientific journal, *Ecology & Society*. The groups were supported by a strategic science communication expert to develop knowledge products and/or engagement processes for non-academic audiences and decision-makers to expand the reach and impact of SARA outcomes. As a result, SARA produced a wide range of outputs, including policy briefs, education toolkits and guidelines for funders. The SARA working group initiative has facilitated the growth of an expansive expert network in the southern African region, representing almost 60 experts from 35 organisations. Through this initiative, SARA aimed to contribute meaningfully to regional and global policy discussions around resilience and development, elevating the southern African voice in international fora.

This iteration of SARA was funded by the Swedish International Development Cooperation Agency, with additional support from the South African Research Chair in Social-Ecological Systems and Resilience, held by Prof. Reinette (Oonsie) Biggs at the CST. The next iteration of SARA and its working group model is planned for 2025-2027.

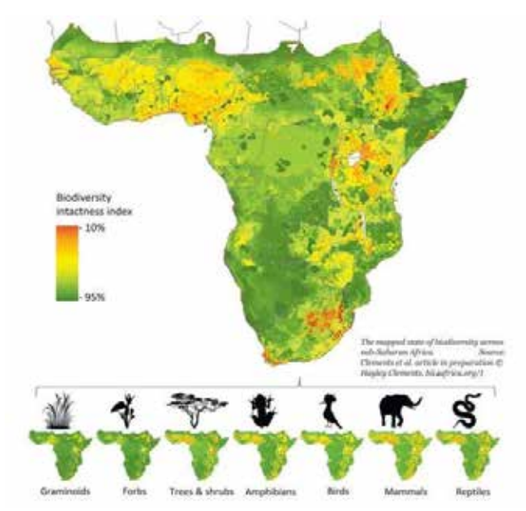
> "[SARA provided] inspiration to think differently, ask different questions, take different approaches, have different perspectives."
>
> - Dorcas Kabuya, SARA workshop participant

> "The non-academic process went beyond producing outputs; it actively engaged stakeholders and influenced policy, catalyzing meaningful change beyond academia's traditional boundaries."
>
> - Sabrina Trautman, SARA workshop participant


Image credit: Kelvin Trautman | KANDS Collective.

Biodiversity Intactness Index multi-partner collaboration

CST project team: Dr Hayley Clements, Prof. Reinette (Oonsie) Biggs, Prof. Alta de Vos, Dr Maike Hamann



Sub-Saharan Africa is critically underrepresented in global biodiversity datasets. Such data is urgently needed to mainstream biodiversity into national and international policy and planning, especially data that can give insight into how humans are impacting biodiversity in ways that reduce its ability to support the ecosystems on which our societies depend.

The groundbreaking BII4Africa project, funded by a Jennifer Oppenheimer grant and which ran from 2019 to 2023, addressed this data gap through a structured expert elicitation process involving experts in African fauna and flora. The Biodiversity Intactness Index (BII) is a simple and practical metric that estimates the proportion of biodiversity that is intact compared to a reference state such as an intact national park. The project, led by Dr Hayley Clements and involving Prof. Reinette (Oonsie) Biggs, Prof. Alta de Vos, Dr Maike Hamann and others at the CST, convened over 200 experts to estimate the impact of Africa's diverse human land use activities on the population abundances of indigenous species.

In 2023, an important milestone for this project was publishing this co-produced dataset in *Nature* journal's open-access data publication *Scientific Reports*. The publication made available all intactness scores representing the remaining proportion of intact populations of terrestrial vertebrates and vascular plants in sub-Saharan Africa across the region's major land uses, such as urban, cropland, rangeland, plantation and protected; and intensities, such as large-scale versus smallholder cropland.

One of the most important learnings of this project was that the dataset and academic analyses were only a part of the project's impact. Equally important was the network of African researchers and decision-makers that the project was able to connect to each other, and to researchers and decision-makers more broadly. The BII4Africa website, which contains profiles of these experts, has become an important platform for making this expertise visible. In 2023, we were also excited to publish a Google Earth story, exploring African landscapes of change through the eyes of these experts.

Whilst the BII4Africa project formally concluded in 2023, its impact has just started. The project and dataset have already caught the attention of many national and international agencies looking to incorporate an understanding of biodiversity change into their metrics, models and assessments; and a few spin-off projects and publications have already begun.

SOCIAL-ECOLOGICAL RESILIENCE

Equitable resilience project – supporting transformative adaptation and building equitable resilience to drought for sustainable development

CST project team: Dr Nadia Sitas, Prof. Reinette (Oonsie) Biggs, Dr Odirilwe Selomane, Kate Pringle, Willem Malherbe

This equitable resilience project was supported by the UK Research and Innovation Global Challenges Research Fund's Equitable Resilience Fund and ran from 2019-2023, and was a strategic research collaboration between the CST, University of Venda, Cranfield University, World Wide Fund for Nature, Cape Peninsula University of Technology, Institute for Development Studies, Institute for Natural Resources and the International Water Management Institute. The project was implemented in South Africa and Kenya through work in four case study sites – the Breede and Groot Letaba catchments, South Africa, and Lake Naivasha and upper Ewaso Ng'iro catchment, Kenya – which are linked to export horticultural value chains. The selected catchments include strategic water sources areas and also have significant populations of people that have been impacted by recent droughts, especially vulnerable communities, as well as important export horticulture industries. Dr Nadia Sitas, together with Prof. Reinette (Oonsie) Biggs, Kate Pringle, Willem Malherbe and Dr Odirilwe Selomane lead the work on the South African case studies, which sought to explore how the twin development objectives of increasing the development benefits of commercial horticulture and reducing the impacts of drought on poor and marginalised communities can be met in a socially and environmentally equitable manner.

