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ORIGINAL ARTICLE

Transformative spaces in the making: key lessons from nine cases in the Global South

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Abstract
Creating a just and sustainable planet will require not only small changes, but also systemic transformations in how humans relate to the planet and to each other, i.e., social–ecological transformations. We suggest there is a need for collaborative environments where experimentation with new configurations of social–ecological systems can occur, and we refer to these as transformative spaces. In this paper, we seek a better understanding of how to design and enable the creation of transformative spaces in a development context. We analyse nine case studies from a previous special issue on Designing Transformative Spaces that aimed to collect examples of cutting-edge action-oriented research on transformations from the Global South. The analysis showed five design phases as being essential: Problem Definition Phase; Operationalisation Phase; Tactical Phase; Outcome Phase; and Reflection Phase. From this synthesis, we distilled five key messages that should be considered when designing research, including: (a) there are ethical dilemmas associated with creating a transformative space in a system; (b) it is important to assess the readiness of the system for change before engaging in it; (c) there is a need to balance between 'safe' and 'safe-enough' spaces for transformation; (d) convening a transformative space requires an assemblage of diverse methodological frameworks and tools; and (e) transformative spaces can act as a starting point for institutionalising transformative change. Many researchers are now engaging in transdisciplinary transformations research, and are finding themselves at the knowledge–action interface contributing to transformative space-making. We hope that by analysing experiences from across different geographies we can contribute towards better understanding of how to navigate the processes needed for the urgent global transformations that are being called for to create a more equitable and sustainable planet Earth.

Keywords Co-production · Facilitation · Global South · Sustainability · Transdiciplinarity · Transformation

Introduction

The advent of the Anthropocene—where humans have become the dominant force of change on the planet—brings complex social–ecological challenges that require humanity to engage with the world and with each other in new ways (Pereira et al. 2015; Steffen et al. 2015; Preiser et al. 2017). Creating a more just and sustainable planet will require not only small changes, but systemic, social–ecological transformations. Greater political equity and inclusion of diverse stakeholders in co-constructing new knowledges, and opening up dialogues for change are imperative for finding ways forward (Scoones et al. 2018). With this comes an urgent need for researchers to engage seriously with the critical question of how to contribute to making transformative change happen (Fazey et al. 2018). Many alternative forms of research that are democratic, inclusive, action-oriented and integrate different forms of knowledge have emerged over the last three decades, including mode 2, transdisciplinarity, post-normal, participatory, sustainability science and action research, but these are not necessarily focused on facilitating transformative changes to achieve a more sustainable and just future (Fazey et al. 2018). New transdisciplinary processes for initiating and supporting transformative change will need to build on and include existing practices

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Table 1 Case studies and their geographical setting

Case title	Geography
Xochimilco wetland (Charli-Joseph et al. 2018)	Xochimilco urban wetland, Mexico City
Argentinian seeds (van Zwanenberg et al. 2018)	Argentina
Food system futures (Hebinck et al. 2018)	Eindhoven (Netherlands), Tuscany (Italy), Burkina Faso, Tanzania
Good anthropocenes (Pereira et al. 2018a)	Southern Africa
Stories for co-creation (Galafassi et al. 2018)	Mombasa (Southern coast of Kenya), Cabo Delgado (Northern coast of Mozambique)
Transdisciplinary research (Marshall et al. 2018)	Peri-urban South Asia
Southern Africa Food lab (Drimie et al. 2018)	South Africa, particularly Mopani District in Limpopo and the site of the agro-ecology and leadership training facility in Soweto
Global fellowship (Moore et al. 2018)	Global, with strong emphasis on Africa, South and Southeast Asia, and South America
Gender meetings (Dyer 2018)	Western Province, Solomon Islands

such as experimentation in public engagement, multi-stakeholder dialogues and knowledge co-production strategies that generate inclusive systemic solutions. However, the explicit framing of the need for transformative change in light of complex social–ecological challenges necessitates moving into a new kind of transdisciplinarity that is action oriented as well as co-produced, while remaining grounded in research. It is from this perspective that we propose a new setting for such processes: transformative spaces.

We define transformative spaces as collaborative environments where experimentation with new configurations of social–ecological systems, crucial for transformation, can occur (Pereira et al. 2018b). Transformative spaces allow and enable dialogue, reflection and reflexive learning, while reframing issues in ways that allow solutions—or at the very least, attempts to experiment and transform—to be co-created and co-realised. As such, they deliberately seek a variety of perspectives aside from those that usually dominate. They also seek to operate as stepping stones for Social–Ecological System (SES) transformations that are attentive to the specifics of the context in which the space is being convened. In this context, we refer to 'safe enough' spaces rather than 'safe spaces'. We use this term to encapsulate that while it is essential to create a level of openness and trust while convening these spaces, there is also sometimes a level of discomfort for participants. We acknowledge that all spaces of stakeholder interaction remain political, and that discussing and co-creating transformation pathways to sustainable and just futures will always be contested (Zgambo 2018). Discomfort for more powerful actors within a space may in some instances also reduce the safety of others (Drimie et al. 2018). Doing something other than 'business as usual' is likely to be uncomfortable for most, at least initially.

The complex social–ecological challenges facing the planet have resulted in an increased focus on the co-creation and co-production of knowledge or, transdisciplinarity (Pohl et al. 2010; Lemos et al. 2018). In part, these approaches are a reaction to the challenges of fast changing complex systems, but the result is that the role of the researcher solely as a provider of knowledge becomes increasingly blurred (Milkoreit et al. 2015; Wittmayer and Schäpke 2014). While researchers arguably have always been more than only knowledge providers, the interest of research in the application of that knowledge, and in the outcomes and impacts that arise from spaces facilitated by researchers—like stronger networks, actionable plans and policy interventions—is a more recent phenomenon (see for e.g., Frantzeskaki et al. 2014; Wittmayer and Schäpke 2014; Luederitz et al. 2017; Schäpke et al. 2018). This research that elucidates the complex dynamics of researchers as knowledge providers stems predominantly from the Global North. There is thus a gap in knowledge concerning lessons and implications as well as conceptual contributions to this thinking from Southern contexts. Building on this nascent, but growing body of work that attempts to characterize these transdisciplinary and potentially transformative efforts, we provide insights from the synthesis of nine cases predominantly in the Global South where attempts were made to create transformative spaces.

We believe that by focusing on cases from the Global South we can further advance efforts of scholars such as Mukute and Lotz-Sisitka (2012) and Bosch et al. (2013) to unpack complexity and understand better the context-specific and precarious social–ecological issues that may be more prevalent in these regions (Pereira et al. 2018b). Further, we hope to make explicit recommendations on how better to design experimental processes and institutional spaces that will progress both research and practice on the transformations that are needed globally, with inclusion of evidence from the South. The author team is a mix of scholars from the North and the South, and we acknowledge that this does not come without sets of diverse assumptions and challenges. However, through this synthesis we have aimed to engage in a different way of working together to integrate perspectives from all parts of the world, without one dominating over the other.

