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INTRODUCTION

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Sustainable development: universal goals across a divided world

The Sustainable Development Goals (SDGs), which grew out of the Rio+20 UN Summit in Rio da Janeiro in 2012 and were agreed at the UN General Assembly in 2015, represent potentially the most ambitious, comprehensive and internationally recognised development agenda that the world has ever seen. In comparison to their forerunners the Millennium Development Goals (MDGs), the 2030 Agenda and the SDGs are ‘universal’ and are envisaged to be implemented by “all countries and all stakeholders” through to 2030 (United Nations 2015). They are also transformative in their ambition, requiring systemic changes that go beyond incremental shifts in policy, behaviour or the use of technology – changes that empower the most vulnerable and genuinely “leave no-one behind”.

Five years later, unity around the goals has been unsettled by the shock of Covid-19, an infectious agent responsible for numerous medical crises, economic recessions and socio-political upheavals across the world. At the time of writing this chapter (September 2020) the ability of national governments to adopt a collaborative rather than a competitive approach to addressing Covid-19 hangs in the balance, and in many ways the world looks more divided than ever. International networks of scientists and researchers are struggling to overcome this division.

As with Covid-19 and, earlier, the MDGs, the current international development agenda poses questions for the global research community. What does this idea of “Transforming our World” (the title of the 2030 Agenda) actually mean when it is translated to the very different contexts in which we find ourselves? How can we understand and help to bring about the kinds of transformative change that the SDGs necessitate? What is the role of research – in particular

research that is rooted within the social sciences but extends to incorporate other disciplinary and practice-based inputs – in these transformations?

This book tries to address these questions. The research detailed in this volume (which took place pre-Covid-19) engages with the specificities of different contexts around the world, while seeking general lessons that can be drawn about transformations to sustainability and the role of research within them. It thus documents a new approach (or approaches) that contribute to the enterprise of “transdisciplinary” research, in which collaborations between academic and non-academic partners attempt not only to understand the world and diagnose systemic challenges of sustainability, but also to contribute to overcoming them.

The next section of this chapter firstly outlines the rationale and emergence of the ‘Pathways’ Transformative Knowledge Network, from which the co-authors are drawn, and highlights the sustainable development challenges with which it engaged between 2014 and 2020. In the following section, we point to some of the theoretical concepts and transdisciplinary approaches that the network applied across and beyond traditional schools of social and natural science. These provided a basis for significant cross-learning between the network hubs – a key objective of the network. We next explore the role that research and researchers can play in contributing to transformations to sustainability, posing questions that will be answered in the next nine chapters of this volume. Each of these sections directs the reader to the most relevant chapters, in which the issues are discussed in much greater detail. Acknowledging the multiple potential audiences to the volume (open access online), we lastly summarise the organisation of this book and provide a roadmap to its use.

Introducing the ‘Pathways’ network

This book draws upon a five-year period of transdisciplinary research that has involved over a hundred researchers across five continents in the ‘Pathways’ transformative knowledge network (TKN). The background and configuration of the TKN and the approaches to organising its work over the five years in question are detailed in Chapter 2. Emerging out of a set of collaborations involving the following organisations and the STEPS Centre (a collaboration between SPRU – the Science Policy Research Unit and the Institute of Development Studies at the University of Sussex), the network was established to undertake cutting edge, independent, critical, engaged research, to offer a common facility for communication, impact and engagement with action and policy and to create a joint platform for learning and exchange between members, including faculty, students. Through the generous support of the ‘Transformations to Sustainability’ programme, the network was able to experiment with these and other activities in a network that spanned various regions across the globe (see Figure 1.1).

FIGURE 1.1 The organisations that are members of the ‘Pathways’ Transformative Knowledge Network and their geographical distribution.

The nodes in the network above are represented by the following hubs and organisations:

Latin America hub

- Centre for Research on Transformation (CENIT), Buenos Aires, Argentina

Europe hub

- STEPS Centre, University of Sussex, UK
- Stockholm Resilience Centre, Sweden

Africa hub

- African Centre for Technology Studies, Nairobi, Kenya
- African Technology Policy Studies Network, Nairobi, Kenya
- Stockholm Environment Institute Africa Centre, Nairobi, Kenya

China hub

- Beijing Normal University School of Social Development and Public Policy, China

South Asia hub

- Transdisciplinary Research Cluster on Sustainability Studies, Jawaharlal Nehru University, New Delhi, India

North America hub

- Arizona State University, USA
- National Autonomous University of Mexico, Mexico

The STEPS Centre's 'pathways' approach (Leach et al. 2010), discussed further in Chapter 3, provided some of the conceptual grounding for the work by highlighting the importance of (indeed the necessity for) multiple 'pathways' of social-technological-environmental change, combining to serve the interlinked challenges of environmental sustainability, poverty alleviation and social justice. This plurality was also reflected in the TKN's activities, and the diversity of contexts in which we worked.

