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








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Reinette (Oonsie) Biggs <sup>a,b</sup>, Belinda Reyers <sup>b,c</sup>, Ryan Blanchard <sup>a,d</sup>, Hayley Clements <sup>a</sup>, Jessica Cockburn <sup>e</sup>, Graeme S. Cumming <sup>f,g</sup>, Georgina Cundill <sup>h</sup>, Alta de Vos <sup>e</sup>, Luthando Dziba <sup>ij</sup>, Karen J. Esler <sup>k</sup>, Christo Fabricius <sup>l</sup>, Maike Hamann <sup>a</sup>, Rebecka Henriksson <sup>m</sup>, Karen Kotschy <sup>n</sup>, Regina Lindborg <sup>o</sup>, Linda Luvuno <sup>a</sup>, Vanessa Masterson <sup>b,p</sup>, Jeanne L. Nel <sup>l,q</sup>, Patrick O'Farrell <sup>fr</sup>, Carolyn G. Palmer <sup>s</sup>, Laura Pereira <sup>a,b,t,u</sup>, Sharon Pollard <sup>n</sup>, Rika Preiser <sup>a</sup>, Dirk J. Roux <sup>lv</sup>, Robert J. Scholes <sup>u</sup>, Odirilwe Selomane <sup>a</sup>, Charlie Shackleton <sup>e</sup>, Sheona Shackleton <sup>r</sup>, Nadia Sitas <sup>a</sup>, Jasper A. Slingsby <sup>w,x</sup>, Marja Spienburg <sup>y,z</sup> and Maria Tengö <sup>b</sup>

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### ABSTRACT

Sustainability-focused research networks and communities of practice have emerged as a key response and strategy to build capacity and knowledge to support transformation towards more sustainable, just and equitable futures. This paper synthesises insights from the development of a community of practice on social-ecological systems (SES) research in southern Africa over the past decade, linked to the international Programme on Ecosystem Change and Society (PECS). This community consists of a network of researchers who carry out place-based SES research in the southern African region. They interact through various cross-cutting working groups and also host a variety of public colloquia and student and practitioner training events. Known as the Southern African Program on Ecosystem Change and Society (SAPECS), its core objectives are to: (1) derive new approaches and empirical insights on SES dynamics in the southern African context; (2) have a tangible impact by mainstreaming knowledge into policy and practice; and (3) grow the community of practice engaged in SES research and governance, including researchers, students and practitioners. This paper reflects on experiences in building the SAPECS community, with the aim of supporting the development of similar networks elsewhere in the world, particularly in the Global South.

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## Introduction

There is growing recognition of the value of sustainability-oriented research networks and communities of practice to support co-learning, collaborative research and development of skills and approaches to support urgently needed transformations to sustainability (Cundill et al. 2015; Van der Hel 2016,

2019; Schneider et al. 2021). Addressing the sustainability challenges facing society requires new ways of thinking and doing research (Funtowicz and Ravetz 1993; Gibbons et al. 1994; Bammer 2005; Fam et al. 2020). Sustainability-focused research networks have become important hubs of innovation in developing

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new research insights and approaches, fostering collaboration and knowledge-sharing, capacity strengthening and fostering research and research-practice communities (Van der Hel 2019; Norström et al. 2020; Schneider et al. 2021). The importance of such networks and communities in the Global South is especially recognised, given the daunting challenges facing these regions, their relatively small research base and the recognised shortcomings of reliance on global North research, methods and perspectives (Chilisa 2017; Adelle et al. 2018).

A sustainability-oriented research network refers to a formal entity linking researchers and other societal actors across scales to promote research and to strengthen their common effectiveness in contributing to sustainable futures (Schneider et al. 2021). These networks (e.g. Future Earth,<sup>1</sup> PECS,<sup>2</sup> LIRA<sup>3</sup>) are usually organised around support entities, such as a secretariat, coordination office and/or steering committee. Potentially linked to a research network, a 'community of practice' refers to a group of people informally bound together by shared expertise and a common domain of interest, who interact regularly to share information and experiences to learn from one another and develop themselves personally and professionally (Wenger 1998). Communities of practice are typically emergent phenomena; it is difficult to establish them top-down, but structures such as research networks, workshops, and conferences can create the conditions for their emergence (Cundill et al. 2015).

