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## TRANSDISCIPLINARY METHODS AND T-LABS AS TRANSFORMATIVE SPACES FOR INNOVATION IN SOCIAL- ECOLOGICAL SYSTEMS

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### Introduction

This chapter outlines the theoretical and methodological aspects of the Transformation Laboratories ('T-Labs') approach used throughout the project to bring together multiple researchers, stakeholders and knowledge partners in a coproduction/ transdisciplinary research mode. This includes a discussion of the origins and negotiation of the term, and the development of the 'T-Labs' concept throughout the course of the project. It discusses the ways in which different hubs applied the T-Lab approach alongside (or through incorporating) other transdisciplinary social science methods. The chapter draws significantly on "T-Labs: A Practical Guide" – a publication produced by the 'Pathways' Network on the basis of the experiences of experimenting with T-Labs across the different hubs (Pathways Network 2018).

### Origins and meaning of the T-Lab concept

The T-Labs approach had previously been coined and used in the run-up to the Transformations 2015 conference, hosted by the Stockholm Resilience Centre and piloted in three experiments focussing on fisheries, algorithms and urban development. The insights and experiences from these T-Labs were fed back into the conference and helped to set the scene for the scientific discussions that it hosted (Transformations Conference 2015). The 'Pathways' transformative knowledge network (TKN) was seen as an opportunity to explore and further develop the idea of T-Labs. This involved experimenting with the approach in different initiatives and in more diverse settings around the world.

The concept was first discussed across the network at the inception workshop in April 2016. There, T-Labs were recognised as a process involving research and transdisciplinary engagement to address a complex sustainability problem or challenge. They are specifically designed to guide transformations

in *social-ecological systems* (SES) towards sustainability, by supporting changes in the conditions that made these systems unsustainable in the first instance. They include a set of stakeholders who may have different roles and perspectives, but who have an interest in solving the problem and some ability to provoke change.

T-Labs build upon the concept of social innovation labs (Westley and Laban 2012). They are designed and facilitated processes aimed at supporting multi-stakeholder groups to address complex social-ecological system problems by creating “safe” spaces to discuss and launch innovations. They further develop the concept of social innovation labs to incorporate social-ecological dynamics (Ely and Marin 2016; Charli-Joseph et al. 2018; van Zwanenberg et al. 2018). T-Labs aim to produce social-ecological innovations which help to create a more just and sustainable outcome for people and other parts of nature (see also Schöpke et al. 2018). The T-Lab is designed to afford diverse groups the opportunity for deeper reflexivity and engagement (Pereira et al. 2020). These transformative spaces seek to foster transformation and not just innovation within social-ecological systems.

A T-Lab aims to:

- frame the challenge, find change-makers and strengthen their individual and joint capacities to more effectively address the challenge;
- develop change strategies that test multiple solutions, which could help to solve the challenge;
- create early prototypes of interventions and build momentum for action.

Prototypes could be new business models, services or kinds of governance that fundamentally change human-environment interactions and contribute to changes for a better future.

The Social Innovation Lab Guide emphasises imagining high potential interventions, gaining system sight, redefining problems and identifying opportunities in the broader context with the potential to tip systems in positive directions (Westley and Laban 2012). The contributions of these ‘real-world labs’ to transformation include experimental methods, a transdisciplinary mode of research, scalability and transferability of results, as well as scientific and societal learning and reflexivity (Schöpke et al. 2018). Other similar examples include living labs (Bergvall-Kåreborn and Stahlbrost 2009; Bergvall-Kåreborn et al. 2009; von Wirth et al. 2019), real-world labs (Schöpke et al. 2015; 2018), urban living labs (Bulkeley et al. 2016; Voytenko et al. 2016; Naumann et al. 2018) and urban transition labs (Nevens et al. 2013). The growing interest in ‘labs’ responds to a demand for places which allow creative, cross-sector and cross-disciplinary decision-making and innovation. Expertise in psychology and group dynamics, complex adaptive systems theory, design thinking, computer modelling and visualisation tools has fed into ideas of lab approaches.