Table 2 Transformative spaces framework used to guide case study design and realisation as co-created in the first author workshop

Design phase	Central concepts and issues to consider	Guiding questions per phase
Problem Definition Phase	**Central concepts**: Objectives Problem space Theory of change **Issues to consider**: Horns of the dilemma Maladaptive states Lock-ins	What are the purposes and goals of your project? What is the problem addressed? Why is it a problem? What are the conflicting issues or different perspectives of the problem? What change do you expect during the course of the convened process?
Operationalisation Phase: Process and convening	**Central concepts**: Types of participants Quality of participation **Issues to consider**: Power relations Sectors, perspectives Incentives and ethics of engagement	Who do you need to have in the space? What are the dynamics between these actors? How do you engage and motivate actors to participate in the process?
Tactical Phase: Methods and Tools	**Central concepts**: Understanding change Measuring impact Experiential learning Appreciative enquiry Learning journeys **Issues to consider**: Sensitive controversial topics	What were the specific facilitation tools you employed or created to enable the co-design process? Why were these employed? How did they help to address the types of issues raised? What conflicts/sensitive issues/confusion emerged and how were these dealt with? What was the impact of the tools on the process? What tools did you use to evaluate the impact of the process?
Outcomes Phase: Measuring impacts of transformative change	**Central concepts**: Unpacking success Changes in behaviour, perceptions, mind-sets, values, beliefs **Issues to consider**: Cross-level impacts Uncertainties and unknowns	Were the expected outcomes met? What were the unexpected outcomes? What changed as a result of the project at the individual level, the collective level and at the systems level? How do changes at individual, collective and systems level interrelate?
Reflection Phase	**Central concepts**: Contribution to the field Further research **Issues to consider**: Socia–cultural and ecological dynamics and diversity	What are the remaining unknowns? What worked? What didn't work? What were you expecting to be able to change, and what did you actually change? What is the role of power dynamics/representivity in transformation? Why would you call your project a transformative space?

Each of the nine case studies are published in a special issue on Designing Transformative Spaces (Table 1). The Special Issue aimed to collect examples of cutting-edge, action-oriented research on transformations from the Global South. However, through that process, we believed it was important then to take a further step to analyse cross-cutting themes and provide a synthesis. Through our synthesis discussion, key areas of interest emerged: the interactive engagement between stakeholders and researchers, the deepening of multi-actor collaboration, the facilitation of transdisciplinary knowledge co-production, inclusivity and depth of participation, and sense-making where individuals cognitively relate to others and their environment. Through the analysis, we focused on five general design phases that could be recognized as important in transformative spaces: (a) Problem Definition Phase; (b) Operationalisation Phase; (c) Tactical Phase; (d) Outcome Phase; and (e) Reflection Phase (see Table 2). Our findings then focus on lessons from the meta-analysis of these nine cases and across these five phases to help guide future research and experimental practice in engaging with actors across public, private and civil society sectors in designing and facilitating systemic change efforts within transformative spaces. Thus, this article aims to contribute to fostering and instigating social–ecological innovations that contribute purposively to transformations.

Context: focus on the global south

Social–ecological transformations have largely been formulated and debated in the conceptual frameworks and contexts of the Global North (Pereira et al. 2015). For example, while many of the sustainability challenges and opportunities around urbanisation are located in the diverse contexts of the Global South, most of our knowledge on urban areas comes from the perspective of the Global North (Nagendra et al. 2018). Structural biases in global knowledge production systems mean the strong imperatives and unique capacities of the Global South to innovate, experiment for sustainability and nurture transformative trajectories remain under researched and often overlooked, despite their potential broadly to inform transformative processes across the world (Nagendra et al. 2018; Marshall and Dolley 2019).

In using the term "Global South", we recognize that we are not referring to a homogeneous entity; rather, it is varied, diverse, and fast changing. For example, there are areas facing extremes in terms of social, political, economic circumstances, often tied to environmental change and injustices associated with histories of resource extraction (Omeje 2017). Here, populations are more likely to be facing (or recovering from) highly volatile political and economic circumstances (World Bank 2011), and face more stark contexts of inequality and disenfranchisement (Hickel 2016). Governance at the level of the nation-state that has failed to enable welfare improvement of the majority is common in many post-colonial countries in the Global South (Börzel and Risse 2010; Hickel 2012).

Failures of imposed political structures in the shape of the nation-state can be partly attributed to a bad fit with previous indigenous and traditional political institutions, authority centres and decision-making practices (see Mbembe 2000; Morgan 2005; Dinnen and Firth 2008). Prior to nation-state delineations, groups within most of these countries did not operate under a centralized authority that cut across tribal, religious and other affiliations. This is visible in the current evidence of local action and autonomous efforts, that spring not only from weaknesses in neo-colonial political institutions, but also from autochthonous power structures (Börzel and Risse 2010). A reliance on alternative power structures means that people in different social, economic and political conditions have already developed strategies to take advantage of the inadequacies in current power structures (Menkhaus 2007). In this context, transformation processes may seem threatening because they represent breaking down many of the constraints that keep business as usual conditions that often support elite capture of benefits (van Breda and Swilling 2019).

Diverse knowledge systems and ways of being in the world and understanding complex human–environment relationships arise in the Global South. Although colonisation aimed to impose Western thinking and institutions on many of these areas, indigenous, local and syncretic knowledge systems continue to operate and can provide inputs for new framings of how people relate to each other and to nature in complex, more systemic configurations (Tengö et al. 2014; Díaz et al. 2015). This historical, context-specific knowledge and its ability to counter more extractive ideas of human–environmental relations is an important source for potential solutions to the social–ecological challenges of the Anthropocene (Brondizio et al. 2016).

Methods

This paper draws from a set of nine case studies on transformative spaces that formed part of a special issue in Ecology and Society (Table 1). The process through which cases were selected and written up was the result of a series of workshops, conference sessions and informal meetings between the editors and the contributing authors. The underlying rationale of the issue together with a core set of guiding questions for contributors to reflect on in their case studies were discussed by the editors at a workshop at the Stockholm Resilience Centre in April 2016. During the 2-day workshop, the editors used a brainstorming and clustering approach to develop the questions that they thought were most important for the case studies to answer, focussing in particular on the design element of the transformative space. Later, these questions were then grouped into a set of five stages in the process of designing transformative spaces (Table 2).