This perspective reflects on the development of the Southern African Program on Ecosystem Change and Society (SAPECS) over the 10 years since its launch. SAPECS is one of the first and largest regional networks linked to the Future Earth Programme on Ecosystem Change and Society (PECS) (Carpenter et al. 2012; Norström et al. 2017) and is seen as a potential model for the development of further regional networks linked to PECS. SAPECS was initiated by bringing together a number of active SES researchers and actors working at the research-policy interface in the region to share knowledge, strengthen the collective voice into policy and practice, and advance SES research regionally and globally based on their work. It therefore has elements of both a research network and a community of practice, and has evolved as a metacommunity with several smaller and more focused communities of practice nested within the larger network.

PECS is evolving towards a model of projects clustered into regional networks, and there have been several requests for SAPECS to document the structure of how the community operates and to share insights that may be useful in establishing further networks. This perspective provides a brief overview of the establishment of SAPECS, its core objectives and conceptual framework, and some

reflections on lessons learnt in terms of its development over the past decade. While every context is different, we hope that these reflections may be of value in informing the development of regional research networks and communities of practice elsewhere, both linked to PECS and more broadly.

## Establishment, objectives and structure of SAPECS

The establishment of PECS in 2011 provided the impetus and legitimation for establishing SAPECS as a regional SES network. SAPECS was formally initiated at a 3-day scoping workshop in February 2012 held in Stellenbosch, South Africa. The workshop was attended by 35 participants from the region and abroad, who were actively conducting or using SES research in the southern African region (Biggs and Reyers 2012). Like most new initiatives, SAPECS did not arise in a vacuum, but built on a substantial history of preceding work, especially the networks developed by the Southern African Millennium Ecosystem Assessment (Biggs et al. 2004), the southern African node of the international Resilience Alliance, the Akili Complexity and Integration Initiative (Palmer et al. 2015), and investment in SES and ecosystem services research at a number of institutions (e.g. Le Maitre et al. 2007). A key objective of the initial SAPECS scoping workshop was to co-develop a science plan that outlined the objectives, conceptual framework and approach of SAPECS (Biggs and Reyers 2012). The aim of the science plan and the engaged process behind its development, was to foster a common vision, framing and structure around which the community could self-organise, and from which research-policy-practice subcommunities could emerge.

From the outset, SAPECS aimed to function as a platform for knowledge-sharing and to stimulate comparison and synthesis of SES work from the region, with a particular emphasis on strengthening the potential voice and impact of this work on SES management and governance in the region (Biggs and Reyers 2012). The establishment of SAPECS was particularly motivated by the lack of funding for synthesising insights and learning across different SES-related research projects in the region, as well as the need for developing new approaches and strengthening capacity for conducting transdisciplinary SES research. The lack of an intellectual home for inter- and transdisciplinary researchers in the region was also an important motivation, and from the start there was a particular focus on engaging and supporting early-career researchers working in this field. Furthermore, SAPECS was seen as a means to strengthen the contribution and voice of southern African perspectives in the international PECS and

wider SES research community (e.g. Biggs et al. 2022), as well as feeding into international assessment initiatives such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (Biggs and Reyers 2012).

### Objectives, conceptual framework and core themes

As laid out in its founding document (Biggs and Reyers 2012), the aim of SAPECS is to advance stewardship of SES and ecosystem services in southern Africa by:

- (1) Producing a body of empirical evidence and developing innovative, practical theory and tools to improve understanding of SES and ecosystem services in the region and developing country contexts;
- (2) Mainstreaming knowledge into policy and practice, and incorporating experiences from policy and practice into scientific understanding, in order to have a tangible impact and effect change in the governance and management of SES in the region; and
- (3) Growing the community of practice, including researchers, students and practitioners engaged in research and management of SES and ecosystem services in the southern African region.

