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Introducing the Tandem Training Course

This course is a new enterprise to help people across communities build the necessary knowledge, skills and capacities to come together to respond to the growing challenges of climate change.

At the heart of this course is the **Tandem Framework**, first developed by SEI and its partners in 2019. It emerged from the recognition that conventional approaches were falling short – failing to foster the kind of deep, collaborative engagement needed to address the complex, interconnected problems posed by a changing climate and increasing risks.

Tandem promotes a collaborative, reflective way of working. It is grounded in the understanding that priorities and challenges often look different when viewed from multiple perspectives. That is, it recognizes that what we think we know may shift as new insights emerge from shared learning. Tandem embraces complexity, values diverse knowledge systems, and supports the collaboration to devise more inclusive and adaptive pathways forward. A hallmark of the Tandem Framework is its emphasis on these processes, rather than on end products.

The framework has been tested and refined with and for practitioners, policymakers, and community members in diverse real-world settings on four continents. This course builds on that wealth of experience - drawing from SEI's work with partners across Africa, Asia, Europe, and Latin America, in settings that include rural agricultural areas, fast-growing cities in low- and high-income countries, and transboundary landscapes (water basins). Most recently in the DIRECTED project, the Tandem Framework was used by "real world labs" in Italy, Germany, Denmark, Austria and Hungary to better support efforts to integrate disaster risk management and climate change adaptation.

The result of their collaboration and work is this course.

The course is a guide for you to use the Tandem Framework in your context. It consists of five modules that together create a package of self-guided materials that can improve collaboration in efforts to find interventions and boost resilience. The materials can help participants resist tunnel vision, overcome prevailing disciplinary silos, and engage all actors equitably. For example, this course can help make needed connections between climate modelers, emergency managers and climate adaptation planners.

Created with funding from the EU Horizon DIRECTED project, this course is the product of the insights of many individuals and partner organizations who contributed to the development of the Tandem Framework. It is through the combination of our collective knowledge, experiences, and insights that the framework and the course have come to life. We thank all of them for their contributions.

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The Tandem Framework

🔗 CHECK OUT THE FULL TANDEM GUIDANCE COMING SOON
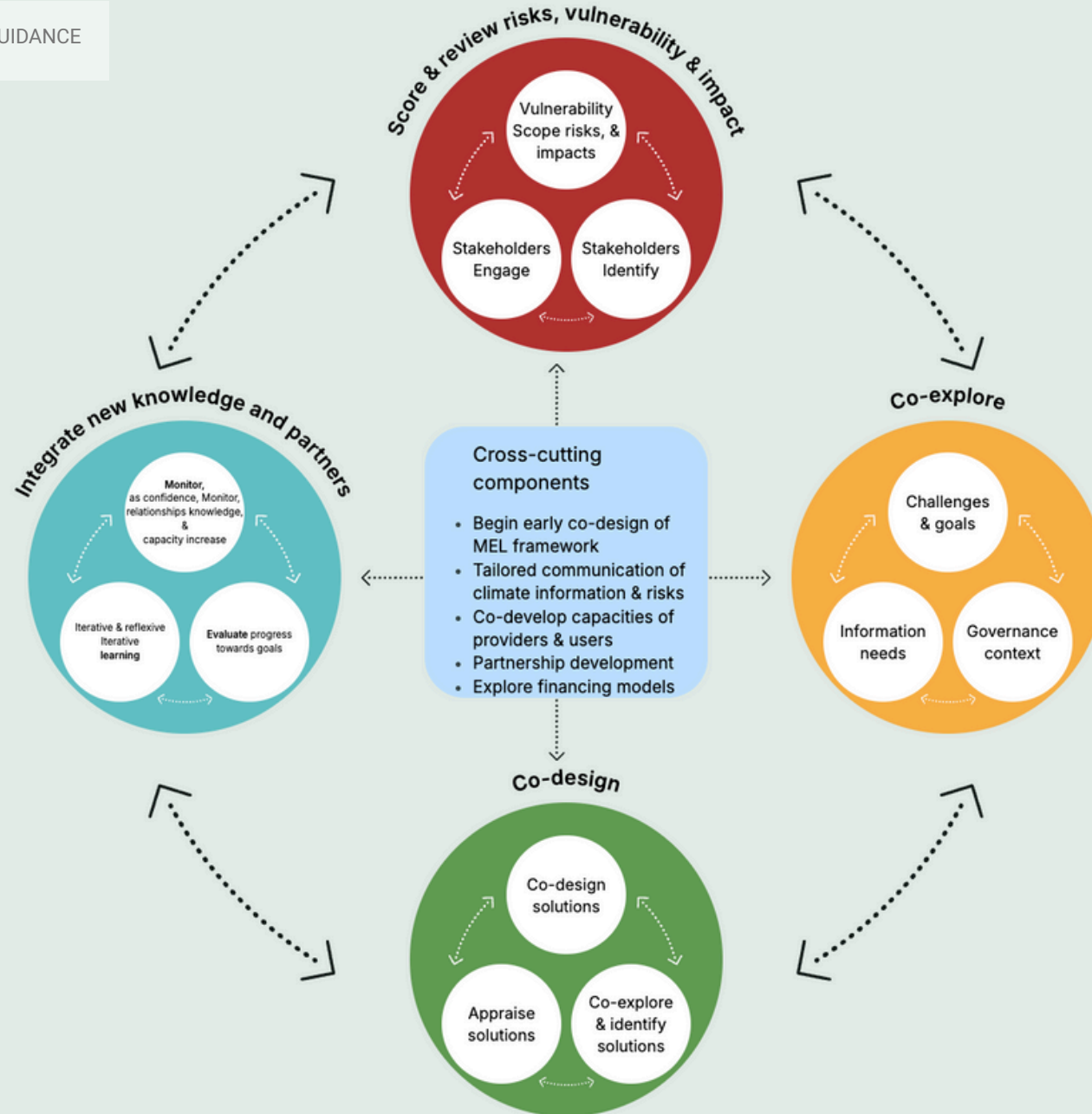
Figure 1: The Tandem Framework (Daniels et al., 2020)

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The foundation of the course: the Tandem Framework

As its name suggests, the Tandem Framework emphasizes working in partnership – moving forward together. Rather than focusing on end products, the framework centres on shaping the collaborative processes that underpin effective climate-related decision-making. It recognizes that co-production is not just a method or set of tools; it is also a mindset. Given the complexity and non-linearity of decision-making in the face of climate risks, Tandem supports a flexible approach grounded in reflection and adaptation.

The framework functions as both a research and design process, offering structured guidance that must be thoughtfully designed and facilitated for the specific context in which it is applied. It is intended to be followed through a "learning-by-doing" approach, progressing iteratively across four key phases:

Phase 1: foundation – building transdisciplinary labs
Identifying and engaging relevant stakeholders; reviewing risks, vulnerabilities, and impacts.

Phase 2: co-explore – co-exploring the labs context
Investigating governance structures, available information, and contextual challenges.

Phase 3: co-design – co-designing interventions
Developing, testing, and evaluating potential responses.

Phase 4: integrating – sustaining impact
Integrating knowledge, building partnerships, and establishing systems for ongoing monitoring, learning, and evaluation.

To support and enhance these phases, Tandem integrates five cross-cutting components:
- Establishing early monitoring, learning, and evaluation practices
- Tailoring risk communication
- Building stakeholder capacity
- Strengthening partnerships
- Exploring financing models

(See Figure 1.)

Throughout, the framework offers guiding questions, activity suggestions and reflective prompts. These are grounded in principles of sustainability, equity and resilience. The goal is to support integrated approaches to climate change adaptation, disaster risk management, and sustainable development – helping teams navigate complexity while staying attuned to the diverse needs and knowledge systems within their contexts.

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Who is this course for?

A lot of people! This course is for all those seeking to enhance their professional practices in the context of sustainable development, disaster risk management, and climate change adaptation. Just as we speak of good medical practices for doctors, we can also refer to the good practices of emergency responders, town planners, mayors, local authorities, or policymakers and scientists working towards nurturing healthy and resilient systems.

Why this course?

New ways of working are needed to address the increasing impacts of a changing climate. To keep up with the pace of change, decision-makers at all levels can benefit from investing time in building their capacities necessary to work with people with different expertise and experience.

Elements of the course:

The Tandem Training Course is designed to support this capacity development. It is structured around five modules and begins with an **Overview** Module, focused on building key skills in research, design, and facilitation that are essential to working with the Tandem Framework. With these foundations in place, participants can begin to apply the Tandem cycle in real-world contexts.

Following the **Overview** Module, the course is organised into four modules, each aligned with one of the key phases of the Tandem Framework: **Phase 1: Foundation, Phase 2: Co-explore, Phase 3: Co-design, Phase 4: Integrating.**

Each module builds on the last, providing guidance, methods, and reflective practices that help participants apply the framework in diverse real-world contexts.

Let's begin!

DIRECTED Rhein Erft real world lab workshop, 2025

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Navigating these modules

Feature	Explanation	How to use it
🔗	**External link**	These link out to other resources such as our Tandem canvases on MIRO ready to download or use online. Hover over them and click to open the external link COMING SOON
📖	**Literature or additional reading**	These indicate additional reading, you don't need to click on these they are just markers for the information on that page.
🛠️	**Tools, methods, resources**	These indicate tools, methods or resources, you don't need to click on these they are just markers for the information on that page.
INTRODUCTION	**Module tab**	These show the different modules. Click on the tab to jump to the first page of that module.
🔍	**Example**	These indicate an example, you don't need to click on these they are just markers for the information on that page.
Italic text	**Glossary word**	Italic text shows words that are avaible in the glossary, click on them to see the definition. COMING SOON

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OVERVIEW: Introduction to the overview module

The Tandem Training Course provides the foundations of co-production. It defines co-production, explains how this differs from related concepts, and outlines the core skills needed to effectively engage with the Tandem Framework. Recognizing that Tandem itself is a process that must be intentionally designed and actively facilitated, this overview outlines three essential skills: **design**, **research** and **facilitation**.

This overview is organized as follows: each section puts forward key aspects of collaborative decision-making, provides concrete examples from experiences of collaborative enterprises in practice, and highlights key related research from the literature. *Key terms (indicated in italics)* are defined in the glossary at the end of the overview.

The subsequent four modules provide guidance to put these core skills into practice. By engaging in the Tandem process, the course supports the development of four key capacities, as outlined by Cumiskey et al. (2025):

- **Collaborative capacity** - Building, maintaining, and sustaining transdisciplinary co-production processes that lead to meaningful outcomes.
- **Systems thinking capacity** - Understanding the complexity and interconnectedness of co-production contexts.
- **Creative capacity** - Using innovative and adaptive approaches in research, design, and facilitation.
- **Reflexive capacity** - Critically reflecting on assumptions, power dynamics, processes, and outcomes.

Together, these capacities form the backbone of effective collaborative work. They are crucial for navigating the complex challenges addressed through the Tandem Framework. On the next page, you can explore how each capacity connects to the essential skills of design, research, and facilitation, as well as the underlying principles that support them.

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OVERVIEW: Breakdown of the Tandem key capacities and skills

CAPACITIES	SKILLS	PRINCIPLES
Collaborative capacity	**Design**: collaborative engagement mechanism for selecting and involving transdisciplinary stakeholders, and create an enabling open, safe/neutral and respectful space (e.g. in Real World Lab). **Research**: mapping stakeholders and their priorities, interests and needs. **Facilitate**: participatory and inclusive methods towards a common goal and ensure all voices are heard and contribute meaningfully. Facilitation that surfaces and navigates tensions in ways that feel safe for all participants.	**Plurality / transdisciplinary** **Goal orientated** **Non-hierarchical** **Safe, neutral and respectful**
Systems thinking capacity	**Design**: methods and tools to explore systems interactions, dependencies and uncertainties (e.g. storylines, systems mapping, user stories, visioning). **Research**: to understand governance context, systemic issues/underlying drivers and critical gaps/problems. **Facilitate**: methods to understand system complexity and uncertainty, break it down and identify leverage points for change.	**Context based** **Influences change**

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OVERVIEW: Breakdown of the Tandem key capacities and skills

CAPACITIES	SKILLS	PRINCIPLES
Creative capacity	**Design**: interactive engagement approaches to support experimentation and innovation, and creative methods that build curiosity and empathy. e.g. (serious) games, simulations, narratives, prototyping. **Research**: new opportunities, partnerships, and resources to support innovative and creative practices. **Facilitate**: creative and artistic methods to support knowledge exchange, experimentation and emotional understanding (e.g. sensemaking, envisioning exercises, solution mapping).	**Interactive** **Experimental** **Empathetic**
Reflexive capacity	**Design**: reflective methods that support evaluation and learning during workshops/activities to guide iteration. **Research**: critically reflect on the engagement process and progress (own values, emotions, assumptions, power dynamics). **Facilitate**: reflection and mutual learning activities with stakeholders to adapt future activities.	**Plurality / transdisciplinary** **Iterative**

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What is research, transdisciplinary research, co-production and co-design? Is there a difference?

Participatory research, transdisciplinary research, co-production, and co-design all occupy a shared - and often contested - space in the practice of collaborative inquiry and action. While these terms have emerged from different disciplinary traditions, they are underpinned by common values: inclusivity, equity, shared learning, and the recognition of multiple forms of knowledge. However, despite their similarities, they are not interchangeable. Each offers distinct emphases and methodologies for fostering collaboration across boundaries.

Participatory research refers to collaborative research that promotes *interactive* approaches, integrating various types of knowledge, reconciling differences, and creating ownership (Lang et al., 2012).

Transdisciplinary research is a type of participatory research that goes beyond multidisciplinary or interdisciplinary research, which does not engage with non-scientific ways of knowing. Multidisciplinary and interdisciplinary approaches usually refer to collaborations between different academic disciplines. Transdisciplinary research is broader, including citizens, *Indigenous knowledge,* practical knowledge and *lived experience.*

Co-production of knowledge is mutual and collaborative knowledge generation, using participatory and transdisciplinary research processes, to support decision making. It can be defined as "iterative and collaborative processes involving diverse types of expertise, knowledge and actors to produce context-specific knowledge and pathways towards a sustainable future" (p.183, Norström et al., 2020). Co-production seeks to break down barriers between academic disciplines and different groups. Even more importantly, it can question power imbalances and help give equal value to both scientific and non-scientific knowledge. "Good" co-production should always be *context-based* (specific to the surrounding circumstances and environment), *pluralistic* (embrace diversity), goal-oriented (driven by purpose) and *interactive* (reciprocal actions and influence) (Norström et al., 2020).

Co-design gears toward collaborative problem solving, it goes beyond the advisory nature of co-production, giving the collaborators control to shape decisions based on their inquiry. This can range from participatory ways of making things, such as products (e.g. data platforms for risk information), to *interventions* such as adaptation plans. Co-design similarly emphasizes the importance of involving anyone who may be affected by the outcome of the co-designed product or intervention as active contributors and "experts of their experience". The intersection with knowledge co-production emerges when co-design is used not just to generate solutions, but as a method of inquiry. In this mode, co-design becomes a way to explore complex problems, understand the current situation from multiple perspectives, and envision alternative, improved futures – articulated through the design process itself. This iterative and collaborative approach brings design and research closer, aligning with the principles of co-production by valuing diverse types of knowledge and fostering joint learning.

Together, these approaches highlight that collaboration is not just a technique. It is a mindset. How people initiate, design, and maintain collaborative processes matters deeply. These approaches have, at times, been applied superficially or extractively, but current good practice insists that meaningful engagement is relational, intentional, and values driven.
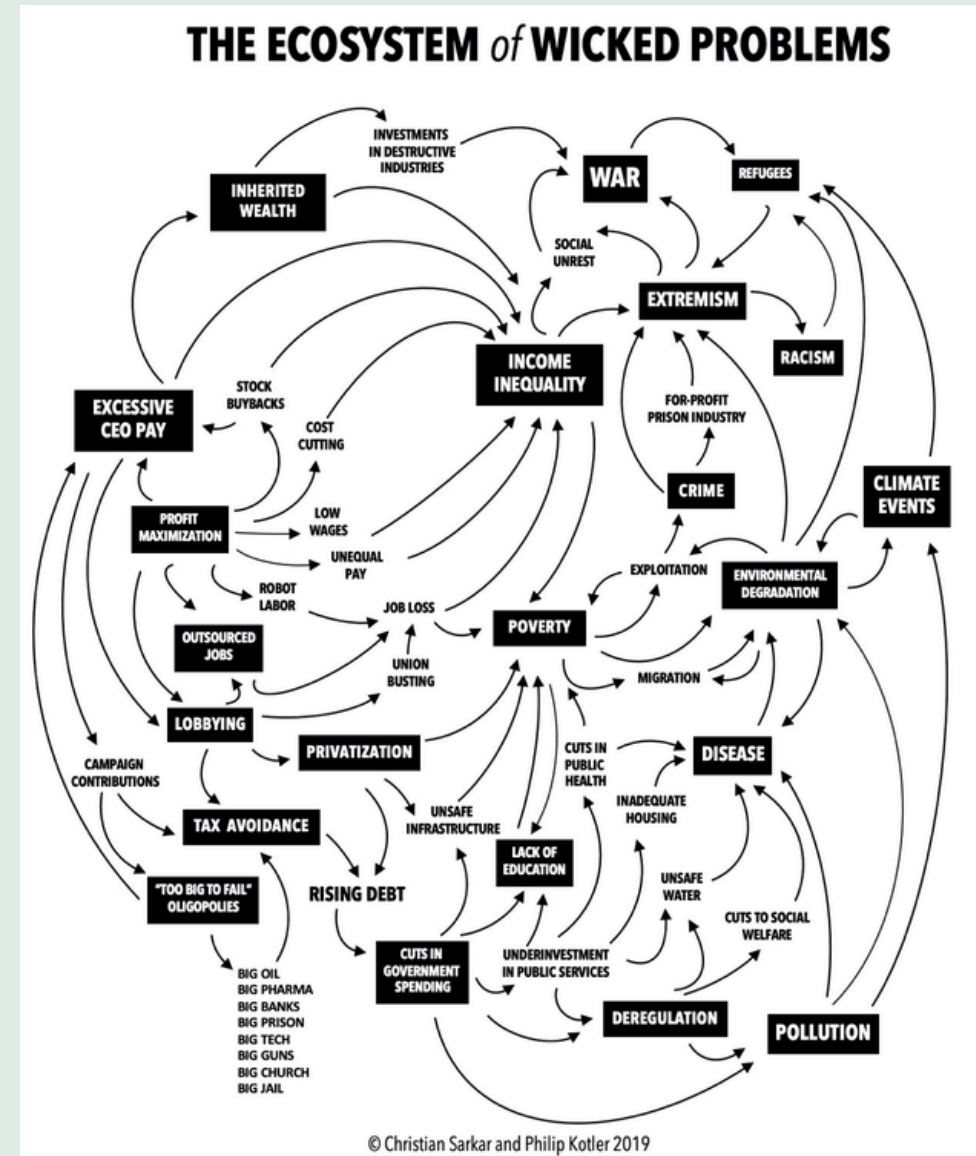
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Why are collaborative approaches important?

Collaborative approaches make it possible to include many types of knowledge. The origin of both knowledge *co-production* and *co-design* is inspired by this acknowledgement of *uncertainty*, and recognition that *socio-environmental* problems today are complex, and often *systemic* in nature. Therefore, solving them needs the involvement of many perspectives and expertise.

The future is not predetermined. There are many possible pathways ahead. However, the current trajectory is concerning, largely due to the presence of *wicked problems*: complex, interconnected issues that are difficult to solve due to their complexity and unpredictability. Climate change, inequality, and resource depletion are examples of wicked problems. These types of problems are not isolated but part of larger, interdependent systems. Navigating these challenges requires *systems thinking*. That is, those seeking to address these problems must acknowledge that every decision and action is part of a larger, dynamic system. It is not enough to address individual problems in isolation. It is important to draw on all knowledge from across the system – scientific, local, and experiential knowledge – to gain a holistic understanding of how the pieces fit together.

Uncertainty is a natural part of working with complex systems like climate and disaster risk. Unexpected things happen, and their effects are hard to predict. Science can help, but the value of evidence depends on context. Additionally, *ambiguity* plays a role. That is, different people can have valid but conflicting views, especially in expert-heavy fields.

THE ECOSYSTEM *of* WICKED PROBLEMS

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🔍 Example: systems thinking in practice

For example, think about the word "*mitigation*". The UN Office for Disaster Risk Reduction uses the term to refer to mitigating the effects of hazards (UNDRR, 2017). By contrast, in the language of the Intergovernmental Panel on Climate Change, the term is associated with greenhouse gas mitigation (IPCC, 2022). Thus, interpretation of the same word changes based on two different knowledge systems and contexts. This also applies to other concepts, such as *vulnerability*, which is often defined without those who are deemed vulnerable. For example, an old person may not be vulnerable just by virtue of age. He or she may have support networks, capacities and resilience that outweigh such definitions.

This was evident in the Covid-19 pandemic, which underlined global socio-ecological, technological, economic and political interdependencies and associated vulnerabilities. Mapping the connections through which impacts can spread is essential for understanding such challenges.

Any *intervention* (attempted solution) in one part of the system has ramifications elsewhere in unpredictable ways. Flood defenses or other hydrological controls - including dams - provide an illustrative example. Whatever is done to protect cities and settlements from flood impacts, these will inevitably alter the ecological system, reshaping floodplains and affecting biodiversity (such as fish migration). Flood defences may also increase risk in the longer term by creating a false sense of security and increased investments in highly exposed areas, only to face increased damages and losses as said defences inevitably fail. Seeing solutions and problems through their connections is therefore essential in efforts to understand how actions lead to reactions, and vice versa.