A second author workshop was hosted by the Centre for Complex Systems in Transition under the GRAID programme in South Africa in early December 2016. This 2-day intensive workshop brought together all lead authors of the case study papers, some additional authors and the editors. Based on the framework outlined in Table 2, initial learnings and reflections from the case studies were discussed to refine the questions and to reveal emerging insights from the combination of cases and to see whether the five phases were appropriate for each of the cases. The contributors were able to use the guiding questions to think about their case studies and identify the main aspect that they wanted to emphasise in their article.

The third workshop was held as a special session during the Resilience 2017 conference in Stockholm, Sweden in August 2017. By the time of the conference, first drafts of the papers had been circulated and peer reviewed by other

contributing authors. The presentations at the conference were aimed at providing key insights from the case studies to group critical emerging themes. During the session, the contributing authors elucidated and further refined more specific cross-cutting themes that emerged from each of the studies. From this, we used thematic clustering and reflective editing of the special issue to generate additional insights on transformations across the case studies. These form the bulk of the analytical material presented in "Unpacking different phases of transformative spaces". For more information on the methods used in the individual cases, please see the respective papers.

Unpacking different phases of transformative spaces

As is apparent in Table 3, across this set of cases we explore multiple interpretations of what a transformative space actually is and how that translates into practice. We explore a variety of settings and scales: from a small village, to a city municipality through to international organisations. We use the five phases outlined in Table 2 as starting points to identify more generalizable patterns and processes that shape transformative space-making in practice and can also guide the future research of such spaces. The phases we identified are modular and iterative, which is fundamental to ensure a more experimental approach in co-producing impact in social–ecological systems (Fig. 1).

Table 3 presents a full overview of the nine cases, their contexts and design phases. Key insights from each of the phases, with reference to the case studies, are presented in the following sections, followed by concluding remarks on future work on transformative spaces.

Problem definition phase

In this phase, the transformative space opens questions on scope and the need for new understandings of existing, persistent problems. In a transformative space, opportunities to reframe problems are essential given contexts where populations have inequitable access to information, feel their voices are not heard, and where some forms of knowledge are heavily weighted in comparison to others (Dyer 2018). The convenors of the transformative space, whether a research team or differently configured group, consider design questions such as: What are the goals of the project? What is the problem to be addressed and by whom? Why is it a problem and for whom? With these guiding questions, the design thinking of this phase requires knowledge on the historicity of the problem, the drivers and barriers for resolving the problem and the evidence of maladaptive or unsustainable system states. There is a need from the start to establish that there may be multiple perspectives on understanding why and how the system in question is "locked-in" to the problems, or in a potentially intransient state (Carpenter et al. 2019).

Across the nine cases, most common was an iterative problem definition approach: while the research teams defined a broader problem setting- driven by a project or research discipline- this was followed by inviting local co-conveners or their participants to refine this problem statement. In many cases this phase was intimately tied to the second phase, the operationalisation phase, which focused on the selection of participants and partnering with suitable co-convenors. The Xochimilco Wetland case took a different approach by not imposing any broad frame. Instead, they allowed the workshop's problem scope to emerge based on the concerns of participants. While a focus on the urbanization of wetlands was expected, participants instead saw a growing lack of self-esteem and social cohesion as a major issue. In contrast, the Transdisciplinary Research case, developed an approach based on building the legitimacy of knowledge developed through the lived experiences of environmental health challenges. Based on exploratory research, the research team first unpacked marginalised voices and views that were critical to co-creating solutions and defined the problem accordingly. They thus aimed to break through dominant political dynamics that otherwise would have strongly influenced the problem setting.

Various approaches for defining the actual systemic problem, with a varying extent of influence of local actors, can be utilised in the making of a transformative space. As shown across the nine cases, this depends entirely on the context and dynamics between stakeholders. Processes of problem setting inevitably invoke conflict and emotions about understandings of the problem and its impacts on present and future generations. Therefore, conveners must attempt to understand the human dimensions of social–ecological experimentations and recognise the emotions, perceptions and conflicts that are often ignored or understudied in such research. Based on this heightened awareness, an appropriate approach to defining a problem can be selected.

Operationalisation phase

Issues of diversity (in terms of sectors, perspectives, genders and so on) and processes of inclusion must be considered during the operationalisation phase. Co-production processes inevitably include a process of decision-making whereby conveners select those who will be invited to the space. Ideally, convenors attempt to select and mobilize a representative group of actors, while balancing power dynamics that might exist among actors. However, this selection process, regardless of the intentions, comes with its

Table 3 Overview of cases and transformative design phases

Case name	Topic	Problem definition phase	Operationalisation phase	Tactical phase	Outcome phase	Reflection phase
Xochimilco wetland (Charli-Joseph et al. 2018)	The Xochimilco urban wetland in Mexico City, a site of cultural and ecological significance, is degrading due to urbanization processes. This T-Lab convened actors involved in the use and management of the Xochimilco urban wetland, aiming to foster engagement by unpacking the social–ecological system and actors' positions within it	Defining of the problem within the T-lab was done without imposing any type of framing by the convenors, who were researchers. What emerged as a deeper concern was not the expected urbanization of the wetland, but a lack of self-esteem and social cohesion related to degradation of the social ecological system	*Types of participants*: Actors involved in use and management of the urban wetland were convened *Quality of participation*: Actors were identified by change agent criteria, and an analysis of ego-centric viewpoints to uncover power inequalities and positions within system. Throughout the convenors reflected on their role in the change process	The T-Lab was combined with a Mixed method approach: Agency Network Analysis and Q-methodology were used to facilitate system understanding and reflection on individual and collective agency among the participants in the T-Lab	The individuals united in a loose collaborative social network; The research shows evidence of new trust and understanding among individuals—the emergence of collective agency. Based on this, participants reframed their own role in the social–ecological system of Xochimilco	Contingency and the unexpected must be part of the equation when participating in these kind of projects. In this case, the 2017 earthquake in Mexico City opened unseen opportunities. These projects should be conceptualized as open-ended
Argentinian seeds (van Zwanenberg et al. 2018)	A T-Lab was created in Argentina to discuss sustainability challenges associated with seed market concentration and to identify potential social innovations to foster sustainability. The T-Lab process helped to identify areas of 'actionable consensus' between actors who otherwise see the system and priorities differently	Participants defined problems within the project-setting of a changing seed system. What emerged were highly polarised sets of views about which meanings or functions of seed systems are most important, and the sustainability problems those systems generate	*Types of participants*: Convening diverse actors involved in governing, producing and using seeds *Quality of participation*: Convenors mapped actors' different views about the main functions or meanings of seed systems	T-Lab-based process, supported by World Café and Q-Method to map and understand competing understandings and meanings of sustainability problems associated with seed systems; and to help identify areas of consensus across different perspectives	Creating of 'unconventional' alliances between researchers, NGO practitioners and marginalized social actors. These alliances helped open up new opportunities for interventions by enabling pooling of different resources (knowledge, legitimacy, organizational capacities)	Importance of identifying and focusing on mutual concerns about transformation between the powerful and less powerful. These become a basis to think about novel interventions that are likely to be politically and practically viable