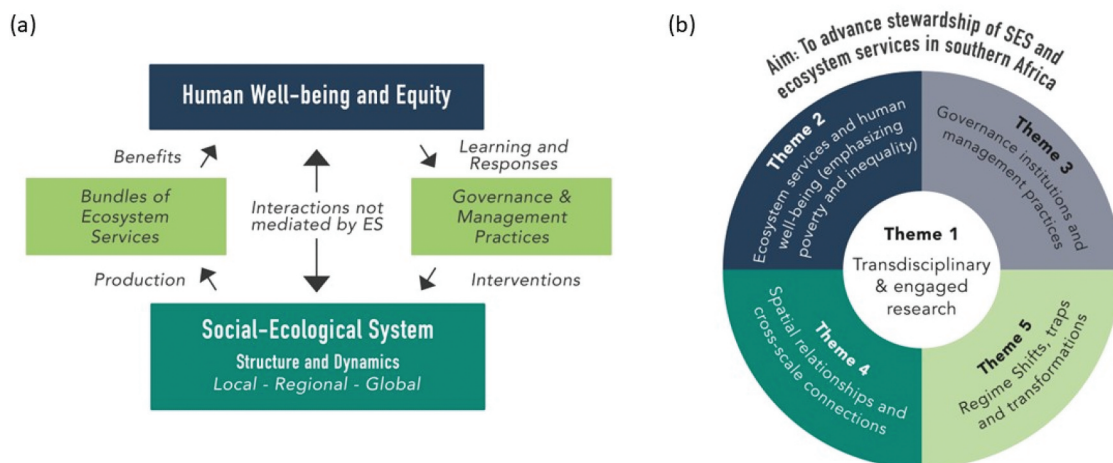
These objectives have been consistently supported and affirmed by network members over the past decade, and have provided important guidance for different activities undertaken under the SAPECS umbrella. Likewise, the conceptual framework developed at the initial SAPECS workshop has served as an important common reference point for designing the different research themes and activities within the network and how they relate to one another. In

terms of the conceptual framework, SAPECS research focuses on the dynamics of intertwined SES, in particular: (1) how changes in the structure and dynamics of SES affect human well-being and equity, especially through impacts on ecosystem services; and (2) how learning and changes in governance and management practices occur and can be leveraged to enhance stewardship and bring about transformations in SES (Figure 1(a)). The emphasis on well-being and equity was identified as especially relevant for the southern African context, specifically in relation to how racially based policies and land dispossession have impacted on peoples' relationships to land, access to ecosystem services, and many other dimensions of inequality apparent in the region (e.g. Clements et al. 2021; Biggs et al. 2022).

This framework, as well as ongoing activities at the time SAPECS was initiated, was used to define a set of four core and one cross-cutting research themes that represented opportunities for innovative collaborations and comparisons across different research sites in southern Africa (Figure 1(b)). The cross-cutting theme reflected the sentiment that SAPECS research should endeavour to adopt transdisciplinary, collaborative approaches that pay particular attention to transdisciplinary training, as well as mainstreaming and communication to promote the overarching aim of advancing stewardship and transformations of SES and ecosystem services in the region. The experience with and commitment to transdisciplinary processes of knowledge co-production that engage with diverse societal viewpoints and values were identified as particular strengths of SES research in southern Africa.

