# Centre for Sustainability Transitions (CST)

## Sustainability in a transitioning world

# 2024 Annual Report

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Economy-Climate

# Message from the director team

Change is inevitable and necessary. It can be painful or it can lead to a renewed energy that releases potential in a system. The possibilities for leveraging fresh energy increase when the necessary conditions have been put in place. This premise was tested at the Centre for Sustainability Transitions (CST) in 2024 by a leadership transition when Prof Mark Swilling stepped down as founding Co-Director. Mark has co-led the Centre since 2015, first alongside Prof Jannie Hofmeyer and then Prof Reinette (Oonsie) Biggs, guiding and growing the reach and impact of a transdisciplinary unit that punched well above its weight. Planning, stakeholder engagement, communication and process design ensured we had built enough trust within and outside of the CST to take the leap of choosing a new co-director. We followed a democratic process of internal nominations, motivations and voting with the outcome ratified by the governing board. Nina Callaghan, then serving as deputy director was chosen, "a safe pair of hands" as Mark says. The virtues and capabilities of the outgoing and incoming leaders aside, the quality and feeling of the process could be described as graceful, discerning and thorough. This is testament to the caliber of people who have constellated here and the relationships and culture we have cultivated over time.

This leadership change was necessary as Mark approaches retirement age, even though he will be staying on as a key researcher, fundraiser and teacher. This change was also important to signal that leadership is seasonal, terms do not last forever and neither should they, allowing for fresh energy to enliven different ways of achieving our purpose. If we had to attribute a season to CST right now, it would likely be the beginning of summer – a time for stability and execution with a focus on operational management, scaling our research and programme offerings and feeling the warmth of each other and what we've achieved so far. Mark's bold, pioneering and entrepreneurial leadership has helped bring us to this point. We are indebted to him for his visionary and catalysing energy, which will continue to be channeled into research projects, mentoring a new generation of young academics and dedicating more time to his service in the public sector. Mark remains a pillar of academic leadership and a well of wisdom for us, so we are happy he'll remain part of the staff for several more years at least.

2024 has seen the renewal efforts for our postgraduate programmes take root. It was exciting to implement the changes across our PGDip, MPhil and PhD programmes, to experiment in real time with a more integrated and cohesive focus on transitions and transformations, linked to CST's core themes. It was the fruition of strenuous learning, thinking and planning over the previous year to land CST's new identity and offering to our students and the world. Our programmes also saw a growth in numbers, with a record 11 new enrolments for the PhD and 16 for the MPhil – an impressive feat for a modestly- sized centre. Our PGDip student numbers remained relatively unchanged at 73 to bring the total CST student cohort to 116.

Our transdisciplinary research programmes continued to flourish, making important conceptual and empirical contributions to understanding sustainability transformations grounded in the South African and wider African context, with deep links to policy and practice. These programs are largely centered around the four research chairs which the CST proudly hosts: two SARChI chairs held by Profs Oonsie Biggs and Mark Swilling, a joint UNESCO chair held by Prof Rika Preiser and Tanja Hichert, and the African Wildlife Economy Institute Chair held by Dr Hayley Clements. The CST continues to host the international project office of the Future Earth Program on Ecosystem Change and Society (PECS) headed by Prof Alta de Vos, which over the past year has co-led an international initiative to establish a new Society for Social-Ecological Systems, a first for the field.

2024 also saw the launch of a new phase of the Southern African Resilience Academy led by Dr Julia van Velden; the initiative is linked to the Global Resilience Partnership and aims to strengthen the voice and inclusion of perspectives from the global South. Dr Ric Amansure led a substantive engagement with the continent's Development Finance Institutions (DFIs) to highlight their potential leadership role and agency in the continent's shift to a low-carbon, inclusive future. In addition to collaborating with and supporting various civil society organisations, policy initiatives and government departments at local, national and international levels, our research projects and collaborations provide rich learning opportunities for students and early career researchers at the CST, whose projects are often embedded within these initiatives and projects.

We would not have coped with this growth and change would not have been possible without the committed efforts of our support staff. Our programme administrators, Amanda October (PhD and MPhil) and Ntobsie Makhalima (PGDip) have been the backbone of our training programmes, navigating a major new university student system, a new curriculum, and record student numbers. Our operations manager, Cornelia Jacobs has had to continue managing the upheaval created by the transition to a new university-wide finance system in 2023, as well as keeping track of over 30 projects, their contracts and finances - a mammoth task, besides having to troubleshoot a new and opaque system. The bumpy financial system transition also impacted our office administrator, Monique Beukes, who handles most of the daily financial transactions. Nadine Christians, our communications manager, has pushed our communications capabilities to the next level with a big investment in the development of a CST intranet system for sharing our internal guidelines and procedures, a revamp of the CST's public website, and a major effort in capturing material to market and promote our postgraduate programmes. We are deeply appreciative of the grit, stamina and solutions-focused approach of our support team that enables the smooth execution of CST's projects as well as student success.

CST's flourishing has been a balm in a world wracked by genocide, deepening climate change impacts and feeble commitments by global finance to build planetary resilience. Our prosperity is directed towards active hope, in support of courageous research, students and partners who dare to influence the conversation and take action for just and sustainable change.

**Nina, Oonsie, Mark**

# Message from the Dean

Leading change and change processes can be a brief project or a journey and I believe the Centre for Sustainability Transitions (CST or Centre) has successfully pulled off the latter. It has been very rewarding to be one of the stewards of the leadership transition at the CST over the past year, and I can attest to a collegial, inclusive and thorough process.

As one of the founding co-directors, Prof. Mark Swilling has walked a strong leadership journey of almost ten years with the Centre. Mark has steered with passion and dedication, being an integral player alongside his two successive partners, Prof. Jannie Hofmeyer and Prof. Oonsie Biggs, in building a world-class research and teaching Centre that Stellenbosch University can be proud of. He has done well to end his term on a high note, still being an active teacher, researcher, mentor, and activist, to support the growth and momentum of the CST from a different vantage point.

Trust and stability have been preserved at the Centre and reinforced by the way in which the transition has been managed. Congratulations to Nina Callaghan, who has courageously stepped forward to assume co-directorship, with the support of staff, students, and the governing board. We have every confidence that she will flourish, and we wish her well!

Change has come to other parts of the University, with the implementation of new financial and student administrative systems. I take my hat off to all administrative staff and leaders who have been in the trenches diagnosing and remedying the troubles that inevitably surface with the implementation of major business processing software. It is an especially important task at a Type 2 centre like the CST which depends on third stream income for the bulk of their operations and meticulous reporting to a host of funders. Kudos to Cornelia Jacobs, Monique Beukes, Amanda October, and Ntobsie Makhalima for holding the fort. CST has managed to raise an impressive R20 million in new funding for the year, driving research projects that have influence and impact on hearts, minds and policy processes at home and internationally. The Centre has been consistent in producing high research outputs for its size and relative to other much larger departments at the university. The 37 articles across diverse sustainability themes are testament to a robust academic culture and an aspirational cohort of students.

It has been my privilege to serve as dean of the Faculty of Economic and Management Sciences and chair of the governing board at the CST. I have witnessed and celebrated the steady and determined growth of the CST over the past seven years and as I take my leave of the university, I remain a champion for their work and vision for the world.

Forward together,

**Prof. Ingrid Woolard**
*Dean: Faculty of Economic & Management Sciences*
*Chair: CST Governing Board*

# What guides us: our vision, mission, values

## Our vision:

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

## Our mission:

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

## Our 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 contribution 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:** the joy, comradery and connectedness of working on interesting and challenging issues together
- **Making a meaningful difference:** to issues that matter to us and the world with responsibility, humility and integrity
- **Being courageous and taking risks:** 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 areas

At our core, we are committed to contributing to sustainable and just futures. Our work is organised around three main activity areas: education and training, research, and engagements at the science-policy-practice interface. These activities are underpinned by five key research themes: knowledge co-production, social-ecological resilience, transformative futures thinking, finance and resource flows, and political economy and development. Our strength lies in our ability to work across sectors - food, water, energy, and conservation - using a systemic lens to integrate global frameworks on socio-technical transitions and social-ecological transformations.

# Leaving a legacy: Prof. Mark Swilling steps down as CST co-director

I have been asked to reflect on my legacy as co-director of the Centre for Sustainability Transitions since it was founded in 2015. The founding co-directors were Prof. Jannie Hofmeyr and myself – he is a systems biologist and I prefer to think of myself as a political economist. We both use complex adaptive systems as the epistemological and ontological basis of our work and worldviews. The merger of the two was initially called the Centre for Complex Systems in Transition until the name changed to Centre for Sustainability Transitions.

My own work on sustainability transitions began more than two decades ago when I co-founded with Eve Annecke the Sustainability Institute (SI). The SI was set up exclusively to provide a home for a new postgraduate programme in sustainable development that Stellenbosch University requested me to design and lead. The SI also animated the development of South Africa's first ecologically designed socially mixed income neighbourhood. I was the project manager of the planning, infrastructure, farming and housing development between 1999 and 2015. For two decades we delivered the educational programme within an evolving social experiment in sustainable living and learning. This experience had a profound transformational impact on an entire generation of students who have become increasingly influential across many different South African institutions. This, more than anything else, is what I regard as my most impactful legacy.

Since the CST became a Type 2 centre in 2021, and without giving up teaching, my focus has shifted more to research. My two books on the just transition – Just Transitions in an Unfair World co-authored with Eve Annecke in 2012 and The Age of Sustainability: Just Transitions in a Complex World published in 2020 – mark out the intellectual landscape of my research work over the past 15 years. Although both books will leave a legacy of a broad intellectual synthesis that brings a Global South perspective into the global sustainability transitions research world, my focus in recent years has been the energy transition and, since 2023, on the financing of the sustainability transitions at global, African and South African levels.

I supervise ten PhDs, most of them focused on sustainability and energy issues. I now teach a PGDip module, Financing Just Energy Transitions, where I have started to introduce my new research work on financing the sustainability transition. My recent appointment as the SARChI (South African Research Chairs Initiative) Chair for Mainstreaming Gender for Energy Security in Poor Urban Environments will mean returning to my roots where I hope to integrate my work on energy and finance into new ways of imagining the future of African cities. In short, I would like to think that my legacy lies in the imaginaries of the students I have taught and hopefully inspired, the research that I have published questions many generally accepted views, and the culture and dynamism of CST as an increasingly influential centre for global sustainability leadership rooted in African realities.

Prof. Mark Swilling

# Research chairs lead the way at the CST

Research chairs are a strategy to advance the frontiers of knowledge while aiming to strengthen innovation and excellence nationally and regionally. Chairs are esteemed researchers in their field who have distinguished themselves by their contributions to science. They are also expected to nurture young academic talent by providing resources, mentorship and opportunities to fellow colleagues, postgraduate and postdoctoral students. They are also expected to build and leverage partnerships with international researchers in their domains. Chairs are created through a funder or benefactor where the researcher's interests align with the strategic objectives of the funder and who meets the academic rigor and leadership required to hold a chair. The South African Research Chairs Initiative or SARChI established in 2006 by the Department of Science, Technology and Innovation and managed by the National Research Foundation (NRF) is the leading research chairs programme in South Africa.

The CST hosts two SARChI chairs: Prof. Oonsie Biggs in Social-Ecological Systems (SES) and Resilience and Prof. Mark Swilling in Mainstreaming Gender for Energy Security in Poor Urban Environments. SARChI chairs are awarded through a competitive bid process and run over five years with the option to renew the chair, dependent on quality leadership and research outputs and financial management. Oonsie has held her chair since 2016, focusing on theoretical, methodological and empirical SES research, grounded in South African and African perspectives. She has several areas of work under her chair that include SES and resilience theory and methods; regime shifts and tipping points in SES; understanding and facilitating sustainability transformations as well as developing SES practice and research networks across the region and the globe. Mark has held his chair since 2023 and aims to develop conceptual frameworks for making sense of urban innovations across Africa. This is done through comparative analyses of in-depth case studies that contribute to an open access database of urban innovations in Africa.

Prof. Rika Preiser and CST research fellow, Tanja Hichert, were together selected as the UNESCO co-chairs in Complex Systems and Transformative African Futures in 2022. The application for the chair was made by Stellenbosch University on behalf of Rika who specialises in theories of complex systems and Tanja who practices futures studies and foresight. The chair develops 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.

Dr Hayley Clements, a senior researcher in African biodiversity and wildlife economies, has held the African Wildlife Economy Institute (AWEI) Research Chair since 2023. This chair focuses on unlocking the potential for wildlife economies to support more socially just and resilient conservation efforts across the African continent. The chair is in partnership with and funded by Oppenheimer Generations Research and Conservation.

The CST is unusual in that the research chairs pool resources to support their programmes and activities at the CST, forming a rich ecosystem of knowledge creation, methods, practices, partnerships and resources. There is a dynamic and collegial relationship between the chairs, with different specialist knowledge areas informing and complementing each other through the transdisciplinary nature of their research. The chairs play a key role in building partnerships for the CST, both nationally and internationally, with research partners as well as policy and practice.

Chairs are the nexus from which most of the CST's projects launch, providing a stable research and development pathway for early career researchers and an opportunity for deep and consistent work with academic and social partners. This innovative and supportive environment contributes to the culture at the CST where collaboration, curiosity, generosity and excellence are fostered, enabling students to flourish and extend our impact to communities and policy-makers across the globe.

## SARChI Chair for Mainstreaming Gender for Energy Security in Poor Urban Environments

The SARChI Chair for Mainstreaming Gender for Energy Security in Poor Urban Environments led by Prof. Mark Swilling and supported by Merin Jacob works to stimulate path-breaking research on Africa's urban challenges in a carbon-constrained world with a social justice and gender mainstreaming orientation. This project generates research which explores, develops and advances new theories and evidence-based knowledge about how African cities should confront the societal challenges of population growth, urbanisation, urban poverty, gender inequality and environmental destruction.

The focus for 2024 was the emergence of urban innovations across African cities that do not follow conventional policy solutions, and which result in more sustainable use of resources, as well as greater social and gender equality. This research goal was achieved in two ways,

the first being a collaboration with the African Centre for Cities at the University of Cape Town and the Urban Futures Studio at Utrecht University. Together with the CST, over 50 urban innovations were identified and analysed in terms of urban food systems, sustainable city-wide infrastructure systems, and energy, transport, waste, water and sanitation systems, to develop the online Infrahub.Africa database. The website explores and captures the use of these innovations as an entry point for imagining more sustainable and equitable African cities.