Against the backdrop of climate and other drivers of change, the team co-developed a series of multi-actor futuring processes workshops to strengthen the capacities of farmers, decision-makers and community members to navigate change and identify key opportunities for building equitable resilience. The workshops used innovative, practical foresight tools to help stakeholders across multiple actor groups involved in farming and associated land, water and climate sectors in the Breede and Groot Letaba catchments to reimagine what healthy, thriving and equitable futures could look like at farm and catchment scales, and to identify what steps are needed to get there. Insights from the workshop have been used to strengthen the research on what resilient and equitable horticultural value chains could look like, including identifying strategic options that can become 'future-fit strategies' for farming in uncertain times. The project was enhanced through the South African Resilience Academy working group which explored the projects' research findings through a metacoupling lens which seeks to place in the spotlight the power dynamics for understanding equitable resilience in southern Africa accessible though several knowledge products.

Enabling agro-ecological wildlife economies that sustain people and planet

CST project team: Prof. Alta de Vos, Dr Hayley Clements

Funded by the French Development Agency (AFD), the **Enabling agro-ecological wildlife economies that sustain people and planet** project aims to conduct and mobilise research on the wildlife economy by collecting information on the broader contribution of wildlife ranching to restoration, biodiversity conservation and socioeconomic development, and developing fit-for-purpose knowledge products and decision-support tools to assist government decision-makers to integrate wildlife enterprises into spatial development frameworks and invest in appropriate land parcels, infrastructure and skills programmes. A specific focus of this project is opportunities for, and overcoming barriers faced by, new entrants to the wildlife economy through the land reform programme. The project is a collaboration between South African National Biodiversity Institute, the CST, and the national Department of Agriculture, Land Reform and Land Rural Development. Additionally, we have been working closely with the Department of Forestry, Fisheries and the Environment (DFFE) and SANParks. The project commenced in 2022 and runs until 2024.

The first part of this project (2022) involved a national-scale data collection effort under the auspices of the Sustainable Wildlife Economy Project (SWEP) where we trained recent graduates to survey ranchers on their land histories, the sustainable land management investments they undertake and degradation challenges they face, animal management strategies and trends, adaptation to change, socio-economic contributions and economic activities.

This was followed by our work in 2023 (as part of an MSc project and subsequent publication), which enabled us to identify different business models within the wildlife economy, each with different investment requirements and socio-economic and ecological implications. These business models allowed engagements with new entrants, DFFE and SANParks in particular, to mainstream scientific knowledge into practical knowledge products such as checklists that can be used by agencies to appropriately guide investment into the wildlife economy.

One of the most promising partnerships-for-impact is our collaboration with SANParks. Under the GEF7 (the seventh replenishment of resources of the Global Environment Facility Trust Fund) protected area expansion project, SANParks is engaging in the establishment of 'mega living landscapes' comprising many different land uses, which can be managed to support biodiversity, regardless of their economic purpose. As part of these landscape-scale initiatives, SANParks is seeking to invest in infrastructure and game donations to benefit new entrants and local communities. Our work is proving potentially useful to help guide these decisions, a possibility that we explored in late 2023 in a workshop near Addo National Park. This workshop set up a host of engagement and impact opportunities for 2024 as the project enters its last year.

Programme on Ecosystem Change and Society

CST project team: Prof. Alta De Vos, Prof. Oonsie Biggs, Dr Julia van Velden, Dr Nyasha Magadzire, Prof. Rika Preiser, Dr Odirilwe Selomane, Dr Nadia Sitas, Dr Hayley Clements

The Programme on Ecosystem Change and Society (PECS) is one of Future Earth's global research networks and the only one with an international project office based in the Global South, at the CST since 2019. PECS was established in 2012 after recognising that a growing global polycrisis demanded new ways of understanding and acting in the world, and new science to match. PECS has been instrumental in shaping such science: a long-running network that aims to integrate research on the stewardship of social-ecological systems, the services they generate, and the relationships among natural capital, human wellbeing, livelihoods, inequality and poverty.

In 2023, we appointed Prof. Alta de Vos, who joined the CST from Rhodes University, as the new director of the PECS international project office. Armed with a new cohort of working groups that launched in 2022, we set out to usher in a new era for PECS in 2023, leading the next chapter in the evolution of SES research, focused on building a sustainable long-term home for researchers in our field.

We hosted an international working group meeting in Stellenbosch, South Africa. This was our first in-person meeting since 2019 – it created an important opportunity to reconnect and progress on activities. The meeting facilitated an important step forward on two focal activities set to dominate 2024 and 2025: our first conference since 2017 and the establishment of a new international social-ecological systems society.

Aside from these exciting strides forward, PECS was abuzz with other activities. Our long-running collaborative governance working group continued their popular webinar series, and the methods working group ran an online hackathon to crowdsource materials on methods for the SES Methods website. We initiated a cross-working group connection online series on cross-cutting topics and published several publications in leading journals. Our regional nodes were also busy; the Latin American Network of PECS (LAPECS) ran a workshop on **The Transformative Potential of Transdisciplinary Research in Social-Ecological Systems from a Latin American Perspective** in Uruguay, whilst the South African PECS co-hosted another successful Garden Route Interface Network Meeting.

Beijer Institute of Ecological Economics – Prof Reinette (Oonsie) Biggs' board membership comes to an end

Prof. Reinette (Oonsie) Biggs' term as board member for the Beijer Institute of Ecological Economics, an international research institute for global sustainability under the auspices of the Royal Swedish Academy of Sciences in Sweden, came to an end in 2023. The Beijer Institute strives to create research frontiers at the interface of ecology, economics and related disciplines, to promote a deeper understanding of the interplay between ecological systems and social and economic development in relation to sustainability. The institute's major activities are international research programmes, synthesis workshops, a broad set of research projects, teaching and training programmes, dissemination of results, the science-policy interface, and collaborative communication.

The Institute's work is supported by a scientific advisory board appointed by the Royal Swedish Academy of Sciences. Members of the board are world leading scholars predominantly from the field of ecology and economics. A special feature of the Beijer board meetings is the associated Askö meetings, held on the island of Askö, which focus on a specific topic at the interface of ecology and economics. These meetings have led to many high-profile papers that have helped define new research frontiers. Prof. Biggs was appointed to the board in late 2017 and served for six years. She led the Askö meeting in her final year in 2023 and now joins the Beijer Institute as a fellow.