### Structure and activities

SAPECS was set up with a similar structure to PECS: it consists of a network of SES researchers working



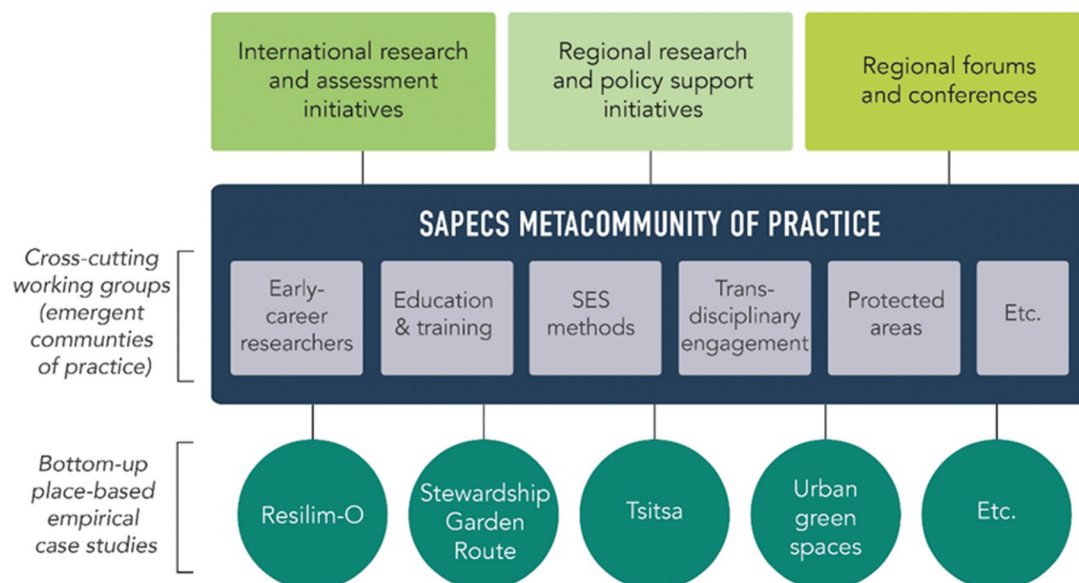
**Figure 1.** (a) the SAPECS conceptual framework and (b) core research themes of SAPECS, which have provided a shared understanding and broad structure for organising working groups and understanding how different research activities relate to one another.



mainly on empirical, often transdisciplinary, place-based case studies in southern Africa, who collaborate through various cross-cutting working groups (Figure 2). These place-based studies are typically led by individual researchers or small teams, often involve graduate students, and are usually funded by individual research project grants. It was agreed at the outset that the key value addition and core of SAPECS would be a set of cross-cutting working groups that draw on insights and experience from these individual projects to foster collaboration, synthesis and knowledge-sharing to inform SES research and governance in the region through knowledge outputs and involvement in key regional processes. These working groups have emerged in a bottom-up way, informed by the SAPECS research themes (Figure 1(b)) but primarily defined around topics where there was shared interest among multiple members, and where one or more members had the initiative to lead and develop a working group. In some cases, working groups could be aligned or co-funded with existing projects and initiatives, which provided helpful support. Consequently, the working groups have evolved over time, as members' engagements in the network have changed and new research topics have emerged. Such self-organization is a defining feature of communities of practice (Wenger 1998), and we see an emergent structure where the working groups operate as communities of practice nested within the overall SAPECS metacommunity.

Given the focus on cross-cutting synthetic working groups, the core activities of SAPECS have

centred around periodic working-group meetings aimed at supporting and advancing working-group activities (Appendix 1). In addition to these meetings, a number of public colloquia and training events have been held to serve the wider regional community interested in learning about SES research or the policy and governance implications of such research. Since 2012, SAPECS has hosted five public colloquia involving researchers, practitioners and students, as well as three student-training events. These events have typically been co-funded by leveraging existing project grants, asking participants to cover their own travel and accommodation where possible, and in some cases obtaining dedicated workshop funding or requiring a small registration fee. SAPECS also hosted the first international conference of PECS in November 2015 in Stellenbosch, a landmark event in the development of PECS. SAPECS furthermore co-hosted the Garden Route Interface and Networking (GRIN) Meeting and associated early-career researcher workshops in 2019 and 2022. This meeting aims to provide a platform for knowledge-sharing between managers and scholars in the region (Roux et al. 2020). Similarly, SAPECS co-hosted the Southern African Resilience Academy (SARA) workshops in 2022, which aim to support inter- and transdisciplinary resilience- and development-related knowledge production and exchange within the region. Effort was invested in developing an SAPECS website<sup>4</sup> and social media accounts, which have been important in communicating the public events and activities of SAPECS, as well as research and