Illustrator Lee Sauer

Systems thinking is the important first step to seeing why *knowledge co-production* is needed. The complicated problems that require co-production can only be understood by looking at risks from a wide, big-picture view. Different perspectives help people better understand how complex systems work, how they are connected, and how they change - and this leads to a more accurate understanding.

Knowledge co-production and *co-design* processes aim to tackle these complicated problems by bringing together different types of knowledge and experience from across the system. They help these diverse perspectives work together, using *systems thinking* to explore problem spaces more deeply and to create solutions that are better suited to real-world situations, more inclusive, and more likely to produce lasting, positive change. Importantly, these skills can also reveal where current efforts are falling short. All decision-makers - including regional organizations, national governments, local planning offices, private companies, and citizen assemblies - can benefit from these processes. **The first step is to collaborate and to recognize oneself as part of a larger, interconnected system.**

What the literature has to say about collaborative decision making:

Innovative strategies, collaborative working, and the rethinking of organizational structures are needed to identify potential for societal transformations (Mulder, 2014; Cosens et al., 2021; Kossoff and Potts, 2018). *Co-production* can help stakeholders re-examine the assumptions, beliefs and cultural norms that often underpin the status quo. *Co-production* processes can shape how problems are perceived and framed, and how solutions can be developed. Practically, these approaches have been introduced to bridge disciplines. For example, they have been used to promote the integration of disaster risk reduction and climate change adaptation in risk governance contexts (Parviainen et al., 2025).

To date, most discussion surrounding *co-production* tends to be aspirational, lacking practical guidance (Miller & Wyborn, 2020). The Tandem Framework is designed to respond to this gap. Nevertheless, to better understand how theories can drive meaningful change, it is useful to think about the purpose of co-production, and what it aims to achieve.

As a process, *co-production* seeks to reshape ways of working, and build trust by improving relationships and democratizing knowledge (Jasanoff, 2004; Norström et al., 2020; Daniels et al., 2020). Its non-hierarchical and *transdisciplinary* approach is helpful in tackling barriers between actors, and democratizing the process of science for decision-making (Jasanoff, 2004: Norström et al., 2020). After all, science is traditionally generated by academic institutions, and judgements regarding what can be considered relevant are often led by "experts" whose expertise is in a given discipline, not necessarily in a working context. In practice, these *siloed* ways of working create gaps between the production of data and its use, as well as between those who generate the data and those who need to apply it. For example, information produced by modellers of future scenarios for climate change does not come with a guarantee showing that it will meet the needs of decision-makers, especially if the modellers themselves do not consider who will use their data (Daniels et al., 2020).

Indeed, issues such as *climate change* and *sustainability* concerns (including their human drivers) tend to be characterized by ill-defined parameters and interdependencies, existing at multiple scales that connect global to the local (Buchanan, 1995; Coyne, 2005; Rittel & Webber, 1973; Hochrainer-Stigler et al., 2023). Through this framing, issues such as *climate change, environmental disasters, biodiversity loss*, and poverty cannot be considered in isolation from each other, but are deeply interconnected, evolving over time and influenced by a web of social, economic, and ecological dynamics. However, the conceptualization of *system boundaries* and *systemic risks* (the borders that constitute a system within which one operates) is only made possible through *transdisciplinary collaboration* (Hochrainer-Stigler et al. 2023).

Want to read more?

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DESIGN: Why is design important?

At its heart, design is about envisioning preferred futures and creating pathways to realize them. It is a problem solving process. A concept that resonates strongly with the ambitions for *resilient development, risk management,* and *climate change adaptation*. We are all in the business of making life on the planet safer, and more sustainable, so that it also has a future. *Design thinking* enables us to not only *mitigate* risks, but to reshape, rethink and redesign systems in a manner that can support both human and natural well-being and prosperity.

> Design thinking enables us to reshape, rethink and redesign systems in a manner that can support both human and natural well-being and prosperity.

Human-centric design has played a role in the destructive consequences that can be witnessed in so many corners of the world, wreaking havoc on everything else on the planet, from *microfauna* and bees to *megafauna* and life in the oceans. An estimated 96% of the world's *mammal biomass* comprises humans and their livestock (leaving 4% for wildlife) (Ritchie, 2022); this represents a series of values, beliefs, and choices of socio-economic design. Similarly, the choice to use 80% of the world's arable agricultural land for housing and feeding livestock (Ritchie & Roser, 2024), as is now the case, is a feature of a global economy that could be designed differently. After all, meat and dairy sources account for just 17% of global calories (ibid). Yet, the reasons underpinning and driving global meat discussed or understood without the involvement of a diverse range of perspectives reflecting on the topic. Here, linkages between knowledge and solutions as processes of *co-production* and *co-design* become evident.

Global problems are, of course, seemingly impossible to tackle by any individual or organization. However, *systems thinking* enables one to see the relevance of the global in the local, and vice versa. Therefore, such an approach reveals opportunities for incremental (small, slow-paced) design and knowledge changes that can alter the ways in which we live with risks, or the planet more generally.

🔍 Example: systems thinking in practice

Consider the current state of *urbanization*. Rapidly growing cities are becoming increasingly unsustainable in many respects: in terms of affordability, accessibility, pollution, heat island effects, expansion on highly exposed areas (including coasts), choices of building materials and concrete use, exponentially increasing electricity consumption. Much of how we live in cities, why we live in them, how we build them, or where they are located, relocated, and why comes down to our ways of working, thinking, and being. **Design thinking encourages us to understand how these intangible factors underpin what we consider 'normal' and to take a whole systems view, to consider every choice as a design choice that will have consequences for all humans and non-human beings.**

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What is design for transitions? How can it help?

To address *complex systems*, designers must develop new ways of working. Unlike traditional design, which often focuses on creating products or services within market-driven frameworks, transition design emphasizes developing a long-term pathway of systemic, collaborative interventions (solutions) aimed at fostering just and sustainable futures (Irwin, 2018).

At its core, *transition design* relies on *systems thinking* to map complex problems, understanding the existing problem or situation. In the design world we call this understanding "What is?". From there the group can consider "What if?", collectively creating a shared vision of the future people, exploring alternative scenarios and imagining different possibilities. Then the next question to pose is "What next?". One way of doing this is *backcasting*, working backwards, from our preferred future to identify a collection of *leverage points* where change may collectively tip the system towards a preferred trajectory. The *design for transitions* process for addressing *wicked problems* makes it possible to:

- understand current challenges and potential consequences of complexity,
- see ways to address their root causes, and
- devise ways to transition toward preferred futures, measured over multiple time horizons (Irwin, 2018).

Going beyond simply generating knowledge, this process focuses on pointing stakeholders in a new direction: toward identifying points and windows of opportunity for driving meaningful change. This type of collaboration aims to help shift system dynamics and to help ensure that interventions are not isolated; instead, interventions are parts of a coordinated process, with each component contributing to the same aims.

🔍 Example: design for transitions in practice

Consider the issue of levees and sea walls. Cities can build them higher and stronger, until each flood-exposed city resembles a walled garden. This will no doubt further exacerbate other *wicked problems* such as segregation, inequality, health and poverty. However, steps to address flooding and these other wicked problems might be possible by imagining a different future: the "What if?" This future could be one in which everyone has access to safe housing, in which cities and people co-exist with nature. This then leads to the next question: "What next?" This could be answered by considering measures that support *nature-based solutions*, the expansion of green spaces, and preservation of natural wetlands. This illustrates how it is possible to work backwards from these visions to think about the actions that could begin this transition. Indeed, grassroots initiatives can shift mindsets and act as an evidence base for larger interventions. However, this can only be achieved through collaboration. It requires working together – including scientists, modellers, policymakers, engineers, city planners, funders, adaptation practitioners, risk managers, insurers, and, most importantly, the public. All of these players can and should contribute to the discussions and plans for viable, alternative futures.

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What the literature has to say about design for transitions:

Design for transitions employs strategies such as linking and amplifying initiatives or projects at these leverage points to increase impact. This can create "ecologies of interventions" that together address interconnected issues (Irwin et al., 2015). Using this approach can amplify grassroots efforts and empower local communities to generate sustainable solutions while building support for *systemic change* (Manzini, 2015). Ultimately, *transition design* moves beyond simply solving problems to reimagining and reconstructing the systems within which those problems exist (Irwin et al., 2015).
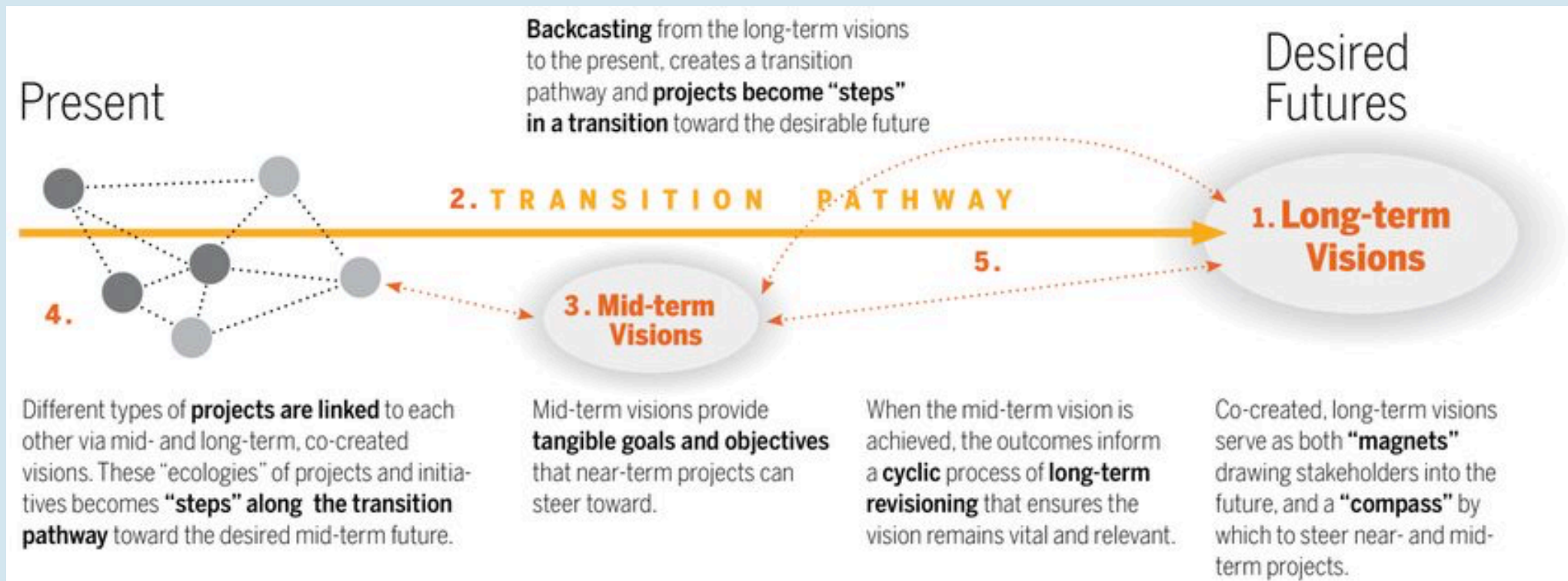
Want to read more?

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Irwin, T. (2018). The emerging transition design approach. Design Research Society 2018 Conference Proceedings, 73. https://doi.org/10.21606/drs.2018.210

Backcasting from the long-term visions to the present, creates a transition pathway and **projects become "steps" in a transition** toward the desirable future

Present

Desired Futures

2. TRANSITION PATHWAY

1. **Long-term Visions**

5.

3. **Mid-term Visions**

4.

Different types of **projects are linked** to each other via mid- and long-term, co-created visions. These "ecologies" of projects and initiatives becomes **"steps" along the transition pathway** toward the desired mid-term future.

Mid-term visions provide **tangible goals and objectives** that near-term projects can steer toward.

When the mid-term vision is achieved, the outcomes inform a **cyclic** process of **long-term revisioning** that ensures the vision remains vital and relevant.

Co-created, long-term visions serve as both **"magnets"** drawing stakeholders into the future, and a **"compass"** by which to steer near- and mid-term projects.

DIRECTED Zala real world lab workshop, 2025

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OVERVIEW: DESIGN

Designing spaces, processes and experiences

Design is not a neutral act. Creating truly inclusive and equitable *co-production* processes requires engaging critically at every step with those involved, with the values they hold, and the dynamics of power at play. In other words, design is an exercise in ethics.

Design is not a neutral act - design is an exercise in ethics!

Purpose, goals, and values

The purpose, goals and values of collaborative processes must be established and used to guide the design of processes because this has implications for stakeholder engagement and the selection of appropriate engagement methodologies.

For example, the accommodation of Indigenous knowledge into scientific practice historically has tended to be an extractive process that forces ways of knowing and being into pre determined scientific frameworks, in turn delegitimizing the "non-scientific" knowledge. To understand how Indigenous, local, or traditional knowledge can inform and revise our understanding of science is a challenge that requires engaging more deeply with underlying philosophies, assumptions and wider values - and thinking about how these views may harm others. Human-centric understanding of the planet provides another good example. Though the world contains immense diversity and richness of flora and fauna, spaces are usually designed to serve human needs. *Co-production* thus becomes a value-led process that hinges upon our ability to critically reflect key issues: How and why is knowledge produced? Who benefits from the designs and who suffers?

Therefore, knowledge co-production necessitates thinking beyond participation, and inclusion, toward understanding how different types of knowledge and values can be made equal. These activities are dynamic and demand ongoing attention and thoughtful judgment, such as selecting appropriate methods, tools, and framing the process. This will be revisited in each phase of the Tandem process as we explore methods for co-exploring, co-defining, and co-designing.

🔍 Example: design thinking in practice

Consider the current state of urbanization. Rapidly growing cities are becoming increasingly unsustainable in many respects: in terms of affordability, accessibility, pollution, heat island effects, expansion on highly exposed areas (including coasts), choices of building materials and concrete use, exponentially increasing electricity consumption. Much of how we live in cities, why we live in them, how we build them, or where they are located, relocated, and why comes down to our ways of working, thinking, and being. Within any city, people hold diverse values, priorities, and relationships to the urban environment. *Design thinking* encourages us to understand how these intangible factors underpin what we consider 'normal' and to take a whole systems view. It prompts us to see every decision as a design decision—one that carries consequences for both human and non-human life. As such, the process of designing new elements or ways of being in the city becomes inherently value-led. As designers, it is our responsibility to ensure that the values of one group are not privileged at the expense of others.

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Reciprocal processes

Collaborative approaches must benefit all participants, not just the researchers or facilitators. Therefore, the purpose of *co–production* and *co-design* must also be negotiated in terms of what participants may want from it, going beyond traditional research and programming practices that tend to be expert-led. For example, project proposals are rarely written in consideration of the needs of stakeholders or beneficiaries. Rather, these are often explored only after the project and its tentative goals have been set. Viable approaches should include acknowledging different motivations and needs, such as community exposure and skill building. Importantly, the process must provide participants with tangible benefits, such as financial incentives (common in healthcare settings), environmental improvements, up-skilling, or providing an enjoyable creative process.

DIRECTED Zala real world lab workshop, 2025

DIRECTED Rhein Erft real world lab workshop, 2025

To support this, the Tandem process includes guiding questions and activities for the phase of *scoping*, designed to explore how a consensus can be built on the aims, goals and values discussed, and how such consensus can support and develop participants' collaborative capacities toward *transdisciplinary* engagement. By following the Tandem process, participants not only contribute to immediate outcomes but also build skills and relationships that generate further value in future collaborative work. By stepping outside the dominant outcome-driven standard (often focused on tangible products or economic value, rather than the process of collaboration itself), practitioners can also explore alternative forms of value that emerge from such processes. This shift represents an important learning process for those designing, developing, and implementing knowledge co-production.

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Attention to power

Power often reveals itself through exclusion - even if such exclusion is unintentional. Exclusion frequently stems from a lack of prioritization, or from practical constraints such as limited time, resources, or institutional support. Nevertheless, those left out can suffer tangible, sometimes life-altering, impacts as a result of the decisions made in their absence. Importantly, inclusion is not just about issuing invitations. The goal is to enable truly equal participation, regardless of participants' age, ethnicity, gender, disability or background. Structural barriers - whether social, cultural, logistical or economic - can limit people's ability to engage meaningfully, even when they are technically in the room.

🔍 Example: inclusive workshop design in practice

Citizens UK, a community organizing group, offers many practical examples of inclusive workshop design. To reduce barriers to participation, it often runs workshops multiple times throughout the day, accommodating people with different work schedules. It provides a nursery to support parents and carers. It offers meals at meetings to ensure participants are fed, to show appreciation for their time, and to build relationships through the shared experience of food. It uses venues that participants can reach by walking, or it provides transit support for those who need it. Perhaps most importantly, Citizens UK asks participants what they hope to gain from its processes. For some, it might be learning facilitation skills; for others, it could be providing a showcase opportunity for a local school.

Once stakeholders are engaged, thoughtful design and strong facilitation practices become essential. Participants must feel safe - empowered to voice concerns, challenge assumptions, and co-create new understandings.

In summary, every decision in a co-production process carries weight. Consistent reflection on these decisions is necessary to avoid reinforcing existing power dynamics or perpetuating systemic inequities. This is why the Tandem Framework defines **design** as a core skill. Design shapes the process itself, and, in doing so, it determines whose knowledge is included, whose voices are heard, and what futures are made possible. When approached with care, this enables more inclusive, equitable and ultimately transformative outcomes.

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What the literature has to say about designing spaces processes and experiences:

Bødker and Iversen (2002) argue that merely adopting participatory methods does not inherently qualify a design process as participatory design. Instead, participatory design is defined by when, how, and why such methods are used, particularly in engaging with and negotiating values. While stakeholder participation is crucial for empowering individuals and fostering connection to the design process, true participatory design extends beyond participation to focus on a "moral proposition" (Carroll and Rosson, 2007) that prioritises values as the driving force. Sanders & Stappers build on this arguing that at its core, co-design is more than a method - it is a mindset, tool, and technique (2012)

To deepen knowledge of co-production practices, processes can be analysed through the lens of Max-Neef's (1991) model which categorises ways of addressing human needs. Max-Neef identifies five types of satisfiers:

Violators and Destructors: Practices that harm or impair the satisfaction of needs.

Pseudo-Satisfiers: Temporary solutions that do not provide lasting fulfilment.

Inhibiting Satisfiers: Approaches that meet one need while undermining others.

Singular Satisfiers: Solutions addressing one need effectively but exclusively.

Synergic Satisfiers: Practices that simultaneously fulfil multiple needs.

Applying this framework to co-design can help uncover opportunities to go beyond traditional evaluation metrics, enabling a richer understanding of the impacts of these processes (Davis et al., 2023). The Tandem process, for example, aspires to function as a synergic satisfier. Its dual goals include generating value through the co-production of interventions and fostering the development of collaborative, transdisciplinary capacities among participants. By following the Tandem process, participants not only contribute to immediate outcomes but also build skills and relationships that generate further value in future collaborative work.

Max-Neef (1991) emphasises the transformative potential of synergistic satisfiers. Processes such as direct democracy, educational games, democratic community organisations, popular education, and self-managed production align with this category, showcasing how co-design can foster broader societal transformation (Max-Neef, 1991; Davis et al., 2023).

Ackoff (1974) outlined in his three rules of participation, participatory projects must be meaningful, likely to be implemented, and enjoyable. This final point signals a shift in emphasis: valuing participants' experience during the process, not just the outputs.

By stepping outside the dominant outcome-driven paradigm, practitioners can explore alternative forms of value that emerge from co-design. This shift represents an important learning process for those designing, developing, and implementing knowledge co-production practices (Davis et al., 2023).

Want to read more?

Iversen, O. S., Halskov, K., & Leong, T. W. (2012). Values-led participatory design. CoDesign, 8(2–3), 87–103. https://doi.org/10.1080/15710882.2012.672575

Costanza-Chock, S. (2020). Design justice: Community-led practices to build the worlds we need. MIT Press. https://doi.org/10.7551/mitpress/12255.001.0001

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What the literature has to say about designing spaces processes and experiences:

For understanding how power is distributed in different *participatory* processes, the "ladder of participation" (Arnstein, 1969) is helpful for understanding how *transdisciplinarity* can support ownership and *mitigate* hierarchies between actors (recognizing that decisions regarding *sustainability* should not be made in the absence of people affected by them). It can also be used to explore who has power when decisions are made:

Citizen control

Delegated power

Partnership

Degrees of power: These rungs enable various degrees of citizen power from Partnership: citizens being involved in the planning, decision-making, and implementation; Delegated power: citizens are given control over specific decisions or areas of responsibility; and Citizen control: citizens have ultimate control over the decision-making process.

Placation

Consulting

Informing

Tokenism: These modes of participation are there to create the appearance of inclusivity without genuine commitment to their input or empowerment. Although Individuals may be included in a process, but have little to no real power or influence over decisions.