TRANSFORMATIVE FUTURES THINKING

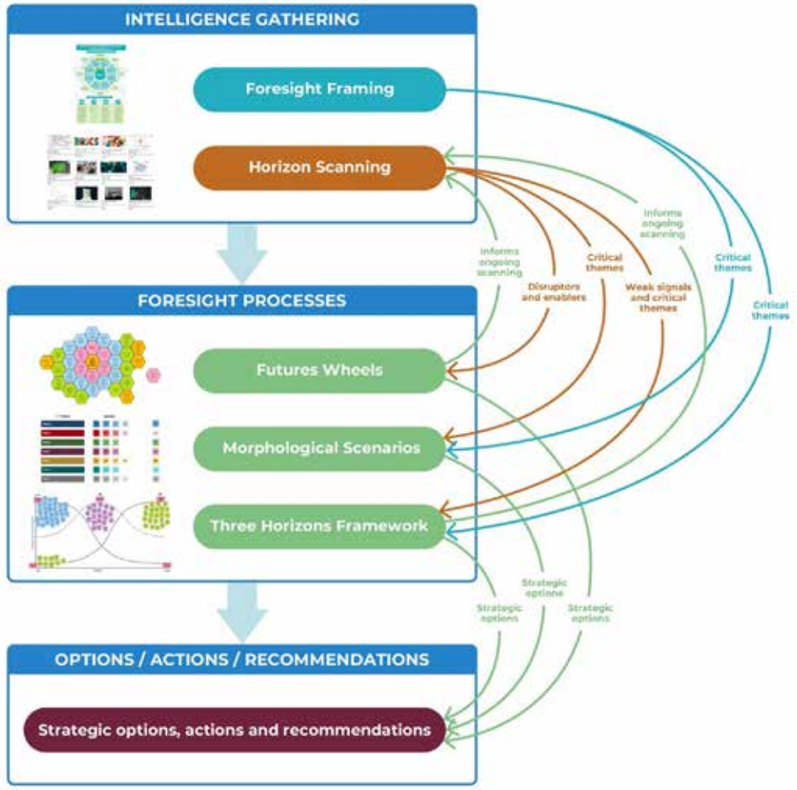
Seeds of Good Anthropocenes: fostering food systems transformations in Africa

CST project team: Prof. Reinette (Oonsie) Biggs, Dr Nyasha Magadzire, Prof. Laura Pereira, Dr Sandra Boatemaa

Seeds of Good Anthropocenes: fostering food systems transformations in Africa is a research project funded by the Canadian International Development Research Centre that started in January 2022 and is set to end in December 2024. The project is led by Prof. Reinette (Oonsie) Biggs and supported by Dr Nyasha Magadzire, in collaboration with CST fellows Prof. Laura Pereira from the Global Change Institute at Wits University and Dr Sandra Boatemaa from the Ensign Global College in Ghana, as well as partners at the Stockholm Resilience Centre in Sweden, and McGill University and Guelph University in Canada. The project falls under the Seeds of Good Anthropocenes initiative and aims to understand how local-scale food initiatives and innovations, i.e., seeds, can be supported to create just, resilient and sustainable food systems.

Using a place-based approach that focused on three coastal urban regions – Cape Town (South Africa), Accra (Ghana) and Mombasa (Kenya), the project identified food-related seed initiatives that had the potential to transform food systems in Africa. Through interviews and participatory workshops, we engaged with these seed initiatives to better understand how funders, investors and policy-makers can support the establishment, development, and up-scaling of seed initiatives in an African context. We aimed to understand the successes and barriers seed initiatives face in achieving their goals, while also identifying areas where seed initiatives could potentially collaborate or experience conflict.

To date, the project has identified 150 seed initiatives, and members have interviewed 90 seed actors across the three case studies. Two future scenarios workshops were conducted in Cape Town and Accra in 2023 and brought together experts, innovators and practitioners in the food systems space of each case study to discuss and envision alternative food futures. This has been integral to building collaborations and amplifying peer-to-peer learning amongst seed actors. The workshops served as an opportunity to experiment and advance the seeds-based foresight approach developed in the larger seeds initiative by placing emphasis on identifying concrete actions required for food systems transformations at the end of the visioning process. Outputs drawn from the interviews and workshops will be disseminated through a series of scientific papers, workshop reports, booklets featuring examples of seed initiatives identified in the project, and videos of key project insights.



Disruptors and Enablers of Research for Development (R4D): exploring futures

CST project team: Tanja Hichert, Prof. Rika Preiser

The Disruptors and Enablers of Research for Development (R4D): exploring futures project was initiated in October 2022 (continuing until June 2024) by the UNESCO Chair in Complex Systems and Transformative African Futures based at the CST. The project is supported by an International Development Research Centre (IDRC) grant, is global in scope, and aims to use strategic foresight to assist R4D actors and stakeholders to be better prepared for the longer-term future.

R4D entails systematic activity that development agencies, philanthropies, bilateral donors, specialised agencies and others engaged in to enhance knowledge-based development. It has been done for different underlying reasons with different goals. These include:

- Influencing policy- and decision-makers who drive change in pursuit of development goals
- Generating knowledge and evidence about foreign aid
- Inventing new technologies to serve marginalised people
- Strengthening research capabilities in low- and middle-income countries

In addition, R4D is seen as a way of learning from and enhancing development practice on the ground as R4D actors include academia, business, government, civil society, community-based organisations and philanthropists alongside bilateral, multilateral and south-south international research and development agencies, research institutes and think tanks. R4D is in flux and there are various fundamental ongoing dialogues about its issues and challenges and need for transformation.

R4D takes place in a volatile, uncertain, complex, and ambiguous (VUCA) context, which means strategies, policies and innovations need contextually relevant approaches to inform decision-making. Strategic foresight is one such approach, which is why this project is focused on developing and providing a systematic way of using ideas about the future of R4D and its operating environment to better anticipate, shape and prepare for change.