Table 3 (continued)

Case name	Topic	Problem definition phase	Operationalisation phase	Tactical phase	Outcome phase	Reflection phase
Food system futures (Hebinck et al. 2018)	This paper compares the transformative potential of participatory foresight methods in four cases that imagine food system change under the Transmango project. Taking place in the Netherlands, Italy, Burkina Faso and Tanzania, each case worked with a set of stakeholders that focused on a place-based issue, ranging from food assistance to food policy plans	The broad setting of the cases was set by the place-based issue, while the participants refined this through the system mapping exercises in the early stages of the workshops. Crucial was alignment to the needs of the participants that were engaged in food system change processes	*Types of participants*: Focus on diversity with a place-based approach: resulting in people connected to food system change in that locality *Quality of participation*: Target groups for invitations were broad, but did not reach vulnerable groups	The participatory foresight methods were helpful in invoking creativity within the logics of systems-thinking and created safe-enough spaces by stepping out of today's power-relations by thinking into the future	Success hinged on the ability to engage a small number of powerful (regime) actors with the resources for change in the exercises, and this influenced the formulation of strategies in the transformative space	Based on these cases, the role of foresight in inciting transformative change can be best understood as a starting point and divided into three concrete roles for transformative change: pre-conceptualization of change, creation of new actor networks, and creation of concrete strategies with high chance of implementation
Good anthropocenes (Pereira et al. 2018a)	Building on potential 'seeds' of transformative change and through the use of various futures methods, visions of radically different and positive futures for Southern Africa were co-created. To encourage this transformative thinking, imagination and the pushing of boundaries were key to this case	The objective of the workshop was to create 'desirable visions' of Southern Africa and as such the focus was pre-determined by the project	*Types of participants*: Diverse group consisting of activists, development specialists, change-makers, UN officials and artists *Quality of participation*: Participants were chosen as they are leading thinkers in what they do. The aim was for diversity, rather than full inclusivity and the participant list was mainly structured around the existing networks of the organisers	Foresight, including an adapted Manoa method (Schultz 2015) use of Future Wheels, cross-impact matrices and the Three Horizons approach (Sharpe et al. 2016)	First, the process contributed final stories of radical, positive visions for southern Africa that have been shared in a variety of contexts; Second, it sparked a network of people committed to seeing how they can in their own way start contributing towards achieving more positive futures; Third, a futures method that has been adapted and used in a variety of different contexts	The focus on bright spots or positive futures was a powerful entry point for changing the mindsets of actors and also empowering them to recognize the types of change that is possible. Future collaborations with participants who want to be able to draw on the method and provide this kind of transformative space in the communities where they work means that the contribution of the process is ongoing

Table 3 (continued)

Case name	Topic	Problem definition phase	Operationalisation phase	Tactical phase	Outcome phase	Reflection phase
Stories for co-creation (Galafassi et al. 2018)	In two coastal regions in Kenya and Mozambique, processes of knowledge co-creation within the context of poverty alleviation and ecosystem sustainability were explored. This focussed on the communicative spaces opened by tools such as story-telling, system diagrams and future scenarios that can challenge dominant narratives	Participants defined the problem within a wider setting of relations between ecosystems and poverty. In five groups divided by expertise, the tool of system diagrams was used to explore linkages between well-being and ecosystems	*Types of participants*: Focus on diversity with a multi-scalar, but place-based approach *Quality of participation*: Team mapped relevant participants on basis of expertise and drawing from long-term engagement in previous projects	Alternation between in- and cross-scale interactions. Engaging emotional intelligence through the arts to invoke a shift in mindsets among participants that are in a co-creation process/workshop. These dynamics were captured through the use of interviews and in-depth process observation	Development of shared views on problem definition and on potentials and trade-offs associated to different intervention pathways	Stories, imagery and lived experiences play a crucial role in eliciting shared understanding and in allowing for exploration of underpinning assumptions of strongly held narratives
Transdisciplinary research (Marshall et al. 2018)	Drawing on insights from long-term involvement in transdisciplinary research on emerging environmental and health challenges in peri-urban India. The ability of transdisciplinary research to contribute to 'transformative space making' is explored. Mechanisms that build legitimacy of pro-poor knowledges and create action-readiness are identified	Problem defined by transdisciplinary research team (marginalised communities, academics, civil society groups) during series of research projects focussed on specific environment and health challenges. Poor and marginalised groups are often wrongly categorised (in mainstream formal problem framings) as responsible for environmental challenges identified, rather than central to realising transformative change	*Types of participants*: Place-based, aimed at fostering long-term processes of transformation; which pay attention to a diversity of knowledges and seek to address unequal power dynamics in co-production processes *Quality of participation*: Team mapped potentially successful alliances (periodically reviewed). Marginalised communities were central to the process	Dialogues and participatory mapping exercises aimed at drawing attention to the politics of knowledge, and to speaking about the power dynamics and agency afforded to different knowledges in processes of transformation	Creating of 'unconventional' alliances between researchers, NGO practitioners and marginalized social actors able to engage with local and national policy processes. These alliances helped give legitimacy to marginalized knowledges and raised preparedness to respond to windows to influence policies	Attention to structural injustices in knowledge systems can contribute useable knowledge to inform policy and highlight opportunities for sustainability transformations. Long term alliances in trandisciplinary research can co-create new knowledge and help challenge dominant narratives, reframe problems and support the exercise of agency of subaltern groups in co-creating sustainability transformations

Table 3 (continued)