Therapy

Manipulation

Non Participation: These modes of participation are not really participation at all, instead they aim to enable powerholders to "educate" or "cure" the participants.
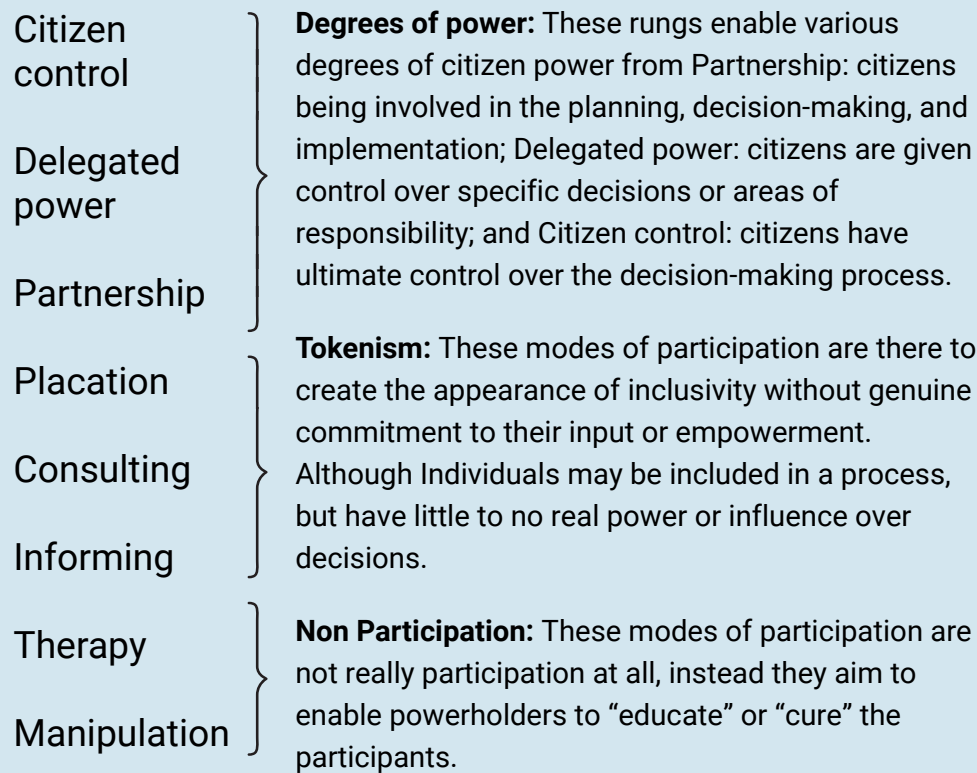
Figure 2: Ladder of participation (Arnstein, 1969)

Arnstein (1969) critiques *tokenistic* approaches like informing and consultation; instead, he agrees with Wilcox, emphasizing the need for deeper, more equitable collaborations, such as partnership, delegation, and citizen control. These higher rungs signify the redistribution of power and the meaningful involvement of participants in shaping outcomes.

Consider the earlier discussion regarding *vulnerability*. If implemented as an expert-led process, *vulnerability* assessments can further reinforce and conceal structural injustices by talking for or on behalf of those deemed as vulnerable (Faas, 2016). Given the use of such tools as a mechanism for *governance*, the inclusion of vulnerable groups thus becomes an ethical imperative for researchers and decision-makers. It is important to consider who can and is allowed to write about the topics at hand, and who can contribute to their management, and how. Participation does not necessarily address the dynamics of power at play.

As Nandy (1987) notes, dialogues between cultures often conceal hidden dynamics of inequality, with dominant cultures imposing their mindset or dialogue, thereby marginalizing less dominant ones. He writes, "There is a pecking order of cultures in our times which involves every dialogue of cultures, visions and faiths and which tries to force the dialogue to serve the needs of the modern West and its extensions within the non-West. Under every dialogue of visions lies a hidden dialogue of unequals…" (p. 14). To counter these dynamics, priority must be given to methodologies that are rooted in context and challenge dominant ways of being.

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RESEARCH: Why is research important?

To grapple with *systems*, or to begin thinking about *transition design* processes, basic understanding of research methods is essential. Such understanding provides the basis for generating information that can support further scoping and *co-exploration* activities.

This section emphasizes the importance of *interdisciplinary* research skills in *knowledge co-production*. It highlights various *qualitative* and *quantitative* methods that can be used to support *co-production* processes, and discusses key ethical considerations relevant to *co-production*. While the use of *qualitative* or *participatory* methods is an essential component of *co-production*, it is important to understand that these methods alone do not equate to *co-production*; they should be seen as part of a broader, collaborative approach.

Qualitative methods

Each Tandem phase requires *qualitative* research - beginning from the scoping of potential stakeholders that could be involved in *transdisciplinary* collaboration. *Qualitative* data is data that is not numerical. They are narrative in nature, providing information regarding people's views, opinions and values in great depth and in ways that quantitative (numerical) data often cannot.

The design of *qualitative* research should consider the best ways to bring forward people's perspectives without the use of leading questions, and to maintain an adequate structure that allows comparison across responses. The use of structured, semi-structured, or non-structured methods must be decided based on the complexity, depth and subjectivity of the topic at hand. It's important to think about the researcher's background and role, as well as how the setting of the interview might affect the conversation. We all have our own *positionality* - shaped by our experiences, identities, and beliefs - even if we don't always realize it. That's why it's important to make a conscious effort to reflect on how our perspective might influence the research process. Much like in the case of *co-production,* dynamics of power between interviewers, interviewees, and within groups may skew the research process, and lead to biased responses. It is also important to pay attention to the language used, to ensure that questions aren't leading, as well as to ask if the language can be interpreted or understood differently than intended.

Focus group discussions are also often used during the set up and scoping phases of a project. It involves gathering a group of individuals to discuss a specific topic, building upon the complexity of attitudes, perceptions, beliefs and lived experience through moderated (or creative) interactions that support open discussion. Whereas one-to-one or group interviews are apt for discussions that are led by researchers, the open format of focus groups requires facilitation and moderation to enable productive and safe conversations. Of course, there are added considerations. Ethical issues (including, for example, complying with any formal ethics procedures and documentation required by research institutions) must be addressed to safeguard people from exploitation and harm. When selecting, or recruiting participants it is important to consider pre-existing relationships, *dynamics of power, social hierarchies* (relating to characteristics such as age, disability, gender, social class, ethnicity or religion), as these can all affect and shape the course of the discussion.

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Analysing qualitative data

Those working with *qualitative* data must be able to identify patterns and themes that emerge from transcripts, surveys, interview notes, voice recordings that are the sources of documentation. Sometimes, identifying key patterns is relatively simple. For example, coding data can be done by assigning labels or codes to identify recurring themes, concepts, or patterns, such as shared interests amidst different stakeholders. Within the DIRECTED project, researchers coded interviews with predetermined codes to pull out key challenges, existing interventions, goals and ideas.

When trying to understand how different groups and individuals relate to the environment or *risk* (and how they are understood), researchers can also use discursive analysis: looking at the context of language and how it is used.

It should be noted that *co-production* and *co-design* processes are by their nature innovative and often necessitate creativity beyond traditional research methods. As such, approaches as described above represent only the very basic, key methods facilitators can leverage in the early stages of program development. As co-production and co-design processes advance, creative and interactive methodologies become increasingly necessary. **Grounded theory analysis** is often a useful method for examining workshop data. Unlike deductive approaches that begin with a fixed *hypothesis*, grounded theory uses an inductive approach, meaning it allows patterns and insights to emerge through repeated, close analysis of the data. This process can be integrated into the workshop itself, giving participants a chance to reflect on their responses together and explore possible themes, trends, categories, and connections between those categories. Through this iterative process, a deeper understanding or theory about the data can be developed based on what participants actually say and do.
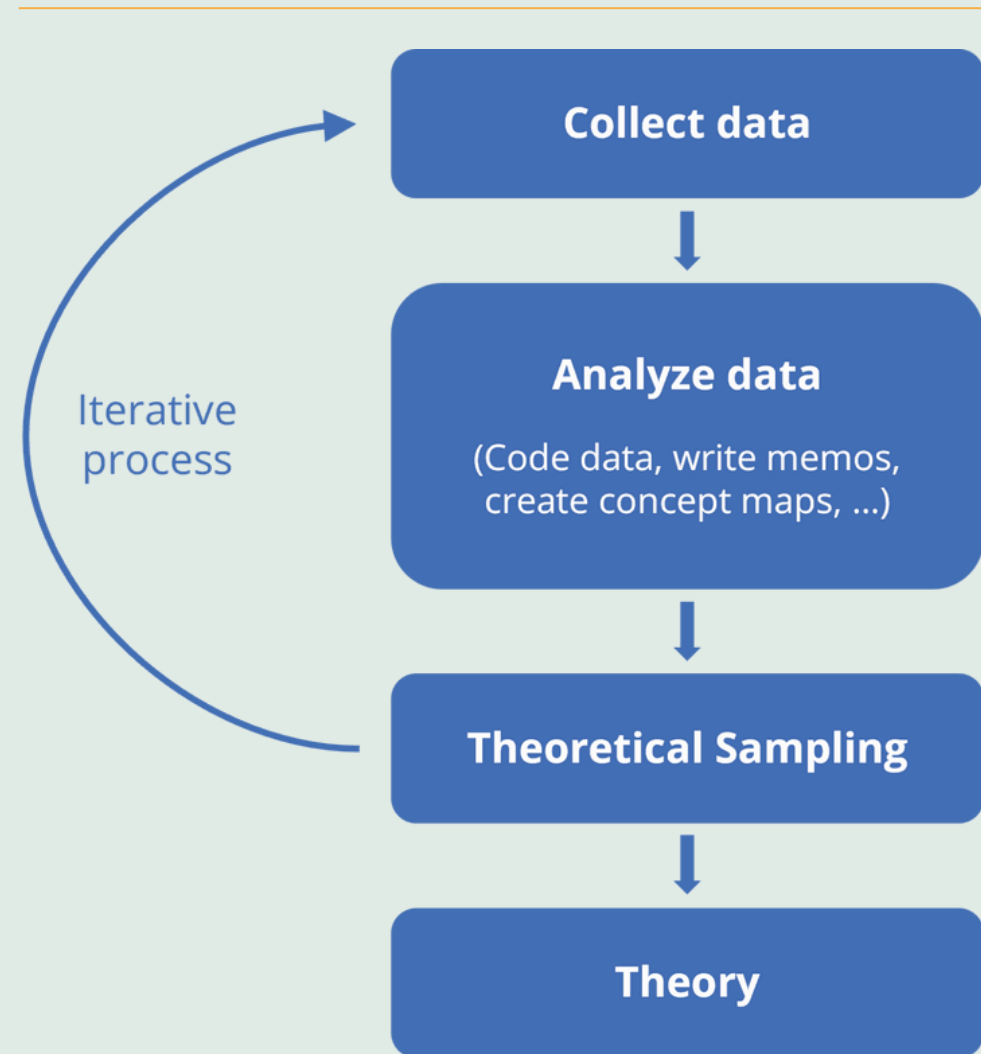
Simplified Flow of a Grounded Theory Study, (MAXQDA, 2025_

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Quantitative methods and data

In *transdisciplinary* initiatives, stakeholders may need to work with *quantitative* data. *Quantitative* data refers to information that can be measured and expressed using numbers. Such data answers key questions: How much? How many? How often: To what extent? For example, in the context of *risk* information, *quantitative* data on *hazards* might include the frequency of floods in a region, the number of people affected by a disaster, and the intensity of a storm. This information is often explored through large historical data sets, upon which many models are based. Therefore, users of *risk* information should have a basic understanding of the principles of data collection, processing and modelling; in turn, data providers should also have an understanding of the context in which data will be used to support decision-making and planning.

In a co-production context such as DIRECTED, the capability of actors to access and use *quantitative risk* information is essential. For example, consider the data needed to assess flooding risk. Mapping, assessing and modelling flood risks require many sources of data: historical rainfall amounts, flood depth and extent, flow velocities, and storage capacities in specific locations. Many data analysis methods require specific skills; the need for such expertise and skills should be considered as part of stakeholder mapping. Decisions about which data and data analysis skills are needed should be determined by the challenges at hand; such decisions are always contingent upon the working context and the risks and sustainability challenges actors are seeking to address.

Knowledge co-production can help make data, like *risk* models or climate services, easier for people to understand and use, especially because there are often gaps that stop this information from being used effectively. For example, a flood *risk* map might exist, but if local planners or communities don't understand how to read it or how it relates to their area, it won't help them make better decisions. Within DIRECTED we have developed e-learning training to be used alongside the data fabric as well as other activities to improve the communication of modelling outputs. One example is using *serious games* to facilitate discussions involving modelled risk scenarios. Another is unpacking key terms and definitions to create a shared understanding about technical concepts that might otherwise be inaccessible for practitioners.

DIRECTED Rhein Erft real world lab workshop, 2025

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Monitoring, evaluation and learning

Monitoring, evaluation and learning (MEL) is the collection of activities aimed at tracking and understanding the negative and positive impacts of an *intervention*. Such activities include *qualitative* or *quantitative* reports, surveys, interviews, focus group discussions, impact assessments, financial performance reviews, or a combination of these. Monitoring, evaluating and learning is a big part of any design or research process. This is why it is used throughout every phase of the Tandem Framework.

Knowledge co-production has sometimes been critiqued due to lack of empirical evidence demonstrating its impacts, effectiveness and benefits. It is indeed difficult to measure the benefits of improved collaboration, more integrated knowledge, enhanced trust, changes in ways of working, or more inclusive practices for research and governance. Transformative changes in ways of working unfold gradually and may not align with program timelines or measurable *indicators*. *Adaptation* and *development* processes are especially complex and nonlinear.

For this reason, *qualitative* research plays a key role in improving and refining *co-production*. Because the nature of the process is iterative, all participants must remain open and welcoming to adapting ways of working based on emerging evidence. At the same time, recording evidence gathered along the way is essential, not only for the benefits of a process used by a given group, but for building a broader knowledge base of good practices. In this sense, the long-term value of *co-production* depends on our collective ability to learn from and share what works.

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Ethics

Ethics is the moral principles that guide one in their work. It includes considerations like informed consent, confidentiality, data integrity, and the broader societal impact of research and design choices.

Co-production, co-design and research processes must address ethical considerations. As we've explored previously, the design of processes requires acute ethical considerations, especially when creating knowledge that leads to real-world action and change, as well as working with people whose participation makes them the subject of research.

There are many different ways of thinking about and addressing ethics. Some people focus on doing what leads to the best outcomes. (This is called utilitarianism.) Others focus on acting with integrity and good character. (This is known as virtue ethics.) Such different approaches highlight why it is important to have conversations about ethics early. These conversations are not only important for ethical considerations, but help us understand our own assumptions, understand others and set the path for open, transparent work.

However, our most common engagement in ethics is through practice rather than theory. Beginning from the basic considerations. For example, facilitators should always seek to guarantee that their work causes no harm, and that all those involved are adequately informed, and have consented to participate. Those involved must truly understand the relevant purpose and processes. Most importantly, participants must feel safe and respected throughout.

Checklist:

- People should be able to leave, and be aware that they have the right to leave an interview or workshop at any time without pressure
- Sensitive topics must be treated with care. Researchers and facilitators should aim to identify and foresee any sensitive topics or topics of tension to the best of their ability, so that participants can be made aware of such potential, so that they can be acknowledged before agreeing to take part.
- People's privacy must be respected
- Prior to the start of any co-production process, participants should be made aware how any information they share will be used and stored, and for how long

Including all of this information on a project information sheet, along with an ethics consent form for participants to sign at the start of a project, is good practice (and for many institutions compulsory).

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What the literature has to say about ethics:

All *co-production, co-design* and research processes should include and incorporate ethical considerations. Given that co-production processes seek to produce action-oriented knowledge for guiding and informing transformative change, one must pay attention to the ethical values embedded within (Partelow et al., 2025). Broadly understood as the orienting moral principles and attitudes that guide action, ethics should be understood as the criteria through which *interventions* or their impacts are evaluated (ibid). Whether discussed in terms of consequentialism, deontology, virtue ethics, or contractualism, a consensus about what is the "right thing" must be achieved, and this consensus opinion must include those who are affected by decision-making. Involving stakeholders in discussions regarding the desirable outcomes or future states is a good start for advancing considerations of ethics. It is also important to note that there are many types of ethics and ethical theories (beyond those of Western academic traditions); being aware of these and taking them into consideration can help provide insights about how different groups and cultures build a collective understanding of what is considered good and beneficial.

Familiarity regarding different ethical theories can also improve constructive engagement. It can reveal underlying assumptions and values on both sides of the process – thus improving the transparency of *co-production* and *co-design* (Partelow et al., 2025). For example, consider the differences between Aristotelian virtue ethics – which focuses upon the moral character and attitudes guiding practical action for the benefit of greater good, rather than set rules – and utilitarianism – which emphasizes the consequences of actions, and the maximizing happiness as set out by John Stuart Mill (Kraut, 2022; Driver, 2014). For *knowledge co-production*, these theories create differing starting points and motivations for the process. Consequently, those working with the topic must be able to reason and explain what drives their behaviour – even when it is not perfect. When working with others,

these must then be communicated, for it is entirely likely that not all would agree. After all, sustainability challenges and risk governance are complex and contested domains, plagued by uncertainties and disagreements. The question remains: Whose futures are we working toward?

Want to read more?

Partelow, S., Luederitz, C., Huang, Y.-S., von Wehrden, H., & Woopen, C. (2024, November 11). Building ethical awareness to strengthen co-production for transformation. Sustainability Science, 20, 307–314. https://doi.org/10.1007/s11625-024-01582-7

Kraut, R. (2001, May 1). Aristotle's ethics. In The Stanford Encyclopedia of Philosophy (Edward N. Zalta, Ed.). Metaphysics Research Lab, Stanford University. Retrieved June 16, 2025, from https://plato.stanford.edu/entries/aristotle-ethics/

OVERVIEW: FACILITATION

FACILITATION: Why is facilitation important?

The term facilitator is used very broadly and often interchangeably with the evolving role of designers and researchers. Facilitation is an important role that goes beyond the traditional skills of designers and researchers. Good facilitators do more than guide the process. They help create an environment where participants feel safe, heard, and motivated to collaborate. They navigate between hands-on and hands-off approaches, adapting to the specific needs of each group and process.

A central aim of facilitation is to build participants' self-efficacy: a person's belief in his or her own capabilities. Self-efficacy shapes behaviour, influences decision-making, and determines their ability to overcome challenges. This is especially important for participant engagement in *co-production* and *co-design* processes.

This idea of empowerment connects with the Tandem Framework's focus on building confidence and capacity. To develop empowerment, facilitators can create processes that lead to transformative outcomes for participants. Fostering an environment where participants gain control, develop skills, and test their knowledge allows them to increase their understanding and engagement throughout the process. Individual, group, and collective co-production can generate empowerment at varying levels – from the individual level to the community level. It can help equip the collective with the efficacy to carry the work forward.

Building and maintaining relationships are central to effective facilitation and collaboration. The facilitator can use relational techniques to help accelerate trust and collaboration. These can be as easy as trying out structured check-ins, prompt-based conversations (e.g., "What are you noticing?"), or group reflections grounded in mutual learning. Such practices can support participants in building meaningful connections. These practices lighten the cognitive load of collaboration, providing moments to "unload" and fostering creativity as an outcome of care practices.

By involving stakeholders in shared processes, the activities and guidance introduced throughout this course are specifically designed to break down barriers and *silos*; build bridges between sectors and disciplines; and support improved collaboration, cooperation and communication. Relationships are a natural by-product of this process. Nevertheless, facilitators must remain conscious of the ways in which they can build solidarity among stakeholders, and the activities that can alleviate potential tensions and disagreements.

Tips and lessons offered throughout this course are intended to help you navigate the role of facilitator.

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OVERVIEW: FACILITATION

What the literature has to say about facilitation:

Irwin (201) and Escobar (2012) highlight the evolving role of designers and researchers as facilitators and mediators. Rather than focusing on duties, rules, or emphasizing outcomes, Steen (2012) advocates for using virtue ethics to guide facilitation practices. Virtue ethics prioritizes character, dispositions, thoughts and actions (e.g., Pritchard, 1998), finding a balance between "deficiency and excess", tailored to each situation. For facilitators, this means understanding participants' needs to determine the appropriate level of intervention. For example, facilitators can empower participants who are passive or show signs that they feel left out; facilitators can also help by refraining from imposing their own vision or methods (Steen, 2012). Steen stresses that cooperation and reflexivity are especially important for facilitators in creating environments that foster curiosity, creativity and empowerment. By embodying these virtues, facilitators create spaces where participants can grow and flourish (Steen, 2012). In turn, through participation, participants can cultivate virtues such as cooperation, curiosity, creativity, empowerment and reflexivity.

Self-efficacy is a key concept in discussions of empowerment, particularly within participatory research and co-design approaches (Irvin & Stansbury 2004; Pant 2014; Wang 2024). It refers to individuals' beliefs in their ability to perform at designated levels and to influence events that impact their lives (Bandura 1994). While knowledge and skills are crucial, it is ultimately one's belief in his or her capabilities that shapes behavior, decision-making, and the ability to overcome obstacles; therefore *self-efficacy* is crucial to participants' engagement levels within *co-production* and *co-design* processes (Bandura 1994; Remm et al. 2021; Wang 2024).

Mackay (1990) further suggests that the co-design process fosters a co-adaptive phenomenon, enhancing participants' understanding of both the process and the concept itself. This dynamic leads to "'can do'" thinking, which empowers participants by providing a sense of control and enhancing their perceived *self-efficacy* in *co-design* activities (Scholz et al., 2002; Wang, 2024).

Want to read more?

Davis, A., Tuckey, M., Gwilt, I., & Wallace, N. (2023). Understanding co-design practice as a process of "welldoing". International Journal of Art & Design Education, 42(2). https://doi.org/10.1111/jade.12459

Wang, Y. (2024). Becoming a co-designer: The change in participants' perceived self-efficacy during a co-design process. CoDesign. https://doi.org/10.1080/15710882.2024.2362327

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OVERVIEW: FACILITATION

Tips in practice: workshop setup and facilitation

This section offers practical guidance for setting up and facilitating inclusive, engaging, and well-structured workshops. These tips are intended to help you create a safe and productive space for collaboration.