This capability of exploring and 'using' the future will enable R4D actors to identify strategic options to better prepare for future risks, to leverage opportunities and take actions and decisions that will ultimately contribute to a transformative R4D system that is resilient and responsive in a VUCA world.

The project is a collaboration between researchers from, amongst others, Stellenbosch University, and the University of Sussex Business School's Science Policy Research Unit and Yale School of Medicine's Center for Teaching, Learning and Innovation, and uses a foresight framework for a structured and systemised application of foresight to the complex topic of R4D.

Project outputs to date include online and in-person strategic foresight workshop reports, and a collection of strategic options – things that can be done (either immediately, or over the longer term) to move towards a preferred future for R4D and to mitigate against less-preferred futures.

FINANCE AND RESOURCE FLOWS

Achieving South Africa's infrastructure goals

CST project team: Prof. Mark Swilling, Alboricah Bathupetsane, Mlondi Ndovela, Juliet Leuna-Obioha

A CST project team manage a national-level partnership between four influential public policy-making institutions: the National Planning Commission (NPC), Presidential Climate Commission (PCC), Development Bank of Southern Africa (DBSA) and the National Treasury (NT) via its Southern Africa – Towards Inclusive Economic Development (SA-TIED) programme. These institutions collaborate in various ways with five related research initiatives.

Several questions drive this collaboration. Firstly, how much funding is required to achieve South Africa's infrastructure goals as articulated in the National Development Plan, with respect to water, energy and digital infrastructure? The NPC, PCC, DBSA and NT/SA-TIED are collaborating to answer this question. In addition, there is a food system study driven by NT/SA-TIED with Dr Odirilwe Selomane, a CST fellow now based at the University of Pretoria, as the primary researcher.

The second question asks what are the future climate change impacts on food, water and energy resources? The NT/SA-TIED has worked with Wits University's Global Change Institute to develop a model that will answer this question. A research paper was written and clear findings show that the impacts are extremely negative. Thirdly, if we know how much is needed for these climate change impacts, what are the macro-economic impacts of infrastructure investments on this scale with respect to energy? This question is addressed through a collaboration between NPC, DBSA, NT/SA-TIED, and the French Development Bank, via the building of a non-equilibrium climate-economy model.

Finally, if we assume that conservative fiscal and monetary policies will remain in place, where will the funding come from? To answer the last question, a 'monetary architecture' approach is used to identify a range of 'elasticity spaces' where balance sheet reconfiguration can unlock new flows of finance for investing in infrastructure. These projects started in 2022, and so far it has led to two journal articles being submitted for publication. A total of ten journal articles are envisaged.

The research is funded through SA-TIED, DBSA and GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), and when completed will have a major impact. These would be the first comprehensive investment requirement studies that would have assessed climate change impacts on water, energy and food in an integrated and comprehensive way. The non-equilibrium model once built will change the way economic policymaking is done, and for the first time a climate change damage factor and finance will be considered in a macro-economic model.

Prof. Swilling's role as a commissioner on the NPC made it possible for him to have the convening power that is required to hold this partnership together. A new grant provided by the British Council and NRF to facilitate the stakeholder collaborations arising from the above research has been made available for 2024/25 and will fund a collaboration with the Department of Science and Innovation (DSI)/NRF Trilateral Research Chair in Transformative Innovation, the 4th Industrial Revolution and Sustainable Development, based at the University of Johannesburg.

BRICS workshop

CST project team: Prof. Rika Preiser, Tanja Hichert

The Co-chairs of the UNESCO Chair in Complex Systems and Transformative African Futures, Prof. Rika Preiser and Tanja Hichert, facilitated a workshop at the BRICS (Brazil, Russia, India, China, South Africa) Science, Technology and Innovation Policy Symposium. The symposium took place at the CSIR International Convention Centre (ICC) in Pretoria, South Africa, and included a workshop that served as a practical application of the symposium theme, **Emerging approaches, tools and methodologies for Science, Technology and Innovation (STI) foresight exercises**.

Prof. Preiser and Ms Hichert ran a mass Three Horizons Framework exercise for 80 BRICS STI experts who generated preferred futures and strategic options for STI-related topics such as circular economy, artificial intelligence, skills for the fourth industrial revolution economy, sustainable energy and nutrition security. The symposium and workshop were hosted by South Africa's Department of Science and Technology's National Advisory Council on Innovation (NACI) who reported afterwards that this session 'significantly contributed to the overall success of the event'.

The water, energy, food nexus

CST project team: Prof. Mark Swilling, Garth Malan, Nontsikelelo Mngqibisa-Gabriel, Lourens Swart

Resource pressures compounded by climate change require us to reimagine resource management in urban contexts. The water, energy and food (WEF) nexus is a framework that pursues integrated, as opposed to sectoral, forms of resource governance. Integration that considers the inter-sectoral connections among these urban systems and services remains largely absent in practice, yet is critical to the future wellbeing and resilience of cities. A detailed understanding of the resource dynamics enables cities to operationalise integration as well as to prepare for and mitigate future crises.

Nexusing water, energy and food to increase resilience in the Cape Town metropolitan area is a research project that brings together an international and multi-disciplinary team of researchers and practice partners. The research team from Utrecht University, Stellenbosch University, and the University of the Western Cape is supported by the Dutch Water Authorities, Vitens, ICLEI Africa, and the Western Cape Economic Development Partnership, with oversight by an independent international advisory board. It is funded by the South African NRF together with the Dutch Research Council (NWO), under the Cooperation South Africa-Netherlands Programme, to support studies on solutions that balance trade-offs and amplify synergies between the water, energy and food sectors, while simultaneously preserving the environment. The project runs from January 2020 to December 2024.