Case name	Topic	Problem definition phase	Operationalisation phase	Tactical phase	Outcome phase	Reflection phase
Southern Africa Food lab (Drimie et al. 2018)	The Southern Africa Food lab is a space that engages with dialogue as tool to generate new ideas, but also create commitments and relationships for new action and support for small-holder farmers. Of importance was the proactive addressing of power imbalances and giving voice to the marginalized in the system through these dialogues	Although the broad problem is identified by the Lab as a key societal issue, the specific objectives of the innovation teams emerges through dialogue and in prototyping or testing of the innovations. The key is on acting, while remaining open and moving between inspiration and experimentation	*Types of participants*: Actors were selected from private sector, civil society, government and academia, while paying attention to balance in terms of roles, gender, and race. Actors were in a decision-making position to catalyse food system change *Quality of participation*: Facilitated dialogue was used to reveal power imbalances particularly around race and gender	Process design of the Food lab was strongly informed by Theory U, a change management method. It is described as enabling individuals to open beyond their preconceptions and historical ways of making sense so that they can consciously participate in a larger field for change	Sustainable, transformational change in the food system is a function of shifts in individual perceptions, perspectives and intentions, combined with shifts in collective perceptions and intentions. Participants deepen their understanding of the system and generate a new and more collective understanding of the system and their role in it	Facilitated dialogue enables focus not just on the exchange of information and knowledge—i.e., the creation of new ideas—but on the creation of new commitments for 'new action', as well as the development of relationships that enable such commitment and action to arise
Global fellowship (Moore et al. 2018)	Bringing together system entrepreneurs from various regions engaged in transformative processes, the aim of the Global fellowship is to strengthen two transformative capacities: building systems reflexivity and navigating emergence. Fellows go through experiential learning in various modules, which include peer-coaching and study visits, and apply these learnings to their own social–ecological challenges	General problem that the Fellowship aims to address is the need to strengthen peer-peer learning and transformative capacities, using insights from resilience and complexity science for transformations. Specific problems that are addressed within the Fellowship itself are multiple based on participants own framings, further refined by numerous exercises (e.g. using multiple lenses for analysing issues, complex systems mapping)	*Types of participants*: Mid-senior level career, who are recognized for their work in trying to transform systems to ensure social–ecological resilience. Focus on diversity to expose network to different perspectives/regions. This to help participants address their own spaces more effectively *Quality of participation*: Applicants were nominated, and then applied, and selected for the Fellowship	"Tools" were concepts, frameworks, and exercises that involved analysis and application. The materials were based on complex, social–ecological systems approaches to resilience, institutional theory, organizational design, and social–ecological innovation research, and included a broad range, such as: inscaping, complex systems mapping, network analysis, the adaptive cycle, and more	Working with individual fellows on social innovation created a training ground to be more reflexive of the spaces they operate in and develop skills to cross scales, confront diversity, and analyse social–ecological relationships	Navigating between the design of the modules (to go from individual mindsets to organizational, to networked and global), and also including participant choices as they emerged was key and resulted in diverse workshops: this ranged from storytelling to learn about communication and complex dynamics to workshops on social finance mechanisms to support social–ecological navigation. Supporting this, flexibility in design was crucial

Table 3 (continued)

Case name	Topic	Problem definition phase	Operationalisation phase	Tactical phase	Outcome phase	Reflection phase
Gender meetings (Dyer 2018)	An initial issue for gender equity in environmental decision making in many developing country contexts is not only women's inclusion but also their substantive participation in decision-making forums. Based on analysis of two cases a number of reasons for the silencing of women as public political actors are highlighted	The researcher defined the problem around gender parity, equal attendance at meetings. Gender parity is not the same at substantive participation. While women may be present in equal numbers in decision making for a, this does not automatically mean there is gender equality that allows women to be influential in these forums	*Types of participants*: Convening actors in natural resource management interventions for sustainability and resilience initiatives *Quality of participation*: While an 'inclusive invitation' was extended, this does not guarantee inclusive participation	Mixed methods: Quantitative systematic mapping of meeting speech patterns contextualised by ethnographic detail and participatory observation	Awareness and increased attention to context and patterns of gendered decision making dominance to lead to creative and contextually relevant reformulation of decision making forums formats	Creating space for different modes of communication can transcend cultural habits and gendered power dynamics around rights to express opinions. Respecting local cultures does not have to mean reinforcing unequal power structures

own dimensions of power and consequence. Not only does this impact the subsequent process, but it also demonstrates the inevitable asymmetries that surface in the co-production process (Cornwall 2008). Even when no explicit selection of participants appears to take place, underlying social power dynamics result in a pre-selection of some at the expense of others (Dyer 2018). It becomes crucial for conveners to get a balance in 'types of participants' and 'quality of participation' (Hebinck and Page 2017) amidst these sometimes hidden social dynamics.[1] Also important is who the conveners themselves are. Although there are real challenges for convenors that are not directly within the system themselves, "outsider" status of conveners can sometimes be advantageous as the participation of "insiders" in shaping the participants of the process might encourage or even discourage participation of certain actors.

Given the majority of the nine cases focused on place-based problems, their operationalisation phase entailed the selection and mobilisation of place-based actors. Along with local co-conveners, research teams mapped out and invited suitable actors that were in various ways connected to the issue at stake while attempting to maintain diversity and look beyond power-structures. In the Southern African Food Lab special attention was given to the selection of participants, as the main selection criteria was a leadership role in their sector (Drimie et al. 2018). This was essential for their aim to instigate new actions and creation of commitments to support smallholder farmers in ensuring community food security within a historical legacy of land dispossessions and concentrated poverty. In their selection of actors from across private sector, civil society, government and academia, their focus was on the participants' ability to ensure representation across sectors and influence on and experience with the system. As such, power dynamics, of actors over the system and of entrenched power inequities, were a major consideration in the operationalisation of this case. In contrast, the aims and objectives of the Global Fellowship case led to a selection approach that focused on diversity that was not explicitly focused on one place, although participants worked on place-based issues. Seeking to strengthen system entrepreneurship, the convenors recognized that systems change requires that agency is distributed across a networked set of actors. To support systems rather than individual entrepreneurship, and to strengthen transformative capacities in a learning space, the design focused on a diverse group of fellows, connected to different networks, embedded in different regions and systems, and with different perspectives.

[1] As emphasised in "Problem definition phase", the ability of conveners to get a good representation is partly influenced by the problem definition, sometimes leading to the choice to give participants space to reframe problems.

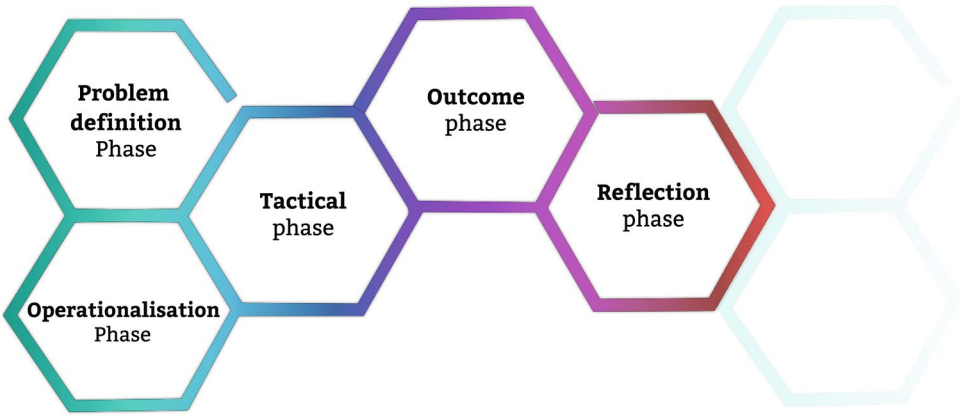

Fig. 1 Five phases for the design of transformative spaces that iteratively feed into each other and are dynamic into the future (i.e., there is no determined end-point)

This creates certain power asymmetries as every participant is confronted with a diversity of views about transformations in their environment.