Establishing group norms

Start each session by agreeing on shared expectations for how participants will engage. Ideally, these norms are set early in the project (e.g. in Phase 1 of Tandem: aligning and relationship building).
You might include:

- Chatham House Rule: Participants are free to use the information received, but not to reveal the identity or affiliation of the speakers.
- Sociocracy-inspired practices: Aim for decisions that are "good enough for now and safe enough to try" to keep momentum while maintaining inclusivity.
- Listening without interrupting: Promote active, respectful listening.
- Equal participation: Encourage everyone to contribute.
- Support facilitation: Reinforce the facilitator's role in guiding the group.
- Respect for differing opinions: Acknowledge and value diverse perspectives.

See more: Facilitators Handbook (pg. 30)

Facilitation techniques

- Warm-ups: Use light, engaging activities at the start of the session to help people feel present, connected, and ready to contribute. This could include check-in questions or creative group tasks.

- The parking lot: Use a designated space (whiteboard, sticky wall, shared doc) to capture off-topic ideas or questions. Return to these if time allows or after the session.

- House rounds: A facilitation method from community and civil rights organizing, House Rounds ensure every voice is heard. You'll need: a host (to guide), a timekeeper (with timer that signals end of each turn), and a note-taker (to record insights). There are normally 2 rounds, go around the group, giving each person a set time to respond with their thoughts. Once everyone has spoken you can then go around the group again allowing everyone to respond to what they've heard, sharing reflections, questions, or building on others' thoughts.

- Veto tokens: These are tokens that allow everyone on opportunity to jump in and object. It helps constructive disagreement and also helps people consider how often they are objecting.

- Ask open-ended questions: Use how, what, when, why, and where questions to encourage depth. Or use tell, explain, describe (TED) questions such as "Tell me more about…", "Explain what you meant when…", "Describe how that played out…".

- Clarify and summarize: Actively listen by paraphrasing or summarizing what's been shared.

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Room set-up

- Avoid rows of chairs - use round tables or circles.
- Leave wall space for posters or flipcharts.
- Ensure enough space for standing circles.

Materials

- Name tags (stickers or printed)
- Sticky notes (various colours)
- Small stickers/dots (to prioritize ideas)
- Flipchart paper
- Ball of string, cup + rubber bands + string (for team tasks)
- Music for breaks or transitions
- Large printed activity canvases
- Bluetack
- Pens

Documentation

- Sign-in sheets for participant tracking
- Consent forms for photos, recording, data use

Assign note-takers for each station and use photographers for both candid engagement shots and capturing outputs (e.g. charts, sticky notes).

It is also helpful to observe and document non-verbal cues, room dynamics and any clear differences in attitudes among stakeholders.

Evaluation

Warm-downs / reflections: End each session with a moment of shared reflection to consolidate learning, encourage feedback, and foster a sense of closure. You might ask: "What stood out to you today?", "What are you taking away from this session?", "What did you find most useful?", "What was difficult?", "How could future workshops be improved?".

You can also invite participants to reflect on preferred modes of engagement going forward (e.g. In-person, Online, One-to-one) and how they would measure successful engagement (e.g. Inclusion, Relationships, Knowledge, Communication, Interest, Transparency).

A simple and effective technique is to go around the group and ask each participant to share one word to describe how they're feeling after the session and one question they still have. This gives you a quick and meaningful snapshot of the group's experience and helps identify areas for follow-up or deeper exploration.

Reflections can be collected verbally in the room or through more structured tools. Structured tools can also be used as prompts to launch more in-depth, discussion-based reflection within the group. Options include:

- QR codes linking to online surveys (e.g. Google Forms, SurveyMonkey)
- Paper forms handed out and collected at the end of the session
- Live tools such as Mentimeter or Slido for real -time responses and visual feedback

Finally, self-reflection tools are great for facilitators to track personal development. Here is the one we used during the DIRECTED project.

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PHASE 1 FOUNDATION

Vulnerability
Scope risks, &
impacts

Stakeholders
Engage

Stakeholders
Identify

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Introducing phase 1 of Tandem: how to build transdisciplinary labs for co-production

This module outlines how to establish the foundations of your *transdisciplinary* lab, the first phase involved in applying the Tandem Framework. The module is organized into sections that cover the following issues: **scoping; identifying stakeholders; aligning goals; values and building trust; and incorporating reflection and monitoring, evaluation, and learning (MEL).** These elements are revisited in a continuous learning loop. Each section includes clear goals, Tandem guiding questions, practical tools, and facilitation tips to support thoughtful design and implementation.

Tandem does not impose a formulaic approach. Indeed, experience has shown that a combination of methods is often most effective. Building transdisciplinary labs requires an iterative approach of active participation and reflection. In Tandem we call this *scoping* - gathering, analysing and assessing. The first question is how to identify and find the stakeholders who should be part of the process. Start by engaging relevant experts to explore their perceptions of *risks* and *vulnerabilities*. Use their insights to evaluate who is present and who should be included (remember that experts can refer to those with lived experience as well as traditional academic "experts"). Then continue to strengthen connections to ensure that the lab evolves to reflect the needs, values, and expertise of all participants. These steps create a strong foundation for meaningful co-production. This phase involves three aspects: *scoping* challenges and stakeholders, engaging stakeholders, and relationship building and aligning as a lab. These topics can be tackled asynchronously; they are deeply intertwined and mutually reinforcing.

As you step into this stage, reflect on the core modules that explored co-design not just as a method but as a mindset. Building a *Transdisciplinary* Lab within the Tandem Framework requires intentionality in how collaborations are initiated, nurtured, and sustained. This intentionality can be expressed through personal qualities such as deep listening, patience, empathy, and flexibility. These virtues are essential for fostering the relational and regenerative aspects of *co-design*. These efforts lay the groundwork for meaningful engagement and sustainable outcomes.

By embracing these principles, designers can navigate the complexity of the front-end stage and foster meaningful collaboration with communities.

Capacity Development

Collaborative and creative capacity
To design and facilitate relationship building engagements and processes to help the lab align around key priorities.

Systems thinking and reflexive capacity
Drawn on to research the system, understand the diversity of actors and challenges involved, and continuously reflect on whether the right people are in the room.

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PHASE 1 FOUNDATION: SCOPING

Introducing scoping

The *scoping* stage in building a *transdisciplinary* lab is critical, as it has the potential to define the direction of the entire project. How *risks* are identified and framed during this phase determines who the stakeholders are, and these stakeholders, in turn, shape the understanding of risks, ultimately constructing the articulation of the problem itself. Problem statements are never neutral; they always imply solution statements and are constructed in particular ways, reflecting the perspectives and priorities of those involved (Escobar, 2012)

PROBLEM STATEMENTS ARE NEVER NEUTRAL; THEY ALWAYS IMPLY SOLUTION STATEMENTS AND ARE CONSTRUCTED IN PARTICULAR WAYS, REFLECTING THE PERSPECTIVES AND PRIORITIES OF THOSE INVOLVED (ESCOBAR, 2012)

To avoid reinforcing power imbalances and hierarchies between knowledge systems, this process must be approached as a politically and contextually sensitive activity. This process may require explicit recognition and deliberate re-balancing of power to foster equitable relationships between stakeholders, recognizing contextual knowledge as an invaluable resource. Therefore, it is important to ensure an iterative, inclusive and reflective scoping process, continually asking, "Have we got the right people in the room?" To strengthen the capacity to address complex issues effectively, the process must ensure that scoping is true to those impacted, recruit a diversity of voices, and acknowledge the expertise they hold.

The following resources are intended as options to support you in facilitating this stage by creating canvases to explore the Tandem guiding questions collectively. We encourage you to consider your specific context and needs. Adapt the materials as necessary to ensure that they are relevant and effective.

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PHASE 1 FOUNDATION: SCOPING

Scoping: Goals

- ☑ *Scope* the *risks*

- ☑ Identify the key communities vulnerable to these risks

- ☑ *Scope* the wider contextual challenges

- ☑ Begin to *scope* current actions

- ☑ Begin to *scope* potential future actions

- ☑ Identify goals for future

- ☑ Identify barriers and enablers for these goals

Scoping: Tandem guiding questions

- ☑ What are the greatest challenges within the decision context that do not allow safe living conditions or a good quality of life? What is the *"lived experience"*?

- ☑ What are the socio-economic challenges, including factors beyond the control of decision-makers that affect access to or management of particular resources?

  How is *climate information* used? What relevant *climate services* or reports are available that address other *risks* and *impacts*?

- ☑ What communities and activities are at *risk*? How does *vulnerability* differ among groups and activities? Why are they vulnerable? Be open to sources of *vulnerability* that are not necessarily related to climate (e.g., those related to dynamic social vulnerability).

- ☑ What areas are most vulnerable? Why are they vulnerable? Be open to *vulnerabilities* that are not necessarily related to climate (e.g., *vulnerability* related to ecosystem services).

- ☑ If there are other types of *vulnerability* (e.g., socio-economic *vulnerabilities*) that are not necessarily related to climate, what drives this vulnerability?

- ☑ Do *climate* or *weather* events and impacts affect/exacerbate these *vulnerabilities*? If so, in what ways?

- ☑ Is there any *risk* of exacerbated *vulnerability* here or elsewhere, due to *compounding* or *cascading risks*?

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PHASE 1 FOUNDATION: SCOPING

Tandem challenges and goals scoping canvas

This canvas, guided by Tandem's questions, offers a collaborative process and a shared canvas for the lab to scope challenges, set goals, brainstorm future ideas, and identify potential barriers and enablers that may support or hinder those concepts.

01. Problems and challenges

What's your story? From your perspective what information is missing for past and future challenges?

Consider:

- Socio-economic challenges
- Areas and activities that are most vulnerable to risks
- Decision-making challenges (e.g., mandates, procedures)
- What do you want the story to be in 2050? How can you amplify current actions? What ideas do you have for new actions? What are the overarching goals?

02. Goals and ideas

What do you want the story to be in 2050? How can you amplify current actions? What ideas do you have for new actions? What are the overarching goals?
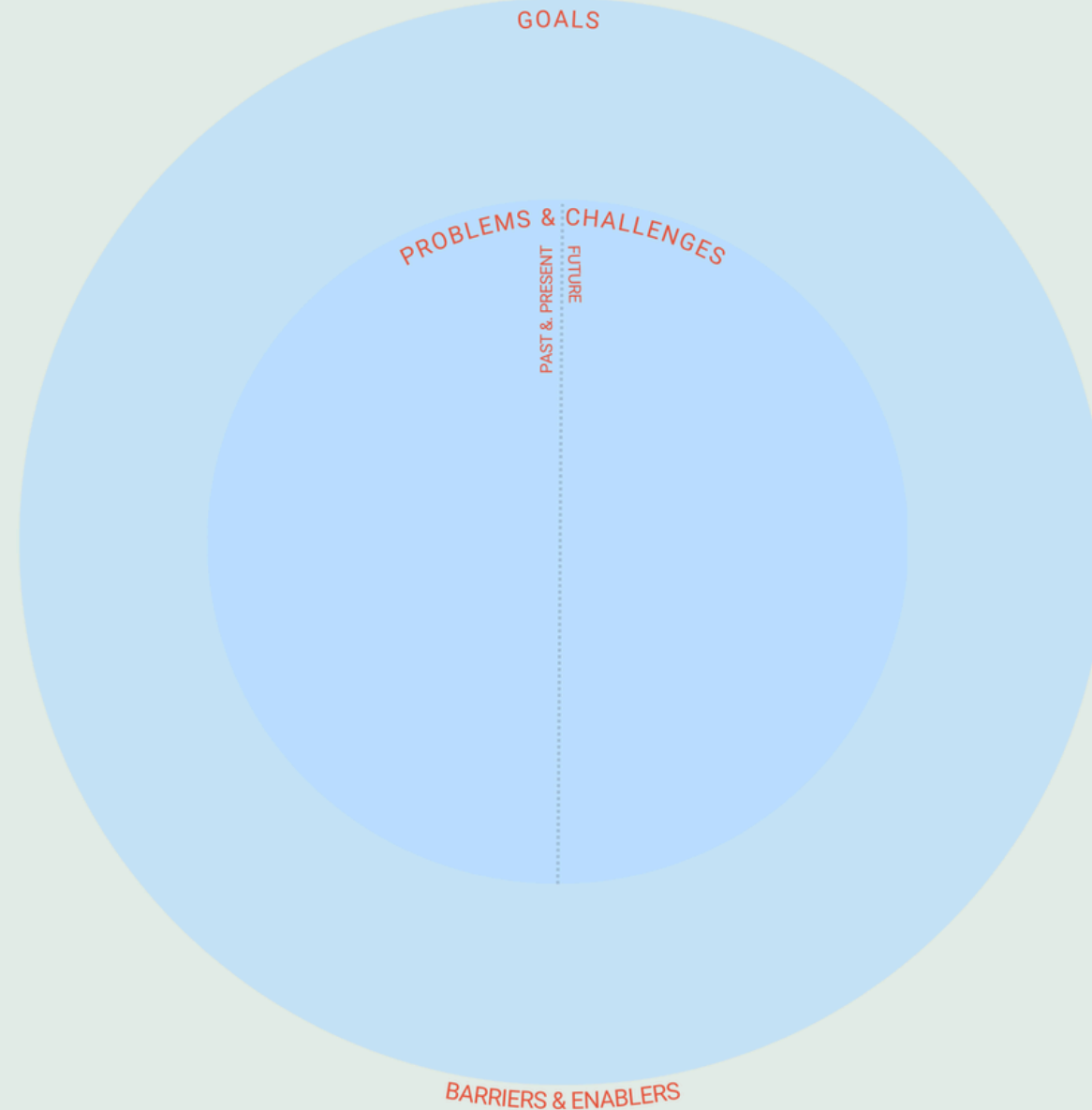
Consider:

- *Governance*, communication, *education, nature-based solutions,* community initiatives, and *infrastructure*
- *Mitigation, preparedness, disaster management, disaster response,* and *recovery*

03. Barriers and enablers

What *barriers* and *enablers* would support or stop you from implementing these actions? What are your personal strengths and weaknesses - what can you enable?

Consider:

- Mindsets and beliefs
- Behaviours and ways of working
- *Governance*, bureaucratic systems and resources
- Grassroots initiatives that could be amplified
- Expertise, skills and capacities

DIRECTED Zala real world lab workshop, 2025

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TANDEM CHALLENGES AND GOALS SCOPING CANVAS

01 Risk problem boundary mapping

What's your story? From your perspective what information is missing for past and future challenges? Consider:

- Socio-economic challenges
- Most vulnerable areas and activities at risk
- Decision-making challenges e.g. mandates, procedures

02 Goals and Ideas!

What do you want the story to be in 2050? How can you amplify current actions? What ideas do you have for new actions? What are the overarching goals? Consider:

- Governance, communication, education, nature-based solutions, community initiatives, infrastructure
- Mitigation, preparedness, disaster management, disaster response, recovery

03 Barriers & Enablers

What barriers and enablers would support or stop you from implementing these actions? What are your personal strengths and weaknesses - what can you enable?

Consider:

- Mindsets or beliefs
- Behaviours or ways of working
- Governance, bureaucratic systems & resources
- Grassroots initiatives that could be amplified
- Expertise, skills or capacities

GOALS

PROBLEMS & CHALLENGES

PAST & PRESENT | FUTURE

BARRIERS & ENABLERS

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PHASE 1 FOUNDATION: SCOPING

Risk governance scoping canvas

This canvas is derived from the risk governance scoping canvas utilized in the DIRECTED project. It offers a collaborative framework for the lab to identify potential vulnerabilities, hazards, and the associated risks they pose. Assess these risks in the context of climate uncertainty, prioritize them accordingly, and then outline their connections to communication, governance, and stakeholder identification.

01. Risk problem boundary mapping
Identify issues in the inner circle categories under each interest area, and then draw connections between them to build a "rich picture" of risks in their context.
What are the *hazards* and expected *impacts* of *climate change*?
What are the existing *vulnerabilities* and *exposures*? Consider:
- What are the socio-economic challenges in the region, e.g. that affect access to or management of particular resources?
- Where are the most vulnerable areas and why are they vulnerable? Be open to *vulnerability* that is not necessarily related to climate.
- What drives this vulnerability?

Considering the potential *hazards* and *vulnerabilities*, what are the *risks* and *impacts*?
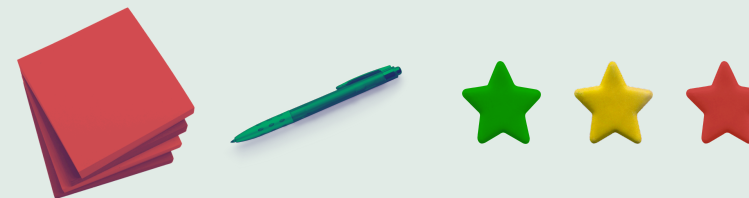Consider:
- Do climate or *weather* events and *impacts* affect the *vulnerabilities*, and if so, in what way?
- What are the different communities and activities at risk?
- Is there any risk of exacerbated vulnerability here or elsewhere, due to *compound* or *cascading risks*?

02. Prioritisation
Not all of the identified issues are manageable, however, the process may reveal key entry points for managing larger, *complex problems*. Use coloured dots or stars to collectively prioritise.

03. Risk governance mapping
The outer circle captures connections to *communication, governance, and stakeholders*. Add notes to links that require further examination, or outline stakeholders who are necessary for managing the required challenges - this does not require a detailed policy analysis or stakeholder mapping at this stage!

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RISK GOVERNANCE SCOPING CANVAS

01 Risk problem boundary mapping

Identify issues in the inner circle categories under each interest area, and then draw connections between them to build a "rich picture" of risks in their context.

What are the hazards and expected impacts of climate change?

What are the existing vulnerabilities and exposures?

Consider:

- What are the socio-economic challenges in the region, e.g. that affect access to or management of particular resources?
- Where are the most vulnerable areas and why are they vulnerable? Be open to vulnerability that is not necessarily related to climate.
- What drives this vulnerability?

Considering the potential hazards and vulnerabilities, what are the risks and impacts?

Consider:

- Do climate or weather events and impacts affect the vulnerabilities, and if so, in what way?
- What are the different communities and activities at risk?
- Is there any risk of exacerbated vulnerability here or elsewhere, due to compound or cascading risks?

02 Prioritisation

Not all of the identified issues are manageable, however, the process may reveal key entry points for managing larger, complex problems. Use coloured dots or stars to collectively prioritise.

03 Risk governance mapping

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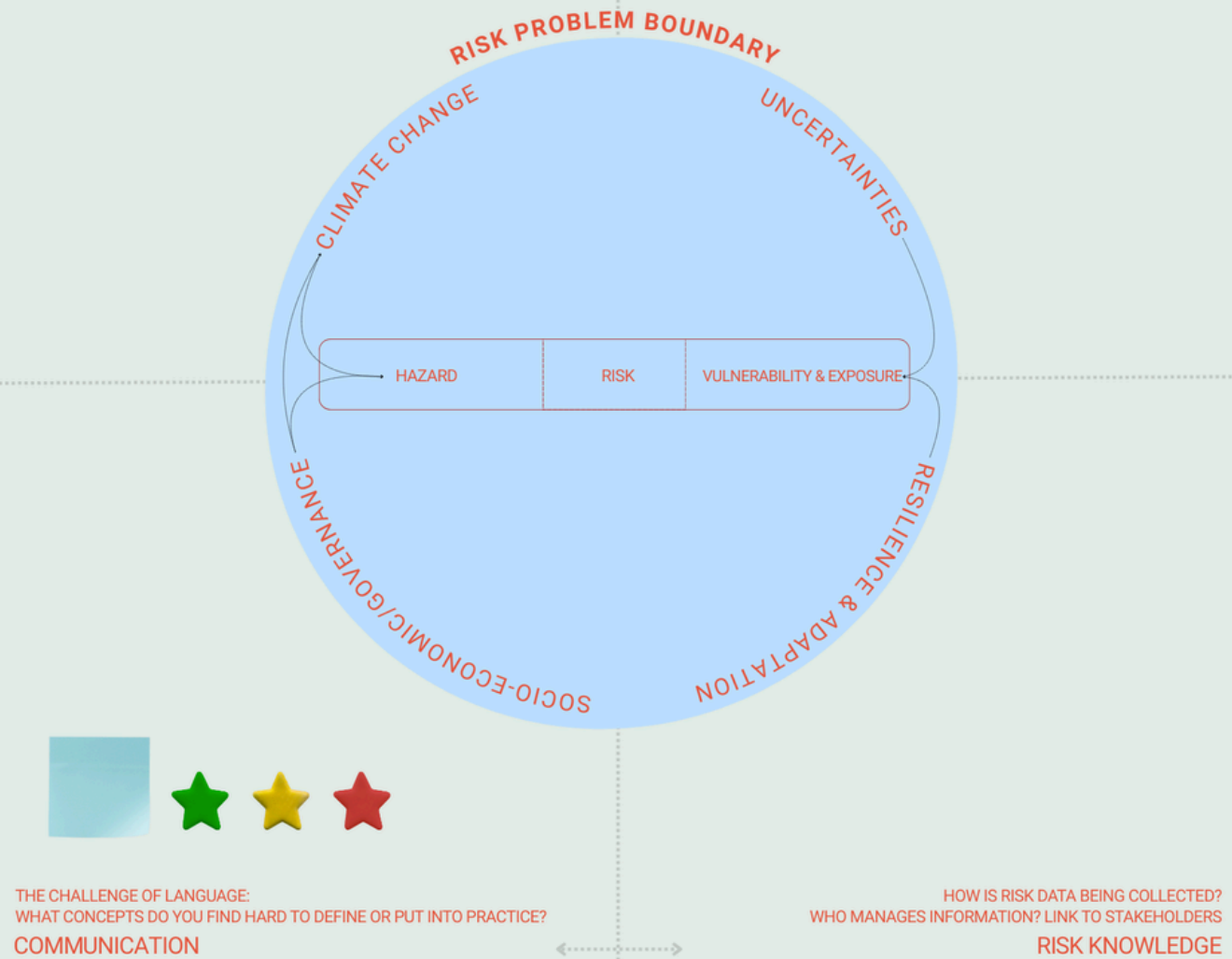
STAKEHOLDER ANALYSIS

WHICH ACTOR PLAYS A ROLE?
WHO IS MISSING? WHO COULD CONTRIBUTE?
WHAT STAKEHOLDER NETWORKS/ PARTNERSHIPS/ BROKER ROLES EXIST?