In response to the City of Cape Town's resilience strategy, we explore the legal, institutional and governance complexities across the resource domains, while critically analysing how they materialise in the diverse socio-economic case study sites. The project developed multi-scale procedural guidelines, evidence-based decision-support tools and policy briefs to inform nexusing practices for governance across siloed domains. The project focus is Cape Town, and through transdisciplinary knowledge co-production research with City of Cape Town officials, we aim to ensure that robust solutions are co-developed with societal actors, allowing for relevant and practical outputs framed within the context reality.

Image credit: Kelvin Tradtman | KANDS Collective.

Global perspectives on just transitions: reflections on the ReSET project and the IST 2023 conference

CST project team: Prof. Mark Swilling, Dr Megan Davies, Kevin Foster, Thandeka Tshabalala, Tasneem Jhetam, Wendy McCallum

The Reconfiguring Energy for Social Equity (ReSET) project is an international collaboration between partners in Germany, India, the Netherlands and South Africa. The project was launched in 2021 and runs until 2025. It is funded by the Volkswagen Foundation. ReSET brings together teams from the Urban Futures Studio (UFS) at Utrecht University, the CST, the Indian Institute for Human Settlements, and the Institute of Environmental Social Sciences and Geography at the University of Freiburg. The project aims to develop a better understanding among academics and practitioners about how energy transitions and social justice can be aligned in practice across different contexts, drawing on case studies from each of the countries.

In the context of massive investments in energy transitions, the scaling up of renewable energy infrastructures, and a rapidly transforming energy landscape at the global scale, it is a critical priority to explore different forms of social justice, including the distributive, procedural and recognitional aspects. ReSET focuses on the role of agency, using the concept of 'institutional work' to investigate dynamics at 'critical moments' across place-based case studies. This comes together in the core analytical framework in ReSET, the Triple Re Framework, which captures the dynamic interaction between three domains of institutional work, namely, reimagining, recoding and reconfiguring.

The project focuses on several case studies that bring into focus the dynamics of the specific context and draws lessons from how actors across different scales connect justice concerns and energy infrastructures. For the team at CST, the case studies span the governance of place-based investments linked to renewable energy infrastructures in the Northern Cape, South Africa, the efforts to expand and institutionalise energy poverty alleviation in Cape Town, South Africa, and the developmental implications of the energy transition on municipal financial sustainability. The research on energy poverty alleviation and municipal financial sustainability is led by Thandeka Tshabalala and Kevin Foster, two PhD students in the ReSET project.

In 2023, the third year of the project, ReSET was defined by the completion of the national comparative analysis, the refinement of the Triple Re Framework and the execution of the case studies. The ReSET project team met in August 2023 in conjunction with the 14th International Sustainability Transitions (IST) Conference. In the run up to the conference, the ReSET team hosted two pre-conference engagements. The first was a workshop facilitated by CST researcher, Dr Megan Davies, and Dr Jesse Hoffman from UFS, which explored the potential for 'movements' to advance just transitions across the Global North and South. The second workshop was an event with Dutch policymakers and practitioners to prepare for COP28 in light of just transitions. The purpose of this workshop was to facilitate dialogue between the Dutch delegation to the COP28, policymakers and renowned experts within and beyond the Netherlands about critical themes in advancing just transitions in the Global South.

Drawing the third year of the ReSET project to a close, Drs Davies and Hoffman participated in the Volkswagen Foundation's Symposium exploring Perspectives on Social Inequality and Wealth in Hannover, Germany, which provided an opportunity to engage more closely with the organisation's broader network of funded projects.

14th International Sustainability Transitions (IST) Conference (30 August – 1 September 2023), Utrecht University, the Netherlands

A large contingent of CST students and researchers attended the 14th International Sustainability Transitions (IST) Conference, which was hosted by Copernicus Institute of Sustainable Development at Utrecht University in the Netherlands. The conference theme was 'Responsibility and Reflexivity in Transitions'. Presenting diverse work on the governance of infrastructure and sustainability transitions in the Global South, collectively, CST students and researchers contributed to eight presentations, five speed talks and two poster presentations. An additional highlight from the conference was the appointment of Merin Jacob to the Steering Committee of the Sustainability Transition Research Network.

Prof. Mark Swilling delivered a keynote address at the conference entitled, **Reflections of an enraged incrementalist – what must be done next?**, which opened with a provocation for the transitions community about how to meaningfully contend with the path-dependency of an extractive and unsustainable global political economy. Drawing from his own experience, narrated across different professional and academic roles, Prof. Swilling reflected on how engaged academics grapple with their positionality and the purpose of sustainability transitions research in the face of the increasingly unjust consequences of a global polycrisis.

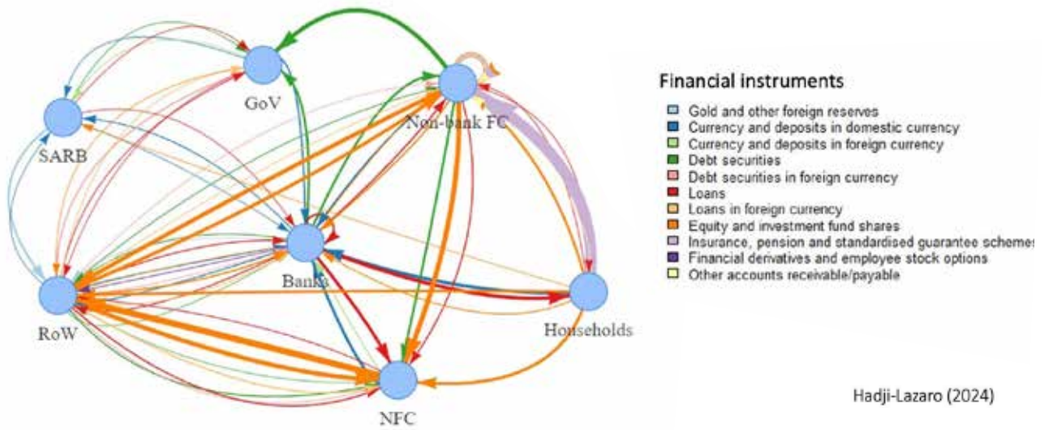
The ReSET team also facilitated a dialogue session at the conference, which opened a conversation with conference delegates about the CST analytical framework and more broadly, how sustainability transitions scholars reflect on their approach to social justice in their research.