Secondly, the CST Urban Innovation team of Dr Sibongangani Mngomezulu (postdoctoral fellow), Nontsikelelo Mogosetsi-Gabriel (PhD candidate), and Tswaledi Tshepo Maila (MPhil student), led a research trip across five African countries – Benin, Ghana, Ethiopia, Kenya, and Rwanda – exploring how these cities are pioneering urban innovation and sustainable infrastructure. The purpose was to better understand emerging, often unconventional urban innovations in rapidly transitioning African cities from a Global South perspective. From Benin's ambitious nationwide market revamp to Ghana's Safisana – the first waste-to-energy plant in West Africa – each country showcased creative, context-driven responses to urban challenges. In Kenya, the team visited Start Somewhere's use of innovative building materials to construct a three-storey school in Kibera.

In Rwanda, the team connected with the designers of the Rwanda Institute for Conservation Agriculture (RICA), a higher education campus that trains the next generation of agricultural leaders. One team member also attended the 12th International Conference of the African Materials Research Society (AMRS2024), held in Kigali. In Ethiopia, they engaged with PhD students and faculty at the Centre for Sustainable Development at Addis Ababa University, sharing insights on local innovations and regional trends.

These visits enriched individual team members' academic research and grew the Infrahub.Africa database, supporting the chair's 2024 focus on sustainability transitions and documenting African cities' responses to urban challenges.

# SARCHI Chair in Social-Ecological Systems and Resilience

The aim of the SARChI Chair in Social-Ecological Systems and Resilience is to advance the rapidly emerging international research and policy agenda around social-ecological systems (SES), specifically from a South African and African perspective. 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. Social-ecological resilience is a rapidly growing transdisciplinary research area that seeks to contribute to this challenge through better understanding of the dynamics of intertwined SES and how to build their resilience – the capacity to enable and navigate systemic changes, particularly those that are emergent and unpredictable. The chair is structured around four key themes and is embedded in regional and international knowledge-coproduction processes in collaboration with an extensive network of local and international partners. In 2024 the chair supported two postdocs, seven PhD students, and two Masters students, as well as working closely with several CST researchers and fellows.

The first theme focuses on advancing SES and Resilience Theory and Methods. A highlight in 2024 was the publication of a paper in Ecology & Society led by PhD student Ms Amanda Manyani which explores how SES research has grown and changed over time using bibliometric methods, co-authorship and co-citation network analysis. Amanda's PhD is one of the most extensive studies to date of the development of the SES field and was submitted in late 2024. PhD student Bekezela Dube, who is working on the operationalizing resilience assessments in the context of protected area systems, focusing on Hwange National Park in Zimbabwe, is also nearing submission. Development of the SES methods website (sesmethods.org), a repository of training materials, including case studies, and teaching and training materials, continued under the co-leadership of PhD student King Psuik and Dr Julia van Velden. The website and SES Methods handbook on which it is based formed the basis for the Resilience Alliance five-day immersive short course run in collaboration with the PECS-III international conference in Montreal in August 2024.

The second theme focuses on regime shifts in social-ecological systems and involves the ongoing development of the Regime Shifts Database (regimeshifts.org), an open-access database that synthesises information on social-ecological regime shifts across a wide range of systems led in partnership with the Stockholm Resilience Centre in Sweden. PhD student Caroline Wallington's research draws on this database to analyse ecosystems and people at risk of regime shifts globally, and their implications for achievement of the SDGs. Another highlight linked to the work on regime shifts was the collaboration with Dr Hayley Clements to develop the bii4africa dataset. Using a modified Delphi process that engaged 200 experts across sub-Saharan Africa, we co-produced the most comprehensive dataset yet on the status of biodiversity across the African continent (Clements *et al*, 2024, Scientific Data). This dataset will be used to map biodiversity loss across sub-Saharan Africa and explore possible tipping points in relation to ecosystem services and human wellbeing.

The third theme focuses on transformations in social-ecological systems. Much of this work centres around the international Seeds of Good Anthropocenes initiative. The work of several students and postdocs is linked to this theme, including Keziah Mayer (focusing on SES stewardship), Reinhold Mangundu (focusing on youth futures working in collaboration with UNESCO chair Prof. Rika Preiser), Sungeni Karonga (focusing on conservation seeds in Malawi), Dr Nyasha Magadzire (focusing on food system transformation in Africa as part of a larger IDRC funded project) and Dr Julia van Velden (focusing on invasive species management in collaboration with the Centre of Excellence for Invasion Biology at SU). The CST hosts the international Seeds website, and a major update to improve database functionality was undertaken. A special issue reflecting on the first 10 years of the Seeds initiative is currently being compiled with Prof. Biggs and Dr van Velden as two of the guest editors. Two further PhD students graduated in 2024 with theses focusing on this broad theme – Dr Catherine Pringle focused on the social-ecological factors shaping pathways to better water futures in South Africa, while Dr Willem Malherbe focused on social-ecological resilience in practice: exploring capacities for navigating change in complex systems. Both graduates were co-supervised by CST fellow Dr Nadia Sitas based at the Climate and Development Knowledge Network (CDKN). A final highlight under this theme for 2024 was the completion of the IPBES transformative change assessment, for which Prof. Biggs served as one of the coordinating lead authors.

The final theme focuses on supporting regional SES and resilience research networks. The key activity under this theme was the continued development of the international Programme on Ecosystem Change and Society (PECS), which is co-chaired by Prof. Biggs and led by Prof. De Vos. The major focus for 2024 was co-hosting the long-awaited PECS-3 international conference in Montreal, Canada, and working closely with the international Resilience Alliance to develop plans for launching the first-ever international Society for Social-Ecological Systems (SocSES).

Regionally, the key activity was supporting the Southern African Resilience Academy (SARA), now led by Dr Julia van Velden. In 2024, we hosted a knowledge sharing event to communicate the findings from the first round of SARA working groups that focused on equitable resilience, and launched a new set of working groups focusing on Transformative Pathways to Resilient and Sustainable Futures. We are also completing a special issue of the journal Ecology & Society that contains papers from the eight working groups that participated in the first SARA round.

## AWEI Research Chair in African Wildlife Economies

International agreements such as the UN decade on restoration and the Global Biodiversity Framework place significant responsibility on nations to conserve and restore biodiversity. African countries are tasked with meeting these responsibilities while also fostering much-needed development. A unique opportunity exists to align development and conservation through wildlife economies across Africa's working lands. African governments, non-governmental organisations and the private sector continue to call for information on how to overcome the barriers to unlocking equitable and thriving wildlife economies.

This Research Chair, held by Dr Hayley Clements, works to develop and grow an adaptive research programme that meets the evolving knowledge needs to unlock wildlife economies across the continent. It is a collaboration with the African Wildlife Economy Institute at Stellenbosch University and funded by Oppenheimer Generations Research and Conservation.

In 2024, the chair served as co-lead researcher for the project 'Enabling agroecological wildlife economies that sustain people and planet', described above, to produce knowledge products that meet the needs to decision-makers tasked with growing a more inclusive wildlife economy in South Africa and Kenya. It emerged from that project that a major barrier to emerging ranchers entering the wildlife economy is access to finance, for infrastructure (e.g., fencing, accommodation) and wildlife (reintroducing the indigenous large mammals that are the bedrock of the wildlife economy).

Dr Susan de Witt, who comes with 10 years of experience in South Africa's impact investment space, commenced a PhD in 2024 to better understand the business and 'social-ecological impact' case for wildlife ranching and how this aligns with private sector investor mandates and motivations. Insights gained from this research will inform the development of innovative financing models, policies, and investment strategies that support the growth of wildlife-based land uses. Klarine Schutte, who has been working closely with South African National Parks (SANParks), commenced a Masters to understand the impact of SANParks' programme to loan wildlife to emerging ranchers, with the lessons from this innovative approach likely to be relevant to countries across the region looking to support wildlife economies.

Sarah Schumann, who works for a carbon and biodiversity project developer, commenced a Masters to understand the potential of rangeland carbon credit projects to fund conservation aligned with human wellbeing across Africa's rangelands. Finally, Lydia Bhebe commenced a PhD to understand the opportunities for formalising the game meat sector to support the health of people, wildlife and ecosystems across the region.

An exciting new partnership was established with Prof. Brian Child (a CST fellow) in 2024 to further support postgraduate student training on wildlife economies and community-based natural resource management (CBNRM). This Fonseca Leadership Programme will provide enhanced fellowships to 16 exceptional African candidates to undertake the CST MPhil programme, aimed at improving conceptual and practical skills in wildlife economy and governance, with a focus on measurably uplifting communities through CBNRM. Funding from the Global Environmental Facility and Jamma Conservation and Communities is supporting these students and a new CST senior researcher, Dr Dian Spear, to lead the programme.

Finally, building on the successes of the 'agroecological wildlife economies' project funded by Agence Française de Développement (AFD), discussions with AFD's macro-economic team in 2024 led to the conceptualisation and funding of a new project 'The socio-economic consequences of ecological trajectories in South Africa'. This €200 000.00 grant will support the chair and new CST researcher – Dr Ella-Kari Muhl – to work with the AFD team, and South Africa's environmental and financial institutions, to explore developmental pathways for South Africa and articulate their macro-economic impacts. Building on AFD's earlier work on nature-related risks to the economy in South Africa, this research will articulate the importance of biodiversity and trajectories of biodiversity change into socio-economic measures that speak to national development planning.

# UNESCO Chair in Complex Systems and Transformative African Futures

**The UNESCO Chair in Complex Systems and Transformative African Futures, held by Prof. Rika Preiser and Tanja Hichert, forms part of the global UNITWIN/UNESCO Chairs Programme. The programme involves a network of over 850 institutions in 117 countries and promotes international inter-university cooperation and networking to enhance institutional capacities through knowledge-sharing and collaborative work.**

As part of UNESCO's Global Futures Literacy Network, the chair develops and applies 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 of looking to, thinking, and caring about the future.

The Chair draws on the expertise of the two co-chairholders to integrate in-depth knowledge of complex systems, combined with the conceptual and practical applications of futures studies. Rika specialises in theories of complex systems, while Tanja, also a research fellow at the CTS, specialises in the practice of futures studies and strategic foresight.

A unique characteristic of this 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.

In 2002 the Chair produced a MOOC on Anticipatory Governance, which had a re-run in 2023. In the first round 1089 participants enrolled and 287 certificates of completion were issued.

During 2022 – 2024, the Chair delivered the 'Disruptors and Enablers of Research for Development (R4D): Exploring Futures' project funded by an International Development Research Centre (IDRC) grant.

This collaborative project included researchers from universities including University of Sussex Business School's Science Policy Research Unit and Yale School of Medicine's Center for Teaching, Learning, and Innovation. It produced significant outputs, including:

1. a foresight-based framework that depicts issues across the R4D landscape, including key opportunities, challenges, debates, ideas, and emerging practice, that encapsulate R4D in support of transformative development pathways;
2. a set of recommendations in the form of strategic options to make transformative change happen in the R4D landscape; and
3. a collection of weak signals of TR4D enablers and catalysts generated by means of focussed horizon scanning.

This foundational work is now being taken forward by an IDRC project to validate and co-create a vision for transforming the R4D landscape globally by exploring the contextual realities in different geographical regions of the global South.

In 2024, Rika and Tanja presented some of their work at the Transforming Knowledge for Africa's Future: UNESCO Chairs and Partners Forum, at the African Union in Addis Ababa, Ethiopia.

A key message was around the dilemma of unavailable knowledge for addressing non-linear and emergent issues such as the climate crisis, energy needs, ageing societies, intergenerational justice and geopolitical tensions, in addition to explicitly working with multiple futures given that Futures Studies offers catalytic knowledge and methods.

Another important contribution focussed on the importance of centering Africa's lived experiences and African imaginaries, while reconciling them with global dialogues to position Africa as a key player in shaping a collective future. This emphasised the need to appreciate diverse knowledge traditions, understand the hopes and fears stemming from various lived experiences, and explore the full spectrum of future possibilities for both Africa and humanity.

Practical work included a session at the Discovery of the Future in the Social and Human Sciences Conference in Trento, Italy. Fellow academics and practitioners engaged around creating visions of future-orientated science working with 'seeds' of changing science. This was based on content from the Disruptors and Enablers of Research for Development work, and using methodology based on the Seeds of a Good Anthropocene initiative. The aim was to generate visions of what radically different, surprising future-orientated science in the future might look like when working with 'seeds' such as Earth Systems Law, Social-Ecological Systems research, Post-Normal Science, Doughnut Economics, Decolonised AI, and Designing Next Institutions.

Under the chair, the academic article, Transformative foresight for diverse futures: the Seeds of Good Anthropocenes initiative, as well the book chapter, Futures studies methods: a typology and guide to research design in the Handbook of Furtures Studies, was published.

# Learning and teaching: innovation through our postgraduate programmes

The Centre for Sustainability Transitions has three exciting postgraduate programmes – a PhD, MPhil in Sustainable Development, and a Postgraduate Diploma in Sustainable Development – for students passionate about sustainable development and transformative learning and teaching. The postgraduate programmes aim to foster thoughtful leaders who are ready to tackle urgent sustainability and equity challenges locally, nationally, regionally and globally.

The PhD programme is a deep dive into theory and practice, coordinated by Prof. Alta de Vos and Dr Julia van Velden in 2024. It is designed not only to prepare students for academia, but also to give them a competitive edge with a strong focus on mentoring and professional growth. Our approach to teaching and learning is holistic, with rich interdisciplinary coursework that supports a thesis-by-publication route.

Our MPhil in Sustainable Development coordinated by Prof. Rika Preiser is an opportunity to refine research skills and deepen questions and practice for a just and sustainable world. It welcomes students from all disciplines and academic backgrounds, and combines structured coursework with independent research, giving students the tools to ask better questions and craft meaningful, real-world solutions.

Our PGDip in Sustainable Development coordinated by Dr Megan Davies provides the foundation for exploring sustainable transitions and transformations. It is module-based and tailored for working professionals, activists, and recent graduates. Students engage with current sustainability challenges in a hands-on and interactive way.

Our postgraduate programmes are not only about gaining knowledge but bringing together students, experts, scholars, and practitioners from different backgrounds and disciplines in a learning environment that is passionate about impact and personal and planetary transformation for a reimagined future.

# PhD programme: cultivating researchers for a world in transition

The PhD programme continues to grow as a dynamic, intellectually diverse space for emerging scholars working at the forefront of sustainability science. In 2024 we welcomed a new cohort of 11 students, bringing our total to 27 active PhDs. We also formally introduced core PhD modules on sustainability concepts and methods, strengthening the programme's foundation and fostering a shared language among researchers studying complex aspects of transitions and transformations to sustainability.

PhDs actively contributed to CST's teaching and learning environment. Many supported postgraduate teaching on the PGDip and MPhil programmes, and initiated a new PhD-led journal club that created space for critical engagement across cohorts.