INSTITUTIONAL LANDSCAPE

RELEVANT POLICIES?
FINANCE?

RISK PROBLEM BOUNDARY

CLIMATE CHANGE · UNCERTAINTIES · RESILIENCE & ADAPTATION · SOCIO-ECONOMIC/GOVERNANCE

| HAZARD | RISK | VULNERABILITY & EXPOSURE |

COMMUNICATION

THE CHALLENGE OF LANGUAGE:
WHAT CONCEPTS DO YOU FIND HARD TO DEFINE OR PUT INTO PRACTICE?

RISK KNOWLEDGE

HOW IS RISK DATA BEING COLLECTED?
WHO MANAGES INFORMATION? LINK TO STAKEHOLDERS

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Directed Project

Funded by the European Union

Project: 101073978 - DIRECTED - HORIZON-CL3-2021-DRS-01

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Introducing identifying stakeholders

Stakeholder analysis is a powerful tool for understanding both the external and internal dynamics of a lab. Externally, such analysis helps identify who holds power and who is already active; it also helps identify which actors should be engaged. Internally, it supports reflection by revealing gaps in representation or capacity that may limit the lab's impact. Crucially, mapping should go beyond the current landscape to ask: Who is missing, and why? Ensuring a diversity of perspectives, *knowledge systems*, and areas of expertise is essential for creating meaningful and inclusive change. Diverse teams not only enrich understanding but also help raise and challenge unconscious biases that may be embedded in individual disciplines.

Stakeholder analysis can be carried out through workshops (some of which are suggested below), interviews, or desk research. Findings can then be recorded in a stakeholder map or a simple table. The table template included as a resource is designed to help you keep track of those you want to engage with, how you plan to connect with them, and the status of that engagement.

It's important that this stage is approached thoroughly and iteratively – ideally alongside the scoping phase. This helps ensure that a broad and inclusive range of voices shapes the lab's direction. When combined with *interdisciplinary* collaboration, a well-executed stakeholder analysis equips *transdisciplinary* labs to generate richer insights and effectively engage with the *complex systems* they aim to transform.

ENSURING A DIVERSITY OF PERSPECTIVES, KNOWLEDGE SYSTEMS, AND AREAS OF EXPERTISE IS ESSENTIAL FOR CREATING MEANINGFUL AND INCLUSIVE CHANGE.

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PHASE 1 FOUNDATION: IDENTIFYING STAKEHOLDERS

Identifying stakeholders: Goals

☑ Identify all relevant stakeholders. Include the following: those most impacted by the identified challenges, those who hold the power to impact the identified challenges, those who are working in that area, and those who hold expertise (lived experience, local knowledge, subject expertise).

☑ Create a strategy to connect stakeholders with your project

Identifying Stakeholders: Tandem guiding questions

☑ Who can provide climate (and non-climate) information? Which actors may be intermediaries or boundary partners to collaborate in the co-production process? (Note: potential partners may have been working in the region a long time, and may have strong relationships with stakeholders; this can enable better uptake and embedding of any processes.) [KB1] What expertise can they provide?

☑ Which organizations, institutions and departments provide relevant sectoral expertise and experience needed?

☑ What gaps in skills or expertise may need to be filled through additional partnerships?

☑ What are different stakeholders' (users, intermediaries and providers) roles and responsibilities in influencing or managing the adaptation challenge (and related issues) identified in the Scoping stage?

☑ Which groups are impacted on the ground (e.g., at the community level) and can provide representative voice(s)?

☑ Which (and whose) decisions and actions can influence the resilience of the system? Which actors are impacted by these issues, are vulnerable to them, or consider them important? What are the relationships between these actors?

☑ Which institutional actors are critical to engage in this process? Consider, for example, the local meteorological department; health services; national government; local government decision-makers and councillors; the private sector; and civil society.

☑ Can champions or change agents be identified in these organizations?

☑ For the different actors identified, what are most pertinent adaptation challenges to deal with first?

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PHASE 1 FOUNDATION: IDENTIFYING STAKEHOLDERS

Tandem stakeholder analysis canvas

A common way to identify stakeholders is by using a power-interest matrix (Mendelow, 1991). This helps map stakeholders based on how much influence they have over an issue and how much interest they have in it:

High power, high interest → Work closely with these stakeholders; involve them fully and encourage collaboration.

High power, low interest → Keep them satisfied and informed so they can be supportive when needed.

Low power, high interest → Keep them engaged and updated, as they are likely to be active participants.

Low power, low interest → Monitor them in case their influence or interest grows over time

Who is most impacted & holds the most interest? Who is most influential? Add them to the graph using different coloured sticky notes for each type of actor. Are there any large gaps? Who could fill them?

Consider:
- Which groups are impacted on the ground (e.g. at community level) and can provide representative voice(s)?
- Which organizations, institutions or departments provide the relevant sectoral expertise and experience needed?
- Which (and whose) decisions and actions can influence the resilience of the system? Which actors are impacted by these issues, are vulnerable to them, or consider them important? What are the relationships between these actors?

- Are there multiple decision-makers at different scales, for whom different climate information (and formats) would be required based on the different types of decisions they are making? What methods of engagement (and communication styles/formats) are needed to ensure that the differentiated groups of actors identified, are engaged? E.g., socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race, religion etc?
- What key knowledge systems exist? Which actors hold relevant knowledge? Are there actors we need to engage, who bring different perspectives of local or indigenous knowledge or encompass different characteristics related to socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race, religion etc? Are they willing and able to share this knowledge? If not, how can this be facilitated e.g. with the support of intermediaries or boundary partners?
- What local organizations and initiatives are already working on issues of climate resilience and related issues? Are there partnership opportunities?

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TANDEM STAKEHOLDER ANALYSIS CANVAS

Who is most impacted & holds the most interest? Who is most influential? Add them to the graph using different coloured sticky notes for each type of actor. Are there any large gaps? Who could fill them?

Consider:

- Which groups are impacted on the ground (e.g. at community level) and can provide representative voice(s)?
- Which organizations, institutions or departments provide the relevant sectoral expertise and experience needed?
- Which (and whose) decisions and actions can influence the resilience of the system? Which actors are impacted by these issues, are vulnerable to them, or consider them important? What are the relationships between these actors?
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- What key knowledge systems exist? Which actors hold relevant knowledge? Are there actors we need to engage, who bring different perspectives of local or indigenous knowledge or encompass different characteristics related to socio-economic status, institution, knowledge type, gender, ethnicity, age disability, race, religion etc? Are they willing and able to share this knowledge? If not, how can this be facilitated e.g. with the support of intermediaries or boundary partners?
- What local organizations and initiatives are already working on issues of climate resilience and related issues? Are there partnership opportunities?

INTEREST OF STAKEHOLDER

INFLUENCE OF STAKEHOLDER

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Net-Map exercise

Net-Map is an interview-based mapping tool that helps people understand, visualize, discuss, and improve situations in which many different actors influence outcomes. By creating influence network maps, individuals and groups can clarify their own view of a situation, foster discussion, and develop a strategic approach to their networking activities. More specifically, Net-Map helps players to determine:

1. **what actors are involved in a given network,**
2. **how they are linked,**
3. **how influential they are, and**
4. **what their goals are.**

Determining linkages, levels of influence, and goals allows users to be more strategic about how they act in these complex situations. It helps users to answer questions such as: Do you need to strengthen the links to an influential potential supporter (high influence, same goals)? Do you have to be aware of an influential actor who doesn't share your goals? Can increased networking help empower your dis-empowered beneficiaries?
This low-tech and low-cost tool can be used when working with rural community members with low levels of formal education, as well as with policy makers or international development actors.

Equipment needed:
- Large sheets of paper for network map (one per interview, at least A3, better A2).
- Felt pens for drawing links (different colours according to different links).
- Adhesive paper as actor cards (sticky notes, [KB1] possibly using different colours for different kinds of actors).
- Flat round stackable discs for building influence towers (e.g. checkers game pieces, bicycle spare parts).
- Actor figurines (different board game figures, optional but especially useful when working with illiterate interviewees).

Net-Map step-by-step manual: short version (555 KB), detailed version in English (248 KB) and Portuguese (852 KB)training slide show (876 K). Available linked.
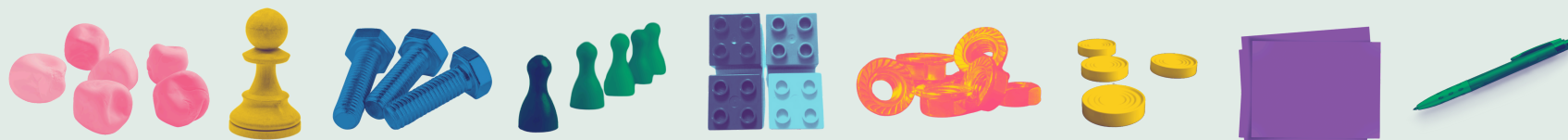
Net-Map exercise

01. Preparation
- Define question (e.g. "Who can influence the success of our project?").
- Define links (e.g. giving money, disturbing someone, giving support, giving command) and assign different colours to the links (i.e. giving money = red link).
- Define goals (e.g., environmental orientation, development orientation, or position towards a change of legislation).
- Decide who should be involved in interviews / discussions.

02. Actor selection
- Ask: "Who is involved in this process?"
- Write names on actor cards and distribute them on an empty Net-Map sheet.

03. Drawing of links
- Ask: "Who is linked to whom?" Go through the different kinds of links one by one (e.g. "Who gives money to whom? Who disturbs whom?").
- Draw arrows between actor cards according to interviewees' directions.
- If two actors exchange something (e.g. information) draw double headed arrows. If actors exchange more than one thing, add differently coloured arrow heads to existing links.

04. Goals
- Ask according to pre-defined goals, actor by actor, e.g. "Does this actor support environmental, developmental goals or both?"
- Note abbreviations for goals next to actor cards, allow for multiple goals where appropriate, by noting more than one goal next to the actor

05. Influence towers
- Ask: "How strongly can actors influence x or y?"
- Explain / agree on a definition of influence with your interviewee. Clarify that this is about influence on the world at large.
- Ask interviewees to assign influence towers to actors. The higher the influence on the issue at stake, the higher the tower. Towers of different actors can be of the same height. Actors with no influence can be put on ground level. Towers can be as high as interviewees want.
- Place influence towers next to actor cards.
- Verbalize set-up and give interviewee the chance to adjust towers before noting height of tower on the Net-Map (important for documentation purposes).

06. Discussion
- According to specific goal of your Net-Map exercise, discuss what this network means for strategy of organization, where influence comes from, what happens in case of conflicting goals

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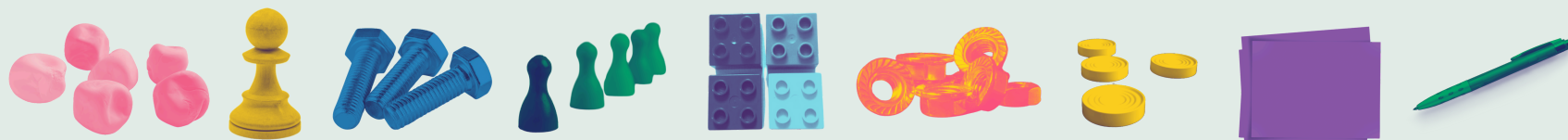
PHASE 1 FOUNDATION: IDENTIFYING STAKEHOLDERS

Stakeholder Excel

When stakeholders have been identified, a plan for engagement can be established. This is important to structure (and measure!) the process of outreach targeting potential collaborators, in efforts to maintain accountability and transparency during the process of establishing real world labs. In addition, partners from diverse sectors may have differing needs and expectations regarding communication; discussion of these issues may be needed to avoid disappointments and mishaps.

Organisation name	Mandate / objective	Focal point name	Contact information	Role	Engagement plan	Status of engagement	Sector	Decision making level	Interest	Power / influence	Additional information
					e.g. to be introduced by xxxx	e.g.introductory email sent	e.g. public services	e.g. regional	High / medium / low	High / medium / low	

PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Introducing aligning and trust building

Collaborations often bring together individuals from diverse backgrounds who may not have worked together before. Therefore, without strong relational foundations, consensus and progress can be difficult. Trust, mutual understanding, and participants' confidence in sharing their experiences are essential; yet these require time and deliberate effort to cultivate, particularly in remote settings.

The ability to navigate tensions, conflicts, and disagreements in collaborative settings is directly tied to relational skills. Without strong relationships, efforts to provide critical feedback or have difficult conversations can lead to negative consequences. The fallout from this can compromise designs, negatively affect team dynamics, and lead to frustration. Therefore, aligning and trust-building are essential foundations for any collaborative project, and it is important to allocate specific time for these activities. Fohér et al. (YEAR) emphasize that personal principles such as ethics, values, and beliefs play a critical role in shaping partnerships. Therefore, this stage involves fostering self-reflexivity to understand one's own assumptions and values, and collective reflexivity to deepen mutual understanding and strengthen relationships among participants.

Norström et al. (2020) highlight the importance of goal-oriented knowledge co-production, by which they mean processes that have clearly defined, meaningful goals that are shared by all participants and can drive efforts to address sustainability challenges. For participants to agree on specific goals, they must have a collective understanding of the problems at hand and reach agreement on measures of success. Such agreement fosters a sense of shared purpose.

Not everyone believes that unanimity is the goal. For example, an Australian Public Service Commission report has argued that, often, when there is a lack of a shared understanding in a problem, certain stakeholder groups may believe their view of the problem as the correct one – and that they alone should be able to define resolution (CITATION, YEAR).The report states that arriving at universal agreement is neither necessary nor feasible; instead it suggests that the aim should be to reach a shared understanding of the dimensions of the problem and an appreciation of the different perspectives that collectively contribute to a full understanding. From there, stakeholders can build a dialogue on a foundation of empathy and trust.

Again, recognition of power is crucial throughout this stage. The risk of extractive practices underscores the need to prioritize community ownership and ensure that credit, profit, and visibility remain with those most affected by and involved in the work (Costanza-Chock, 2020)

Bratteteig et al. (2012), outline four key aspects of projects that are influenced by power dynamics that are important for the lab to collectively discuss and align on:
→ Agenda control: what is discussed and who decides the themes
→ Participants: who is invited to participate
→ Scope: which solutions are possible and which problems are addressed
→ Resources: how much time is available and how much time can participants give

The tools in this module are designed to help participants collectively identify challenges and navigate differences with care. By building trust and agreeing on transparent ways of working from the outset, transdisciplinary labs can create a relational base that supports long-term collaboration and equity.

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PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Aligning and trust building: Goals

☑ Align as a lab on project goals

___

☑ Collectively define ways of working

___

☑ Highlight and discuss any potential conflicts or difficulties

Aligning and trust building: Tandem guiding questions

☑ What language is used by different actors to describe the same concepts e.g., related to *risk*, *vulnerability*, *resilience* etc.? Can less technical (or local) language be used? How do these terms translate into the day-to-day work of actors? Can a shared understanding of different terms and their usage be reached?

☑ What key knowledge systems exist? Which actors hold relevant knowledge? Which actors must be engaged to bring different perspectives? For example, who can contribute local or indigenous knowledge? Who can offer the perspective of those representing different socio-economic levels, institutions, knowledge types, genders, ethnicities, ages, disabilities, races, and religions? Are they willing and able to share this knowledge? If not, how can such knowledge be brought into the process? Can intermediaries or *boundary partners* provide needed support?

☑ How should interactions throughout the process be coordinated? How can these processes be mutually agreed upon by stakeholders? Is there a shared understanding? Is there joint ownership of these processes? How and when should all relevant actors identified from this process be engaged? Which actors are critical to engage with most deeply in the *co-exploration* and *co-production* processes? Which actors need to be engaged on a less regular basis? Are there key points in the processes when particular actors will be needed for their knowledge or expertise?

☑ Are there multiple decision-makers at different scales? Will different types and formats of climate information be required for these different types of decision-making? What methods of engagement (and communication styles/formats) are needed to ensure that the different participants are engaged? For example, are different engagement methods warranted for people offering insights from different socio-economic levels, institutions, knowledge types, genders, ethnicities, ages, disabilities, races, or religions?

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PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Co-exploring terminologies exercise

Approaches like word matching can be used to ensure that there is a shared understanding of meaning, and to highlight assumptions. This co-exploration exercise introduces *climate*, *adaptation*, *disaster risk reduction* and *development* concepts to workshop participants.

Participants discuss concepts with one another to identify key differences: 1) between *weather* and *climate*, and 2) between *development, adaptation, mitigation,* and *disaster risk reduction*. Participants receive a series of written statements/actions (such as, "Today it is raining"). They must then cooperatively decide to which concept the statement/action belongs.

The facilitator then explains the meaning of the different concepts and statements/actions. Using this new information, participants then rearrange the statements/actions linked to each concept accordingly, and they then discuss what they have learned.

Full guidance is available on weADAPT.

FRACTAL workshop, Windhoek Namibia, 2015

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PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Tandem aligning and trust building canvas

Take time to reflect and consolidate key points: the challenges, priority areas for the future, personal and professional expectations, and collective goals for the project. Work through each question adding sticky notes.

Then, using small stickers, dots or stars, participants can add their support for goals.

01. What do you think are the most important challenges for (add name of focus area) ....?

What are the barriers to generating change?

02. What is our vision for (add name of focus area) ....?

What are the priorities for a future (add name of focus area) ....?

03. What are your personal / professional goals and expectations?

Consider what you want to get out of this experience! Are there skills or capacities you want to develop? Are there connections you want to make? Are there organizations and communities you would like to introduce to the tandem *co-production* process?

03. What are the group's collective goals for this collaboration?

Consider participants' personal aims alongside the priorities for a collective future. What is this collaboration seeking to achieve?
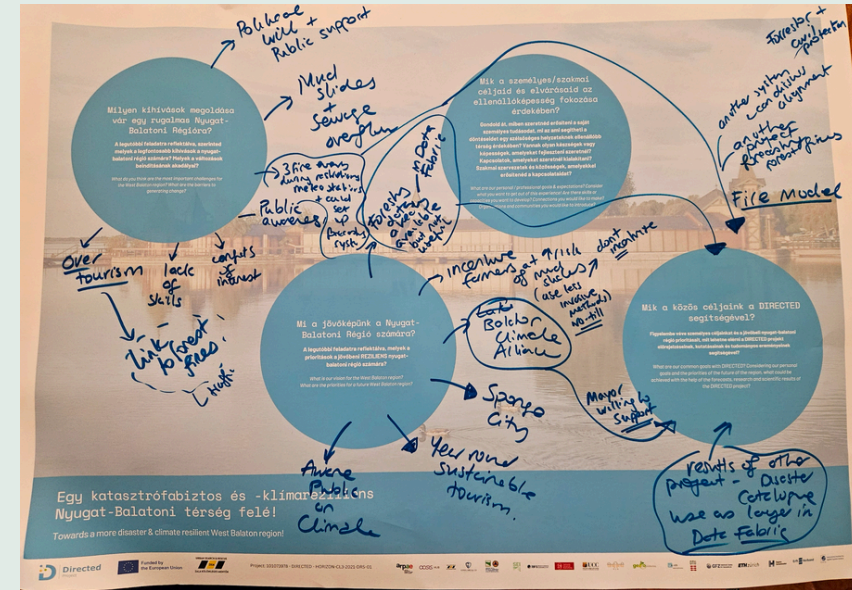
DIRECTED Zala real world lab workshop, 2025

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01
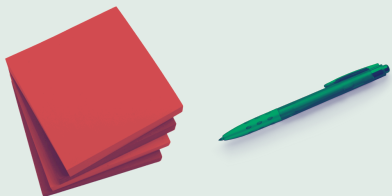
What do you think are the most important challenges for ....?

What are the barriers to generating change?

03

What are our personal / professional goals & expectations?

Consider what you want to get out of this experience! Are there skills or capacities you want to develop? Connections you would like to make? Organisations and communities you would like to introduce?

02

What's our vision for ....?

What are the priorities a future ....?

04

What are our collective goals for this collaboration?

Considering our personal aims alongside the priorities for a collective future, what do we want to achieve through the this collaboration?

TANDEM ALIGNING AND TRUST BUILDING

Take time to reflect and consolidate key points: the challenges, priority areas for the future, personal and professional expectations, and collective goals for the project. Work through each question adding sticky notes.

Then, using small stickers, dots or stars, participants can add their support for goals.

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55

PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Establishing ways of working together canvas

The value of this exercise is in the collective discussion generated. For each Tandem phase and component, discuss and mark the potential challenges (red flag) and the actions you will take to overcome these challenges (green flag).

Consider:
- What capacities may need to be developed?
- How will you explore finance models?
- Are there any additional barriers for stakeholder participation, such as childcare or language barriers?
- What will be your ways of working?
  - How should interactions throughout the process be coordinated?
  - How can these be mutually agreed upon among all stakeholders?
  - Is there a shared understanding and joint ownership of the process?
  - What language will be used? Can a shared understanding of different terms and their usage be reached?
- How will you develop partnerships?
  - How and when should relevant actors identified from this process be engaged?
  - Which actors are critical to engage with most deeply in the co-exploration and *co-production* processes? And which actors need to be engaged on a less regular basis?
  - Are there key points in the process where particular actors will be needed for their knowledge or expertise?