More broadly, these approaches rely on conditions such as broad-based research (across disciplines and methods), co-creation of solutions (across sectors and including citizens) a specialised physical environment (a ‘safe enough space’ where participants are more likely to be creative), clear process design and facilitation (including explaining how any particular workshop links to wider changes), rapid

prototyping (of the social innovation, e.g. testable model, software, plan or intervention to be designed) (see pp. 47–53 in the Social Innovation Lab Guide, Westley et al. 2015), multi-disciplinary support staff (and facilitators) and continual learning (supporting the roll-out of the lab’s outputs). The main focus of these labs has been on achieving social change, and more specifically changes in relationships between people and between people and their social environment. However, they tend to miss human–environment relationships and connectedness between nature and human society, which is particularly important for achieving sustainability transformations. The ‘Pathways’ Network attempted to use T-Labs to attend to these relationships through a focus on social-ecological systems.

T-Labs offer a methodological approach for working with the emergence of bottom-up and collaborative planning initiatives specifically targeting sustainability transformations in social-ecological systems. Based on Zgambo (2018), a T-Lab is a space for:

- facilitated, collective learning about the nature of a problem or challenge;
- learning about different kinds of possible solutions, or pathways of possible change;
- helping to create a collective sense of the need for change – within and beyond the stakeholders directly involved;
- developing strategies for affecting change;
- identifying which actors have transformative potential.

### When is a T-Lab appropriate?

T-Labs are still a “new and experimental concept” across much of the world, and to the best of our knowledge, the food system T-Lab held in South Africa was the first to be undertaken in the Global South (Pereira et al. 2020) and there was a sharing and learning experience from that process that fed directly into the ‘Pathways’ Network T-Labs. Previously, T-Labs had only been used in Western contexts (Transformations Conference 2015), and so there is a need for interrogating when they are appropriate and when alternative processes of convening are better suited to other situations (Pereira et al. 2018).

T-Labs are intervention processes that require thorough planning, but are still flexible enough to allow emergence and the unexpected to occur. Ideally, the form a T-Lab takes is dependent on the local context and the people involved. Key elements of a successful T-Lab include having a complex problem to address, the participation of a motivated and diverse group of stakeholders who are willing to take a leading role, a window of opportunity to address the problem, a shared goal of an action plan as an outcome and skilful facilitation. The following are some of the conditions under which a T-Lab may be an effective intervention (Zgambo 2018):

- 1 There is a complex SES challenge to address
- 2 There is a diverse group of participants with transformative capacity or agency
- 3 Identifiable action-oriented outcome(s) can be the end goal of process

**TABLE 4.1** When to use/not use a T-Lab

<i>When to use T-Labs</i>	<i>When not to use T-Labs</i>
A transition or transformation is taking place in a social-ecological system	There is no interest in, or sense of ownership of, the problem
There is a complex problem related to this transformation	There is limited capacity or interest to invest significant time to the process
There are people with significant ownership over the problem and strong motivation to change it	There is no flexibility to explore or change the focal question/challenge
There is confusion and disagreement about what is going on and why	
There is a collective sense of urgency	

- 4 There is a strongly motivated convenor
- 5 There has been little to no niche impact on the regime (i.e. no successful implementation of the alternative innovations in the dominant regime)
- 6 There is tension in the regime, or noticeable shifts in the culture or economic or political scene that can serve as potential windows of opportunity for T-Lab innovations to take effect.

It is also important to recognise when a T-Lab may not be the most appropriate approach (see Table 4.1).

As researchers are finding themselves at the intersection of action and analysis, where they navigate the fine line between actively intervening in processes to enable change, while also being able to provide a critical analysis of what types of changes are occurring, some researchers are finding themselves as ‘transformative space-makers’ (Marshall, Dolley and Priya 2018). T-Labs are an example where research has opened up a space for productive collaboration and interaction between diverse stakeholders with the intention that there may be actionable outcomes with which policy and other decision-making actors can engage.

### **What does a T-Lab involve?**

Once it has been determined that a T-Lab is appropriate for the given problem, it is necessary to design the process. This means thinking in more depth about the system and the associated sustainability problem, what further research is needed, and who can be involved.