The early phases of the 'Pathways' TKN adopted a distributed and bottom-up approach to identifying the sustainability challenges that would be the focus of each hub. These foci were organised around three broad themes that cut across many of the Sustainable Development Goals detailed in Table 1.1. In the individual hubs, the research involved transdisciplinary networks selected by teams from each of the six hub organisations listed in Figure 1.1 and below:

Theme 1 – Sustainable agricultural and food systems for healthy livelihoods (SDGs 1, 2, 3, 9, 11, 12, 15)

- Transformations to sustainable food systems in Brighton and Hove/ Europe hub – STEPS Centre, University of Sussex, UK with inputs from Stockholm Resilience Centre, Sweden
- The future of seeds (and agriculture) in Argentina/South America hub – Centre for Research on Transformation (CENIT), Buenos Aires, Argentina

Theme 2 – Low carbon energy and industrial transformations (SDGs 1, 3, 5, 7, 8, 9, 10, 13)

- Low carbon energy transitions that meet the needs of the poor/Africa Sustainability Hub – African Centre for Technology Studies, Nairobi, Kenya
- China's green transformations/ China Hub – Beijing Normal University School of Social Development and Public Policy, China

Theme 3 – Water and waste for sustainable cities (SDGs 1, 2, 3, 6, 8, 9, 10, 11, 12, 14, 15)

- Water governance challenges, Mexico City/ North America hub – Arizona State University, USA and National Autonomous University of Mexico, Mexico
- The urban system of water and waste management in Gurgaon, India / South Asia hub – Transdisciplinary Research Cluster on Sustainability Studies, Jawaharlal Nehru University, New Delhi India

Between 2015 and 2019, the TKN experimented with diverse approaches to researching and intervening in the sustainability challenges above – bringing together different kinds of networks and applying a range of social science methods. Working together, the TKN also had the ambition of experimenting, documenting and comparing across the hubs in the network with the objective of “learning across disciplines, cultures and contexts” (Ely and Marin 2016).

This book thus represents an effort to bridge this internationally shared normative agenda for sustainable development with concrete action research initiatives in a set of specific contexts across the world. It generates fresh insights into the role that social science can play in these initiatives, and provides lessons for future transdisciplinary research that aims to connect the global and the local. While these pages provide only a condensed and partial account of the experiences that have emerged, they offer an important resource for future efforts that strive towards a collective and shared understanding of ways in which humanity can respond to the multiple challenges of sustainable development.

In search of transformations to sustainability

Representing universal goals in a divided world, the 2030 Agenda identifies a series of 17 aspirational goals (see Table 1.1) and 169 targets, all agreed in New

TABLE 1.1 The Sustainable Development Goals (United Nations 2015)

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

York in 2015. But behind these lie the radically different contexts – at national and subnational levels – in which these ambitions are to be realised. Citizens and communities across the planet are searching for transformations to sustainability that cater to their own needs and worldviews.

Theories around social transformations have a long pedigree and have recently come to the fore in social science research related to transformations to sustainability (Hackmann and St Clair 2012). Chapter 3 provides a detailed overview of this area of research as a background to some of the conceptual approaches that have been applied in the different hubs of the ‘Pathways’ network. It draws upon multiple disciplines including classical sociology and political economy and more recent notions of socio-technical system transitions and social ecological resilience. Drawing together these bodies of literature and the analytical and normative commitments of the ‘pathways approach’ for grassroots empowerment, the book provides a new synthesis of knowledge around ‘social transformations to sustainability’, rooted in theory and action. Through deploying a range of theories and flexible methodological approaches defined as ‘transformation laboratories’ (T-Lab, see Chapter 4), the TKN has generated a set of hub-based experiences that engage with locally defined transformations. These are recounted in detail in Chapters 5–10. Together, they form the basis of a new approach to conceptualising ‘transformative pathways to sustainability’ and a reference for future praxis. While not making any claims about transformations emerging as a result of our work (or even being steered by the contributions of our time-limited project), these chapters document the processes through which the six hub teams endeavoured to conduct transdisciplinary research that goes beyond analysis to action.

Learning across disciplines, cultures and contexts

An important contribution of the ‘Pathways’ TKN and of this book is how this search for transformative pathways to sustainability has emerged differently in each of the hubs. The project was designed in such a way as to enable this process of cross-learning (Marin et al. 2016; Ely et al. 2020), in particular by encouraging interactions between early career researchers across the network and sharing leadership between the global North and global South (the network was co-led from the UK and Argentina hubs).

The hub organisations, teams and transdisciplinary networks (with whom they worked in T-Labs) differ greatly across disciplinary and institutional dimensions. The individual hub activities are clarified in Chapters 5–10, each of which provides a chronological and reflective account of the various stages that the hub team went through in their transdisciplinary research and the insights that emerged. Unsurprisingly, these insights are grounded in diverse theoretical literatures (briefly explored earlier in Chapter 3) and based on different methodological approaches (covered in Chapter 4). Through providing a flexible approach (using what we describe as theoretical and methodological ‘anchors’) we were

able to draw some conclusions from learning that has taken place across selected hubs (Chapter 11) and the whole network (Chapter 12).