Thandeka Tshabalala and Kevin Foster – ReSET from a student's perspective

As we reflect on our PhD journey during the ReSET project team meeting in Utrecht, the significance of our collective efforts became increasingly evident. Funded by the Volkswagen Foundation, this project aimed to demonstrate that developing a just energy transition is not a once-off event but a dynamic process shaped by various factors and people. We sought better understanding of the complexities of achieving a more equitable and sustainable energy future by examining influential events and work, and their impact on the transition process.

As PhD students actively researching the unfolding energy transition in South Africa as part of the ReSET consortium, we contributed invaluable insights to the study. We also gained firsthand experience of a collaborative international research process, engaging with partner research teams from India, the Netherlands and Germany, and learnt about the institutional work involved in making a just transition in these countries. The meeting also gave us an opportunity to receive valuable feedback on our PhD progress, and papers from the international team.

The gathering in Utrecht commenced on 21 August 2023 and concluded on 28 August 2013. This was followed by the IST conference held in the same location, which we attended. Thandeka's presentation delved into a comprehensive literature review focusing on energy poverty in the South African context. This exploration revealed the profound interconnections between energy poverty and issues such as inadequate housing and unemployment. It became clear that addressing energy poverty requires a broader perspective that encompasses socio-economic factors at the household level. Kevin's presentation explored the discourse around the just energy transition in South Africa, and the absence of local government from the national narrative, despite electricity distribution being a critical function of municipalities in South Africa. Kevin additionally reflected on his own positionality in relation to this research and what his history as a local government consultant and his association with the CST means for the way his research questions are answered.



Hadji-Lazaro (2024)

Macro-economic modelling

CST project team: Mlondi Ndovela

South Africa is considering an energy transition characterised by massive uptake of low-carbon technologies at the centre of its decarbonisation strategy. While the country continues to navigate the energy transition landscape, this undertaking will restructure the productive nature of industries within the economy as some industries will decline and some increase their output. Global and national empirical research has outlined sunrise and sunset industries in the context of an energy transition. However, macroeconomic impacts beyond the gross domestic product and employment induced by a transition towards low-carbon technologies remain understudied and unspecified in South Africa. The current tools used within the country cannot identify macroeconomic vulnerabilities and possible economically sound transition pathways without triggering financial and/or economic instability. This prevents policymakers from understanding and assessing the risks, constraints, vulnerabilities and opportunities of a low-carbon transition.

It was within this context that in 2023, as part of the modelling project, we launched the seminar series, **Vulnerabilities and opportunities in macrofinance and macroeconomy in the face of climate change** with Prof. Antoine Godin, Economist and Modeler at the French Development Agency (AFD) as the first guest. Prof. Godin is responsible for developing and monitoring AFD's programme on macroeconomic modelling tools for the ecological transition, which includes the GEMMES (General Monetary and Multisectoral Macrodynamics for the Ecological Shift) model. Developed by AFD, this tool is one of few where scenarios include economic and financial risks related to climate change and the increasing scarcity of resources.

Development Bank of Southern Africa: Prof. Mark Swilling's board chair comes to an end

Professor Mark Swilling ended his nine years as board member of the Development Bank of Southern Africa (DBSA). His journey began with no prior board experience, yet he embraced the role of non-executive board chair for an SOE with a clear understanding of his responsibilities—to lead and represent the board, not the organisation. This distinction underscored his approach to fostering dialogue, collective problem-solving, and consensus-building within the boardroom.

Prof. Swilling's tenure coincided with significant milestones for the DBSA, including its representation at the Finance in Common Summit (FICS) in Cartagena, Colombia. This summit, which gathers public development banks (PDBs) globally, emphasise the pivotal role of PDBs in driving long-term solutions for global challenges. Prof. Swilling noted that PDBs, with their $23-trillion asset base, have become crucial in addressing these issues, moving from being 'banks of last resort' to "banks of first resort."

A key experience for Prof. Swilling was participating in panels discussing the role of PDBs in catalysing energy transitions, where he was recognized for his deep understanding of the DBSA's strategies and operations—an uncommon trait for a non-executive chair. This knowledge enabled effective oversight without overstepping into executive management's domain, maintaining a delicate balance crucial for good governance.

Prof. Swilling also highlighted the importance of independent and effective board leadership in preventing political interference, a lesson underscored by South Africa's history of State Capture. He stressed that boards must protect institutional interests over political pressures to maintain the integrity and long-term viability of public institutions.

Prof. Swilling's tenure was marked by efforts to expand the DBSA's developmental impact, a mission encapsulated by the slogan "Let's make the 'd' in DBSA a big 'D'." This involved higher risk appetites, moderate returns on investments, and direct project management, particularly in infrastructure development. The DBSA's Infrastructure Development Division (IDD) played a crucial role, implementing projects that benefited thousands of learners and supporting local small and medium-sized enterprises (SMMEs).

Reflecting on the experience, Prof. Swilling expressed pride in the DBSA's accomplishments and gratitude for the opportunity to contribute to its mission of sustainable development. This period was transformative, reinforcing his belief that making hope possible at scale is the essence of being truly radical.

POLITICAL ECONOMY AND DEVELOPMENT

Just Energy Transition – opening dialogue with trade unions, community activists and the non-governmental sector

CST project team: Lourens Swart, Nina Callaghan, Dr Nthabiseng Mohlakoana, Mlondi Ndovela, Alboricah Rathupetsane, Prof. Mark Swilling

The transition to a greener energy system is underway in South Africa, and it is important that all perspectives be accounted for in order for the process to be just. A project that highlights and hones in on the importance of different perspectives within the Just Energy Transitions (JET) is the JET Impacts on Trade Unions and Communities. This project focuses on understanding the impacts of the energy transition on workers within trade unions in the Emalahleni area in Mpumalanga. In partnership with Vukani Environmental Movement, groundWork, Sustainable Energy Africa and the CST, and hosted at the office of the National Union of Metalworkers of South Africa, a workshop with various stakeholders and community activists unpacked various challenges and concerns.