**Figure 2.** SAPECS is centred around a variety of cross-cutting working groups, which have functioned as smaller emergent communities of practice nested within the larger SAPECS metacommunity of practice. These working groups draw largely on insights from place-based SES research projects and case studies led by SAPECS members. SAPECS also actively engages in wider regional and international SES-related research, assessment and policy initiatives through the presence of SAPECS members in these networks. The projects and working groups depicted are a selection of those currently most active.

training opportunities, both to SAPECS members and the broader community.

SAPECS actively links to and interacts with regional and international policy-support initiatives, research networks and assessment initiatives such as Future Earth and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),<sup>5</sup> through the involvement of SAPECS members in these networks. These cross-connections have been critical, not only for bringing ideas about the wider policy context and international research frontiers into SAPECS, but also for bringing insights from SAPECS into a variety of research and policy-support spaces at regional and global scales. These regional and international linkages have provided important capacity-building and networking opportunities for early-career researchers in SAPECS, especially in lieu of their being able to participate in the more well-established societies and associations of traditional disciplines.

### Reflections on building the SAPECS community of practice

Here, we reflect on lessons learnt in the development of the SAPECS community over the past decade, which we hope may help inform the development of other regional research networks and communities of practice. The way in which SAPECS has been structured and is run, especially the emphasis on working groups and flexibility, draws directly on the theoretical approaches being studied (Preiser et al. 2018; Reyers et al. 2018, 2022), and has helped create conditions for a metacommunity of practice as well as several smaller, more focused communities of practice to emerge. It is particularly these emergent communities of practice, where members interact to share information and experiences in order to learn from one another and develop themselves personally and professionally, that we feel lie at the heart of the value of SAPECS. Below we reflect specifically on the role of the following aspects in the development of SAPECS: (1) champions and mentors; (2) shared conceptual and regional focus; (3) membership; (4) face-to-face meetings; (5) funding; and (6) supporting early-career researchers.

#### Champions and mentors

It is well established that the formation and maintenance of communities of practice typically require a small core of ‘champions’ to facilitate the development of the community (Wenger et al. 2002). In the case of SAPECS, this leadership was provided by Reinette (Oonsie) Biggs and Belinda Reyers, who met as early-career researchers during the Southern African Millennium Assessment (Biggs et al. 2004) in

the early 2000s. These two individuals took the initiative to establish the community and mobilise resources to support meetings. Both were relatively early in their careers at the time, and the connection to PECS provided an opportunity to link to the broader SES research community. Several of the more senior SAPECS and PECS members played an important mentorship role in encouraging, supporting and guiding the development of SAPECS.

Although there are many particularities to the development of SAPECS, three important insights are: (1) the connection to global research networks can provide an important legitimisation and incentive for champions and others to develop regional networks, particularly in topical research and policy areas where interest and funding can be leveraged; (2) initiatives such as the Millennium Ecosystem Assessment, the Resilience Alliance, and IPBES can have long legacies, both in terms of developing networks that can be leveraged in future and in developing younger research leaders, particularly in the Global South; and (3) support and mentorship from more experienced members can play a critical role in supporting younger champions and leveraging collective experience to inform the design of research networks and create the conditions for communities of practice to emerge.

#### Shared conceptual and regional focus

Having a specific geographical focus (southern Africa) together with a shared conceptual focus has been important in fostering a space for shared learning and practice. Bringing together SES researchers working within a shared geographic context in the Global South, with its particular challenges and opportunities, revealed a real interest and desire to share and learn from one another. In particular, there has been much interest in understanding how approaches in the literature, often developed and applied within a Global North context, need to be adapted or even rejected and replaced with local context-appropriate innovations (e.g. Scholes and Biggs 2005). There has also been substantial interest in how members can work together to inform and shape specific regional policies (e.g. Clements et al. 2021). Simultaneously, the connection to a global community and network has been valued, to ensure that regional research shapes and is shaped by cutting edge international research agendas. The regional focus has also been useful in defining the criteria for membership (see next point).