Even with careful selection processes that pay attention to these complex social dynamics, some form of power will inevitably enter into the convened space, including potential conflicts arising from pre-existing tensions or prejudices. Likewise, it is critical to acknowledge that transformative spaces do not occur in a vacuum, and participants have a history of engagement with other convened processes and may possibly feel some form of research or engagement fatigue (see Lemos et al. 2018). Knowing such dynamics can affect the 'quality of participation' during a process, given that these can affect the quality of a 'safe space' for certain actors (Gaventa and Cornwall 2008). Lessons learned from these cases demonstrate that such sensitivities can be mediated to some extent through the choice of methods (see next section). Open reflexivity and transparency in terms of selection is vital to convening a transformative space. Over time, who is included in the transformative space may also shift and this reflexivity is important to be able to ensure that the space allows for this fluidity as interests change.

The tactical phase: the methods and toolbox for transformative spaces

The tactical phase is focused on the choice, development and application of methodologies to enable a transformative space, and to support the work that will be done in that space, by the conveners, independently or together with participants. In most cases, conveners decided upon developing a toolbox: a range of facilitation and data collection methods that work towards meeting the objective of the transformative space and scientifically record the process. The choice of facilitation tools depends on the earlier phases of problem defining and operationalisation since certain methods are aimed towards understanding the current system, while others focus on working towards catalysing system change, and some on both. The social innovation lab guide (Westley and Laban 2012), outlines one way through which to ensure that different tools are used in certain sequences so as to increase the likelihood that the goals and outcomes are achieved at each stage of the process. Since there is no perfect approach, and always many optional pathways to undertake these kinds of processes, choosing the "right" tools for each group can be a tricky process, and it is also important to recognise when a particular method is not working with a group and to shift to something else (Zgambo 2018).

The conveners employed different types of participatory methodologies, such as participant observation, narrative enquiry, participatory scenario mapping and participatory impact pathways analysis. In some spaces, mixed quantitative–qualitative approaches were used to facilitate system understanding, such as Agency Network Analysis and Q-Methodology (Table 3). The case Stories for co-creation applied an approach that engaged actively and purposefully with the emotional intelligence of participants through the use of arts. Here, the application of performative arts and its ability to contribute to opening up different perspectives to the transformations needed to tackle climate change was explored. The case shows how the use of artistic interventions allowed for a move from a mere cognitive understanding of facts to a process of revealing perceptions and underlying worldviews that mediated that understanding. The research team captured these shifts of perceptions and mind-sets through narratives, interviews and, in-depth process observation.

Creativity was used in the case of Food System Futures as a way to think about what a desired food system could look like. Through the use of participatory foresight methods, participants were encouraged to think imaginatively while within the bounds of system-logics, resulting in four plausible future food systems. In this case, the use of system thinking contributed to increased understanding of the food system, the different actors and their activities, and (un)desired

system outcomes. By combining this system-understanding with a futures lens, participants were able to step out of the today's dominant power-structures and challenge currently dominant trade-offs. Moreover, the research team took an iterative approach to this tactical phase, allowing for swift adjustment in case the process took an unexpected turn or did not meet objectives.

As the cases highlight, while the methods themselves may not be unique and could be used in other types of processes, it is the choice of methods for designing and facilitating work within the space that is crucial for the establishment of a transformative space. It is thus critical to match the methods and tools employed in the process with the key outcomes that it seeks to achieve and ensure that they are meaningful to the contextual dynamics. The combination of methods (see Table 3) gives structure to the participants and to the facilitation of the transformative space, and is tailored to the contexts in which the transformative spaces are embedded. In this way, the transformative space can start to model (and even exemplify) different ways of working, which may be essential to the future transformative efforts in this space.

Outcomes phase: understanding and measuring impacts for transformative change

In this phase, the authors work towards understanding what the key outcomes for transformative change are. It takes stock of the impacts of the transformative space at the individual, the collective and system level and reflects on the efforts of researchers to track and understand changes that emerge. Detecting change that can be attributed directly to the transformative space is challenging, particularly in relation to a 'live' and open process, where there are multiple influencing processes and events outside the domain of the transformative space. While some notable changes may occur during or immediately following the implementation of an experimental process, other changes may emerge later—possibly associated with individual change and relationships initiated during the transformative space.

The difficulty with trying to identify, undertake and assess transformative change can be identified across the cases, as most conclude that the transformative spaces are actually starting points of change, rather than endpoints (see Fig. 1 for a visual representation). Instead, the cases give insights into how change has been effected at individual, collective and system levels and how these change processes might be further catalysed. In the Argentinian Seeds case, a key outcome of the transformative space was the creation of 'unconventional' alliances between researchers, NGO practitioners and social actors that are systematically marginalised within formal policy dialogues, such as around agricultural seed markets. Through the creation of novel alliances of actors, the transformative space helped to open up new opportunities for intervention. These new alliances enabled a pooling of different kinds of resources, such as of knowledge, legitimacy and organizational capacity, to help overcome some of the difficulties of trying to galvanise action for building more sustainable pathways of change in the context of pervasive 'locked-in' agricultural systems.

Echoing through the cases is the contribution of transformative spaces in the development of connections between actors that are normally fragmented and how their improved understanding of system dynamics can be catalytic to effecting larger change and help to re-organise these systems. To analyse and track progress towards more systemic change as an outcome of transformative spaces, research teams need to be more creative and reflexive about monitoring and evaluation. While this is often overlooked, it could contribute to the identification of both qualitative and even quantitative signs of change. More work to be able to track the real impact of these spaces, the reconfigured relationships and changes in mind-sets is critical for furthering the work on understanding and instigating transformative change (see O'Brien and Synga 2013 with reference to responding to climate change).

Reflection phase

Concluding the design phases, reflection is important to explore and understand what worked and what did not. Reflecting includes debriefing on whether expectations aligned, objectives were met, and how power-dynamics in the space enabled or disabled transformative change. Powerful actors that command resources and influence can often pose an important barrier to change. These issues mean that a transformative space is often not a transformation in itself, but rather a form of preparedness for transformation that entails unlocking constructive ways of working with power dynamics that are undeniably constitutive of any social–ecological system (Moore et al. 2018). In transformations, a single intervention is insufficient as the system has been locked into unsustainable and unjust trajectories due to historical path dependencies and requires a much longer-term engagement. Moreover, the larger the scale of transformation desired; the longer the time required to observe impact and change. For these larger higher-level transformative changes, new methods and longer time commitments are needed.