### ***Defining the system and the problem***

The team convening the T-Lab should make sure they agree on the basic problem framing (noting that this can change as the T-Lab proceeds). This can then be explored in more detail through research and workshops.

An important aim in T-Labs is to create networks of change-makers and support distributed **agency**. Agency refers to the capacity of a person or group to

act according to its motivations, values and goals. In a social-ecological system, agency is shaped by a number of important elements, which relate to their power relative to other actors (Westley et al. 2013). They include:

- how people see or frame the system
- the capacities and skills that they have to act
- their social networks
- their values and beliefs
- constraints such as poverty or inequality.

Defining the system therefore can include mapping the capacities and constraints, social networks and values and beliefs. This, in turn, can help to reflect on these elements and how they can be strengthened or changed, individually or collectively. This can also help to identify the relationships between people, and between people and ecosystems and technology.

### ***Using research***

To design a T-Lab, careful research is needed to understand the problem and the system components and interactions. This may involve reviewing the existing literature, and undertaking new research to fill in gaps where necessary. It also involves scoping and interviewing participants who will be included in the T-Lab about the challenge. Methods might include:

- visits to sites affected by the problem (businesses, farms, nature reserves, villages or urban areas)
- group discussions
- semi-structured interviews with individuals
- Q-Method
- Agency Network Analysis.

These methods can help to identify and understand who should be involved, how they perceive the problem and actions taken to address it.

### ***Designing workshops***

T-Lab workshops are highly facilitated events, typically taking place over 1–3 days, and usually reconvened 2–3 times. They provide an opportunity to bring together those identified as core actors that represent key components of the system in focus. At these events different ways to ‘see’ the system can be explored together as well as identifying the roots of the problem. This goes beyond a technical understanding of the system to appreciate different framings, perspectives and values. In the ‘Pathways’ Network, most of our cases used two main workshops to structure the T-Lab process. These were interspersed with a number of other engagements.

The T-Labs methodology aims to help broaden the set of actors who are involved and bring together contrasting views to reveal dilemmas and generate creative, collaborative responses. This often results in bringing together actors that usually do not meet together and are more or less aligned with each other.

Bringing together powerful actors with marginalised ones for the first time can be a powerful enabler of innovation. However, there are many challenges involved in bringing such diverse actors together. Innovation is not a neutral process. Ideas are shaped by politics and power relations in any group of people, including in 'Labs'. The content of a T-Lab – dealing with social and ecological issues – means that these dynamics are even more important. Sustainability problems often have disproportionate effects on people who are marginalised – by power, poverty, age/ generation, language, gender, sexuality, race, ethnicity, class, culture and so on. If done well, tensions can be turned into constructive ways forward and can help generate novel re-combinations of existing ideas. However, the ethics of bringing a diverse set of actors with different power dynamics together needs to be explicitly addressed in the design phase of the T-Lab (see Pereira et al. 2019).

### ***Review and reflection***

The T-Lab process includes time to review and reflect on what has been learnt at each stage. This includes:

- Feedback to the participants of workshops on what was discussed and what happens next;
- Reflections among the project team about what has been learnt at each stage.

While a T-Lab process is a deliberate attempt to support on-going transformations, because we are dealing with complex adaptive social-ecological problems, it is unpredictable and emergent. This requires methods to keep track of what is happening and that can give real-time feedback to the learning process.

### ***Participatory methods***

The methods used across the hubs had the objectives of both a) enhancing our understanding of whatever phenomena we were interested in, and b) a means of trying to support or nurture interventions, including forming alliances, supporting struggle, reframing debates, challenging power, etc. That is, they all attempted to bridge research and action, in ways that involve engagement with communities of practice.

Based on experiences and insights from the Pathways TKN, we illustrate (Table 4.2) the variety of the different methods that the six hubs used in their T-Lab processes. However, these are by no means an exhaustive list of methods that can be used in T-Labs (or even the full list of those used in the TKN).