The shared objectives, conceptual framework and research themes that were identified at the initial scoping workshop have been very useful in creating a shared purpose, focus and structure around which working groups could form on an ongoing basis. These working groups created the space for the

emergence of smaller, more focused communities of practice around specific topics, for example transdisciplinary engagement, protected areas, and SES methods (Figure 2). However, research themes and framings are dynamic and need to be managed as such, and SAPECS will be undertaking a larger revision and update of its research themes over the coming year to provide a renewed innovative space within which working groups can form.

### Membership

Much ongoing thought has gone into the organisation and structure of SAPECS to ensure that it meets the objective of functioning as a community of practice. Early on, an important conceptual distinction was made between a community of practice and the wider community of interest (Wenger 2004). We agreed that SAPECS was about working together to advance the frontier of SES research and practice, centred on the working groups, while the needs of those interested in learning about SES research or SES researchers but who did not have the capacity or interest to be involved in working groups, were better served through attending public colloquia, conferences and training opportunities hosted by SAPECS. Accordingly, it was agreed that membership of the SAPECS community required two things: (1) conducting or leading SES research or science-policy activities in the region; and (2) an interest in engaging in collaborative synthesis activities through the working groups. In addition, it was agreed at the outset that a culture of collaboration, inclusiveness, openness and respect for other ideas was a central value of the community, as was a desire to break out of traditional modes of research to embrace more transdisciplinary practice. Distinguishing between the metacommunity of practice and the wider community of interest, and agreeing on criteria for membership, were helpful in defining the community and building a shared culture.

Once the initial network of individuals was established through the scoping meeting in 2012, new members conforming to the agreed membership criteria were nominated by existing members to join ongoing working groups. Invitations were extended to selected nominees, taking into account an agreed desire to maintain a balance of established and early-career scientists in the community, not have the working-group meetings become too large and unwieldy, while diversifying participation and representation to stimulate discussion and debate. Importantly, it was also agreed at the first meeting that SAPECS is a community of individuals, and not of institutional representatives, and that delegation of attendance was not possible. The SAPECS network has therefore grown organically through genuine connections and collaborations with existing

members. At the same time, some members became inactive as their interest or capacity to participate in working groups waned. This approach to growing the community worked well in leveraging existing relationships and trust.

However, it has also created the perception that the network is quite exclusive. It has also probably played an important role (together with funding challenges) in the limited engagement of researchers beyond the borders of South Africa in SAPECS. As SAPECS enters the next post-COVID phase of its development, one of the ideas is to experiment with a periodic open call for working groups (similar to the new approach adopted within PECS) to broaden the opportunities for engagement and the diversity of people involved in the community. One of the key challenges and tensions we foresee is how to keep the network sufficiently cohesive to create the conditions for the emergence of smaller communities of practice, as well as sustaining the metacommunity, especially if there is significant expansion into the wider region.

### Face-to-face meetings

Face-to-face meetings have been important to the development of SAPECS, especially in building a shared sense of purpose and ways of working, and establishing the personal relationships and trust that underpin collaboration. Working-group meetings were held every 1–2 years until the COVID-pandemic, allowing SAPECS members to convene and spend 2–4 days together to share ideas, advance or develop new cross-cutting working groups and further collaborations. These meetings have been limited to 30–40 people in order to facilitate collaborative group dynamics. They always involved shared dinners, and sometimes also outings to local field sites, which have been valuable in generating a shared understanding of key SES research sites in the region. Going forward, there may be scope for greater use of virtual meetings, particularly at the level of individual working groups. However, there has been a strong sense that periodic face-to-face meetings are indispensable in sustaining the metacommunity, providing opportunities for the emergence of smaller working-group-linked communities of practice, and building links and synergies across working groups.