Our students presented their work at major international and national events, including the PECS-III Conference in Montreal, Canada, the Latin America Energy Economics Conference in Rio de Janeiro, Brazil, the NEST Conference, which took place in several countries including in Stellenbosch, South Africa, for early-career sustainability researchers as well as local conferences such as the Garden Route Interface Meeting in Knysna, South Africa. There was also great excitement and celebration of our three doctoral graduates in 2024 – Dr Catherine Britt Pringle, Dr Willem Stefanus Malherbe, and Dr Tuwilika Victoria Shifidi – whose work has added valuable insight to just transitions, governance, and resilience.

Heeding the university's call for research for impact, our PhD candidates published academic papers that focused on various topics including the evolution of social-ecological systems, ecosystem service dynamics in changing landscapes, wildlife ranching, pathways for just transition, and ethical dilemmas of doing transformative research. These and many other articles were published in renowned academic journals including Ecology & Society; Wiley Interdisciplinary Reviews: Water; Conservation Science and Practice; Development Southern Africa; and Nature Humanities and Social Science Communication. Other publishing highlights were Reinhold Mangundu's work in a book on Transformation, Agency and the Economy (Springer) and Amanda Gcanga's research featured in the journal Energies. Many PhD candidates have also contributed to opinion pieces in local media on their fields of interest.

In addition to academic outputs, students convened and facilitated spaces of knowledge exchange, leading workshops in working groups and at conferences. They also played key roles in national dialogues, co-facilitated a workshop on community and trade union perspectives and provided valuable insight into research focused on financial modelling.

## CST research fellow – Dr Nadia Sitas

Dr Nadia Sitas graduated from the transdisciplinary TSAMA Hub programme, a forerunner of the CST's current PhD programme, and was employed at the CST from February 2019 to December 2023 after spending several years at the CSIR. Nadia is now thematic lead at the Climate and Development Knowledge Network (CDKN) and continues to work closely with the CST.

Inspiringly, Dr Sitas served as co-supervisor of all three PhD graduates at the CST in 2024, providing critical grounded, practice-based inputs on their research projects. Nadia is deeply engaged in a wide variety of policy initiatives regionally, continentally and globally. Along with CST fellow Dr Odirilwe Selomane, she served as coordinating lead author on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Nexus assessment, which was adopted by governments at IPBES 11 in Namibia in December 2024.

Nadia also continues to publish prolifically, co-authoring papers in leading international journals on diverse topics including the inclusion of ecosystem services in the management of municipal natural open space systems; emphasising the need for equity and justice to underpin the discourse on tipping points; co-creating enduring practitioner-researcher collaborations in multifunctional landscapes; the need for including reviews of grey literature for science-policy processes and applied research: and shedding light on global South transformations, focusing on integration, transgression, diversity and hope.

## A CST triple feat: three PhD candidates graduate in 2024

### Dr Catherine Britt Pringle

**Co-supervisors: Prof. Reinette (Oonsie) Biggs and Dr Nadia Sitas**

**Thesis title: The social-ecological factors shaping pathways to better water futures in South Africa**


We are confronted with increasingly rapid and interconnected systemic challenges. These challenges are particularly evident in the water sector, where a quarter of the global population lacks safe drinking water, and urban areas are expected to face severe water scarcity by 2050. While there is widespread acknowledgement of the need for sustainable, equitable and resilient water futures, transforming to such futures remains a formidable task, as it necessitates profound systemic shifts within our societies. This thesis investigated the key social-ecological factors and processes shaping pathways to better water futures within a South African context, and is structured around four research papers.

The first paper focused on key agents – people or organisations – who initiate and guide social-ecological systems (SES) processes towards positive change. A rapid review of ten terms that have emerged in the SES literature to describe these key agents was conducted, specifically exploring their roles, motivations, and strategies; the conditions facilitating their actions; their broader impact on SES processes; and where these terms overlap or differ from one another.

The second paper investigates one type of agent – boundary spanners – who work across geographic, socio-cultural, or interdisciplinary boundaries to foster collaboration, network building, and knowledge exchange. Through a qualitative assessment, contextual factors shaping the agency and behaviour of boundary spanning actors involved in water governance in a case study of the uMngeni catchment, South Africa, is uncovered.

The next paper employs an exploratory case study approach to examine how farmers in a water-constrained agricultural production system, anticipate, absorb, and adapt to shocks, and what factors mediate their ability to do so. Investigation identifies potential leverage points for building a more resilient and sustainable export fruit production system at both a farm and catchment scale.

The final paper interrogates the social processes facilitating transformation towards collaborative water governance. Using Holling's adaptive cycle as a heuristic of phases present during transformation of social-ecological systems (conservation, release, reorganisation, and exploitation), the paper considers the role of learning, power, agency, and structure during each phase of the evolution of the uMngeni Ecological Infrastructure Partnership, a collaborative water partnership in the uMngeni catchment, South Africa.

The thesis concludes with a synthesis chapter that highlights key variables emerging from the different papers to understand the social-ecological factors and processes that shape pathways to better water futures in South Africa. Results indicate the importance of several variables which include the presence of unique agents, socio-cognitive constructs, meso- and macro scale factors, access to capital, and the interplay of broader social processes in driving transformations, in the water sector and more generally. Several practical recommendations are made to facilitate transformations to more desirable water futures. These include re-thinking sustainability priorities with a focus on social aspects, adopting a dual perspective that combines an agent-centric view with a systems-orientated approach; spotlighting power dynamics; targeting underlying mental models; and co-creating favourable conditions for change. Findings from this thesis may provide valuable guidance for scholars, policymakers, and practitioners in steering water systems towards more sustainable, resilient, and equitable futures.

## Dr Tuwilika Victoria Shifidi

**Co-supervisors: Dr Nadia Sitas and Dr Richard Meissner**

**Thesis title: Equitable Water Governance and Water Politics in the Cubango-Okavango River Basin**


Physical and economic water scarcity are fuelling tensions and cooperation among state and non-state actors sharing transboundary water. Inequitable water governance processes are a primary precursor of water governance challenges in transboundary water systems. These water governance challenges are attributed to two primary problem areas. The first problem area identified is that water governance literature tends to take a very state-centric approach to transboundary water governance, forgoing the role of non-state actors in mediating hydropolitics, forging hydrodiplomacy, and co-creating context-relevant knowledge towards equitable transboundary water governance.

The second problem is that many water governance studies have generally focused on biophysical processes and engineered hydraulic solutions while paying little attention to the social systems and the inherent intertwinedness and interconnectedness between social and ecological systems. Innovative management and governance of especially shared water resources, particularly in transboundary basins, should continuously be improved and developed to efficiently manage the water available to current users while at the same time lessening conflicts and maximising output of use for various competing interests without compromising future needs and environmental flows.

Using the Cubango-Okavango River Basin (CORB) as a case study, this thesis investigation explored four main research questions: (1) How do state and non-state actors influence the decision-making of transboundary resource governance? (2) How does legal pluralism affect the stakeholders' decision-making regarding transboundary resource governance? (3) How does hydropolitics impact issues of water availability and equity in the CORB? and (4) How can futures tools inform water governance in the CORB? These questions are interconnected and allowed for the development of four academic papers.

A mixed method qualitative approach was used, data from semi-structured, in-depth interviews, 3 Horizon futuring process, and an actor-mapping questionnaire was analysed by thematic analysis. Embedded within an informed grounded theory, narrative and descriptive analyses, a Hydropolitical Security Complex (HSC) tool, and a Critical Interpretive Synthesis (CIS) to answer the research questions. Active participation by non-state actors in the water governance of the CORB is imperative for maximising synergies between state and non-state actors in transboundary water governance. This is a significant finding for maximising contextualised synergies between formal and informal governance systems in the CORB transboundary river system.

In additional, the study found that the 63 CORB stakeholders interviewed preferred governance mechanisms aligned with legal pluralism, suggesting that for plural water governance to be realised on the ground, there needs to be an increase in the level of local stakeholders' participation in transboundary water governance through the creation of new or fortified existing informal structures.

Findings brought to the fore how water governance aspects related to customary law in the CORB are considered or perceived to be more adaptive and relevant for understanding water governance within a local context when compared to civil law aspects. The thesis developed a water conflicts typology on actual and perceived triggers and areas of conflicts at both the basin level and the local level from a Namibian perspective, creating a deeper understanding of hydropolitics in the CORB. This is relevant for a deeper understanding of how issues related to the social wellbeing and ecological integrity of the CORB can be included in future decision-making processes to foster cooperation for improved transboundary water resources governance.

Findings speaking to the fourth research question found that transitioning from the current water governance system to the aspirational futures of water governance is uncertain, complex and presents multifaceted challenges. Shifts towards more transformative governance should include modifying existing water governance structures and creating additional informal institutions to involve more people in water governance at the local level to encourage broad articulation of ideas and participation in water governance and equitable access to water resources. Therefore, transformative water governance should consider the unique context in which governance will occur.. Given the abovementioned finding, the synthesis chapter explored the opportunities and challenges that exist for integrating an adaptive governance approach grounded in SES thinking. A synthesis matrix was used to synthesise solutions that may be possible for shifts towards equitable and sustainable transboundary water governance within the CAS features.

## Dr Willem Stefanus Malherbe

**Co-supervisors: Prof. Reinette (Oonsie) Biggs and Dr Nadia Sitas**

**Thesis title: Social-ecological resilience in practice: exploring capacities for navigating change in complex systems**


The world is facing a period of increased change and uncertainty due to multiple interacting challenges associated with the Anthropocene. The scale of these challenges requires new ways of navigating change and surprise in social-ecological systems to achieve just and sustainable futures. The concept of social-ecological resilience has been proposed to understand how systems navigate these challenges. The concept, however, is defined and applied in different ways, and the ambiguity surrounding it often detracts from how it is used. This study aims to advance the operationalisation of social-ecological resilience in ways that can engage with the complex and intertwined sustainability and equity challenges of the Anthropocene.

Four different approaches of enquiry are used – each related to a separate chapter prepared in the format of a journal article. The first approach is a systematised literature review that explores the progression of resilience definitions used in Sustainability Sciences. The remaining approaches applied to case studies of food systems in South Africa. A capitals approach and thematic analysis was used to empirically assess resilience capacities in horticultural farming operations. A mixed-method metacoupling approach was used to determine the effect that mechanisms that govern cross-scale interactions have on dimensions of equity in the horticultural value chain. Finally, participatory workshops using futuring approaches were used to evaluate the desired futures among different actor groups.

Results of the systematised review showed how resilience definitions have shifted in a normative direction in sustainability science. This is associated with the increasing use of transformation as one of the capacities and focus areas in resilience studies. Transformative capacity is associated with normative elements both in research (e.g. to address equity and justice), and in the definitions (e.g. with human wellbeing as stated outcomes). The capitals approach was used to classify resilience capacities based on the effects of changes and responses within farming operations. Results from the metacoupling approach showed how governance mechanisms applied at multiple scales may contribute to effects that undermine policy objectives at local levels and highlight the differential power that actors have to influence these outcomes. The futuring approaches showed how small-scale, and to a lesser extent emerging farmers, face a larger number of constraints than established farmers, yet these groups identify similar pathways to achieve their desired futures.

This study contributes to the operationalisation of social-ecological resilience by proposing a collective set of capacities, namely anticipative, absorptive, adaptive, and transformative capacities, as the mechanism through which resilience processes may be used to navigate the dynamics of complex social-ecological systems. Importantly, anticipative capacity is proposed to explicitly consider normative aspects of resilience, while a need for the spatial fit of governance mechanisms is highlighted as a policy recommendation. Also to be considered is the differential ability of actors to influence equity in systems, termed the 'equity landscape', emphasising the need for actors who lack recognition to be considered and empowered in relevant governance processes at different scales.

# MPhil in Sustainable Development: impactful and interdisciplinary

**The MPhil in Sustainable Development admitted 16 new students into our programme – a two-year, part-time degree that continues to attract a diverse and dynamic group of change-orientated professionals and researchers. 2024 marked the implementation of a new 120-credit thesis format, which takes the form of a journal-ready article. With this shift, we aim to strengthen the visibility and academic contribution of our students' work within key sustainability debates.**

Our MPhil cohort engages with a broad spectrum of research, reflecting the CST's commitment to interdisciplinary and impact-driven inquiry. A significant cluster of projects focuses on the evolving energy landscape in southern Africa, with students exploring topics such as financial flows and justice in renewable energy infrastructure, the role of provincial government in energy transitions, local manufacturing value chains for renewable components, and Namibia's renewable energy trajectory.

Several students concentrate on inclusive socio-economic development. These projects investigate the performance and outcomes of agricultural business incubation, the role of development finance in post-COVID recovery, and the potential of community-based mechanisms such as Participatory Guarantee Systems to support small-scale farmers. These studies probe the institutional conditions needed to unlock transformative local economies.

Urban and food systems transitions also received attention. Students examined informal settlement upgrading through architectural practice, imagining co-created urban futures through diverse temporal and sensory lenses, analysing persistent disconnections between food availability and access within South Africa's food system governance.

Human-environment relationships emerged as a powerful thread across multiple studies. From nature hikes offering sanctuary to children in violent landscapes, to the use of indigenous local knowledge for strengthening connections between underprivileged youth and nature, these projects bring emotional, cultural, and relational depth to sustainability questions. Students also explored the inner workings of change processes through the pedagogical impact of relationality on change-agent development.

As these students progress through the various phases of their research, we are excited by the critical questions they are raising and the practical implications their work holds. The introduction of the article-based thesis format opens new pathways for CST's MPhil research to influence both academic and practitioner communities in real time.

The year was rounded off with the graduation of nine of our students – a proud feat for the Centre.

# Postgraduate Diploma in Sustainable Development: foundations for future change agents

**In the context of rapidly escalating and increasingly complex sustainability challenges, students from diverse backgrounds and professions join the PGDip in Sustainable Development, motivated by how these challenges manifest in their communities and workplaces. In a globally transitioning world, the PGDip aspires to cultivate competencies and dispositions to collaborate with empathy and respect, work across differences, and advocate for justice and equity.**

In 2024, we welcomed a cohort of 30 students, bringing the total number of students registered in the programme to 73. Following an intensive period of programme restructuring and renewal, the 2024 cohort was introduced to a renewed curriculum orientated towards sustainability transitions and transformations. This refreshed curriculum was delivered in a restructured format to better support the success of full-time and part-time students. Modules ran back-to-back with a stronger sense of flow through asynchronous preparation and synchronous in-person learning, followed by the consolidation of individual assessments.

A wider range of assessment formats was introduced to link academic inquiry to practical and professional application. Most modules included a block contact period on Stellenbosch University's main campus, embedding the programme's explorations of sustainability within the context of this university town that is nested in wider social-ecological systems. Two modules retained a portion of in-person learning at the Sustainability Institute which served as a context for encountering radical alternatives and niche innovations. For all modules, strong links between concepts and application were enriched by diverse guest contributions and immersive field trips.