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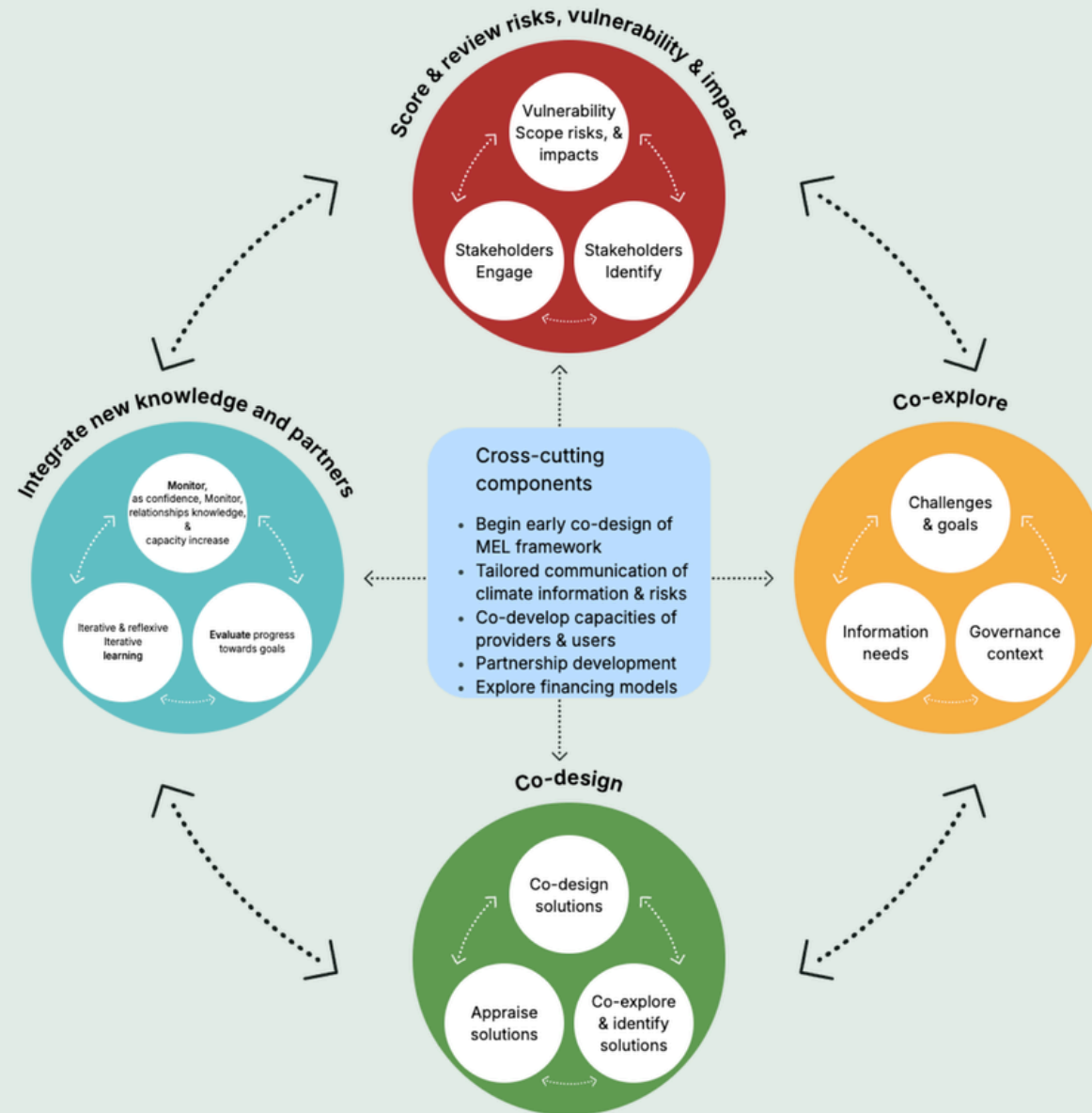FOUNDATION

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ESTABLISHING WAYS OF WORKING

The value of this exercise is in the collective discussion generated - For each tandem phase and component, discuss and mark the potential challenges (red flag) and the actions will you take to overcome these challenges (green flag).

Consider:
- What capacities may need developing?
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  - Are there key points in the process where particular actors will be needed for their knowledge or expertise?

Score & review risks, vulnerability & impact
- Vulnerability Scope risks, & impacts
- Stakeholders Engage
- Stakeholders Identify

Co-explore
- Challenges & goals
- Information needs
- Governance context

Cross-cutting components
- Begin early co-design of MEL framework
- Tailored communication of climate information & risks
- Co-develop capacities of providers & users
- Partnership development
- Explore financing models

Integrate new knowledge and partners
- Monitor, as confidence, Monitor, relationships knowledge, & capacity increase
- Iterative & reflexive Iterative learning
- Evaluate progress towards goals

Co-design
- Co-design solutions
- Appraise solutions
- Co-explore & identify solutions

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PHASE 1 FOUNDATION: ALIGNING AND TRUST BUILDING

Capacity and needs assessment canvas

This exercise should be done following the identification and prioritisation of key problem areas and the aligning activity. You can have a sheet per problem area and use a world cafe style set up to have participants rotate around problem area, or you can ask them to explore in small groups and feedback and discuss after.
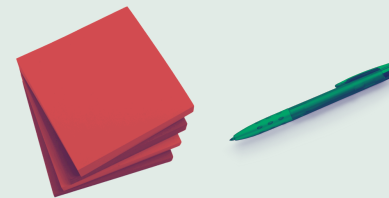
01. Identify capacities and needs

In small groups think for 1-2 mins about:

- Existing capacities within (add place) to address the problem identified. Consider:
  - models/data/tools
  - communication systems
  - coordination mechanisms/ partnerships
  - What types of expertise are involved in the collaboration?
- How is each type of expertise represented across the partner organisations?
- How does each type of expertise contribute to the project's objectives?
- What additional types of expertise would benefit the project?
- Needs from the project (i.e. gaps/ barriers that the project can address)
  - *interoperability*
  - access to models/data
  - improving coordination
  - building networks
  - knowledge exchange

02. Reflect and order capacities and needs

Place the sticky notes on the paper and position them based on the strength of the capacity and the priority of the needs.

03. Feedback and discuss

How will you address these needs? Are there some stakeholders that have high capacity in some areas and could therefore support the development of other needs?

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CAPACITIES & NEEDS ASSESSMENT

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Place the sticky notes on the paper and position them based on the strength of the capacity and the priority of the needs.

03 Feedback and discuss
How will you address these needs? Are there some stakeholders that have high capacity in some areas and could therefore support the development of other needs?

EXISTING CAPACITIES TO LEVERAGE

NEEDS FROM THE PROJECT
(GAPS TO ADDRESS)

STRONGER

WEAKER

HIGHER PRIORITY

LOWER PRIORITY

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Reflection and monitoring, evaluation and learning

Once the lab is set up and alignment among participants has been established, it is important to develop a shared understanding of how progress will be measured and evaluated. In a co-production process like Tandem, there are typically two key strands of monitoring, evaluation and learning (MEL) to consider.

The first focuses on the collaborative process itself: assessing whether the collaboration is meeting its goals, such as strengthening relationships, building capacity, and expanding networks. The second focuses on the outcomes of the work: evaluating whether the *co-designed interventions* developed through the process are achieving the intended impacts. Establishing a clear, collective approach to MEL early on supports ongoing learning and adaptation. This helps ensure that both the process and its outcomes remain meaningful and effective.

MEL for knowledge co-production and co-design processes

Before choosing tools to measure how well *co-production* is working, it is important to first agree on what success looks like. The very first step should be creating a shared understanding of what co-production means in your specific context. Once that is clear, you can then decide how to track progress and impact.

In the DIRECTED project, lab leaders started by discussing what kind of *co-production* made sense for their setting. These discussions were based on the five types of *co-production* identified by Bandola-Gill et al. (2023), who reviewed over 500 papers. The types are:

- Evidence for policymaking – using *co-production* to create knowledge that supports planning and decision-making.

- Boundary management – improving how existing knowledge is shared and used.
- Transdisciplinarity – bringing together people from different fields and sectors to work together.
- Knowledge democracy – rethinking who gets to create knowledge and why.
- Science and politics – exploring how science is shaped by political contexts and vice versa.

These types often overlap. For example, a lab might focus on producing evidence for policy, while also working across disciplines and questioning how knowledge is usually produced. While large projects might be able to take on several of these aims, smaller projects might only focus on one. What matters is being clear and honest about what your *co-production* process is trying to achieve and why.

After agreeing on the *scope* of *co-production*, the next step is to look at how the process is being done. Are the activities truly *co-productive*, or just *participatory*? To help with this, Norström et al. (2020) suggest four qualities of good co-production. These qualities are:

- Context based – focused on a specific issue and place
- *Pluralistic* – welcoming different types of knowledge and perspectives
- Goal-oriented – having clear, shared goals
- Interactive – encouraging active engagement and ongoing learning

Measuring whether a process meets these qualities requires using a mix of methods and regularly checking in with participants. It is also important to co-design the MEL approach with stakeholders from the beginning. What you

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measure – such as effectiveness, efficiency, or *impact* – should reflect the priorities of the people involved and the context.

In DIRECTED, a custom MEL approach was created to assess the quality of the co-production process. It combined the four principles above with Tandem's guiding questions. The goal was to understand how co-production activities were helping different groups – such as risk managers, planners, modellers, and volunteers – work better together in real-world labs.

The evaluation also looked at whether **co-production** improved understanding of *hazards* and *risks*; whether it helped include marginalized groups; whether it supported setting clear goals for risk governance and data use; and whether it challenged traditional, top-down ways of working.

Example: take a look at the needs assessment used in the DIRECTED project

The real-world labs of the DIRECTED project used consultations, interviews, and questionnaires to undertake capacity needs assessments. This approach was intended to strengthen the core skills and capacities identified within the labs for more effective co-production. At the end of this module, you will find the DIRECTED capacity needs assessment that was used to establish a *baseline* understanding of stakeholder needs and track progression over time.

MEL for outputs, outcomes and impact

It is also essential to assess the *impacts* of the *outputs* and *interventions* that emerge. This should be done using a *systems-thinking* lens. Using a three-way framing – *outputs, outcomes and impacts* – is a typical way to measure and evaluate work. In short, *outputs* are what you produce.

Outcomes are the changes that occurred because of your *outputs*. *Impact* is the long-term difference your work makes. However, *impacts* can vary based on the context. In DIRECTED, impacts have included improvements in risk *governance*, data access, collaboration, and trust. In climate adaptation, impacts might refer to long-term shifts in adaptive capacity. In sustainable development, impacts might be reducing poverty or improving access to water, sanitation or education.

Assessing impact goes beyond immediate outputs. Ethical, social, political, cultural, and environmental effects should also be considered. For example, while a dam may score well on flood control, it could harm ecosystems or displace vulnerable groups. Similarly, risk-governance tools must be examined carefully. Who is included? Who is exclude? What are the broader consequences of their use? Therefore, indicators must be context specific. The best *indicators* use a combination of *qualitative* and *quantitative* methods. These ethical dimensions are explored further in the *Co-design* and appraisal module.

Co-production is not static. It requires continuous learning and *reflexivity* (Bharwani et al., 2024). As new challenges arise or insights emerge, your theory of change and MEL approach should be revisited and adjusted. For example, if new stakeholders are identified as critical to achieving goals, they should be brought in, and the plan revised accordingly. Monitoring, evaluation and learning are not one-time tasks. They involve a process of reflection, learning, and improvement.

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Theory of change canvas

One useful approach is to collectively develop a theory of change. A theory of change outlines how specific activities are expected to lead to short-, medium-, and long-term changes. This helps identify indicators that can be used to track progress and impact. Although it may be challenging to define these indicators at the beginning (since co-production is inherently iterative), it is better to start with a flexible plan that can evolve as the process unfolds.

Steps to developing a theory of change:

1. **Define the long-term goal.**
   - Begin by identifying the ultimate *impact* or change you hope to achieve. This might include shifts in risk governance, increased community resilience, improved trust, or changes in climate adaptation practices.
2. **Understand the current context.**
   - Establish a shared understanding of the situation. What challenges exist? What is working? What needs to change? Answering these questions establishes your baseline.
3. **Map backwards to identify outcomes.**
   - Work backwards from the goal to define the key *outcomes* needed to reach it. *Outcomes* should reflect changes in knowledge, attitudes, behaviours, relationships, or systems.
4. **Identify outputs and activities.**
   - Next, identify the specific actions and *outputs* (e.g., tools, workshops, reports, partnerships) that will support these *outcomes*.
5. **Make assumptions explicit.**
   - Clearly state any assumptions about how and why these activities will lead to the desired outcomes. This increases transparency and helps guide MEL later on.

6. **Identify indicators of change.**
   - For each *outcome* and *impact*, define practical *indicators* that can show progress. These should be:
     - **Observable** – *Indicators* that can be documented, such as meeting attendance, the number of new collaborations, or visible changes in planning documents.
     - **Measurable** – *Indicators* that can make use of data and information from surveys, interviews, feedback forms, or before-and-after assessments.
     - **Meaningful** – *Indicators* that are relevant to the specific goals and values of the lab or community.
     - **Feasible** – *Indicators* that are simple enough to monitor with available time and resources.
   - Some *indicators* may be *qualitative* (e.g., improved trust, stronger relationships), while others may be *quantitative* (e.g., the number of stakeholders engaged, changes in literacy levels, access to services). A *mixed-methods approach* that blends stories, reflections and statistics often works best.

Add the principles that guide your collective work across the top of the canvas. Then map your theory of change.

- Considering your goals established through the Tandem aligning and trust building canvas, what impact would you like to see?
- What *outcomes* and *outputs* do you think will achieve these *impacts*?
- How will you measure the success of these *outputs*? What *indicators* will you use?

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Overarching principles

Add the principles that guide your collective work across the top:

2026 2027 2030 2050

THEORY OF CHANGE

Consider:

- Considering your goals from exercise X what impact would you like to see?
- What outcomes and outputs do you think will achieve these impacts?
- How will you measure the success of these outputs - what indicators will you look for?

OUTPUTS OUTCOMES IMPACTS INDICATORS

Directed Project

Funded by the European Union

Project: 101073978 - DIRECTED - HORIZON-CL3-2021-DRS-01

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Annex: DIRECTED Capacity needs assessment

Within the DIRECTED project, we based our capacity needs assessment on the knowledge co-production capacities and skills outlined in our forthcoming paper (Cumiskey et al., 2025). For each identified capacity or skill, we asked hosts to provide their: understanding of the concept; perspective on its value to their work; a self-assessment of their current capacity level; their anticipated capacity development needs; and an evaluation of the capacity development support provided by DIRECTED.

In addition to this initial assessment, we intend to implement a reflective component at the end of the project. Participants will be presented with their original survey responses and invited to reflect on these in light of the knowledge and capacities they have developed throughout the project. This approach acknowledges that personal and professional growth is often best recognized in retrospect, once learning has taken place.

The assessment includes a combination of short-answer and Likert scale questions (rated 1 to 5). To ensure clarity and consistency in interpretation, we provided descriptive anchors for each point on the scale. For example, in response to the question:

"To what extent do you consider knowledge co-production processes as valuable?", the scale was defined as:

1. Not valuable at all - I don't believe it is needed
2. Neutral - I am unsure about the value of co-design
3. Few benefits - I see its potential but have significant doubts
4. Quite valuable - I think it can be beneficial for my work
5. Extremely valuable - I believe it is essential and a highly effective mode of working

The basics

Adhering to GDPR rules, all survey responses are confidential. We collect specific identity details only to help understand the demographic we have reached. The data from this survey will be used for scientific purposes within the DIRECTED project. Please confirm the following statements:
- I consent to the processing of my anonymous data for research purposes
- I confirm that I am 18 years or older

Name | Job role/title | Sector (If other, please describe):

Transdisciplinary collaboration overview

- How would you describe "knowledge co-production" in a few words? (Short answer)
- What do you consider as the benefits of co-production to your work? (Short answer)
- To what extent have you collaborated with CCA practitioners before DIRECTED? (Scale 1- 5)
- To what extent have you done any co-production work before DIRECTED? (Scale 1- 5)
- What were your expectations regarding co-production before you started DIRECTED? (Scale 1- 5)
- To what extent do you consider knowledge co-production processes as valuable? (Scale 1-5)
- Please describe how DIRECTED has supported your capability to enable collaboration and knowledge co-production in your RWL? (Short answer)
- How has DIRECTED helped you in promoting collaboration between DRR/CCA? (Short answer)
- What have been the primary challenges to enabling collaboration and knowledge co-production in your RWL? (Short answer)

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Annex: DIRECTED Capacity needs assessment

Research skill

- Before DIRECTED, to what extent have you done research? (Scale 1-5)
- Please describe your past research experience/methods used in few words. (Short answer)
- To what extent do you consider qualitative methods valuable and/or useful to further understand your stakeholders' needs? (Interviews, surveys, etc). (Scale 1-5)
- Now, how would you rank your (Scale 1-5):
- ability to lead surveys, interviews or focus group discussions?
- skills to manage and collect data (transcripts, workshop outcomes, survey results)?
- ability to Monitor, Evaluate and Learn (from) the knowledge co-production process?
- To what degree has DIRECTED increased your skills in conducting research? (Scale 1-5)
- What further support or skills do you need for leading research in your RWL?

Facilitation skill

- Before DIRECTED, how would you rank your (Scale 1-5):
  - confidence to facilitate co-production workshops?
  - skills in facilitating creative/interactive methods?
- Now, how would you rank your (Scale 1-5):
  - confidence to facilitate co-production workshops?
  - ability to listen to participants?
  - ability to manage potential conflicts in RWLs?
  - ability to facilitate discussions?

- Before DIRECTED, how would you rank your (Scale 1-5):
  - confidence to facilitate co-production workshops?
  - skills in facilitating creative/interactive methods?
- Now, how would you rank your (Scale 1-5):
  - confidence to facilitate co-production workshops?
  - ability to listen to participants?
  - ability to manage potential conflicts in RWLs?
  - ability to facilitate discussions?

Design skill

- What does "design thinking" mean in your context/RWL?
- Before DIRECTED, to what extent have you used design processes and creative methods? (Scale 1-5)
- Please describe how you have used design processes and creative methods before DIRECTED (Short answer)
- To what extent do you consider (Scale 1-5):
  - design thinking helpful or valuable to your day to day work?
  - design processes and creative methods useful in your RWL context?
- Now, how would you rank your (Scale 1-5):
  - ability to design knowledge co-production processes?
  - skills in utilising design thinking in your day-to-day work?
- To what extent has DIRECTED increased your capacity in design thinking?

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Annex: DIRECTED Capacity needs assessment

Systems thinking capacity

- What does "systems thinking" mean in your context/RWL?
- Before DIRECTED, to what extent have you employed systems thinking in your work? (Scale 1-5)
- How would you rank your skills in utilising systems thinking in your day-to-day work? (Scale 1-5)
- To what extent do you consider systems thinking helpful or valuable to your day to day work?
- Now, how would you rank your (Scale 1-5):
- skills to understand complexity and interconnectedness between disaster risk and climate change?
- skills to communicate complexity with risks and climate change?
- skills in conducting risk assessments that integrate risk reduction and climate change adaptation, or consider cascading impacts?
- skills in developing/using risk scenarios in workshops?
- To what extent has DIRECTED increased your skills in systems thinking (for example, in terms of seeing connections between disciplines, risks and climate change)?
- What support/tools or ideas do you need to further promote systems thinking in your RWLs? For example, in terms of understanding cascading impacts, uncertainty, or the integration of climate change considerations into risk management?
- Is there further support you may need to further promote the integration of climate change considerations into your current risk management approaches?

Reflexive capacity

- Now, how would you rank your (Scale 1-5):
  - ability to build trust and relationships between stakeholders?
  - ability to create open and safe spaces for stakeholder discussions?
  - ability to Monitor, Evaluate and Learn (from) the knowledge co-production process?
- To what extent has DIRECTED increased your capacity to build relationships?
- What knowledge or skills would help you in identifying opportunities for promoting collaboration between DRM/DRR/CCA actors, or between modellers and stakeholders?

Collaborative capacity

- In your opinion, what are the key skills or attributes required for reflective capacity? (e.g. Critical Thinking, Self-awareness, Empathy, Open-mindedness, etc.) (Short answer)
- How often do you engage in reflection about your work, decisions, or actions? (Scale 1-5)
- How valuable do you think reflective capacity is in your professional or personal life? (Scale 1-5)
- How confident are you in your ability to critically reflect on your own actions, assumptions, and decisions? (Scale 1-5):
- In what contexts do you find it most challenging to be reflexive? (e.g Under time pressure, In group settings, During crises, Other) (Short answer)
- To what extent has DIRECTED increased your reflexive capacity? (Scale 1-5)
- Do you feel you have sufficient tools or frameworks to support reflective practices? If yes, which resources have helped you? If no, what additional resources would be helpful?