### Funding

Resources are often seen as a critical constraint in establishing and maintaining research networks and communities of practice. The initiative to establish a community is often not undertaken until a grant has been secured to do so. In our case, we were able to use funding from a larger project with the

institutional support of the two co-leads to fund the initial scoping workshop. Since then, working-group meetings have been funded by leveraging various sources held by SAPECS researchers, and participants have generally paid their own travel and, sometimes, accommodation. Overall, these resources have been fairly limited, and not seen as the primary enabler or constraint for the network; rather, what was important was identifying a focus for the community and having a longer-term champion or champions, as well as clear shared values and ways of working together.

However, the lack of a central grant or source of funding has been an important contributor to limited engagement with researchers beyond the borders of South Africa, and less well-resourced researchers within South Africa. Our reliance on bringing in new members through nominations by existing members) has also contributed to this bias. Intra-African collaboration has been highlighted as a critical frontier in many areas of sustainability research (Mwelwa et al. 2020), with a range of barriers (financial, political, economic, language, supervisors) making these collaborations challenging and resource intensive to build. Funding for intra-continental collaborations at the scale needed to bridge such barriers is not common in most grants, but represents an avenue for building broader regional collaborations.

### Supporting early-career researchers

SAPECS has been especially important in supporting a growing cadre of SES students and early-career researchers who often do not fit well into existing disciplinary departments, societies and events, and who may lack appropriate mentorship opportunities (Haider et al. 2018; Holden et al. 2019; Sellberg et al. 2021). Several early-career researchers attended the initial SAPECS scoping workshop, and the early-career researchers working group has been one of the most active working groups. One of their first activities was to develop a survey to identify key opportunities and challenges of being a student in the SES space in southern Africa (Box 1). In addition to this working group, early-career researchers have been supported through

#### Box 1: Challenges and opportunities of being an SES student in southern Africa

Results of a survey of postgraduate SES students who attended the first SAPECS colloquium in 2012 indicated that students appreciate the opportunities for important, urgent and impactful research in the SES arena, but face particular challenges when it comes to university funding structures, supervision availability and methods training. Specifically, funding for PhD degrees is often limited to three years, which is usually insufficient to engage meaningfully in transdisciplinary research. There is also more demand for supervision and mentorship than can be met by the current research staff at academic institutions, and there is a lack of inter- and transdisciplinary method training opportunities in southern Africa.

open capacity-development events (e.g. winter schools), colloquia and conferences hosted and co-hosted by SAPECS, and participation in SAPECS working-group meetings and papers. A large portion of attendees at SAPECS events as well as the PECS conference hosted in 2015 have been postgraduate students. The attendance of students has been funded by a combination of support from their supervisors and funding linked to the research chair held by R Biggs. Several of the first generation of SAPECS-linked students now hold positions in various emerging SES research hubs and universities in the region (often facilitated by networks formed through SAPECS), and are training the next generation of SES scholars.

The SAPECS community also provided a valuable forum for sharing the challenges supervisors face in mentoring SES students, and for starting to develop strategies to address these. Some of these experiences have been captured in publications on early-career researchers' experiences in transdisciplinary research brought together through PECS and SAPECS events (Holden et al. 2019; Sellberg et al. 2021). To address some of these challenges experienced by students and supervisors, SAPECS organised winter schools to support training in SES theory and methods. SAPECS researchers have also led the development of a SES methods handbook (Schneider et al. 2021) and associated website and have published their experiences of conducting transdisciplinary research (Cockburn and Cundill 2018; Holden et al. 2019; Sellberg et al. 2021).