Rolling out these changes was made possible by a student cohort and programme team prepared to 'be in transition' with all the challenges and possibilities that unfolded during the academic year. For staff and students alike, there was a keen sense of the CST's sustainability ethos being embodied throughout – in critical and creative classroom engagements, a supportive student community, and adaptive student support and administration.

We celebrated the graduation of 43 students from the PGDip programme in 2024.

# Short courses

## Short course on research methods for resilience and sustainability research

CST researchers Prof. Alta de Vos and Prof. Reinette (Oonsie) Biggs co-led an immersive five-day short course offered in collaboration with the Resilience Alliance, NSERC ResNet and The Programme on Ecosystem Change and Society (PECS). The week-long immersive course took place at Le Baluchon Eco Resort near Montreal, Canada ahead of the PECS-3: Pathways to Sustainability conference. The course explored approaches to studying social-ecological systems, with a special emphasis on participatory and place-based methods. Drawing on The Routledge Handbook of Research Methods for Social-Ecological Systems, the course offered participants a unique opportunity to benefit from a small-group format and an intensive learning-by-doing programme involving leading international scholars in the resilience field. The course was attended by 14 participants from countries across the Global North and South, including two CST students and another co-supervised by CST staff. The course provided rich opportunities for building early career research networks, and discussions at the course have informed the development of the early career researchers hub in the new Society for Social-Ecological Systems (SocSES).

# Convening conferences

## The 9th Network of Early career researchers in Sustainability Transitions (NEST) conference: addressing inequalities and sustainability transitions

'How do we embody diversity and complexity in addressing sustainability transitions?' This was one of the questions that emerged from scholars who participated in the NEST 2024: Stellenbosch Regional Hub.

*"The role-playing exercise was a fun and innovative way to engage reflexively with research methods. While I'm familiar with using desktop research, having to identify the 'symptoms' of my 'illness' pushed me to think from, rather than about, the method itself. Adopting this new perspective provided fresh insights into desktop research and its integral role in the research process."*

*– Lexi Daoussis, MPhil student, CST*

The Network of Early career researchers in Sustainability Transitions (NEST) was founded to support the growing number of PhD students and early career researchers (ECRs) specialising in sustainability transitions. This global volunteer initiative emphasises transformative change, shared knowledge and collective action, and cultivates community exchange. The annual NEST Conference was one opportunity for ECRs to connect and share their research.

The conference drew scholars outside of NEST's predominantly Euro-Western demographic to promote worldwide scientific collaboration between ECRs. The conference was co-hosted across three hubs in three countries: Monash Sustainable Development Institute at Monash University in Australia, the Center for Research on Digitalization and Sustainability at Inland Norway University of Applied Sciences in Norway, and the CST at Stellenbosch University in South Africa.

We intentionally focused on African scholars through the Stellenbosch regional hub, reflecting a broader trend in transitions research of the geographic expansion of empirical cases from the Global South with a focus on transitions-in-the-making. We saw this in the presentations on renewable energy waste generation in South Africa, sustainable and equitable housing transitions, circular economies in the global South, and sustainable and just food transitions in Kenya. We were proud of NEST 2024 as it shifted the narrative from research 'of' Africa to research 'from' Africa.

The conference showcased African scholarship in a time of global transitions where the multiplicity and plurality of African realities can offer radical alternatives to the world. It provided a platform for connection, and for African scholars to supplement the lack of strong research networks regionally, as well as addressing the challenges of isolation in their research and separation from the wider academic landscape.

The South African hub featured a walking keynote address by the CST's Prof. Mark Swilling, who guided participants through the Lynedoch Eco Village to ground participants in the practicalities of change in an African context. This was followed by a methods clinic where participants diagnosed several methods and, drawing from their own expertise, created a shared understanding of the ways we engage.

> *"It was a very engaging, informative, transitional two days of learning from each other. Thank you for organising this!" – Marietta Musyoka, PhD candidate at Tangaza University*
>
> *– Institute of Social Transformation*

## PECS-III: shaping pathways to sustainability

After the disruption to in-person gatherings due to COVID-19 pandemic restrictions worldwide, scholars, practitioners, participants, and early career researchers finally had an opportunity to gather for the third international conference of the Programme on Ecosystem Change and Society (PECS-III) which took place in August 2024, in Montreal, Canada. The conference, with its theme, 'Pathways to Sustainability: Social-Ecological Resilience and Transformation Across Scales', brought together 378 registered participants from more than 50 countries. It was a vibrant gathering of a community who work on place-based social-ecological systems (SES) research.

As hosts of the PECS international project office, the CST played a prominent leadership role in the event. The CST was the third most represented institution at the conference, with a strong delegation of faculty, students, and research fellows. Prof. Alta De Vos co-chaired the conference and co-led the organisation of the event, with Prof. Oonsie Biggs and Dr Julia van Velden serving on the organising and advisory committees respectively. CST research fellow Dr Odirilwe Selomane delivered a powerful keynote address, weaving together perspectives on justice, pluralism, and planetary change.

PECS-III surfaced emerging themes that reflect the field's evolving priorities. These included deepening relational and decolonial approaches to sustainability research, advancing methodological diversity through mixed and participatory methods, and supporting real-world partnerships for transformative change. Several sessions explored tensions between the generalisability of place-based research and the need for situated, contextual knowledge. Others reflected on the institutional and epistemic shifts needed to reimagine the role of SES research in a rapidly transitioning world.

CST researchers were deeply engaged across the PECS-III programme, reflecting the Centre's wide-ranging contributions to the social-ecological systems field. CST staff and students – Caroline Wallington, Keziah Mayer, Kinga Psuik, Lexi Daoussis, Liebrecht Davies-Fick, Merin Jacob, Prof. Oonsie Biggs, Prof. Rika Preiser, Dr Julia van Velden, Prof. Alta De Vos, Sungeni Karonga, and Willem Malherbe – contributed across the PECS-III programme, covering themes such as conservation and social equity, contested land and resource use, governance in energy and water systems, researcher reflexivity, plural valuation, and transformative pathways including Seeds of the Good Anthropocene. Several also contributed to sessions on SES research methods, including the SES Methods handbook and website. Two CST PhD candidates, Caroline Wallington and Keziah Mayer, were selected for the competitive early-career short course on novel methods in SES research.

PECS-III reaffirmed the value of slow scholarship, meaningful connection, and collective experimentation. From forest walks to co-creating art, the conference invited participants to think with their whole selves. Throughout, a spirit of reflection, generosity, and rigour animated conversations about where the field has come from and where it must go next.

### An ECR's Experience of PECS-III, Canada – Keziah Mayer

Attending the PECS-III Conference was an unforgettable experience, one filled with deep conversations, new collaborations, and fresh insights into social-ecological transformations. Just before the conference, I participated in a weeklong PhD course on Social-Ecological Systems Methods, hosted by the Resilience Alliance. The course brought together 16 early career researchers (ECR) from around the world at Le Baluchon eco village. My group created a lesson plan on 'Values of Nature', which was submitted to the open source repository, SES Methods. Not only was it a productive work week, but it also provided the foundation for collaboration.

In addition to participating in the course, I presented my PhD research and the results of my first paper, both through a short talk and a poster session, at the conference. I facilitated an innovative session, 'Diverse Voices, Diverse Pathways', where we explored how different perspectives shape pathways to sustainability which was an inspired learning for us all.

Beyond presentations, I coordinated a blog, ensuring that the insights of early career researchers (ECR) were captured and shared on the PECS website as well as the ECRs' social media platforms. One highlight was writing my own blog post, 'Of trees and elephants: embracing a relational science', reflecting on how relational thinking can deepen our approach to social-ecological research. Being surrounded by people who are driven to contribute to a more just and sustainable future nurtured the part of me striving towards a good Anthropocene. PECS-III was about more than just knowledge sharing, it was about connecting ideas and people to drive real change.

## PECS-III solidifying our continued work – Caroline Wallington

The PECS-III Conference exceeded its vision to be an exceptional gathering of the "greatest researchers, thinkers, and place-based practitioners that work in the interdisciplinary and complex social-ecological space". It is notable that half of the conference's 379 participants were early-career professionals (ECPs). It was clear from the programme and side events that the conference was co-designed with and for ECPs. Along with many others, I had the opportunity to share my research, which explores social-ecological regime shifts across space and time. A highlight was the special session for ECPs designed to connect and harness key insights on our desired way forward for the field of social-ecological systems (SES). The session was a catalyst for the creation of the Early-career Hub, which will form part of the Society for Social-Ecological Systems, being launched in 2025.

The experience was certainly overwhelming at times, but the kindness and humility of this group created a unique gathering where ECPs were able to connect not only with each other but also across generations. I left feeling welcomed, inspired, and empowered.

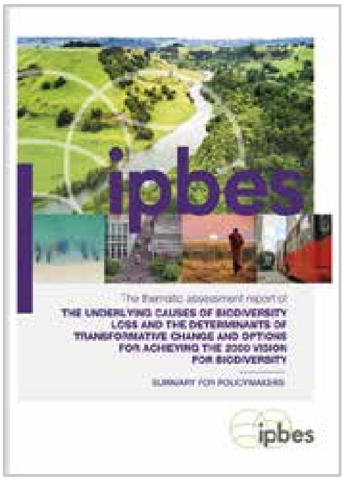
# CST research and project highlights: our contributions

Research at the Centre for Sustainability Transitions serves as a powerful tool to understand the world, navigate complex interconnected challenges, and ultimately serve society in ways that are tangible, equitable, and sustainable. Our research examines diverse fields from sustainability transitions and social-ecological resilience to finance and influencing policy. This multi-disciplinary approach is crucial because the issues we face do not exist in silos. Our research and projects are informed by five core research themes: knowledge co-production, finance and research flows, transformative futures thinking, social-ecological resilience, and political economy and development. Here are some of the highlights from projects undertaken at the CST in 2024.

## Knowledge co-production

### Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) Transformative Change and Nexus Assessments

IPBES, also known as the 'IPCC for biodiversity,' is an independent intergovernmental body comprising over 147 member governments. Established in 2012, it provides policymakers with objective scientific assessments about the state of knowledge of the planet's biodiversity, ecosystems and the contributions they make to people, as well as the tools and methods to protect and sustainably use these vital natural assets.



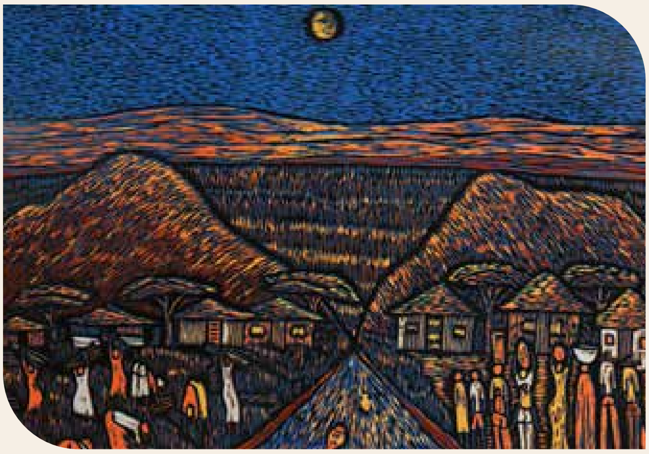

The two latest IPBES assessments – the Transformative Change and Nexus assessments - were initiated in 2022 and approved at a plenary with all member states in Namibia in December 2024. Several CST staff members and fellows were involved in leadership roles in these assessments, either as coordinating lead authors or lead authors. The role of coordinating lead authors is a particularly 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. Oonsie Biggs served as coordinating lead author for 'Chapter 3: How transformative change occurs,' of the Transformative Change assessment, while CST fellow Prof. Laura Pereira served as a lead author for 'Chapter 5: Realizing a sustainable world for nature and people: means for transformative strategies, actions and roles for all.' CST fellow Dr Odirilwe Selomane was lead author for 'Chapter 3: Future interactions across the nexus' of the Nexus assessment, while CST fellow Dr Nadia Sitas as lead author for 'Chapter 4: Policy and sociopolitical options across the nexus that could facilitate and accelerate the transition to a range of sustainable futures.' Laura, Odi and Nadia were all based at CST as staff members earlier in their careers, attesting to the impact of the CST in these areas.

The Transformative Change Report – with the full title, Thematic Assessment Report on the Underlying Causes of Biodiversity Loss and the Determinants of Transformative Change and Options for Achieving the 2050 Vision for Biodiversity – was prepared over three years by more than 100 leading experts from 42 countries from all regions of the world. The report explains what transformative change is, how it occurs, and how to accelerate it for a just and sustainable world. It highlights that there is a closing window of opportunity to halt and reverse biodiversity loss and to prevent triggering potentially irreversible decline and collapse of key ecosystem functions. It also emphasises that most previous and current approaches to conservation, which aim to reform rather than transform systems, are failing to halt or reverse the decline of nature around the world, which has serious repercussions for the global economy and human wellbeing.

In particular, the report finds that the cost of delaying actions to halt and reverse biodiversity loss and nature's decline around the world by even a decade is estimated to be double that of acting now. Acting immediately can also unlock massive business and innovation opportunities through sustainable economic approaches, such as nature-positive economy, ecological economy and Mother Earth-centric economy. Recent estimates are that more than $10 trillion in business opportunity value could be generated and 395 million jobs could be supported globally by 2030.

## Mobilising African experts to co-produce biodiversity information: the Bii4Africa project

Accelerating socio-economic development over the past century has caused a dramatic transformation of ecosystems, through human activities such as cultivation, urbanisation, resource extraction and infrastructure development. As awareness grows about the scale and pace of biodiversity loss, so does our understanding of the importance of biodiversity to human wellbeing. Despite this increased awareness, development agendas and policy interventions persistently overlook the critical role of biodiversity in sustainable development. A lack of context-specific biodiversity information at policy-relevant scales has posed major limitations to mainstreaming biodiversity considerations into decision-making. Nowhere is this more true than sub-Saharan Africa, which is severely under-represented in global biodiversity datasets.



There may be a lack of biodiversity data for sub-Saharan Africa, but there is a wealth of knowledge about the region's biodiversity and how it is influenced by human activities. An entirely different approach to measuring biodiversity is to ask the people who work in these ecosystems for their insights on how much biodiversity remains. This knowledge is held by African biodiversity experts – researchers, field rangers, tour guides, museum curators – the people who work on a daily basis in the region's changing landscapes. In this project, we sought out and convened 200 experts in African biodiversity in a series of expert elicitation processes to translate their knowledge into co-produced data. The resulting 'bii4africa' dataset contains standardised estimates of the impacts of human activities across sub-Saharan Africa on the abundances of its terrestrial vertebrates (±5 400 amphibians, reptiles, birds, mammals) and vascular plants (±45 000 forbs, graminoids, trees, shrubs). In 2024, we published this extensive dataset open access, with all contributing experts as co-authors. The paper has already been accessed over 11,000 times. We are now using this dataset to produce a map of remaining biodiversity intactness across sub-Saharan Africa. The contributing experts are showcased on the project website and Google earth story explores the landscapes where these experts work across the region. CST contributors of this project are Dr Hayley Clements (project lead), Prof. Alta De Vos, Prof. Reinette (Oonsie) Biggs, Dr Maike Hamman, and Dr Odirilwe Selomane. The project is funded by Oppenheimer Generations Research and Conservation.