Transformative spaces must be crafted so as to allow for conflict to be a productive process of contestation, of unmasking interests and rethinking perceptions. In this way, these spaces move away from the consensus model (Mostert 2015) that informs many efforts at transdisciplinary engagement. Consequently, they can facilitate the development of social interactions between actors that

previously did not come into dialogue. In the Gendered Meetings case, the ethnographic approach used to understand underlying gendered dynamics of communication in Solomon Islands villages revealed that prima facie assessments of participation can be misleading. It concludes that without recognition of how some communicative practices gain dominance, and thus voice, over others, real transformation is unlikely to take place. This is one way that transformative spaces are distinct from other experimental settings and participatory processes, as they are deliberate in inviting conversations about conflict and its causes and are thereby open to the human dimensions of deliberations about future pathways. The Good Anthropocenes case shows how transformative spaces allow for a shift in personal perspectives in terms of reframing and re-thinking initially negative images (the Anthropocene) by explicating positive changes and enriching the dialogue with transformative visions. This case shows how alternative approaches can be a useful approach to foster dynamics of change. In this instance, a focus on positive futures allowed participants better to link current practices to transformative change, contributing a set of approaches that enabled societal actors to deal with changes needed for transformation and to see their individual contributions to the larger vision.

The other cases also illustrated ways of doing this reflecting, such as identifying and focusing on mutual concerns between both powerful and less powerful players, and to use these as a basis to think about ways forward. Critical to developing transformative spaces is a serious and open engagement with how knowledge is being created and utilised, not just in terms of bringing diverse actors together to co-produce new knowledge in a particular setting, but with a mutual recognition that context, culture and power will shape the form of understandings of all involved (Stirling and Mitchell 2018). Another implication is how this understanding plays out in wider knowledge systems with the structural injustices that they encompass (Marshall et al. 2018). As such, transformative spaces have the potential to transform the value of knowledge, heightening it to a common resource and public good rather than a power tool for the selected or privileged few.

Researchers are key actors in transformative spaces and as a result can do a great deal in helping to turn power from a disabler into an enabler for transformation. However, they are also bound by their own rhythms of work and institutional commitments. In retrospect, this can pose barriers towards realising their full potential as transformative space-makers (Hebinck et al. 2018; Marshall et al. 2018). The limited time available in projects and the results-driven frameworks sometimes mean that they have less time to spend in the transformative space or cannot meet expanding and ongoing expectations. In turn, this may limit the information and knowledge researchers gain on the multiple outcomes of these spaces, creating in this way a knowledge gap. This is particularly true in the Global South were structural injustices may be more pervasive.

Key lessons relating to research in transformative spaces

The aim of this synthesis has been to explore how to create spaces for developing initiatives and approaches that can contribute to large-scale, systemic transformations that strengthen the relationship between people and planet. Central to this goal is the pressing need to make transformation more directly relevant to the conditions that arise in the Global South. This includes addressing marginalisation; dealing with and confronting the long legacies of colonialism in its many manifestations, and whose effects are still experienced; and challenging the status quo to help address social and power inequalities. Indeed, these are issues that have not had a central place in SES transformation research, but are arguably central to any social–ecological change process, and are particularly salient to the conditions of transformation.

We conclude that transformative spaces, through designing the engagement and dialogues in ways that involve and consider emotions and allowing for empathy, further contribute to humanizing the solutions. We argue this is a distinguishing feature of the co-created outcomes of transformative spaces, that they are immediately socially relevant, and neither impersonal, nor apolitical. We consider researchers such as ourselves not just to be distant observers of transformation, but in fact to have considerable agency in catalysing or creating conditions for transformation (Milkoreit et al. 2015). In other words, we can help create or support the seeds for transformation when these seeds are weak or completely lacking. Researchers are not just knowledge makers or more conservatively, knowledge holders (a dominating paradigm in Western knowledge systems), but transformation makers and facilitators, and hence consciously or not, they are changing their own roles, identities and values in the process. There is much to be gained from ensuring that the learnings from transformative spaces are as diverse as possible and are not restricted to Western paradigms and problem-framings. Transformative spaces allow for a reflection on the broadening and shifting roles of researchers in both North and South research communities. Another insight has been that creating transformative spaces is not about a single event or workshop. Rather it is a continued process of engagement through designed

and facilitated interactions that often involve a series of workshops or programs that requires planning, organisation and curation.

Opening up to emphasise the vital knowledge and capacities for enabling transformative change that are prevalent in the Global South is a crucial research gap. This paper has made a first attempt to synthesise some of the many learnings that a cross-case comparison can elucidate, whilst holding true to the individuality of the studies and recognising that these findings are not universal. Below we identify five key findings from the nine cases.

Ethical dilemmas associated with creating a transformative space in a system

First, all the cases raise some ethical dilemmas when creating a transformative space, whether initiated by a researcher, an NGO or a grassroots organization. Transformative spaces often initially start small, and so almost by definition, they are exclusive rather than inclusive spaces. While they do not have to be organized as small "closed" spaces, the nature of the interpersonal interactions and engagement that these processes are designed to foster supports a more intimate design. Transformative spaces are designed to generate ideas that challenge the status quo and the dominant systems, and hence change the systems conditions that created the problems in the first place. This means that a transformative space can put participants at risk because the ideas can be seen as controversial to others who can feel threatened by the new ideas, especially if the ideas change power relations. For some participants, engaging with such ideas could entail exclusion from their communities or in some cases, a fear for their own life (see Drimie et al. 2018). As Moore et al. (2018) highlight, transformative spaces can indeed "feel—and be—dangerous" because they challenge stability and predictability. However, such efforts to give voice to the powerless may also give rise to internal resistance to change, and possible setbacks, as actors in the system become nervous when power imbalances are explicitly identified and addressed. Power-related tensions arose amongst intended beneficiaries of the agro-ecology leadership program in the Food Lab case study, when some smallholders worried about a course participant becoming too dominant due to newfound knowledge and confidence. Especially in the Global South, where these issues of vulnerability and marginalisation are often explicit, the ethical implications of engaging in the system need to be acknowledged by researchers upfront. This includes being honest about setting expectations about the outcome of the process. It is only by further investigating processes in these contexts that a better understanding of these ethical dilemmas and ways to ensure the wellbeing of all participants can be developed and that expectations of change can be better managed.