**TABLE 4.2** Participatory methods in Pathways TKN T-Labs

<i>Hub</i>	<i>Method and purpose/general description</i>	<i>Techniques</i>
UK Hub	<p><b>Open space</b>  <i>[Qualitative method]</i>                      Engaging actors, appreciating different actors' perspectives, histories and positioning relative to the transformations at play; allow stakeholders to openly share perspectives on different questions and bridge between otherwise unrelated areas.</p>	Participatory workshop
Latin America (Argentina) Hub	<p><b>Continuum methods, specifically Evaluation H</b>  <i>[Qualitative method]</i>                      Identify different actors' positions and perspectives (especially at the extremes), foster discussion across them, identify challenges and opportunities and work towards solutions. Gather participants together to position themselves in relation to each other and to open up debate. It can be effective if participants represent different sectors, backgrounds, or types of involvement in the issue being explored, particularly if these different stakeholders do not interact often.                      A significant question is written at the top of a wall, table, or large sheet of paper (the work surface). Participants place their responses along a horizontal line halfway down, which offers a continuum, e.g. good to bad, easy to difficult, important to not important. Participants are also asked to write the factors which influence why their response was placed where it was on the line. The factors identified can be positive or negative, and are usually attached to vertical lines at either end of the continuum (hence the 'H' or rugby post name). The factors are then clustered. Discussion explores how to overcome negative factors or support positive ones.</p>	Facilitated, participatory workshop
	<p><b>Q-Method</b>  <i>[Mixed method]</i>                      Identify competing discourses about the nature of sustainability challenges, their drivers, and their possible solutions in the seed sector, and map areas of consensus and disagreement between different groups of stakeholders; Identify different actors' perspectives, foster discussion across them, identify where alliances between different actors are possible, and work towards solutions.</p>	World Café; Open Space Technology

(Continued)

<i>Hub</i>	<i>Method and purpose/general description</i>	<i>Techniques</i>
Africa (Kenya) Hub	<p><b>Participatory Impact Pathways Analysis (PIPA)</b> [Qualitative method]</p> <p>Identify impact pathways to detect key stakeholders with interest and influence in policy, business and technology; to elicit the various pathways for transformation; target what pathways (i.e. engagements, networks) could be engaged in the process so as to enhance uptake of the research outputs.</p>	Participatory workshop
China Hub	<p><b>Multi-stakeholders' process engagement</b> [Qualitative method]</p> <p>Identify change agents (e.g. laid-off workers, former plant owners, local government officials, scholars, NGOs) on local environmental transformation; navigate the power dynamics inherent in local transformation, and foster reflection to provide guidance for new ways of engaging with environmental policy at the larger context of transformation.</p> <p>Uncover how gender relations affect a development problem by showing that gender relations may affect the solution and what could be done, and to identify the different roles and gender divisions of labour in the household (pre- and post- green transformation), as an important approach to ensure gender equality and women's empowerment.</p>	In-depth semi-structured interviews & focus group;  Gender analytical tools (Triple Roles Approach)
	<p><b>Role play simulation</b> [Qualitative method]</p> <p>All participants play different roles in response to a situation introduced by a facilitator. The situation can either be the one under discussion, or another (fictional or real) situation where a similar problem is faced. The volunteers all stand on a starting line, and the facilitator announces hypothetical policies or projects which will be implemented. Based on their roles, the volunteers take either a step forward (if they are to benefit from the policy), backward (if it will have negative impact on them) or stay still (if it will have no impact). At the end, participants discuss the differences between the winners and losers, and how this exercise compares to their own experience.</p> <p>This method allows participants to imagine how different actors might respond to the problem, or to see the varied effects of policies and interventions on different stakeholders in a given setting. A fictional or similar setting can be used when the situation under discussion is sensitive, and participants may not feel completely free to express their opinions.</p>	Role-play