## The S'timela Game: deepening the Just Energy Transitions conversation

CST research fellow, Dr Nthabi Mohlakoana supported by CST researchers have developed a game to deepen conversations about the Just Energy Transition (JET) in South Africa. The S'timela Transitions Game was conceptualised based on the interaction with community and labour representatives that were part of a workshop in Emalahleni, Mpulamalanga Province. Vukani Environment Movement, Sustainable Energy Africa and GroundWork partnered with CST to support coal communities and trade unions to better understand the energy transition process and the specialist, often alienating language that is part of this discourse. The S'timela game emerged out of these partnership engagements. It uses common language and imaginaries that ordinary people are familiar with to shape their participation in the JET process. Participants used the analogy of a train to refer to South Africa's energy transition process, with many feeling they had no clarity of the journey or destination and did not know how to get on the train to be part of a just energy transition future.

The S'timela game is made up of role playing cards, such as train driver, train conductor, first class ticket holder, third class ticket holder, no-ticket holder, etc. These cards ask the role players to imagine themselves taking part in the energy transition process. For example, the train driver would assume the role of driving the energy transition and therefore would have a prominent position in government, such as the President or the Presidential Climate Commission. Someone that is a third class ticket holder would assume the role of working class individual and think how such people would engage with the JET process.

This game helps participants see the transition journey from multiple perspectives, provides a platform to use familiar language and associate the energy transition process with their own realities. For researchers, this game offers an unthreatening and creative way to talk about JET with communities. The S'timela Transitions Game is being further refined for open access.

## The SES Methods website: an online repository of training resources for students, researchers and educators

It was a year filled with activities for the SES Methods project that continued to gain momentum not only by gathering resources and information for its online repository, but hosting a series of 'method bazaars', a hack-a-thon, and presenting and building connections at the PECS-III Conference.

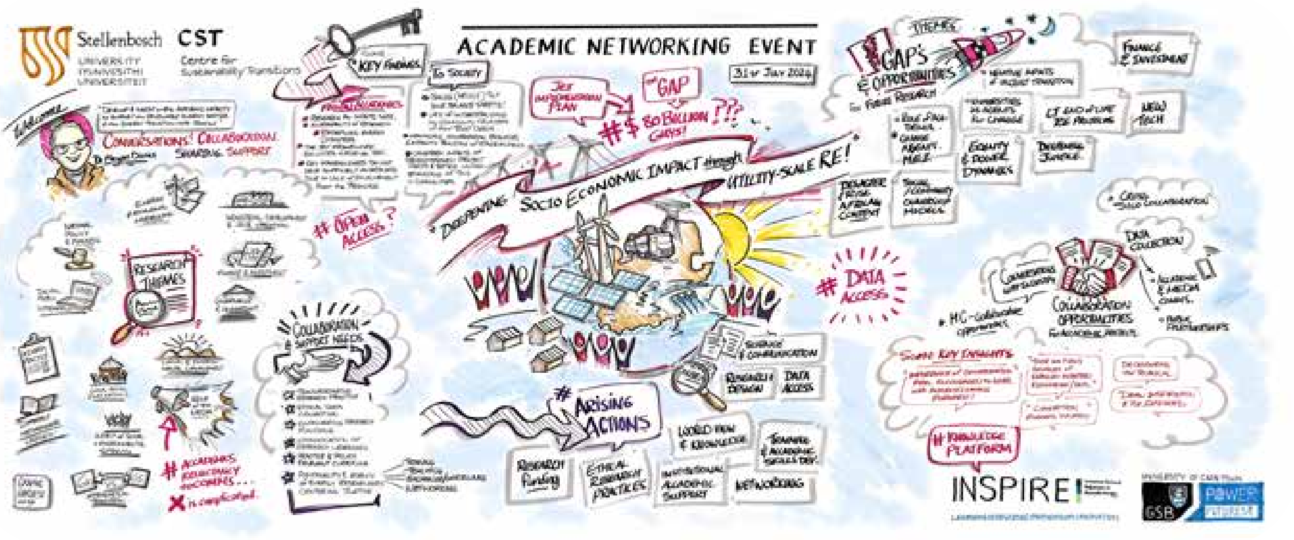
In a world experiencing a range of complex social-ecological challenges that require strong collaborations, new methods to tackle these complexities, while integrating diverse ways of knowing, has become even more important. In 2024, several activities and initiatives related to the SES Methods project and tackling these complex issues, were rolled out: the poster presentation at the PECS-III Conference provided an opportunity to showcase the work done by the project, as well as allowing for networking opportunities; the SES Methods bazaars, which provided a platform for researchers, students and practitioners in the field to gather for an interactive knowledge exchange; and the SES Methods hackathon, which formed part of the CST's outreach module for MPhil students, generated high-quality content as well as increased the visibility of students within the SES research landscape.

A major activity of the project is the SES Methods website. The online repository platform, based on The Routledge Handbook of Research Methods for Social-Ecological Systems, provides a comprehensive synthesis of research methods used to study social-ecological systems. These resources are an effort to demystify SES methods to make them more accessible to new researchers of this field, giving them the capacity to make informed choices on research designs, and progressively increasing their capacity to collaborate across disciplines and contexts.

The website provides accessible content on commonly used SES methods, generated by local and international researchers and practitioners actively working in the field. It provides an opportunity to become part of a community of practice that collectively cultivate shared resource hub, building the methodological agility and competence of SES research.

## Overcoming acceleration challenges in the South African energy transition

As the global energy transition unfolds, new challenges emerge beyond simply the priority to scale up the financing and deployment of renewable energy technologies. In South Africa, for example, transmission grid constraints limit the expansion of utility-scale solar and wind energy projects, the employment opportunities linked to green industrialisation are prioritised in national debates and evolving industry approaches to community benefits are increasingly contested at the local level.




The ACCELERATE project led by Dr Megan Davies launched in 2024, centres these 'acceleration challenges' in South Africa's just energy transition and explores the implications of a shifting procurement landscape in terms of governance, procurement, industrialisation, and job creation. Funded by the DANIDA Fellowship Centre and implemented by the Danish Technical University (DTU), the four-year project is a collaboration between DTU, the CST, the Development Policy Research Unit and the Graduate School of Business, both at the University of Cape Town. Industry associations SAPVIA and SAWEA are project partners.

The CST leads a work package that investigates how relations are (re)negotiated and power dynamics shift, how the arenas opened by new governance arrangements are taken up by diverse actors, and what new forms of community involvement and local interactions emerge.

Two CST PhD candidates, Abulele Adams and Chulumanco Mdingi, drive the CST's contribution. One examines socio-economic dynamics and stakeholder engagement practices in a shifting procurement landscape, while the other explores policy, investment, and impact assessment mechanisms for spatial prioritisation of renewable energy developments.

In 2024, we focused on building a strong foundation for international collaboration and local partnership, driven by early career researchers. ACCELERATE's research design prioritises knowledge co-production and transformative research, requiring diverse knowledge and stakeholder participation.

Inspired by this, ACCELERATE partners hosted an Academic Networking Event, where 35 practitioners, students, and researchers gathered in Cape Town, South Africa, to focus on the socio-economic dynamics of utility-scale renewable energy in South Africa's Just Energy Transition. The key aim for the event was to explore how to develop the academic capacity to support the renewable energy industry and deepen community impact and socio-economic development in support of the national commitment to a just energy transition. The gathering was significant in affirming that complex acceleration challenges require researchers to engage in new and collaborative ways, which often goes against the grain of how 'science-policy-practices' research processes take place.

## The Southern African Resilience Academy

The Southern African Resilience Academy (SARA) was established in early 2021 and is coordinated through the Centre for Sustainability Transitions led by Dr Julia van Velden, working together with Prof. Reinette (Oonsie) Biggs and Prof. Alta de Vos. The overarching aim of SARA is to provide a convening and support space for inter- and transdisciplinary researchers and practitioners working on pressing resilience and development challenges across southern Africa. SARA is one of several South-to-South Resilience Academies supported by the Global Resilience Partnership (GRP).

SARA's activities in 2024 centred on a three-day knowledge exchange, held in Stellenbosch, South Africa, and focussed on disseminating the outcomes of a set of eight working groups that examined the theme of 'equitable resilience', as well as creating connections which might be relevant to the new round of working groups planned between 2025 and 2027. This event was a vibrant mix of talks, activities and workshops, and attracted 69 participants from academic and practitioner backgrounds across southern Africa. The gathering provided a platform for learning, networking, and collaboration, and focused on how to best create transdisciplinary networks which contribute to theory, policy and practice. A participant reflected: "[The event] just reinforced how important it is to have these spaces where people with different ways of working can share ideas. A big outcome is not just the 'products' but learning how to talk to each other and work with each other."

SARA then ran a call for applications for new working groups to synthesise knowledge under the theme, 'Transformative Pathways to Resilient and Sustainable Futures'. This call resulted in the selection of eight new groups (52 members in total), including diverse topics such as climate resilient futures in southern Africa, synthesising local knowledge, gender equity, and policy innovation, and leveraging human-nature connectedness to promote sustainability transitions in southern African urban settings. Members included policy makers, practitioners, academics and students from nine different African countries. Several of the groups include CST staff or fellows, who will be part of this co-learning process over the next three years.

Groups will meet in a series of online and in-person engagements from 2025 to 2027, with the academy aiming to build strong and trusted regional networks in southern Africa, as well as providing a transformative learning experience for members through co-created skills clinics, mentorship, and support to craft policy engagement processes.

# Transformative futures thinking

## Youth futures for systemic justice: towards anticipatory praxis project reflections and learnings

How are youth seen and valued in a world in transition? A team of researchers and students from the CST set out to explore this question in the collaborative research initiative, Youth Futures for Systemic Justice: Towards Anticipatory Praxis. The project marked the second phase of a three-part programme funded by the International Development Research Centre (IDRC-CRDI) and co-developed with the South African Institute of International Affairs (SAIIA) and the Bertha Centre for Social Innovation and Entrepreneurship. It is led by Prof. Rika Preiser working together with CST fellow and former CST graduate, Dr Deon Cloete, and informs the PhD and Masters projects of Reinhold Mangundu, Jurgen Wolfenden and Ben Carlyle at the CST.

*"It was clear that the shared passion for the development of our continent and the collective hunger for agency had brought us all together in this beautiful space of unity and purpose."*

*– Youth participant*

The initiative was rooted in a desire to support youth changemakers and seed initiatives – small-scale, often marginal, yet highly innovative community experiments that challenge dominant paradigms and offer pathways toward more just and sustainable futures.

A central aim of the project was to shift how youth are viewed in the context of development and transformation. Rather than being positioned as passive recipients of top-down policy interventions, youth were engaged as agents of systemic change – already embedded within their communities and capable of co-creating solutions that respond to complex, interlinked crises.

A key strength of the project was its emphasis on building relationships. The initiative deliberately sought to support not only individuals, but also ecosystems – networks of youth, changemakers from various sectors and researchers, working toward reimagining African futures. This allowed for meaningful collaboration, intergenerational dialogue, and the kind of trust-building that is essential for long-term transformation.

Over the course of the year, the team facilitated two in-person engagements in Cape Town, South Africa: the Co-Visioning Workshop that brought together youth-led seed initiatives and changemakers to explore future competencies and worldviews, and the Anticipation Summit, which deepened this inquiry through a focus on relational systems thinking, collective sensemaking, and anticipatory governance. These engagements were followed by four virtual Transformation Labs (T-Labs) that served as iterative touchpoints for reflection, learning, and co-creation.

The contributions of youth innovators in this project was nothing short of inspiring. From Namibia to South Africa to Kenya, young people shared bold, creative, and contextually grounded responses to some of the most pressing challenges of our time. Their work demonstrated that transformative change is not only possible but that it is already happening in contextual ways. These initiatives were deeply rooted in local knowledge and needs, yet they also offered transferable insights for global challenges.

## Seeds of Good Anthropocene: fostering food systems transformations in Africa

The IDRC-funded project, Seeds of Good Anthropocene: Fostering Food Systems Transformations in Africa, was launched in 2022 and is a collaborative partnership project led by CST researchers Dr Nyasha Magadzire and Prof. Oonsie Biggs, working together with the CST fellows Laura Pereira at the Global Change Institute at the University of the Witwatersrand and Sandra Boatemaa at Ensign Global College in Ghana, together with collaborators at the Stockholm Resilience Centre in Sweden, and McGill University and the University of Guelph in Canada. It forms part of the broader Seeds of Good Anthropocene initiative and seeks to identify and analyse local-scale food initiatives and innovations that offer viable alternatives to dominant, unsustainable food system practices.

Focusing on three coastal urban regions: Cape Town, Accra, and Mombasa, the project uses a place-based case study approach to identify and engage with promising food-related seed initiatives. Through interviews and participatory workshops, the team explores how these initiatives emerge and operate, what enables or constrains their growth, and how funders, investors, and policymakers can better support their development and scaling. The research also sheds light on opportunities for collaboration among seed actors, as well as potential tensions that might arise in overlapping areas of work.


By 2024, the project identified approximately 150 seed initiatives and conducted 90 in-depth interviews with initiative leaders across the three sites. Additionally, three food futures workshops, one in each country, have brought together practitioners, innovators, and experts to envision alternative food system pathways. These workshops have not only strengthened connections among seed actors but have also contributed to advancing scenario and foresight methodologies by focusing on actionable steps needed to achieve desired food futures. Project outputs include a series of scientific publications (with several contributions slated for a special issue of Ecology & Society), workshop reports, visual summaries, short videos, and a booklet showcasing selected seed initiatives.

Originally scheduled to conclude in December 2024, the project has been extended for an additional year to support the development of a Community of Practice (CoP) for food innovators in the case study countries. The CoP will serve as a platform for peer-to-peer learning, network-building, collaborative funding applications, and fostering both intra- and inter-regional collaboration among food system innovators.

## CST research fellow – Dr Sandra Boatemaa

Dr Sandra Boatemaa was a postdoc at the CST between 2017 and 2021 and is now one of our key collaborators on the IDRC-funded African food systems transformation, leading the Ghana case study. To date there have been very few seeds – examples of innovative, potentially transformative initiatives – collected in West Africa, and one of the objectives of the IDRC project was to fill this gap. Sandra also continues to be a prolific publisher working on various global health topics, focusing on the African context and challenges.