Our experience highlights the demand for capacity building and support for early-career researchers, and the high leverage and potential return on investment that capacity development in the rapidly growing transdisciplinary SES field can bring. SAPECS has facilitated a number of student and researcher exchanges between different hubs in the SAPECS community, as well as with other PECS hubs internationally. Importantly, it has also provided a set of contacts that have enabled students to move between different research nodes for different degrees, which has broadened their experience. These benefits could be enhanced by more structured exchange programmes and funding, such as the recent Erasmus+ funding secured for exchanges of researchers and students between the Centre for Sustainability Transitions at Stellenbosch University in South Africa, and the Stockholm Resilience Centre in Sweden.

### Conclusion

SAPECS has provided a powerful platform to connect, leverage and advance SES research, practice and training in the southern African region. This has been achieved by building on a strong legacy of transdisciplinary SES research in the region and bringing together individuals and groups from emerging regional hubs of SES research and practice, as well as



researchers based abroad who are actively engaged in SES research in the southern African region. The early development of SAPECS and PECS were closely interlinked and drew inspiration from each other, with SAPECS trialling structures within PECS, including the recent move towards regional networks.

The network has been managed in a loose, adaptive way, based on a recognition that people are engaging voluntarily and are not obligated to participate or deliver any specific outputs. The design and structure of SAPECS has enabled people with common interests to connect via working groups and face-to-face meetings, and have the freedom to pursue common interests. This working culture means that the focus has been more on knowledge-sharing than on producing research outputs. Accordingly, most of the emphasis in SAPECS to date has been on its third objective, namely to grow the community of practice, through a combination of working-group meetings, open colloquia and postgraduate training events.

The discussions at SAPECS meetings have been important in shaping evolving ideas undertaken in individual case studies by SAPECS members and their students. These studies have been the primary means of advancing SAPECS' first objective, namely, to develop a body of empirical evidence, theory and tools for understanding SES in the region. Some working groups have also directly advanced work in this regard, notably the transdisciplinarity working group which put together two reflective papers (Cundill et al. 2015; Roux et al. 2017) and the protected areas working group which produced a special issue (De Vos et al. 2017). These products were conceptualised during SAPECS working-group meetings. The idea for the development of the recent SES methods handbook (Schneider et al. 2021) and associated website<sup>6</sup>, of which several SAPECS members have been editors and authors, was born at a SAPECS winter school, and further developed at various SAPECS meetings. A synthesis of insights with regard to the five SAPECS research themes is presented in a recent paper by Biggs et al. (2022).

The second SAPECS objective, mainstreaming SES knowledge into policy and practice, has mainly been achieved through transdisciplinary approaches adopted in individual projects (e.g. Nel et al. 2014; Reyers et al. 2015; Pollard et al. 2020) and through engagement of individual SAPECS members in policy and practice support processes in the region (e.g. Cockburn et al. 2018; several SAPECS members are engaged in IPBES, and serve on the South African National Research Foundation's scientific advisory committees).

As in the case of the larger PECS network, SAPECS has served an important function as a 'home' for SES researchers in the region. SAPECS has provided a safe space to learn and surface tensions, dilemmas and conflicts that arise when working in complex SES and cross-disciplinary and transdisciplinary divides, and to

discuss how these play out specifically in the southern African context. SAPECS has also provided a platform for sharing and leveraging learnings and insights from individual projects and case studies, as well as helping to build relationships for larger collaborative SES projects and informing specific regional policy issues. In this way, SAPECS has emerged as a metacommunity of practice out of an enabling research network, within which are nested several smaller, focused communities of practice in the form of working groups. Our experience supports the value of PECS moving towards establishing regional SES networks in different parts of the world, and highlights the value of such regional networks in supporting progress towards sustainability.

## Notes

1. [www.futureearth.org](http://www.futureearth.org).
2. [www.pecs-science.org](http://www.pecs-science.org).
3. [www.council.science/what-we-do/funding-programmes/lira2030](http://www.council.science/what-we-do/funding-programmes/lira2030).
4. [www.sapecs.org](http://www.sapecs.org).
5. [www.ipbes.net](http://www.ipbes.net).
6. [www.sesmethods.org](http://www.sesmethods.org).

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