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Annex: DIRECTED Capacity needs assessment

Creative capacity

- In your opinion, what are the key skills or attributes required for creative capacity? (e.g: Imagination, Problem-solving, Open-mindedness, Experimentation, Other) (Short answer)
- How often do you engage in creative thinking or problem-solving in your personal or professional life? (Scale 1-5)
- How valuable do you think creative capacity is in your professional or personal life? (Scale 1-5)
- How confident are you in your ability to generate innovative ideas or approaches? (Scale 1-5)
- What do you see as the biggest barriers to expressing or developing your creativity? (E.g: Lack of time, Rigid processes, Fear of failure, Lack of support, Other) (Short answer)
- What practices or activities do you use to nurture your creativity? (E.g: Brainstorming, Journaling, Mind-mapping, Creative hobbies, Other) (Short answer)
- To what extent has DIRECTED increased your creative capacity? (Scale 1-5)
- Do you feel you have sufficient tools or frameworks to support creative practices? If yes, which resources have helped you? If no, what additional resources would be helpful? (Short answer)

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Challenges & goals

Information needs

Governance context

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PHASE 2 CO-EXPLORE: INTRODUCTION

Introducing phase 2 of Tandem: co-exploring "What is?"

This module builds on the foundations laid out in Phase One. It guides you through Phase Two of the Tandem Framework: co-exploring "What is?" It is structured into sections that introduce different research methods to help you dig deeper into the current and historical context of your *wicked problem*. Through this phase, you will co-explore the present situation, make sense of your research findings, and begin to place those insights within a broader *systems view*. This process helps you identify potential areas for *intervention*. The goals for this section, and the Tandem guiding questions, are grouped together as the information needs, *governance* context and challenges and goals. They should be explored collectively, recognizing their interrelation.

The approach dovetails with the concept that "the more complex the conceptualisation of the system that produces the problem, the sharper the sense of purpose or of what needs to be done" (p.47, Escobar, 2012). In other words, a deep, systemic understanding is needed about the answer to the question of "What is?" before one can meaningfully imagine and answer the question, "What if?"

These elements are part of an ongoing learning cycle that is the subject of this module. Each section of the module includes clear goals, guiding questions, practical tools, and facilitation tips to support thoughtful planning and implementation.

Capacity Development

Collaborative and creative capacity
Use to design and facilitate ongoing relationship-building engagements, recognising that relationships are not only built - they must be maintained. Draw on creative approaches to develop research processes that enable inclusion and embrace multiple forms of knowledge.

Systems thinking
Draw on to deepen your understanding of the context surrounding the challenges identified in the scoping phase, recognising their interconnections and how they influence one another.

Reflexive capacity
Use to remain open to new lines of enquiry - continually questioning whether you're asking the right questions and whether the right people are in the room to explore them.

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Co-explore: Goals

- ☑ Understand the key challenges and goals of the lab

- ☑ Understand the connections between the ecological risks, daily practices, ways of working, policy landscape and mindsets and behaviours that underpin these

- ☑ Identify any existing actions and plans in place

- ☑ Identify any gaps in knowledge

- ☑ Identify any relevant decision areas

- ☑ Identify and scope points of interventions

Co-explore: Tandem guiding questions

Structural

- ☑ Are there institutional- or policy-relevant "windows of opportunity" such as the potential to embed the climate service in legislative frameworks that can support its longterm sustainability?

- ☑ In the policy, planning and implementation landscape, what plans, projects and policies are in place or in the pipeline to address the adaptation issue(s) and climate impacts? Are these considered sufficient or is further work required to strengthen or broaden policies, projects or implementation?
  - How have such responses been funded and what opportunities exist for funding future projects? Is there a business case for action?

- ☑ What are the potential institutional and governance arrangements for the institutionalization of the climate service?

- ☑ Are there other knowledge systems that need to be considered and included in the design of the climate service e.g. research and practice-based knowledge, and indigenous knowledge? How can these be integrated or aligned?

- ☑ What decisions (e.g. at the policy, institutional or individual level) address the adaptation challenge and may benefit from a climate service or better climate information? How are these decisions made currently?

- ☑ What current and projected climate impacts interact with or exacerbate the adaptation challenge (or may do so in future)?

Mindset

- ☑ What is the urgency and magnitude of the adaptation challenge? Does public perception of the challenge and related issues provide an opportunity for action or do other trigger points exist?

- ☑ How can the value of the climate service be effectively communicated to higher level decision-makers, e.g. the economic and/or social benefits deriving from the use of the climate service?

- ☑ Are they considered credible and trusted by different actors and how are they used? If they are not trusted sources, why is this? How could trust be improved?

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PHASE 2 CO-EXPLORE: INTRODUCTION

The everyday

☑ Which actors are responsible for the production, dissemination and management of climate data and information? Which actors require such information in what format? Which actor(s) could be responsible for administering the climate service or coordinating the necessary

☑ information sharing and packaging? Is there willingness and opportunity for partnership building, collaboration and coordination between these actors?

Are there practical constraints to developing a climate service (e.g. time, budget, cultural, human and financial capacities)? How does this affect the aim of the climate service? How can these constraints be best addressed?How is the strategy to operationalise and institutionalize the climate service implemented? Which are the key actors with defined roles and responsibilities to take forward the strategy? Are there any capacity gaps that need addressing for this to occur?

Is there any difference in representation (e.g., of men and women, other social identities or knowledge types) in their ability to influence the decision-making process?

Has climate information (scientific or local/ traditional/indigenous) already been factored into climatesensitive decisions either at individual decision-making or policy making levels? If so, which decisions, how, when and by whom?

Were there any limitations in the use/application of this information in these decisions? If so, what were they? Has other non-climate evidence been factored into these decisions?

☑ What existing weather or climate information is available from local providers e.g. meteorological departments, NHMS, private companies or research institutes? Are there any opportunities that can be identified to build on or adapt these existing services to address information needs? In addition to data availability, discussions about data access and sharing are important to uncover to assess opportunities for sharing data more widely or in different, innovative and more accessible ways

☑ What existing data and information is available, and are these trusted sources? Which actors hold this data and information?

☑ What are the limitations of currently available climate information? If no relevant climate information can be provided to date, are there non-climate services-related efforts with overlapping interests which could be explored/applied to partly address these concerns?

☑ Are there existing climate-related services (including environmental and meteorological monitoring services, early warning systems, indigenous or traditional forecasting measures) that have been used to reduce10. Are there existing climate-related services (including environmental and meteorological monitoring services, early warning systems, indigenous or traditional forecasting measures) that have been used to reduce
  - What are the shortcomings/gaps and benefits of these services for decision-makers? What actions have been informed by these services?

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PHASE 2 CO-EXPLORE: INTRODUCTION

The everyday

☑ What institutions have responsibility or mandates for the issues being discussed and for data production and sharing?

☑ How do adaptation solutions affect different stakeholder interests? Are there any synergies/mutual benefits and/or conflicts with other goals and policies?

☑ What planning tools or impact models are used and what are appropriate formats of climate information that could best be integrated or considered alongside such climate services?
  - Are there related capacity needs to interpret model outputs? E.g., due to a lack of suitable tools or limited technical expertise

☑ What other (non-climate) drivers of change, related to social vulnerability and socio-economic development trends, interact with or exacerbate the adaptation challenge (or may do so in future)?

Experimental

☑ What local research related to the adaptation challenges has been undertaken? E.g. to better understand climate impacts at the local scale or in relevant sectors?

☑ Is there adequate training and capacity development on these services? Is this too technical or specialist or not tailored enough to the local context? ±Capacity development

☑ Can examples from other cities or contexts help to spur possible adaptation measures?

☑ What existing solutions and recommendations can be identified? These may be the design and delivery of particular outputs, projects, policies, the strengthening of capacities through particular training or support, innovations in data sharing or the development of new partnerships or increased collaboration between institutions. Are these at appropriate temporal and spatial scales to address the adaptation issue(s) identified?

☑ How do adaptation solutions affect different stakeholder interests? Are there any synergies/mutual benefits and/or conflicts with other goals and policies?

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PHASE 2 CO-EXPLORE: CO-EXPLORING WHAT IS?

Choosing research and design methods

You may wish to begin your exploration with desk research, but to gain a deeper understanding of how people experience the problem – and the positive actions already underway – interviews, focus groups, and workshops with a range of stakeholders are essential.

Remember, your values and the values of your stakeholders will shape how you select and apply methods. Values influence how designers interpret and respond to ethical questions, how they support dialogue among participants, and how design ideas evolve throughout the process (Iversen et al., 2012). Designers rely on their judgment to navigate value tensions and use tools that encourage reflection and negotiation. In turn, the values that emerge help guide future method choices. It's important to critically consider why a method is chosen and how it supports value-led design.

Generative methods, such as co-creation activities and collective making, are key to co-design. These creative, often playful approaches help people explore complex issues together (Sanders & Stappers, 2012; Langley et al., 2018). They make abstract or overwhelming problems more tangible and accessible. Examples include *storytelling*, *prototyping*, and *visualization*. Playful methods can boost engagement (Iversen et al., 2012), while things like paper *prototyping* can build empathy and understanding (Lee & Park, 2021). *Co-design* also helps to flatten power differences by encouraging people to take turns, and share ownership of the process (Ferne, 2020; Tierney et al., 2021). These approaches lead to better design outcomes, but, importantly, they also make participation more meaningful and enjoyable (Davis et al., 2023).

DIRECTED GA workshop, 2023

PHASE 2 CO-EXPLORE: CO-EXPLORING WHAT IS?

Focus groups

Focus group discussions are a flexible method for gathering rich, in-depth insights. They can be embedded within workshops or run separately to explore specific topics. Such group discussions are used to explore participants' perspectives, experiences, and ideas. They are especially useful for understanding diverse viewpoints and generating new knowledge. Unlike structured interviews, focus group discussions encourage open, dynamic exchange. There are two main styles:

Structured focus group discussions follow a set script and resemble interviews. They are useful for gathering specific data, but less suited for creative discussion.

Non-structured or semi-structured focus group discussions are more flexible and allow deeper exploration. These are better for co-production and are recommended for real world labs. Non-structured focus group discussions are traditionally organized with the "fishbowl" method, with chairs are arranged in a circle and people openly facing one another when responding to prompts and conversing. Researchers are placed among them in a non-hierarchical manner, as observers and participants.

It is possible to undertake activities to help facilitate and enable discussion, including:

- **Free listing** – asking participants to list and share things/opinions of a given topic
- **Comparisons** – asking participants to discuss the pros and cons of a suggested approach
- **Ranking/sorting** – giving the group a set of pictures / topics / terms / opinions and asking them to sort the items based on pre-selected criteria such as importance or category

- **Serious play** – using tools such as Legos, for example, to communicate information about engineering projects or to build a model of something under discussion to convey complex information
- **Energizer activities** – these are quick, engaging exercises used to boost energy levels in a group setting. Often employed at the start of workshops to set a positive tone, they can also be introduced at any point when the atmosphere feels sluggish. Examples include asking participants to stand up and stretch, do a quick shake-out, or play a fast-paced game like rock, paper, scissors to refresh focus and engagement.

Tips:
- Start by clarifying your goal. What do you want to learn? Prepare three to five guiding questions and possible follow-up prompts. Share a simple one-pager with participants outlining the purpose and topics.
- Use laptops with transcription software (e.g., MS Teams), plus extra microphones if needed. Store data securely in a pre-determined place, outlined in consent forms.
- Supplement recordings with photos of flipcharts and observation notes.
- After the formal discussion, share and validate findings with participants to ensure accuracy.

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PHASE 2 CO-EXPLORE: CO-EXPLORING WHAT IS?

Surveys

Surveys can be helpful to collect data from many different individuals at a single point in time to gain a snapshot or overview, or from the same individuals several times over an extended period to understand changes. Surveys typically have two main forms of questions: open-ended and closed-ended. Many surveys use a combination of both.

Closed-ended questions have a predetermined set of answers to choose from. This can be a binary answer (yes/no or agree/disagree), a scale (strongly agree to strongly disagree), a list of options asking for a single answer (age categories), or a list of options asking multiple answers possible (interests). Closed-ended questions are best for *quantitative* research. They provide numerical data that can be statistically analysed to find patterns, trends, and correlations.

Open-ended questions are best for *qualitative* research. Open-ended question have no predetermined answers to choose from. Instead, they give people an opportunity to write or draw responses that they generate.

When planning your survey it is important to consider:

- Wording: It is important to consider the wording of the question to make sure that it is clear, that it cannot be misinterpreted, and that it is not a leading in nature (seeking a predetermined answer).

- Order: It is also important to consider the flow of the questions. The question order can affect the responses participants give. It is often better to start with simple questions and end with more complex, sensitive, or controversial questions.

- Distribution – It is important to consider not only who you are asking to take your survey but how and when surveys will be conducted. Many surveys are now undertaken online, but this may impact who is able to participate. Consider paper surveys handed to your participants or in public spaces like libraries. Additionally, handing out surveys in workplaces or at the end of workshops may increase response rates.

Interviews

Interviews are a great way for researchers to build rapport with participants and tap in-depth insights from stakeholders. Interviews can be treated as purposeful conversations that explore the views, experiences, beliefs and/or motivations of individuals on specific matters.

There are three types of interviews:

- **Structured** interviews use a pre-determined list of questions that are asked in a specific order.
- **Semi-structured** interviews follow a general framework with a set of core questions, but allow for flexibility to explore responses in more detail.
- **Unstructured** interviews are more conversational and exploratory, allowing the interviewer to follow the interviewee's lead and to explore emerging themes.

Interview questions do not have to rely solely on conversation. Asking participants to draw, write, or engage in a creative activity can help them express themselves in different ways. These techniques often make people feel more comfortable and can lead to richer, more revealing discussions.

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PHASE 2 CO-EXPLORE: CO-EXPLORING WHAT IS?

Workshops

A workshop is a structured and interactive session, typically involving hands-on activities, group discussions, simulations, and collaborative exercises. In the facilitation chapter we covered a lot of considerations for planning and facilitating a workshop (including processes, room set up, and documentation).

Workshops can take many forms. Often the most impactful ones are those that break away from the conventional. Incorporating creativity into your workshop design can help participants feel more at ease, foster engagement, and ensure they leave with a sense of value and contribution.

It is a great idea to incorporate an ice breaker activity into the start of any workshop, these are a specific type of energizer activity, designed to help participants get to know one another and ease into group interaction. A nice example is 'participant bingo', where each person is given a bingo card with various actions or interests listed. Participants then mingle to find others who match those criteria, encouraging conversation and relationship-building.

In the DIRECTED project, we took a more creative approach to icebreaking. Participants were provided with a variety of materials, such as modelling clay and pipe cleaners, and posed a thought-provoking question to explore in teams. Each pair then used the materials to construct a creative response, sharing their interpretation with the wider group. This activity not only broke the ice but also encouraged playful collaboration and deeper engagement with the theme.

Additionally, integrating serious games or tabletop exercises can create structured opportunities for engagement and dialogue. Tools like "reflection chance cards" can prompt thoughtful reflection, while "veto tokens" can help formalize disagreements. This can turn potential conflict into a constructive part of the process, rather than something personal.

Remember, each workshop should conclude with a moment of reflection and evaluation. Re-visit the facilitation section to remind yourself of different evaluation options.

Here are some great resources to explore different workshop techniques:
- Arts-based methods for transformative engagement: a toolkit. (Pearson et al., 2018)
- Rapid games designing (rapidgamesdesign.info, 2020)
- Games for a new climate (Red Cross Red Crescent Climate Centre, n.d.)

Cultural probes

Cultural probes are open-ended activities, prompts, questions and instructions for recording thoughts and feelings; such probes are given to a group of participants to learn more about their daily lives and environment. They are a great *qualitative* research tool and can be used when participants cannot make it to workshops, or when a workshop is not suitable for the insights you would like to solicit. Common cultural probes include diaries, maps, games, a disposable camera or photo album and media diary. This article is a good example of how a cultural probe could be used.

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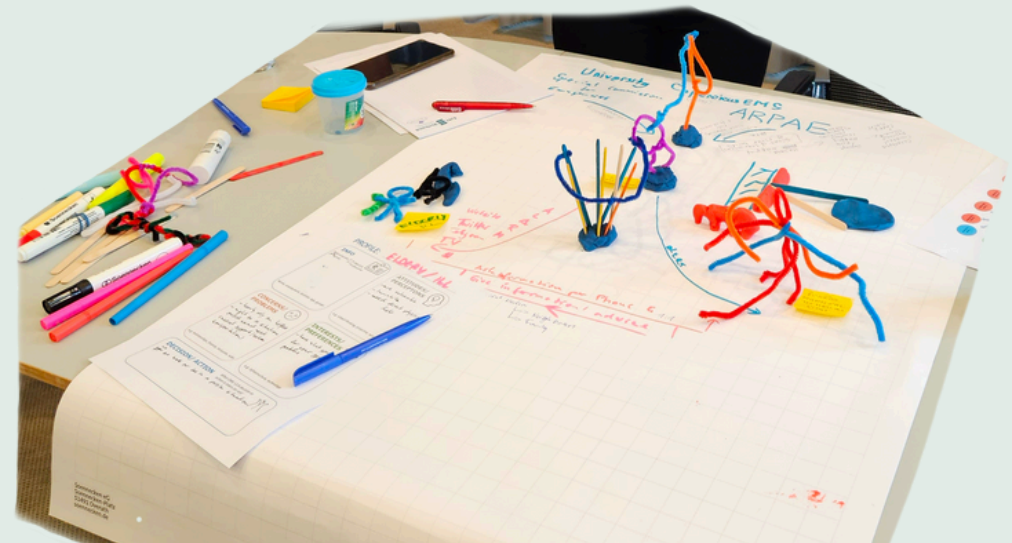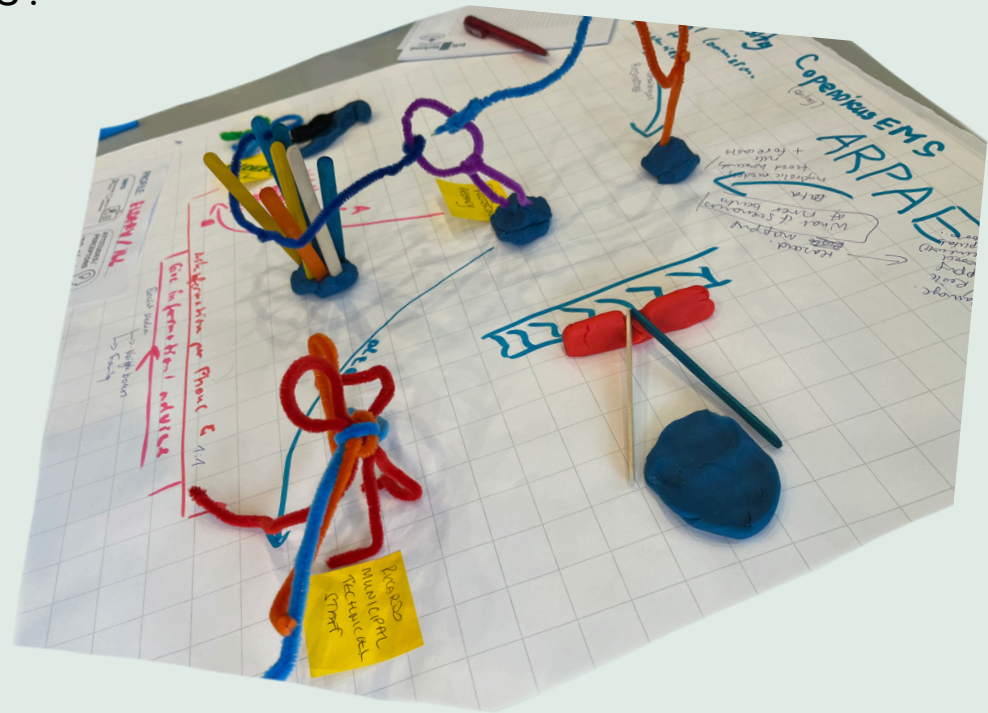
Co-exploring stakeholders exercise

This exercise is designed to help you look more deeply at the different actors you identified in the scoping phase. The exercise, which involves completing a card for each stakeholder, encourages you to think beyond information such as employment and location, and to consider participants' mindset, concerns, interests and actions.

Optional task:
Invite participants to use play-based creative materials (e.g., Play-Doh or modelling clay), lollypop sticks, pipe cleaners, paper and pens) to create your stakeholders and their contextual elements (e.g. home, river, wheelchair) to share their personal stories.

Completing this tactile and playful activity can help visualize the stakeholder concerns, needs and related actions, and highlight the diversity of stakeholders involved.

The following activities in this phase explores *storytelling* as a sense making approach. Once you have completed these cards, *storytelling* can be a great technique to think more deeply about each stakeholder's experience and mindset.

DIRECTED GA workshop, 2023

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CO-EXPLORING STAKEHOLDERS

This exercise is designed to help you look more deeply at the different actors you identified in the scoping phase. By completing a card for each stakeholder we encourage you to think beyond practicalities of information like employment or location but to consider their mindset, concerns, interests and actions.

Optional task:
Create 3D versions of your stakeholders to encourage deeper thinking about their story surrounding the specific challenge.

To do so, participants are invited to use play-based creative materials e.g. Play-Doh (or modelling clay), lollypop sticks, pipe cleaners, paper and pens. Additional contextual elements can also be created to share their story e.g. home, river, wheelchair.

Completing this tactile and playful activity can help visualize the stakeholder concerns, needs and related actions, while highlighting the diversity of stakeholders involved.

(INSERT ACTIOR NAME)

INFO
EMPLOYMENT, LOCATION, AGE, ANY OTHER RELIVENT PERSONAL DETAILS

MINDSET
ATTITUDE, PERCEPTIONS, E.G. SILOED THINKING, PROACTIVE, WORLD VIEW

CONCERNS
PROBLEMS, E.G. RELATIONSHIPS, FINANCE, INCLUSION, RULES

INTERESTS
PREFERENCES, E.G. INFRASTRUCTURE, COMMUNITY, TECHNOLOGY

DECISIONS / ACTION
WHAT DECISIONS OR ACTIONS DO THEY SUPPORT? WHAT DECISIONS OR ACTIONS DO THEY HAVE INFLUENCE OVER?