Sandra had a team of Masters students working with her on the IDRC project and has collected 78 seeds. In addition, three Masters projects based at Ensign Global University have been linked to the project: Deborah Larbi-Sarpong focused on assessing the food environment in Jamestown and Ussher Town; Judith William investigated out-of-pocket healthcare expenses under the national health insurance scheme in Ghana; and Helen Bour focused on Food Systems Mapping: A Scoping Review of Challenges and Innovations in Ghana's Coastal Areas.

# Social-ecological resilience

## Enabling agroecological wildlife economies that sustain people and planet

Growing recognition of the global biodiversity crisis has placed increasing pressure on nations to conserve and restore ecosystems while advancing development. In Africa, wildlife economies offer a unique opportunity to align these goals by using wildlife as an economic asset through ecotourism, hunting, game meat, carbon credits, and much more while equitably benefiting the local communities who steward these landscapes.

Despite growing interest, governments, NGOs, and the private sector continue to face barriers to unlocking equitable wildlife economies, particularly due to gaps in accessible, decision-relevant knowledge. This project, led by the South African National Biodiversity Institute (SANBI) in partnership with the African Conservation Centre and CST researchers Prof. Alta de Vos and Dr Hayley Clements, aims to co-develop tools and knowledge products to support implementation in South Africa and Kenya.

In South Africa, the revised Biodiversity Economy Strategy seeks to grow the sector by enabling emerging black landholders to participate more fully. Access to reliable information on business models, investment requirements, and expected returns remains a key barrier, especially for new entrants in a sector long dominated by established private wildlife ranchers. In 2024, we worked with the Department of Forestry, Fisheries and the Environment (DFFE) to present this information on the new Biodiversity Sector Investment Portal. We also published some of this information in a peer-reviewed paper in the journal, Conservation Science and Practice, which identified six distinct wildlife ranching models and analysed their socio-economic contributions across different biomes – critical information for tailoring support to new entrants.

The project also hosted its final user-needs workshop with key state implementing agencies: South African National Parks (SANParks), the Department of Agriculture, Land Reform and Rural Development (DALRRD); and the private sector. A conservancy model was identified as a key mechanism to expand the wildlife economy to new market entrants, catalysed by strategic government investment and public-private partnerships, alongside other strategies such as investing in basic infrastructure, tailoring business plans to entry-level models, and supporting shared governance arrangements for mentorship and market access.

When the DFFE released its revised strategy in 2024, it sparked public debate, particularly around its intention to scale up sectors such as hunting. In response, project members contributed an article, South Africa's conservation model: why expanding the use of biodiversity to generate money is a good idea, published in The Conversation Africa. The article explained the rationale and nuance behind biodiversity-based enterprises. This public engagement also led to an interview on the South African current affairs news programme, Carte Blanche.

In Kenya, we co-hosted two major workshops. The first, held in Nairobi, convened national policymakers and sector experts to map high-potential wildlife economy models. The second, in Narok, brought together conservancy leaders from southern Kenya to co-create pathways for rewilded rangelands, develop knowledge products, and identify investment-ready pilot opportunities grounded in local realities.

## Modelling feedbacks in conservation systems

Conservation areas are expected to deliver biodiversity, climate, and livelihood benefits, but doing so depends on navigating complex feedback between people, ecosystems, and institutions. These feedbacks are often overlooked in existing models, limiting their usefulness for real-world decision-making.

The SCAT working group, co-led by the CST's Prof. Alta De Vos, with Dr Hayley Clements as a key member, is working to change that. Hosted by the German Centre for Integrative Biodiversity Research (iDiv), the group brings together expert systems modellers and place-based scientists and pracademics from six continents to develop better tools for understanding and governing conservation systems. These archetypes make it possible to compare diverse cases, reveal common challenges, and test how different interventions might play out. In 2024, the group met twice in Leipzig to refine the archetypes and begin modelling key dynamics such as human-wildlife conflict and infrastructure development.

By building models that reflect the complexity and diversity of real-world systems, the group aims to generate more generalisable, policy-relevant insights for conservation science.

## Program on Ecosystem and Society (PECS) international project office

The CST continues to host the international project office for the international Program on Ecosystem Change and Society (PECS), led by Prof. Alta de Vos. PECS is one of 26 global research networks linked to Future Earth, and the only programme coordinated out of the Global South.

The main activity for 2024 was hosting the long-awaited PECS-III international conference in Montreal, Canada, which was co-led by Prof. de Vos. The other key activity was to work closely with the international Resilience Alliance to develop detailed plans for launching the new Society for Social-Ecological Systems (SocSES). The Society will leverage new online networking platforms and technology to support small-group collaborative work and discussions that have characterised the SES field. In addition to various thematic streams, SocSES will be organised around a number of regional hubs, one of which will be the Southern Arican regional hub, building on the networks and work developed by the Southern African Program on Ecosystem Change and Society (SAPECS).

## Laying the groundwork for a social-ecological systems society

For over a decade, researchers in the social-ecological resilience (SES) have called for the creation of a dedicated society – a shared home to support connection, collaboration, and mutual learning across geographies, disciplines, and knowledge systems. As the SES field has matured and expanded globally, it has become increasingly clear that existing networks are no longer sufficient to sustain and support the growing SES community.

In an era of accelerated social and environmental change, such a society has become increasingly necessary. Researchers working at the interface of sustainability and transformation are not only generating critical insights, but also navigating new ethical, institutional, and relational demands. A society offers structure and support for this work, creating space to build capacity, foster inclusivity, and strengthen the field's collective voice and relevance. PECS-III in Montreal became a pivotal moment in moving this idea forward. A dedicated PECS working group meeting, co-organised by CST researchers, convened early career and senior scholars to reflect on the evolution of the field and imagine what a next-generation society could look like. Throughout the conference – in symposia, hallway conversations, and informal gatherings – participants coalesced around a shared vision: a global, inclusive, and responsive society that could nurture early-career scholars, promote regional equity, enable synthesis, and engage more effectively with policy and practice. The foundation for building the Society for the Social-Ecological Systems was solidified.

SocSES
SOCIETY FOR SOCIAL-ECOLOGICAL SYSTEMS

# Finance and resource flows

## CST's work to strengthen Africa's DFIs for a just and climate-resilient future: unlocking Africa's financial power

In 2024, the Centre for Sustainability Transitions focused on a simple but powerful idea: Africa's Development Finance Institutions (DFIs) are uniquely positioned to lead the continent's shift to a low-carbon, inclusive future. With the right support, these public banks can finance climate-smart infrastructure, clean energy, agriculture, and small businesses – sectors that commercial lenders often overlook.

Our project, The Role of DFIs in Africa's Just Transition, supported by the European Climate Foundation, helps DFIs deliver on that potential. We worked closely with the Association of African Development Finance Institutions (AADFI) to connect with DFI leaders across the continent and assessed institutional strengths, climate finance readiness, and operational challenges.

In partnership with Makerere University we also co-developed four Master's-level curriculum modules covering climate finance, just transition leadership, and green entrepreneurship. These were designed to equip the next generation of African finance professionals with the tools to drive inclusive, climate-aligned investment.

We also collaborated with RUFORUM, national cleaner production centres, and other institutions to share learnings and build momentum. These partnerships are now shaping new initiatives aimed at strengthening institutional capacity and aligning DFIs with climate finance goals.

It was also important for us to bring Africa's voice to global conversations. As co-leads of the Global Research Network on Public Development Banks, we helped shape the research agenda for the 2025 Finance in Common Summit, which was held in Cape Town.

We were also invited by the United Nations' Department of Economic and Social Affairs to present at the Financing for Development 4 (FfD4) Pre-Conference in New York, bringing African DFI insights into global conversations alongside institutions like AFD, IDFC, and the World Bank.

In 2025, the CST will focus on putting this work into action. Tools such as the DFI Capacity Guideline Handbook, country policy briefs, and the proposed Africa Infrastructure DFI Support Hub will help DFIs strengthen internal systems, scale green finance, and embed justice in their transition work. In a fast-changing world, Africa's DFIs are stepping forward to lead, and the CST remains a committed partner to their efforts.

## Potsdam Sustainability Campus: a collaborative initiative

The Potsdam Sustainability Campus is an innovative and transformative programme championed by the City of Cape Town's Urban Sustainability Unit. Local governments are generally tasked to implement ideas through traditional governance structures, driven by sectoral agendas to implement projects and deliver solutions. Cities exist as interconnected systems, however, there is a growing awareness that these sectoral approaches embed trade-offs more than provide solutions. As such, the campus serves as an exemplar of systems-based governance as a means to address our complex societal challenges.

In doing so, the Campus has been earmarked to test various sustainability initiatives, for scale and replication across the city. These range from various agricultural techniques, renewable energy (agrivoltaics and hydrogen energy), e-mobility, biodiversity restoration, low-cost and low-impact housing and waste upcycling – all of which are to support and empower the local community and provide a space for training and education. This is to demonstrate and derisk the novel and promising technologies that would support the City in meeting the SDGs. It is also an experiment in the governance mechanisms that would enable agile and systemic management to grapple with the complexities of our current challenges.

*"We are in a time of urgency, and we need bold new ideas and practices, which cannot come from repeating 'already tried' projects, or expecting precise outcomes – we need a new culture of pushing boundaries, harnessing learning, sharing resources, and accepting that change is messy – only then will we see broader success."*

*- Urban Sustainability Unit, City of Cape Town*

The CST, alongside ICLEI Africa, has partnered with the Campus securing funding from the Council for Scientific and Industrial Research (CSIR). This funding will launch the first phase of the programme, 'The Campus: A One Hectare Circular Farm and Learning Hub'. This phase will develop a one-hectare farm using circular economy principles, with each element designed to minimise and absorb waste, and maximise yield while providing a space for training and education. The CST serves as the academic partner, providing guidance based on emergent transitions research that guides the on-site implementation. This is an exciting partnership, not only as a transdisciplinary project, but for the potential it holds for generative collaboration, which is responsive to the challenges in our city.

## Policy experimentation for sustainable investment in South Africa's WEF nexus

Creating meaningful change requires diverse partnerships and collective action. The WEF Policy Experimentation work brings this mantra to life by using dialogue to connect diverse actors for joint action. While identifying the funding gaps in the water, energy, and food sectors allows us to quantify the investment needs, it does not mean capital will naturally flow to those needs. Funnelling investments where it is most needed means people in finance, business, local government, policy, and other relevant groups need to do things differently, and this requires cross-sectoral conversations.

In 2024, the project applied this approach to South Africa's water sector, which is operating under crisis conditions. The dialogue was expertly facilitated by CST fellow, Prof. Andrew Boraine who has over 40 years' experience in matters of governance. The convening brought together actors from the private banking sector, development finance institutions, pension funds, water sector practitioners, sector research organisations, business and local government. The dialogue focused on establishing a common understanding for sectoral challenges and reform processes underway and driven by National Treasury, identified ways to create better conditions for attracting more private sector funding, readying the pipeline of water infrastructure projects and promoting collaboration. As Andrew puts it: "Water reform is a top issue for both the government and business. Potential private investors want to see stability and consistency in the water system, particularly in municipal water. It is unclear at this stage whether the water sector and local authorities have a shared goal for collaborative action on water reform. We therefore recommend urgent policy discussions with local government, linked to the local government reform process currently underway, about potential institutional and financial changes to ensure a shared agenda for change."

The dialogue was organised by CST in partnership with the Department of Water and Sanitation, the Water Partnerships Office, the National Planning Commission National Treasury, Operation Vulindlela in the Presidency, and the Presidential Climate Commission.

## CST research fellow: Prof. Andrew Boraine

CST research fellow, Prof. Andrew Boraine, brings over 40 years of experience in governance and partnering to the classroom. He is able to marry theory with decades of practical wisdom, which is a rare and valuable offering for students looking to tackle current, real-world sustainability challenges. Andrew is the co-convenor of the Governance and Institutional Change module of the CST's PGDip programme, and also offers master classes to other CST programmes on collaborative change making. He has also facilitated many high-level convenings for CST's research projects to help steer and manage complex knowledge co-production processes, and has collaborated with the CST Governance and Infrastructure research group to lead a dialogue for South Africa's water sector to help craft an agenda for joint action. Andrew is an international expert on economic and urban development and partnering for systems change.

He was a senior official in the constitutional department of Nelson Mandela's government in the immediate post-Apartheid years, and was the first post-Apartheid City Manager of Cape Town. Andrew later founded the South African Cities Network and helped establish the Cape Town Partnership, of which he was CEO for 10 years between 2003 and 2013. He was the CEO of the Western Cape Economic Development Partnership (EDP) until 2023, an intermediary organisation supporting diverse stakeholders to work together for collective impact and change.

Andrew is an Adjunct Professor with the Centre for African Cities, at the University of Cape Town.

## (Re)industrialising and greening South Africa's manufacturing sector

The CST has been working with a sub-group of the South African Steel and Metal Fabrication Master Plan (SMP) Group, which is made up of social partners from business, government and labour, to drive growth in the steel industry. The steel and iron industry are the backbone of South Africa's industrial sector, providing material input to mining, construction, and vast manufacturing activities. The industry also supports over 270 000 livelihoods. Due to low economic growth leading to low material demand, limited infrastructure (roadworks, rail, water supply or energy-related infrastructure), high electricity and transport prices, policy-related issues and other conditions, this labour-intensive industry has been struggling to sustain itself.

A major area of opportunity for addressing the issue of limited manufacturing demand is the material inputs required for major infrastructure projects; that is, the manufacture of piping and reservoirs for water infrastructure projects, or the steel sections for electrical towers in energy infrastructure projects. The National Transmission Company of South Africa (NTCSA) for example, plans to construct over 14 000 km of powerlines in the next ten years. If supplied locally, companies will have six to eight times more demand than they have had in the last 10 years. This will create an opportunity for revitalising the local manufacturing industry. Using local companies to manufacture and build infrastructure also aligns with the National Development Plan, as it supports the growth of the domestic industrial base and associated livelihoods.

**CST's collaboration with steel industry players seeks to:**

- understand how the packaging of the power transmission projects effects the ability of local companies to participate;
- understand and identify appropriate industrial policy intervention points, which can create better investment conditions for local industry while benefiting the programme; and
- understand the complex challenges experienced by manufacturers, including the major material suppliers upstream and smaller fabricators downstream.

The partnership between CST and the SMP unites research, industry and government to support local industrial growth, and therefore support local livelihoods. The team has been drafting a position paper from the perspective of local industry, which aims to provide insights and recommendations to government and the NTCSA on how to best support the participation of local manufacturers in the power transmission builds.