North America (Mexico) Hub	<p><b>Agency Network Analysis (ANA)</b> [Mixed method]</p> <p>Describe the actor's agency profile by identifying individual agency through collecting information about actors' social network, the practices they share with the members of their social network, their representation of the SES, and the position they occupy in it.</p>	Ego-nets; Action-nets; Cognitive maps
<b>Avatars – Agents of Change</b>	<p>[Qualitative method]</p> <p>Drawing a character or an archetype that represents us in specific situations can make our participation in that group/situation more open and effective. Each participant draws their character on a large sheet of paper and lists five 'powers' that it has (e.g. the ability to listen well, ability to guide others, communication, and so on). Participants are invited to imagine their personages taking responsibility for different things, embodying different roles, and cooperating with others in new ways. The characters (or Avatars) show the variety and strength of capacities among the participants.</p>	Graphic self-representation
<b>Mapping significant and valued elements</b>	<p>[Qualitative method]</p> <p>Participants identify the elements of the system that are most significant and valued by them. They start as individuals by listing 2 elements, then find symbols to represent these elements with materials. They then discuss as a small group why they value these elements, what they provide and any associated emotions. Participants then construct a map of the system using physical objects (e.g. dough, colours, small modelling objects, pebbles, pictures, small branches) in their small group, then share the maps with the wider group. This method encourages participants to focus on specific parts of the system and think about how they are valued. By discussing them, differences in value and importance are revealed. The method allows discussion of the deeper significance and cultural meaning of different parts of the system.</p>	Participatory mapping
South Asia (India) Hub	<p><b>Multi-stakeholder processes for the mobilised publics through the development of their Collective Practical Understanding (CPU) and actions</b></p> <p>[Mixed method]</p> <p>Coproduction of knowledge, knowledge sharing, dialogues and engagement with institutions of planning and governance for demonstrating the possibilities of alternative pathways.</p> <p>Development of multi-stakeholder-knowledge-enhancing platform enabling social mobilisation and awareness, including direct actions, participation and real-world experiments.</p> <p>Mapping of knowledge, values and institutions of mobilised publics and organising them for the creation of a multi-stakeholder platform for individual and collective actions.</p>	Citizens science; Citizens watch and citizens journalism approaches & tools; Real-world experiments

For more ideas on methods, see the Social Innovation Lab Guide (Westley and Laban 2012), which gives detailed guidance on workshop design and the principles behind social innovation labs.<sup>1</sup>

## Key insights

Depending on the nature of their defined problem space and the groups they convened, different hub teams in the ‘Pathways’ Network adopted some of the following approaches in their first T-Labs:

- create a collective sense of the need for change
- make visible alternative views about the problem and the possible solutions
- help to negotiate and create some kind of consensus across different views
- help to develop, or aim to develop some more specific social-ecological innovations.

Experiences in the ‘Pathways’ Network pointed to two types of innovations that might emerge from T-Labs:

- new innovations that can ‘bridge’ different (and to some extent conflicting) framings, offering the possibility of a route through an unsustainable impasse. We have previously referred to these as ‘bridging innovations’ (van Zwanenberg et al. 2018)
- innovations that draw on the resources of different actors who have been brought together through the T-Lab process. These may be novel re-combination between ‘bottom-up’ (or grassroots) efforts and top-down (government-led or high-tech-based) initiatives. We have previously described these as ‘hybrid innovations’ (Ely et al. 2013).

In the ‘Pathways’ Network, there were important differences in the extent to which T-Labs were convened (or spontaneously emerged) that will be explored in the subsequent chapters.

- What were the key insights that came out of the project?
  - T-Labs are a process, not a method, event or set of events. Their adaptability was illustrated by the varying ways in which they were implemented (see Chapters 5–10).
  - There was considerable negotiation over the terminology of T-Labs, and T-Labs (even the word) was sometimes rejected (e.g. in India) for being too scientific.
  - There were instances where T-Labs contributed to change; however, causality was difficult to attribute (explored further in Chapter 12).

- Failure to identify change (in terms of short-term impact) does not necessarily mean failure. In some cases unexpected events contributed to change alongside the work of the hubs (e.g. transformative agency was mobilised following the earthquake response in Mexico, and fundraising in India led to further work in Gurgaon).
- Insights from wider work on ‘transformative spaces’ in the global South may help strengthen the T-Lab approach going forward. Some of these were explored further in the special issue of *Ecology and Society* (Pereira et al. 2018) and a synthesis paper (Pereira et al. 2020).

## Note

- 1 Another useful resource is the STEPS Centre’s “Methods and Methodologies” site <https://steps-centre.org/methods/> (accessed 20/5/2020).

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