This book is the output of a project that has been fortunate to benefit from significant resources. At the same time, it takes place within a context of a much broader field of ‘transformations to sustainability’ work. Indeed, the field is expanding so rapidly and in so many directions that it is impossible to keep up with the various contributions that are emerging. It has therefore not been possible to do justice to the many parallel insights that are emerging from the different corners of the world. Nevertheless, we hope that the work presented here can combine with the efforts of wider international networks in a way that furthers both our theoretical and practical understanding of sustainability challenges and how social transformations can overcome them.

In the following pages, the book engages with the following emerging questions, drawing on experiences from the six hubs of the ‘Pathways’ Transformative Knowledge Network:

- How are transformations to sustainability conceptualised across different theoretical and scholarly traditions, and how does this influence the organisation of transdisciplinary research?
- How can we, as researchers, understand and help to bring about the kinds of transformative change that the 2030 Agenda calls for?
- What broader lessons does this point to regarding the role of research – in particular research that is rooted within the social sciences but extends to incorporate other disciplinary and practice-based inputs – in these transformations?

The organisation of this book and a roadmap to its use

This volume appeals to multiple different types of readers, from academic researchers in the social and natural sciences to transdisciplinary scholars with a history of engaged, problem- and solution-oriented research. It will be of use to policy-makers or research funders with an interest in how knowledge can contribute to sustainable development initiatives. It will also appeal to practitioners – whether they find themselves within the private sector, in non-government organisations or indeed in communities around the world, striving to solve their own sustainability challenges. Here we provide a ‘roadmap’ explaining how this book can best be used, and the resources that each of the chapters provide to their various potential readerships. As an open access online publication, this book can be read either in its entirety or as individual chapters.

The first section of the book (including this chapter) provides an introduction to the book and the project that it draws upon. The next chapter describes the ‘Pathways’ Transformative Knowledge Network, its genesis, hub partners and their distinctive disciplinary and contextual backgrounds. It explains some of the differences between the cases that each team has focussed upon, including

the themes that have been addressed (sectoral or cross-sectoral), the histories of engagement with non-academic actors in each locality and the disciplinary backgrounds of the team members.

The second section of the book explores some of the tools and approaches that were applied throughout the project, as well as some of the conceptual insights that have emerged as the work has progressed.

Chapter 3 extends the description in this chapter by beginning to analyse the different approaches to theory adopted in the project as a whole and in each of the hubs. In view of the book's focus on transformative change – a search for profound and long-term reconfiguration of systems and structures – the chapter reviews some of the theoretical literature in this area and how it has been applied in the 'Pathways' Transformative Knowledge Network.

Chapter 4 describes the TKN's approach to Transformation Labs, positioning it alongside earlier work on social innovation labs (Westley and Laban 2015) and exploring some of the insights that have emerged from applying this approach in very diverse contexts.

Section 3 focusses upon the six international cases. The chapters outline the experiences of each hub in the Transformative Knowledge Network and draw from process documentation and reflection by the teams who were responsible. These relate back to some of the concepts outlined in Chapters 2–4 and explore how they "played out" in different contexts, each characterised by varying disciplinary traditions and socio-political cultures. The six chapters can be read individually by anyone with a particular interest in the geographical region or the sustainability challenge in question. They are arranged as follows and 'paired' to reflect the thematic focus of the work and the architecture of the project:

Agri-food transformations

- 5 UK – Towards a More Sustainable Food System in Brighton and Hove
- 6 Argentina – Bioleft: a collaborative, open-source seed breeding initiative for sustainable agriculture

Transformations in Energy and Industry

- 7 Kenya – Making Mobile Solar Energy Inclusive
- 8 China – The Economic Shock of a Green Transition in Hebei

Transformations in Urban and Peri-Urban Spaces

- 9 Mexico – Wetlands Under Pressure: The Experience of the Xochimilco T-Lab
- 10 India – Enabling Transformations to Sustainability: Rethinking Urban Water Management in Gurgaon, India

Section 4 offers a conclusion to the book and is made up of two chapters.

Chapter 11 focusses on one particular area of application of the ‘pathways’ approach – that associated with the notion of framing and the contribution that ‘re-framing sustainability challenges’ can make to transformative change. The chapter draws upon the work in the Mexico, UK and Argentina cases but is of wider analytical relevance.

Chapter 12 draws on the work in all six of the hubs and identifies further conceptual contributions and comparative insights. Building on the theoretical foundations in Chapter 3 and the intervening chapters, it pulls together the lessons from the transdisciplinary research in each hub, and develops a synthesis on ‘transformative pathways to sustainability’. Finally, it lays out a future agenda for internationally networked, engaged social science research on sustainability transformations.

FIGURE 1.2 A roadmap suggesting how different parts of this book may be most effectively used by readers with different interests.

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