# Political economy and development

## Just Energy Transition financial modelling for local government

Local government takes centre stage in a dual track project funded by the Open Society Foundations. The project forms part of Kevin Foster's PhD, which seeks to understand the impact of the energy transition on municipal sustainability in South Africa.

The local government just energy transition financial modelling stream built the model to project the possible financial impact of the energy transition on local municipalities in South Africa. The project team built this model and developed the energy and financial scenarios in collaboration with Palmer Development Group and Stellenbosch University's Centres for Renewable and Sustainable Energy Solutions. Using Greater Kokstad Municipality (GKM) as an applied case, we specified and ran potential scenarios of energy transition that local governments face. The outcomes showed us the challenging reality faced by a well-run, financially sound municipality due to embedded generation increases and in response to loadshedding and rising electricity prices from Eskom. Two examples of elements of this reality are navigating a sartorially focused regulator like the National Energy Regulator of South Africa, in a multisectoral governing environment like municipal government; and building new governance approaches while operationally overwhelmed by existing process, such that strategic managers are forced into the field, making repairs, rather than adapting management systems. The second track, the Just Urban Transitions stream emerged after a stakeholder workshop held in early 2024. The stream evolved so rapidly that project collaborators realised it needed to incorporate a local community member to explore an implementation lab to further the concept of just and sustainable grid communities. After exploration, the financial modelling work co-produced with GKM laid a good foundation for examining what it means to build a just and sustainable grid community. Work with stakeholders is ongoing and focuses on building a shared understanding of the reality facing the GKM, and what the technical requirements are for adapting the electricity grid for a more sustainable municipality. The outcome of our findings will be presented to the GKM in 2025 and our hope is to continue to collaborate with the municipality and civil society to better understand the needs not only of the municipality but also that of their communities.

## South Africa's monetary architecture: 1983 to 2024

The South African Monetary Architecture project, which was conducted by the CST in partnership with the National Planning Commission, addresses two fundamental questions: (1) Why have the inequalities inherited from Apartheid persisted despite thirty years of democracy? and (2) Why has investment in Gross Fixed Capital Formation (GFCF) averaged 15% of GDP per annum since 1994, which is half the target set in the National Development Plan?

To address these questions, a Monetary Architecture (MA) approach has been adopted. The MA approach rests on the assumption that in a credit-based system everyone's asset is someone else's liability, and vice versa. As a result, the architecture of a financial eco-system can best be understood as a web of interlocking balance sheets. It is a complex adaptive system with identifiable patterns of behaviour that can be mapped and therefore understood. We worked closely with the architect of the MA approach, Steffen Murau, from the Global Climate Policy Centre in Berlin, with funding support from GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit).

The MA approach was used to analyse four key historical moments in the evolution of South Africa's monetary architecture: 1983 to 1985, 1996, 2014, and 2024. For each historical moment the balance sheet configurations between all public and private financial institutions are described and analysed within the overall changing dynamics of South Africa's political economy and its interactions with the global financial system.

The institutions that formed part of this analysis were the South African Reserve Bank, commercial banks, development finance institutions, pension funds, state-owned enterprises, shadow banks, National Treasury and South Africa's household balance sheets. We show that the total assets on the balance sheets of all South Africa's financial institutions are equal to R50 trillion. We also show that despite high levels of profitability, the private sector's contribution to GFCF is on average 10% of GDP when it should be 20 to 25% of GDP.

No industrialised economy has successfully developed when profits are not re-invested. As a result, large quantities of finance end up circulating within the financial system rather than the real economy. One of the consequences of this financialisation of the economy is high levels of inequality with the wealth of the top 0.1% of the population equal to twice the wealth of the bottom 90% of the population. State capture hollowed out the state-owned enterprises which have therefore not able to play their role as the lead investors in public infrastructure. The report to the NPC recommends a set of 'elasticity spaces' where there is potential to reconfigure a range of balance sheets to unlock capital investment in South Africa's infrastructure sectors, in particular water, energy, digital infrastructure and food systems.

## The GEMMES-SA model for development

General Monetary and Multisectoral Macrodynamics for the Ecological Shift – South Africa (GEMMES-SA) is a scenario-based, non-equilibrium macroeconomic model designed to capture the interactions between financial stability, sectoral investment, and macroeconomic policy in the context of climate change. Most importantly, GEMMES-SA helps guide policymakers on the implications of the decisions they make today and their potential impacts in the future.

"Models are not the answer. They are an excuse for us to start a conversion around systematic macro-economic and financial vulnerabilities and risks." – Antoine Godin, Economist and Modeller at Agence Française de Développement (AFD) Group

The GEMMES-SA model is being co-developed through a partnership between the CST, Agence Française de Développement (AFD) Group, Development Bank for Southern Africa (DBSA) and the South African National Treasury.

In 2024, we had several aims: building capacities of non-equilibrium modelling in South Africa, and strengthening understanding of the System of National Accounts (SNA) for data collection and interpretation purposes. To achieve this, AFD led capacity building workshops on Stock-Flow Consistent macroeconomic modelling and its applications using their experience in Colombia and Morocco. The workshops were aimed at strengthening the technical modelling capacities and improving the tool kit of the macro-economic modelling our team.

The team succeeded in its two main objectives for the year, the results of which led to the drafting of a co-authored paper, a 'from-whom-to-whom' approach to understand the financial structure of South Africa.

Focusing on seven sectors and multiple financial instruments over the last ten years, we detail the dataset's construction process before examining key findings. This analysis of South Africa reveals an interconnected financial system where sectors play distinct but interdependent roles. The database and our results provide insights about the financial structure of the South African economy and the conditions for it to fund key investments for its long-term sustainability.


## SA-TIED Workstream 5: water-energy-food in the context of climate change

Climate change is no longer a distant threat, but a reality we are already navigating. In 2024, southern African countries experienced record low rainfall, with dam levels across Botswana, Namibia and Zimbabwe reaching emergency thresholds and devastating crop yields. In South Africa, heavy rainfall events wreaked havoc in parts of the KwaZulu-Natal and the Eastern Cape provinces. This new reality threatens the long-term security of our water, energy and food sources.

Recognising the crucial juncture between research and policymaking in tackling this problem, CST is a leading partner in Workstream 5 of Southern Africa – Towards Inclusive Economic Development (SA-TIED) Programme which brings together diverse disciplines and decision-makers to critically examine the question: 'What system changes (policy, regulatory, institutional, financial) are required to ensure that South Africa has long-term sustainable supplies of energy, water and food in the face of climate change?'

The work commenced by commissioning sector-focused studies to rigorously investigate the investment requirements for each sector. Concurrently, the Global Change Institute (GCI) at Wits University modelled the climate change impacts to provide guidance for what we can expect in the near and far future in terms of climate conditions, thereby creating a basis for assessing multiple future scenarios (possible climate futures). For southern Africa, this forecast includes extremely dry conditions and more heatwaves. The implications of these climate conditions must be accounted for when thinking about investments in water, energy and food.

The water study has achieved the most significant advancements, providing insights into the investments South Africa needs to make in critical water infrastructure (reservoirs, dams, piping, new technologies, etc.) every year from now until 2050 under the different climate scenarios. This means water security can be proactively pursued. This information is vital for the country's developmental future.

The CST has been instrumental in leading this work collaboratively with decision-making partners, including the Presidential Climate Commission who has been tasked by South African President, Cyril Ramaphosa to lead the country's climate change response; National Treasury, which leads the management of public funds; the Development Bank of South Africa, whose mandate includes supporting economic growth through infrastructure investments; and the National Planning Commission, which is tasked with advising government towards achieving the National Development Plan. This partnership bridges academic excellence and national priorities, exemplifying the application of research for impact.

# Financials

| Income (ZAR) | |
|---|---|
| Opening balance | 16 914 743,16 |
| Mainstream budget | 5 718 324,80 |
| Project related income incl. interest | 22 154 298,78 |
| Total income | 44 787 366,74 |

| Expenses (ZAR) | |
|---|---|
| Mainstream expenses | 6 130 992,85 |
| Project related expenses | 25 639 901,27 |
| Total expenses | 31 770 890,60 |
| **Closing balance** | **13 016 472,62** |

## Largest projects

| Project name | Funder | Project total | Period |
|---|---|---|---|
| Economic Recovery through a Just Energy Transition in SA | Open Society Foundation | 21 481 612 | 2021 - 2024 |
| South African Research Chair in Social-Ecological Systems and Resilience | National Research Foundation (NRF) | 14 750 000 | 2021 - 2025 |
| Southern African Resilience Academy 2 | Global Resilience Partnership | 9 392 500 | 2024 - 2027 |
| Reconfiguring Energy for Social Equity | Volkswagen Stiftung | 6 045 000 | 2020 - 2025 |
| Overcoming acceleration challenges in the South African Energy Transition | DANIDA, Technical University of Denmark (DTU) | 5 148 510 | 2024 - 2028 |
| World-leading Postgraduate Programme in Sustainability Rransitions | Stellenbosch University | 4 967 662 | 2023 - 2025 |
| Seeds of Good Anthropocenes: Fostering Food System Transformation in Africa | International Development Research Centre (IDRC), Canada | 3 650 000 | 2022 - 2024 |
| International Development Research Centre (IDRC), Canada | International Development Research Centre (IDRC), Canada | 3 159 123 | 2022 - 2024 |
| *The Campus: A One Hectare Circular Farm & Learning Hub | Council for Scientific and Industrial Research (CSIR), South Africa | 3 078 029 | 2024 - 2026 |
| Mainstreaming Gender for Energy Security in Poor Urban Environments | National Research Foundation (NRF) | 2 833 150 | 2023 - 2024 |
| Inequality and the Biosphere: Achieving the Sustainable Development Goals in an Unequal World | FORMAS, Sweden | 2 105 606 | 2021 - 2024 |

## Largest projects

| Project name | Funder | Project total | Period |
|---|---|---|---|
| Africa Low-Carbon and Transformation - Enhancing Africa's Capabilities for Implementing Sustainable, Low-Carbon Energy Development and Transformative Initiatives | European Climate Foundation | 2 000 000 | 2023 - 2024 |
| Rangeland management project | Northern Arizona University | 1 180 000 | 2024 - 2027 |
| AWEI Research Chair in African wildlife economies | Oppenheimer Generations | 854 938 | 2024 - 2025 |
| Enabling Agro-Ecological Economies | Agence Française de Développement (AFD) | 814 704 | 2022 - 2024 |
| Financing the South African Just Energy Transition: mobilizing South African domestic resources for the JETP | Deutsche Gesellschaft fur Internationale Zusammenarbeit | 792 857 | 2024 |
| WEF Policy Experimentation | University of Johannesburg (NRF) | 760 000 | 2024 - 2025 |
| Youth Futures for Systemic Justice: Cocreating Skills Anticipation Praxis with Youth Innovators in ESA. S009361 | International Development Research Centre (IDRC), Canada | 608 632 | 2024 |
| Utrecht WEF Nexus: collective academic publications | Utrecht University | 605 000 | 2024 |
| James McDonnell Foundation Conservation Surveys | James McDonnell Foundation | 496 400 | 2023 - 2024 |

# Governing board

**Prof Ingrid Woolard**
Chairperson and Dean: Economic and Management Sciences, Stellenbosch University

**Prof Sibusiso Moyo**
Deputy Chairperson and Deputy Vice-Chancellor Research, Innovation and Postgraduate Studies, Stellenbosch University

**Dr Amollo Ambole**
Programme Director: African Mayoral Leadership Initiative, African Centre for Cities

**Prof Desta Mebratu**
Extraordinary Professor at Centre for Sustainability Transitions, Stellenbosch University

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Distinguished Professor in the Faculty of Education, Stellenbosch University

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

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

**Prof Guy Midgely**
Acting Director School for Climate Studies, Stellenbosch University

**Prof. Karen Esler**
Distinguished Professor, Department of Conservation Ecology and Entomology, Stellenbosch University

**Prof Maarten Hajer**
Distinguished Professor Urban Futures and Futuring and Director of the Urban Futures Studio, Utrecht University

# CST staff and postdocs

**Prof Reinette (Oonsie) Biggs**
Co-Director

**Prof Mark Swilling**
Co-Director and Distinguished Professor

**Nina Callaghan**
Deputy Director

**Dr. Ricardo (Ric) Amansure**
Senior Researcher

**Monique Beukes**
Administrative and Financial Office

**Nadine Christians**
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**Prof. Alta de Vos**
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**Amanda October**
MPhil and PhD Administrative Officer

**Juliet Leuna-Obioha**
Infrastructure and Governance Finance Administrator

**Prof Rika Preiser**
Associate Professor

**Alboricah Tokologo Rathupetsane**
Junior Researcher

**Dr Julia van Velden**
Researcher

# Our research fellows

Dr Michelle Audouin
Prof. Desta Mebratu Belay
Dr Duan Biggs
Dr Ryan Blanchard
Prof. Andrew Boraine
Tanya Brodie
Prof Brian A Child
Dr Deon Cloete
Dr Enrico Di Minin
Dr Johan Enqvist
Dr Cecile Feront
Robyn Foley
Dr Bipashyee Ghosh
Prof. Maarten Hajer
Dr Maike Hamann
Tanja Hichert
Dr Linda B Luvuno
Dr Current Masunungure
Dr Kristi Maciejewski
Wendy McCallum
Dr Luke Metelerkamp
Dr Nthabi Mohlakoana
Dr Chantal P Naidoo
Prof. Laura M Pereira
Dr Odi Selomane
Dr Nadia Sitas
Dr John van Breda
Prof Timo von Wirth
Dr Matthew Zylstra

# Graduates

## PhD at the Centre for Sustainability Transitions

Three PhD candidates successfully defended their theses in 2024.

**Willem Malherbe**

Social-ecological resilience in practice: Exploring capacities for navigating change in complex systems

**Catherine Pringle**

The social-ecological factors shaping pathways to better water futures in South Africa

**Tuwilika Victoria Shifidi**

Equitable Water Governance and Water Politics in the Cubango-Okavango River Basin

## MPhil in Sustainable Development

16 MPhil in Sustainable Development students successfully graduated in the reporting period. They produced innovative research that focused on various topics including sustainable urban development, to placed-based activism and the digital gender divide.