The aim of the first workshop was to gain an in-depth understanding of the needs of trade union members, community members, and general concerns surrounding the Just Energy Transition (JET) discourse. The platform provided an opportunity to interact and share the real-world experiences of people in JET hotspots, and to gauge how they understood the process holistically. The metaphor of a 'train' (called 'stimela' in the local language) was used extensively to represent the energy transition and the daily experiences of people in the community. It was from this interaction that the idea of the 'Stimela Transitions Game' was conceptualised to allow people to play the role of different actors in the energy transition.

The workshop was followed by a community meeting in Middelburg, hosted by groundWork and where the CST formed part of a panel discussion that delved into different aspects of the JET, including social ownership and funding for community-led projects.

A second workshop is set to take place in 2024 and together with the findings of the first workshop, a report will be produced and will contribute more perspectives to the ongoing JET dialogue in South Africa, as well as highlighting the role of researchers and academic institutions in JET hotspots. Funding for this project was made possible by Open Society Foundations.

Image credit: Urban78 | iStock Photos.

The Just Urban Transition

CST project members: Kevin Foster, Thandeka Tshabalala, Dr Megan Davies

The Just Urban Transitions project, funded by Open Society Foundations and done in partnership with Lauren Hermanus of How We Adapt, works closely with key local government stakeholders to identify just urban transition goals through the energy transitions to support and build sustainable municipal electricity distributors. It seeks to understand parameters shaping local decision-making, what the principal just energy transition challenges facing urban local government are, and to co-produce institutional work to respond to these challenges. Earlier work on the project identified the following key thematic areas of transition challenges for local government: distribution grid management, demand management, municipal revenue and electricity tariffs, system costs and electricity tariffs, and energy procurement.

In 2023, we sought to identify specific work to be done in specific contexts, with the aim of developing a 'city lab' approach. This approach brings together different stakeholders, including policy makers, practitioner, civil society and academia, to co-produce insights and knowledge to address complex urban governance problems. For this purpose, a workshop was convened with the support of Sustainable Energy Africa and current and new South African energy transition stakeholders to identify just urban transition challenges and opportunities.

The workshop identified three opportunities for a 'city lab' approach: creating a forum within a municipal context to build trust between an electricity distributor, its business customers and its public; to create a sustainable model for sharing public and private resources in the distribution grid; facilitating engagement between a municipal electricity department and its political executive to better understand their mutual needs and plan for a sustainable future; and exploring in the context of a specific settlement, the benefits and implications of increasing the amount of free basic electricity to households.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) transformative change and nexus assessments

CST project team: Prof. Reinette (Oonsie) Biggs, Dr Nadia Sitas, Dr Odirilwe Selomane, Prof. Laura Pereira

IPBES, also known as the IPCC for biodiversity, is an independent intergovernmental body comprising over 145 member governments. Established in 2012, it provides policymakers with objective scientific assessments on 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. IPBES aims to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human wellbeing and sustainable development. A large number of NGOs, organisations, conventions and civil society groupings participate in the formal IPBES process, with several thousand individual stakeholders, ranging from scientific experts to representatives of academic and research institutions, local communities and the private sector, contributing to and benefiting from the work of IPBES.

Two new IPBES assessments were initiated in 2022 and will serve at the IPBES plenary in December 2024 for approval by member states. The Transformative Change Assessment aims to understand and identify factors in society at individual and collective levels, including behavioural, social, cultural, economic, institutional, technical and technological dimensions, which may be leveraged to bring about transformative change for the conservation, restoration and wise use of biodiversity while taking into account broader social and economic goals in the context of sustainable development. The Nexus Assessment focuses on the interlinkages among biodiversity, water, food and health to understand the interlinkages among the United Nations' Sustainable Development Goals related to food and water security, health for all, protecting biodiversity on land and in the oceans, and combating climate change.

Several CST staff members and fellows serve as coordinating lead authors or lead authors in these two assessments. The role of coordinating lead authors is an important 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. Reinette (Oonsie) Biggs was nominated as coordinating lead author for **How transformative change occurs** (chapter three) of the Transformative Change Assessment. Prof. Laura Pereira, former CST staff and now a CST fellow, is the lead author for **Realising a sustainable world for nature and people: means for transformative strategies, actions and roles for all** (chapter five). In the nexus assessment, Dr Odirilwe Selomane, also a former CST staff member and now a CST fellow, was nominated as coordinating lead author for **Future interactions across the nexus** (chapter three) and Dr Nadia Sitas is coordinating lead author for **Policy and sociopolitical options across the nexus that could facilitate and accelerate the transition to a range of sustainable futures** (chapter four), and **Summary and synthesis of options, knowledge and technology gaps and capacity development** (chapter seven).

Dr Sitas has also been involved in supporting the work of Capacity Development for Biodiversity and Ecosystem Services Experts which develops and strengthens the capacity of professionals in biodiversity-related fields in West, Central and East Africa to engage in IPBES and BES-Net to build commitment for biodiversity action across the world by translating IPBES products into action for biodiversity and conservation on the ground.

Image credit: Kelvin Trautman | KANDS Collective.