Readiness of the system for change

Second, related to the previous point is the importance to assess the readiness of the system for change and avoid initiating change processes too early, with a higher risk of failure because the convenors (and possibly the participants) do not understand the system. Understanding the readiness of the system for change will allow transformative spaces' outcomes to be more easily adopted or even institutionally embedded outside the group of participants in the transformative space (Westley et al. 2017). Even when there are small 'openings for change' there are signals that communities of practice and research should not neglect nor hesitate to seize. We need to keep in mind that it is not only the experimentation process itself, but part of the open-endedness of experimentation that makes it critical to identify the individuals, organizations, and networks that are deeply committed to changing the dynamics of systems that they themselves may represent. It is necessary to include a diverse range of relevant actors who develop a shared sense of ownership of the process for it to be sustained in the long-term and to effect change at the 'systems' level. It is also important to have a baseline from which to assess potential changes in the system.

'Safe' vs. 'safe-enough' spaces for transformation

Third, the cases raise the issue of transformative spaces as "safe" or "safe-enough". One aspect of this is that the participants might be putting themselves at risk by participating. But the "safe" also means that transformative change requires learning, and more specifically "un and re-learning" in order for participants to challenge their own thinking, and let go of preconceived ideas (Olsson et al. 2017). This often means that participants show personal vulnerability. The Global Fellowship, T-labs and the Food lab were all designed for "unlearning"; they challenge preconceived ways of thinking and knowing, and use different methods to guide the participants through such processes. The idea is that to transform a system, it is necessary to undergo changes at the personal level (including scientists' assumptions) and then to start building capacities and networks for change. This implies that there is a need for a level of discomfort to be able to process internal transformations and act systemically. As well as personal learning, the encounter with diverse opinions can also be an uncomfortable space for some participants, especially if they disagree with what is being said. Creating an environment where all feel safe enough to articulate their differences can be vital in some instances.

Assemblage of frameworks for transdisciplinary research

Fourth, transformative spaces require an assemblage of frameworks to set up the transdisciplinary research; simply put, there is 'no one size fits all' situation. The cases show that a diversity of methods, tools and skills is required for transformative spaces to be designed, operated and reflected upon. Similar reflections have emerged from literature on living labs as spaces for intervening around sustainability in cities (Voytenko et al. 2016; Bulkeley et al. 2016). Next to this, tools and methods are not neutral, but are necessarily constructed on particular assumptions and perspectives on knowledge, which in turn can shape outcomes dramatically. It is therefore important for researchers to reflect on these assumptions so as to design processes that fit the contextual dynamics at play and the interests of those involved. It is also important to avoid matching or mixing frameworks and theories that come from ontologically opposing sides because such a mis-match will generate non-reliable findings (that in turn will deteriorate the eligibility and reliability of process outcomes). This comes together with the researcher's willingness to reflect on their own role and be willing to question their own assumptions.

Transformative spaces as starting points for institutionalising change

Fifth, transformative spaces as unique knowledge-action interfaces can either foster a transformation from infancy or institutionalise ongoing transformative processes by creating, strengthening and even 'positioning' new social networks. As transdisciplinarity becomes normalised within research, there is a need to recognise the different practices within this larger epistemological framing of which the growing scholarship around transformative spaces is an example. A transformative space is a form of preparedness for transformation, unlocking constructive ways of working with power dynamics in the status quo. As such, transformative spaces allow participants, including the conveners or researchers involved, to reflect on their individual agency, their capacities and perspectives that enable or disable collective action, the forms of alliances they can build, and new ways of seeing their world that open up alternative pathways forward. Because transformative spaces operate within ongoing, highly complex and often contested social–ecological realities, it is possible that these spaces provide participants with the space for reflection that then empowers them to mobilize change in other arenas. This echoes what Lotz-Sisitka et al. (2015) refer to as the need to develop transgressive learning or disruptive capacity building that moves beyond existing notions of adaptive management. Transformative spaces can provide the contexts for institutionalising these kinds of more radical system interventions.

Conclusions

This article synthesises the learnings from research engagements across nine diverse cases in transformative spaces in a development context, which were individually set out in a Special Issue in Ecology and Society (see Pereira et al. 2018b). This synthesis paper provides concrete insights for the crafting of fitting methodologies to research transformative spaces in a development context. We do so by setting the cases out in the five phases that we argue can be recognised in transformative spaces. This process allowed us to distil a number of key messages that should be considered when designing transformations-oriented research. We urge anyone engaging in or designing research in transformative spaces to stay mindful of these five points:

- There are ethical dilemmas associated with creating a transformative space in a system;
- It is important to assess the readiness of the system for change before engaging in it;
- There is a need to balance between 'safe' and 'safe-enough' spaces for transformation;
- Convening a transformative space requires an assemblage of diverse methodological frameworks and tools;
- Transformative spaces can act as a starting point for institutionalising transformative change.

In addition, by choosing case studies from the Global South, we have tried to highlight how learning from these perspectives can disrupt Western ideas about transformation and push transformation research and practice into new directions. Such emphasis includes a stronger focus on dimensions of justice, history, power and contested meaning. Galvanising the initial learnings about transformative spaces from the Global South has global significance, as much research on transformations so far has been typically set out to address problems and challenges in the Global North, or 'Western' contexts. The need to ensure that theories on transformation are not based solely on research from privileged regions of the world is an imperative if the world is to move onto a more sustainable pathway. As such, the paper addresses the broader picture of transformation across diverse contexts and yields insights with implications across the North–South continuum.

Our approach to transformative spaces recognises that disrupting the dominance of Western examples is a key stepping stone for accelerating global transformations for two reasons. First: there is no transformation without challenging

the status quo in each of its various manifestations. In the Global South, there is historically less trust of the status quo and hence a window of opportunity to experiment with transformation from a different vantage point. Second, by turning to the Global South we attempt to challenge the deep institutionalisation of Western-based knowledge paradigms. The transformative space is essentially a way to bring the agency and knowledge of those actors that are typically left behind by these paradigms. This relates to the ethical dilemmas of transformation and efforts to deal with them in the knowledge co-production process.

Many researchers are now engaging in transformations research as transformative space-makers and have moved away from dominant ways of researching change as observers, but there is a continued need to expand our understanding and exploration of how these transformative spaces play out in the long term. As Fazey et al. (2018: 54) note in the context of climate research, researchers need to acknowledge that they work from within the system and become reflexive to taking on alternative roles that are more experimental and action-oriented, to deliver more "highly adaptive, reflexive, collaborative and impact-oriented research". Here we have presented tangible examples of research that is doing exactly this in diverse contexts in the Global South. There is need for urgent action towards more sustainable and just futures for people and the planet and there is a pivotal role that research can play in catalysing this change. We hope that by sharing our experiences from across different geographies that we have been able to ignite continued scholarship, which will be able to contribute to the urgent global transformation to a more equitable and sustainable planet Earth.

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