**Shelley Bragg**

Value creation beyond profit: a review of sustainable business models and their ability to address social and ecological challenges

**Shamilah Damons**

Digital Gender Divide in South Africa's ICT Sector: A Qualitative Inquiry

**Onaedo Etobe**

Exploring the Socio-Economic Effect of Oil Spillage on Fishing as A Source of Livelihood for Women in The Niger Delta: A Case Study of Bodo Community in Rivers State, Nigeria

**Irene Mhlanga**

Evaluating the contributions of trophy hunting areas to biodiversity conservation in Zimbabwe

**Evidence Bongani Mnisi**

Balancing the need for biodiversity protection and city development in a context of growing socio-economic inequality in Cape Town

**Freedom Uyanda Ngobeni**

Integrating Nutrition Education in South African High Schools: Insights and Perspectives from Mpumalanga Learners

**Caris Paynter**

The Transformative Potential of The Feminine Principle: A Post Qualitative Inquiry into the Aura Valley Programme of Be The Earth Foundation

**Linda Joka**

The role of traditional authorities in ensuring a just energy transition in the rural Eastern Cape South Africa

**Jerome Chimphonda**

The role of off-grid rural electrification in supporting a Just Energy Transition in Malawi

**Alexia Daoussis**

Mobilising diverse values of nature: insights from court cases on human rights in South Africa and rights of nature in Ecuador

**Wilhelm Liebrecht Fick**

The art of co-imagining: Investigating the role of arts-based research practices in the co-production of imaginative social-ecological futures

**Nongcebo Priscilla Hlongwa**

Perceptions and governance related to climate change policy implementation in eThekwini Municipality: bridging priorities and barriers for sustainable urban development

**Merin Raju Jacob**

Future cities of the global South: an exploration of urban imaginaries emerging from Africanfuturism/African science fiction

**Caitlin Leatherby**

Practices in place: how place-based activism supports emotional resilience and addresses burnout in environmental activists

**Shirley Esmeralda Mambadzo**

Examining governance structures and stakeholder collaboration in urban agriculture using a polycentric governance framework: a case study of Windhoek

**Chawanangwa Jacqueline Mhango**

The state of research on Neglected And Underutilised Crop Species (NUCS) in Africa: a bibliometric analysis

## PGDip in Sustainable Development

43 Students successfully completed and graduated with a Postgraduate Diploma in Sustainable Development.

Hombakazi Blou

Casey Cooper

Daniel Daruty de Grandpre

Toma Daiber

Calvin Frank Dias

Sisekelo Dladla

Sasha Fabian

Irma Naomi Faul

Sheron Senkepeng Banda

Angelique Bianca Harris

Milo Hills Williams

Fabian Dieter Holm

Kgomotso Jaca
Gizelle Louw
Julius Makatsela
Mojathoto Makeke
Crystal Marsh
Alexander Matthews
Sinazo Mcetywa
Nasiphi Mdlulwa
Khotso Morudi
Didintle Mputle
Londiwe Msomi
Kaleo Nakazwe
Maria Nelago Nashapi
Thandile Ngxikwe
Masentle Nzimande
Manon Perrot-Baar
Sedzani Ratsibi
Etienne Roux
Uzair Salie
Annegrethe Scholtz
Samantha Taggart
Siyanda Tawana
Leonore Wetupa Tjikune
Liebe Tredoux
Kegomoditswe Tsiane
Liesel Viljoen
Esmarie von Benecke
Frances Weiner
Rayhaanah Williams
Noluyolo Innocantia Xorile
Kamvelihle Kobus Yekelo

# Publications

CST staff, students and fellows contributed to 37 peer-reviewed journal articles in 2024.


Carstens, M. & Preiser, R. 2024. Exploring relationality in African knowledge systems as a contribution to decoloniality in sustainable science. *Ecosystems and People*, 20(1):1-10.

Kumschick, S., Fernandez Winzer, L., McCulloch-Jones, E.J., Chetty, D., Fried, J., Govender, T., Potgieter, L.J., Rapetsoa, M.C., Richardson, D.M., van Velden, J., Van der Colff, D., Miza, S. & Wilson, J.R.U. 2024. Considerations for developing and implementing a safe list for alien texa. *BioScience*, 74:97-108.

Denner, C., Clements, H.S., Child, M.F. & De Vos, A. 2024. The diverse socioeconomic contributions of wildlife ranching. *Conversation Science and Practice*, 6(7):1-22.

Roy, H.E., Pauchard, A., Stoett, P.J., Truong, T.R., Meyerson, L.A., Bacher, S., Galil, B.S., Hulme, P.E., Ikeda, T., Kavileveettil, S., McGeoch, M.A., Nuñez, M.A., Ordonez, A., Rahlao, S.J., Schwindt, E., Seebens, H., Sheppard, A.W., Vandvik, V., Aleksanyan, A., Ansong, M., August, T. & Blanchard, R., *et al.* 2020. Curbing the major and growing threats from invasive alien species is urgent and achievable. *Nature Ecology & Evolution*, 8:1216–1223.

Clements, H.S., Do Linh San, E., Hempson, G., Linden, B., Maritz, B., Monadjem, A., Reynolds, C., Siebert, F., Stevens, N., Biggs, R., De Vos, A., Blanchard, R., Child, M., Esler, K.J. & Hamann, M., *et al*. 2024. *Scientific Data*, 11(1):1-17.

Derickson, K., Walker, R., Hamann, M., Anderson, P., Adegun, O.B., Castillo-Castillo, A., Guerry, A., Keeler, B., Llewellyn, L., Matheney, A., Mogosetsi-Gabriel, N., Mundoli, S., Pahwa Gajjar, S., Sitas, N. & Xie, L. 2024. *Urban Forestry & Urban Greening*, 95:1-10.

Gupta, J., Bai, X., Liverman, D.M., Rockström, J., Qin, D., Stewart-Koster, B., Rocha, J.C., Jacobson, L., Abrams, J.F., Andersen, L.S., Armstrong McKay, D.I., Bala, G., Bunn, S.E., Ciobanu, D., DeClerck, F., Ebi, K.L., Gifford, L. & Gordon, C., *et al.* A just world on a safe planet: a Lancet Planetary Health–Earth Commission report on Earth-system boundaries, translations, and transformations. *The Lancet Planetary Health*, 8(10):813-873.

Xoxo, B.S., Mantel, S.K., De Vos, A., Tanner, J.L. & Le Maître, D.C. 2024. Using the analytic hierarchical process to identify potential sites for rural ecological infrastructure investment in South Africa: examples from Cacadu and Tsitsa Catchments. *Restoration Ecology*, 33(2).

Swart, L., Swilling, M. & Gcanga, A. 2024. Exploring a Water-Energy-Food (WEF) Nexus Approach to Governance: A Case Study of the V&A Waterfront in Cape Town, South Africa. *Energies*, 17(16).

Wessels, N., Sitas, N., O'Farrell, P. & Esler, K.J. 2024. Inclusion of ecosystem services in the management of municipal natural open space systems. *People and Nature*, 6(1):301-320.

Pereira, L.M., Gianelli, I., Achieng, T., Amon, D., Archibald, S., Arif, S., Castro, A., Chimbadzwa, T.P., Coetzer, K., Field, T.-L., Selomane, O., Sitas, N., Stevens, N., Villasante, S., Armani, M., Kimuyu, D.M., Adewumi, I.J., Lapola, D.M. & Obura, D. 2024. Equity and justice should underpin the discourse on tipping points. *Earth System Dynamics*, 15(2):341-366.

Shackleton, S., Du Plessis, P., Sitas, N., Forbes, C. & Methner, N. 2024. Co-creating enduring practitioner-researcher collaborations in multi-functional landscapes. *South African Journal of Science*, 120(9-10):1-7.

Yoshida, Y., Sitas, N., Mannetti, L., O'Farrell, P., Arroyo-Robles, G., Berbés-Blázquez, M., González-Jiménez, D., Nelson, V., Niamir, A. & Harmá□ková, Z.V. 2024. Beyond Academia: A case for reviews of gray literature for science-policy processes and applied research. *Environmental Science & Policy*, 162.

Cockburn, J., Weaver, M. & Sitas, N. 2024. Shedding light on global south transformations: integration, transgression, diversity and hope. *Ecosystems and People*, 20(1).

Shifidi, V., Sitas, N. & Meissner, R. 2024. Maximizing synergies between state and non-state actors to enhance water governance in the Cubango-Okavango River basin. *World Water Policy*, 10(4):1187-1222.

Psiuk, K. & Enqvist, J. 2024. Control or coexist with urban baboons: Exploring residents' views and values in Cape Town. *Conservation Science and Practice*, 6(9).

Klein, L., Buckle, P., Nguyen, N., Preiser, R., Vandenbroeck, P. & Ison, R. 2024. Valuing who we are in relation to others: The 'praxis of co' in an Anthropocene-world. The 2025 agenda for the cyber-systems community. *Systems Research and Behavioral Science*, 41(6):946-951.

Preiser, R., Hichert, T., Biggs, R., Velden, J., Magadzire, N., Peterson, G., Pereira, L., Mayer, K. & Benessaiah, K. 2024. Transformative foresight for diverse futures: the Seeds of Good Anthropocenes initiative. *Development Policy Review*, 42(1).

Manyani, A., Biggs, R., Hill, L. & Preiser, R. 2024. The evolution of social-ecological systems (SES) research: a co-authorship and co-citation network analysis. *Ecology and Society*, 29(1).

Phonchi-Tshekiso, N.D., Sitas, N. & Selomane, O. 2024. Community perceptions on land and water acquisitions in the Okavango Delta: implications for rural livelihoods. *Ecosystems and People*, 20(1).

Mohlakoana, N., Rathupetsane, A., Malope, B. & Jacob, M. 2024. Demistifying employment in South Africa's Just Energy Transition: Exploring emerging decent work themes. *Development Southern Africa*, 41(3):649-665.

González-Mon, B., Mancilla-Garcia, M., Bodin, Ö., Malherbe, W., Sitas, N., Pringle, C.B., Biggs, R. & Schlüter, M. 2024. The importance of cross-scale social relationships for dealing with social-ecological change in agricultural supply chains. *Journal of Rural Studies*, 105.

Malherbe, W., Biggs, R. & Sitas, N. 2024. Comparing apples and pears: Linking capitals and capacities to assess the resilience of commercial farming operations. *Agricultural Systems*, 217.

Baatiema, L., Sanuade, O.A., Kretchy, I.A., Okoibhole, L., Kushitor, S.B., Haghparast-Bidgoli, H., Awuah, R.B., Amon, S., Mensah, S.K., Grijalva-Eternod, C.S., Adjaye-Gbewonyo, K., Antwi, P., Jennings, H.M. & Arhinful, D.K., *et al*., 22(1):154-14.

Sutherland, E.K., Smith, J.D., Ofori-Boateng, M., Kushitor, S.B., Sarkwah, H.N., Kwanin, B.A., Sward, K.A., Gouripeddi, R., Manortey, S.O., Price, M.D., Rositch, A., Ngwa, W., Alder, S.C., Joshu, C. & Price, R.R. 2024. Study protocol for the development of a real-time interface showing the availability of breast and cervical cancer services in Ghana. *PLOS One*, 19(10).

Amon, S., Aikins, M., Haghparast-Bidgoli, H., Kretchy, I.A., Arhinful, D.K., Baatiema, L., Awuah, R.B., Asah-Ayeh, V., Sanuade, O.A., Kushitor, S.B., Mensah, S.K., Kushitor, M.K., Grijalva-Eternod, C., Blandford, A. & Jennings, H., *et al*. 2024. Household economic burden of type-2 diabetes and hypertension comorbidity care in urban-poor Ghana: a mixed methods study. *BMC Health Services Research*, 24(1):1028.

Kushitor, M.K., William, J., Larbi-Sarpong, D.E., Ampomah, M.A., Adoma, P.O., Brightson, K.T.C. & Kushitor, S.B. 2024. Primary health care response to noncommunicable diseases: an assessment of wellness clinics in Ghana. *BMC Health Services Research*, 24(1):794-11.

Konlan, M.B., Habib, H.H., Kushitor, S.B., Addy, P., Dadzie, A.Q., Mulder-Sibanda, M. & Aryeetey, R.N.O. 2024. Evaluation of the improved feeding practices for the First 1000 Days Project in Ghana. *World Nutrition*, 15(2).

Doku Asare, E.P., Kushitor, S.B., Sutherland, E.K., Ofori Boateng, M. & Manortey, S. 2024. Knowledge and use of art therapy for mental health treatment among clinical psychologists. *PLOS One*, 19(5).

Lule, S.A., Kushitor, S.B., Grijalva-Eternod, C.S., Adjaye-Gbewonyo, K., Sanuade, O.A., Kushitor, M.K., Okoibhole, L., Awuah, R., Baatiema, L., Kretchy, I.A., Arhinful, D., de-Graft Aikins, A., Koram, K. & Fottrell, E. 2024. The contextual awareness, response and evaluation (CARE) diabetes project: study design for a quantitative survey of diabetes prevalence and non-communicable disease risk in Ga Mashie, Accra, *Ghana. Global Health Action*, 17(1).

Amenya, R.M., Manortey, S., Ofori Boateng, M., Kushitor, S. & Sutherland, E. 2024. Determinants of Modern Contraceptive Uptake among the Youth in Akuse Township in the Lower Manya Krobo Municipality, Ghana. *Health*, 16:72-86.

Kombat, M.Y., Kushitor, S.B., Sutherland, E.K., Boateng, M.O. & Manortey, S.2024. Prevalence and predictors of diarrhea among children under five in Ghana. *BMC Public Health*, 24(1):154-15.

Wu, T., Rocha, J.C., Berry, K., Chaigneau, T., Hamann, M., Lindkvist, E., Qiu, J., Schill, C., Shepon, A., Crépin, A-S. & Folke, C. 2024. Triple Bottom Line or Trilemma? Global Tradeoffs Between Prosperity, *Inequality, and the Environment. World Development*, 178.

Sahle, M., Lahoti, S.A., Lee, S-Y., Brundiers, K., van Riper, C.J., Pohl, C., Chien, H., Bohnet, I.C., Aguilar-Rivera, N., Edwards, P., Pradhan, P., Plieninger, T., Boonstra, W.J., Flor, A.G., Di Fabio, A. & Hamann, M. 2024. Revisiting the sustainability science research agenda. *Sustainability Science*, 20(1):1-19.

Olvitt, L., Davies, M., Ebrahim, A. & Cockburn, J. 2024. Transdisciplinary curriculum design for sustainability transitions: A reflective dialogue. *South African Journal of Science*, 120(9-10):1-8.

Wittmayer, J.M., Huang, Y-S. (Elaine), Bogner, K., Boyle, E., Hölscher, K., von Wirth, T., Boumans, T., Garst, J., Hendlin, Y.H., Lavanga, M., Loorbach, D., Mungekar, N., Tshangela, M., Vandekerckhove, P. & Vasques, A. 2024. Neither right nor wrong? Ethics of collaboration in transformative research for sustainable futures. *Humanities and Social Sciences Communications*, 11(1):1-15.

Van Breda, J.R. & Treffry-Goatley, A.2024. Doing just sustainability transitions: Facing the legitimation crisis in the Anthropocene today. *South African Journal of Science*, 120(9-10):1-5.

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