Financials

INCOME (ZAR)	
Opening balance	18,260,154
Mainstream budget	6,272,262
Project related income	20,736,664
Total income	45,269,081

EXPENSES (ZAR)	
Mainstream expenses	5,176,515
Project related expenses	23,177,822
Total expenses	28,354,338
Closing balance	**16,914,743**

Ten largest projects

Project	Funder	Project name	Project total (ZAR)	Period
OSF Energy	Open Society Foundations	Economic Recovery through a Just Energy Transition in SA	21,481,612	2021 - 2024
SARChi Seeds	National Research Foundation (NRF)	Research Chair in Social-Ecological Systems and Resilience	14,750,000	2021 - 2025
ReSET	Volkswagen Stiftung	Reconfiguring Energy for Social Equity	6,045,000	2020 - 2025
SU Strat 2	Stellenbosch University	World-leading Postgraduate Programme in Sustainability Transitions	4,967,662	2023 - 2025
ECF Energy	European Climate Foundation	Africa Low-Carbon and Transformation - Enhancing Africa's Capabilities for Implementing Sustainable, Low-Carbon Energy Development and Transformative Initiatives	4,400,000	2023 - 2024
IDRC SEEDS	International Development Research Centre	Seeds of Good Anthropocenes: Fostering Food System Transformation in Africa	3,650,000	2022 - 2024
GRP SARA	Stockholm University; Global Resilience Partnership	The Southern African Resilience Academy	3,210,555	2021 - 2023
IDRC R4D	International Development Research Centre	Disruptors and Enablers of Research for Development	3,159,123	2022 - 2024
SARChi Energy	National Research Foundation (NRF)	Mainstreaming Gender for Energy Security in Poor Urban Environments	2,833,150	2023 - 2024
FORMAS	The Royal Swedish Academy of Sciences; Beijer Institute	Inequality and the Biosphere: Achieving the Sustainable Development Goals in an Unequal World	2,105,606	2021 - 2024

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Prof. Lesley Le Grange, Distinguished Professor in the Faculty of Education, Stellenbosch University

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Dr Nthabiseng Moleko, Senior Lecturer, Stellenbosch Business School, Stellenbosch University

Prof Sampson Mamphweli, Director: Centre for Renewable and Sustainable Energy Studies (CRSES), Stellenbosch University

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Dr Megan Davies
Merin Jacob
Monique Beukes
Dr Nadia Sitas
Nadine Christians
Dr Nthabiseng Mohlakoana
Dr Nyasha Magadzire
Nontobeka (Ntobsie) Ngcwenga
Dr Ricardo (Ric) Amansure
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Dr Odirilwe Selomane
Robyn Foley
Dr Ryan Blanchard
Dr Sandra Boatemaa
Tanja Hichert
Wendy McCallum

SU research associates

Dr Charon Marais
Prof. Jannie Hofmeyer
Prof. Karen Esler

2023 graduates

PhD

Student name	Thesis itle
Blessing Kavhu	Investigating the impact and drivers of land use/cover change on surface water resources in the Okavango basin, using remote sensing and modelling

MPhil in Sustainable Development

Student name	Thesis title
Alboricah Rathupetsane	Just upstream are jobs: Mapping South Africa's wind manufacturing potential
Amelia Timms	Tropical forest fragmentation: a global review and insights from African experts
Amy Murgatroyd	From principles to practice: Exploring the role of the evaluator in implementing a Made in Africa Evaluation (MAE) approach.
Camryn Van Den Bergh	COVID-19: Insights and prospects from shifting learning experiences in Stellenbosch University's Postgraduate Diploma in Sustainable Development
Elzé Van Achterbergh	Change contagion: Exploring the role that social interactions play in increasing support for corporate sustainability
Fiona Ngadze	Applying the Safe and Just Operating Space (SJOS) framework to Sustainable Development in Zimbabwe
Guy Dalamakis	Decolonial gestures of heutagogy: A postqualitative inquiry into the potential of self-determined learning in Stellenbosch University's Postgraduate Diploma in Sustainable Development
Haeun Lee	Exploring equity dynamics along the seaweed value chain in Zanzibar
Jacqueline May	An exploration into why South Africa does not grow organic cotton
Johanna Fourie	Understanding the sustainability of free-range and/or grass-fed beef in South Africa
Lourens Swart	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
Luke Symonds-Mayes	Trophy hunting as payments for ecosystem services: A value chain exploration
Megan Mccarthy	A system dynamics-based analysis of charcoal production from Invasive Alien Plants in South Africa: the case of the Tsitsa River Catchment
Megan Schulze	Investigating how climate change thinking can be incorporated into mine closure and rehabilitation strategies, using case studies from South Africa.
Michaela Geytenbeek	Facilitating the development of nature connectedness
Nichola Mcculloch Richards	Beyond resistance? Exploring dynamics of incumbency in South Africa's power sector reform
Nina Callaghan	Relational governance for sustainability transitions
Nirvana Milton	The role of food aid during the COVID-19 pandemic in building community resilience to disasters: A case study from Stellenbosch, South Africa
Winniefred Seibes	Assessing the prevalence of energy poverty and the impact thereof on educational well-being of high school students in Windhoek, Namibia.

PGDip in Sustainable Development

Aedan Foulkes
Aishah Ebrahim
Amy Novak
Anna Hauff
Beatrix Van Huyssteen
Benjamin Carlyle
Cait Mccann
Carmen Möllmann
Celeste Van Tonder
Christina Pobee
Dominique Marais
Erin Johnston
Francis Thorold
Gary Cotterell
Gcinile Mahlangu
Hannah Hopper
Hendrietta Sarila
Isa Klaassen
Jodene De Villiers
Jody Wentzel
Kate Boswell
Keamogetswe Motsilanyane
Keanu Moodie
Keira Powers
Khensani Nkatingi
Lesego Monametsi
Letsie Chele
Lonwabo Mbam
Lukhanyo Qamarana
Marie Basson
Michelle Coetzee
Natalie Van Der Heuvel
Natasha Piprek
Neo Tsiu
Nicole Garcia
Nomfundo Ndlovu
Nthakoana Maema
Obayd Hoosain
Sandi Theron
Thembisile Ndlovu
Tswaledi Maila
Tumiso Macheli

Publications

Journal articles

Biggs R, Reyers B, Blanchard R, Clements HS, Cockburn J, Cumming GS, Cundill G, De Vos A, Esler KI, Hamann MH, Pereira L, Preiser R, Selomane O, Sitas N, Spierenburg MJ, Et Al. 2023. The Southern African Progam on Ecosystem Change and Society: an emergent community of practice. *Ecosystems and People*; **19**(1):2150317, 10 pages.

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