(The above stakeholder card template is repeated across six cards on the page, each containing INFO, MINDSET, CONCERNS, INTERESTS, and DECISIONS / ACTION sections with identical descriptive text.)

⊗ DOWNLOAD CANVAS
⊗ OPEN IN MIRO

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PHASE 2 CO-EXPLORE: DISTILLING DATA

Introduction to distilling data

Once you have collected all your data, the next step is to extract meaningful findings and insights. There are six main approaches to qualitative analysis:

- *Content analysis*
- *Thematic analysis*
- *Grounded theory*
- *Discourse analysis*
- *Narrative analysis*
- *Conversation analysis*

For many projects, content analysis and thematic analysis are the most relevant and practical. This guide on *qualitative* research analysis provides a deeper look at each method.

Content analysis

Content analysis is particularly effective for examining interview or focus group transcripts, as well as documents, texts, and even images. It allows you to identify recurring patterns, themes, and concepts within the material – primarily through coding.

There are two main types of coding:

- **Inductive coding:** Codes emerge as you review the data. This is typically best for the initial round of analysis.
- **Deductive coding:** You begin with a predetermined set of codes. This method is ideal for follow-up or more structured rounds of analysis.

A common starting point is to establish a framework of high-level codes: broad categories that align with your research questions. For example, in the DIRECTED project, we coded interview transcripts using overarching themes such as challenges, goals, and ideas. These were then broken down into sub-codes that grouped related responses. Once coded, the data can be quantified to assess the frequency of different themes.

Thematic analysis

Thematic analysis often builds upon content analysis but can also stand alone as a more exploratory approach. Rather than starting with a rigid coding framework, themes may develop organically, arising from the data. This method focuses less on frequency and more on interpreting meaning and context.

A useful technique in *thematic analysis* is clustering, particularly when working with sticky notes or digital boards like Miro. By grouping related ideas through repeated iterations, patterns and themes naturally emerge. This process helps uncover deeper insights and a richer understanding of your data.

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PHASE 2 CO-EXPLORE: SENSEMAKING

Introduction to sensemaking

The next step is to make sense of your material. This part of the module focuses on how we can use *systems mapping* and stories to better understand the *complexity* of a given problem.

When tackling complex issues, there is always a risk of creating solutions that are too simple - and that can sometimes make the problem worse (Wallace, 2021). This is especially true when dealing with wicked problems because challenges are constantly evolving, hard to define, and difficult to solve (Rittel & Webber, 1973). These problems often involve hidden tensions, *paradoxes*, and deep *uncertainty*.

To address them effectively requires looking at the bigger picture. That means understanding how the problem fits into the wider system and where small, strategic changes might make the biggest difference. Generative and reflective mapping processes are key tools in this kind of systemic sensemaking and co-exploration of "What is?"

Why are wicked problems so WICKED?

Horn and Webber (2007) outline several reasons wicked problems are difficult to address:

- There is no single "correct" way to see the problem.

- People may have conflicting views, and they may propose contradictory solutions.

- Problems are often linked to other problems.

- Data might be incomplete or unclear.

- There are many value conflicts.

- Cultural, political, and economic constraints get in the way.

- Logic doesn't always apply.

- Different types of reasoning may be needed.

- There are many possible *intervention* points.

- Consequences are hard to predict.

- There are high levels of uncertainty and ambiguity.

- Resistance to change is common.

- Problem-solvers may be removed from the people and places affected.

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PHASE 2 CO-EXPLORE: SENSE MAKING

How can storytelling help?

Storytelling is a great sense making technique and way to communicate complexity. It allows for the construction of narratives that contextualize data in meanings, values, and perspectives, ultimately leading to a richer understanding of the research topic. Shared stories can also facilitate a sense of collective understanding, allowing participants to see how their different perspectives converge or diverge. Often *storytelling* is a great tool to use alongside a visualization, such as a *systems map*. Together they can provide a richer understanding of the data.

What is systems mapping and how can it help?

Systems mapping is a way to make sense of the messy reality of *complex problems* by visually mapping out key relationships and dynamics. It helps us understand not just the parts of a *system*, but how they interact to produce certain outcomes. In this way, a *systems map* acts like a living *hypothesis*: a working idea of where and how to intervene in order to create meaningful change. One of the most valuable insights that *systems mapping* offers is the identification of *leverage points.* These are places in the system where small, well-targeted actions can lead to significant and lasting improvements.

A *systems map* reflects our shared understanding of how a system works. It shows how *inputs, outputs, outcomes,* issues, trends, drivers, and actors interconnect. The type of map you choose will depend on your goals and the questions you're trying to answer.

It is important to strike a balance between capturing complexity and keeping the map usable. And, remember, it is a living map. That is, the map is not intended to be perfect or final. It will shift and evolve as you continue to explore and learn.

Uncertainty is a core feature of *complex systems,* especially when unexpected events or *feedback loops* occur. This is something to keep in mind when exploring "What is?" Today's challenges, such as *climate change* and *disaster risk*, are large, interconnected and complex that it is nearly impossible to fully predict their effects.

This is why a *systems perspective* is essential. Such an approach by its nature works across disciplines and includes a wide range of voices.

After any sense making exercise it is helpful to digitalize the outcome and allow participants access for a set period of time to allow for amendments and reflections. Additionally, it can be helpful to tidy up the recorded system map used for sensemaking and to revisit it with the lab for a sense checking exercise.

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PHASE 2 CO-EXPLORE: SENSE MAKING

Multi-layer perspective mapping

A multi-layer perspective canvas offers a framework for visualizing the interconnected layers of a problem space, enabling designers to adopt holistic approaches. Wallace has adapted the multi-layer perspective canvases, drawing on Geels' (2002, 2010, 2011, 2018) foundational work and its extensions in system innovation and transitions by Ceschin and Gaziulusoy (2016). This adaptation is further informed by Transition Design perspectives from Irwin (2015, 2018), Kossoff (2011), and others (Irwin et al., 2015; Kossoff et al., 2015).

Wallace's canvas is a practical tool for articulating problems and identifying *leverage points* by visualizing the systems in which these *wicked problems* are embedded. Wallace (2021) explains that "engaging with plurality [this method] reveals how complex design approaches can use multiple *leverage points*." These *leverage point*s, interconnected across *systemic levels,* generate "constellations of activity" or "solution ecosystems" (Eggers and Muoio, 2015), incorporating both strategic and tactical approaches to problem-solving.

In practice, Wallace has applied this canvas to guide problem analysis and shape action pathways in diverse design projects. By situating problems within their ecological contexts, the canvas helps uncover points of influence across system levels, enabling designers to target practices and cultural frames as effective *leverage points*. This *systemic lens* not only clarifies the complexity of *wicked problems* but also facilitates actionable interventions that address root causes and ripple effects.

The canvas is made up of five levels. These levels can be used on different canvases to analyse the problem evolution, understand the ecosystem, identify *leverage points*, and map *transition pathways*.

The five levels are:

Ecology –Global factors impacting on or impacted by activity across other levels. This can include extreme events, change in climate, viral outbreaks, or wars.

Landscape – The wider landscape that is deeply structured and underpinned by politics and economics. Usually slow moving but crisis, e.g. war, can prompt rapid change.

Mentalité – The things we believe, think and feel that underpin our ways of being and societal norms and rules.

Regime –Societies rules and norms, daily practices, behaviours, routines, ways of working and being! This includes formal and informal aspects of organisations and everyday life.

Niche – The part of the system where grassroots work is happening. Experimental activity and innovations that challenge the norma are incubated here.

Using these five levels Wallace et al. (2024) further developed different canvases to aid a problem contextualization (Problem Evolution Canvas), understand and identify points for action (Action Ecosystem Canvas), and generate solution ecosystems ("How Might We…" Canvas). The final use is for mapping *transition pathways* (Transition Pathways Canvas) which we explore further in the next module.

These following methods have been taken from the University Arts London Climate Systems Mapping Facilitation Guide (Wallace et al., 2024).
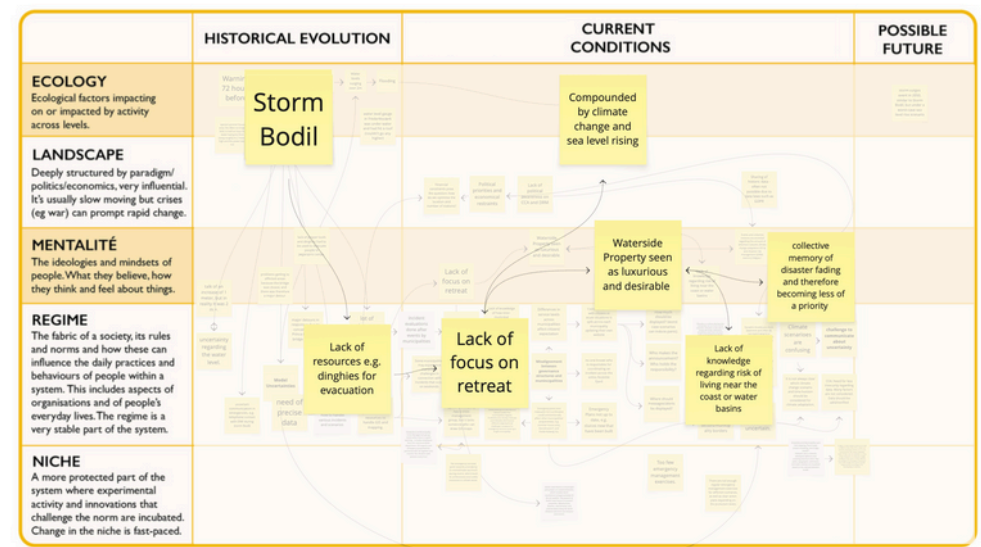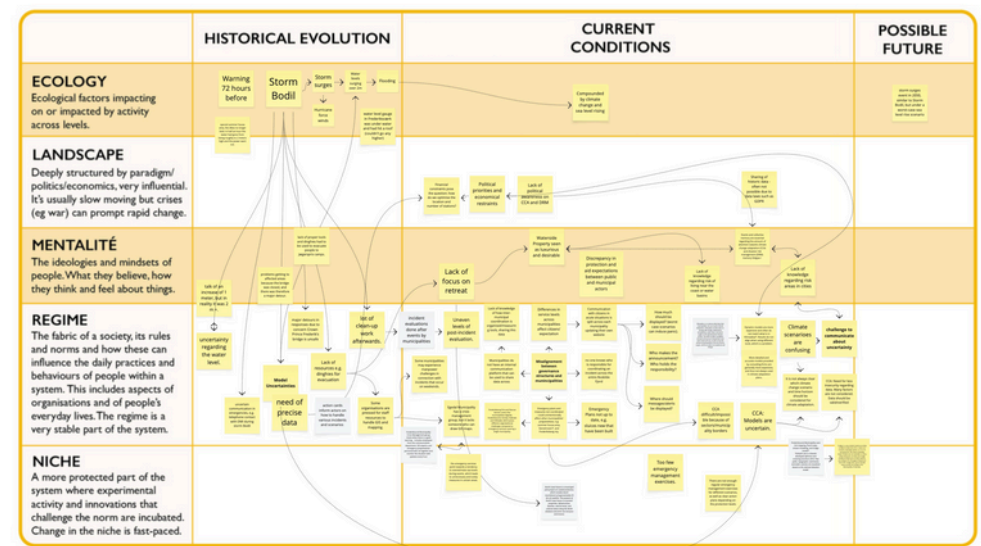
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PHASE 2 CO-EXPLORE: SENSE MAKING

Multi-layer perspective problem evolution canvas

This canvas identifies and maps key decisions, drivers, actions affecting a wicked problem, and it locates these in relation to multiple levels and time. This helps improve understanding of stakeholders' perceptions, recollections of the historical evolution of a problem, and current conditions of a problem. On the next page you will see we have mapped the Tandem guiding questions on to the MLP map as prompts for filling out the MLP. You will then find the blank MLP on the page after.

- The inputs to the map may be generated through a workshop or combined with inputs from secondary research.

- Please note that systems-level maps will never be finished as the system itself is too large and dynamically shifting to ever achieve accuracy or completion.

DIRECTED Canvas from a train the trainer workshop, 2025

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	HISTORICAL EVOLUTION	CURRENT CONDITIONS	POSSIBLE FUTURE
ECOLOGICAL Global factors impacting on or impacted by activity across other levels. This can include extreme events, change in climate, viral outbreaks, or wars.			
STRUCTURAL The wider landscape that is deeply structured and underpinned by politics and economics. Usually slow moving but crisis, e.g. war, can prompt rapid change.	• Are there institutional- or policy-relevant "windows of opportunity" such as the potential to embed the climate service in legislative frameworks that can support its longterm sustainability? • In the policy, planning and implementation landscape, what plans, projects and policies are in place or in the pipeline to address the adaptation issue(s) and climate impacts? Are these considered sufficient or is further work required to strengthen or broaden policies, projects or implementation? ○ How have such responses been funded and what opportunities exist for funding future projects? Is there a business case for action?	• What are the potential institutional and governance arrangements for the institutionalization of the climate service? • Are there other knowledge systems that need to be considered and included in the design of the climate service e.g. research and practice-based knowledge, and indigenous knowledge? How can these be integrated or aligned? • What decisions (e.g. at the policy, institutional or individual level) address the adaptation challenge and may benefit from a climate service or better climate information? How are these decisions made currently?	• What current and projected climate impacts interact with or exacerbate the adaptation challenge (or may do so in future)?
MINDSET & IDEOLOGIES The things we believe, think and feel that underpin our ways of being and societal norms and rules.	• What is the urgency and magnitude of the adaptation challenge? Does public perception of the challenge and related issues provide an opportunity for action or do other trigger points exist? • How can the value of the climate service be effectively communicated to higher level decision-makers, e.g. the economic and/or social benefits deriving from the use of the climate service?	• Are they considered credible and trusted by different actors and how are they used? If they are not trusted sources, why is this? How could trust be improved?	
THE EVERYDAY Societies rules and norms, daily practices, behaviours, routines, ways of working and being! This includes formal and informal aspects of organisations and everyday life.	• Which actors are responsible for the production, dissemination and management of climate data and information? Which actors require such information in what format? Which actor(s) could be responsible for administering the climate service or coordinating the necessary information sharing and packaging? Is there willingness and opportunity for partnership building, collaboration and coordination between these actors? • Are there practical constraints to developing a climate service (e.g. time, budget, cultural, human and financial capacities)? How does this affect the aim of the climate service? How can these constraints be best addressed?How is the strategy to operationalise and institutionalize the climate service implemented? Which are the key actors with defined roles and responsibilities to take forward the strategy? Are there any capacity gaps that need addressing for this to occur? • Is there any difference in representation (e.g., of men and women, other social identities or knowledge types) in their ability to influence the decision-making process? • Has climate information (scientific or local/ traditional/indigenous) already been factored into climatesensitive decisions either at individual decision-making or policy making levels? If so, which decisions, how, when and by whom? • Were there any limitations in the use/application of this information in these decisions? If so, what were they? Has other non-climate evidence been factored into these decisions? • What existing weather or climate information is available from local providers e.g. meteorological departments, NHMS, private companies or research institutes? Are there any opportunities that can be identified to build on or adapt these existing services to address information needs? In addition to data availability, discussions about data access and sharing are important to uncover to assess opportunities for sharing data more widely or in different, innovative and more accessible ways	• Are there existing climate-related services (including environmental and meteorological monitoring services, early warning systems, indigenous or traditional forecasting measures) that have been used to reduce10. Are there existing climate-related services (including environmental and meteorological monitoring services, early warning systems, indigenous or traditional forecasting measures) that have been used to reduce • What are the shortcomings/gaps and benefits of these services for decision-makers? What actions have been informed by these services? • What institutions have responsibility or mandates for the issues being discussed and for data production and sharing? • How do adaptation solutions affect different stakeholder interests? Are there any synergies/mutual benefits and/or conflicts with other goals and policies?	• What planning tools or impact models are used and what are appropriate formats of climate information that could best be integrated or considered alongside such climate services? ○ Are there related capacity needs to interpret model outputs? E.g., due to a lack of suitable tools or limited technical expertise • What other (non-climate) drivers of change, related to social vulnerability and socio-economic development trends, interact with or exacerbate the adaptation challenge (or may do so in future)?
EXPERIMENTAL The part of the system where grassroots work is happening. Experimental activity and innovations that challenge the norma are incubated here.	• What existing data and information is available, and are these trusted sources? Which actors hold this data and information? • What are the limitations of currently available climate information? If no relevant climate information can be provided to date, are there non-climate services-related efforts with overlapping interests which could be explored/applied to partly address these concerns? • What local research related to the adaptation challenges has been undertaken? E.g. to better understand climate impacts at the local scale or in relevant sectors?	• Is there adequate training and capacity development on these services? Is this too technical or specialist or not tailored enough to the local context? ±Capacity development • Can examples from other cities or contexts help to spur possible adaptation measures? • What existing solutions and recommendations can be identified? These may be the design and delivery of particular outputs, projects, policies, the strengthening of capacities through particular training or support, innovations in data sharing or the development of new partnerships or increased collaboration between institutions. Are these at appropriate temporal and spatial scales to address the adaptation issue(s) identified?	• How do adaptation solutions affect different stakeholder interests? Are there any synergies/mutual benefits and/or conflicts with other goals and policies?

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	HISTORICAL EVOLUTION	CURRENT CONDITIONS	POSSIBLE FUTURE
ECOLOGICAL Global factors impacting on or impacted by activity across other levels. This can include extreme events, change in climate, viral outbreaks, or wars.			
STRUCTURAL The wider landscape that is deeply structured and underpinned by politics and economics. Usually slow moving but crisis, e.g. war, can prompt rapid change.			
MINDSET & IDEOLOGIES The things we believe, think and feel that underpin our ways of being and societal norms and rules.			
THE EVERYDAY Societies rules and norms, daily practices, behaviours, routines, ways of working and being! This includes formal and informal aspects of organisations and everyday life.			
EXPERIMENTAL The part of the system where grassroots work is happening. Experimental activity and innovations that challenge the norma are incubated here.			

net zero lab

Directed Project

Funded by the European Union

Project: 101073978 - DIRECTED - HORIZON-CL3-2021-DRS-01

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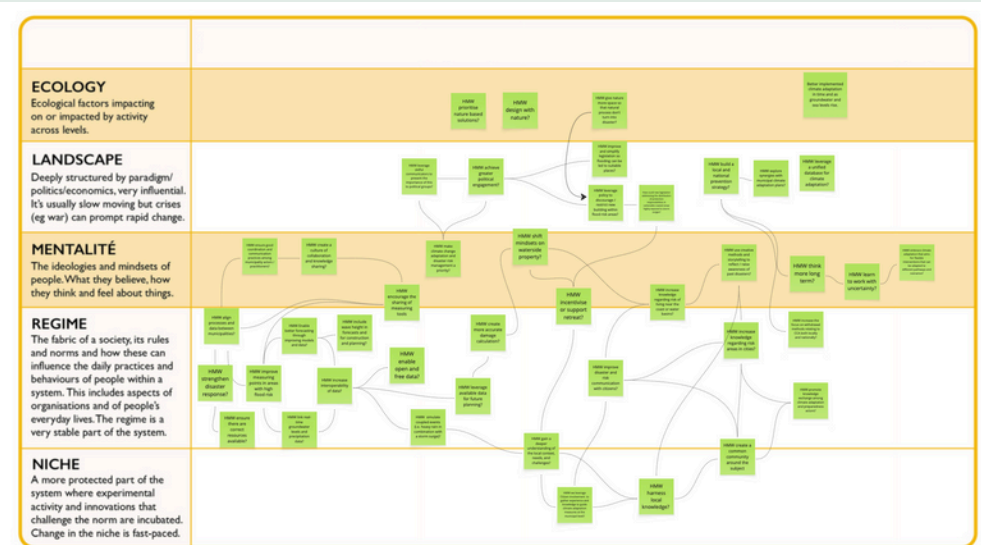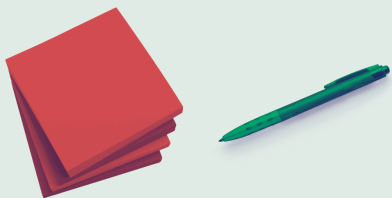DOWNLOAD CANVAS
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PHASE 2 CO-EXPLORE: SENSE MAKING

'Multi-layer perspective 'How might we...' canvas

The 'How Might We...' method is a key *design-thinking* tool that helps designers reframe problem statements. It is useful for facilitating efficient, focused, and innovative ideation sessions to tackle *complex design* challenges. Positioned as the bridge between the define and ideate stages of the design thinking process, statements generated using this approach enable a shift from problem analysis to solution exploration (Interaction Design Foundation, 2016).

"How Might We..." statements offer an opportunity to redefine problem statements informed by research insights. This marks the final phase of sensemaking in the "What is?" stage and sets the stage for exploring "What if...?" scenarios. By asking questions that are simultaneously open-ended and actionable, such statements encourage creative thinking while maintaining alignment with the core challenges at hand.

Mapping these statements onto a multi-layer perspective map can further enhance this process. By visualizing *intervention* points within the system, designers can identify and organize multiple pathways for change. This approach generates possible "constellations of activity" or a "solution ecosystem" (Eggers and Muoio, 2015), enabling a holistic and systemic response to complex design problems.

DIRECTED Canvas from a train the trainer workshop, 2025

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POTENTIAL LEVERAGE POINTS

ECOLOGICAL

Global factors impacting on or impacted by activity across other levels. This can include extreme events, change in climate, viral outbreaks, or wars.

STRUCTURAL

The wider landscape that is deeply structured and underpinned by politics and economics. Usually slow moving but crisis, e.g. war, can prompt rapid change.

MINDSET & IDEOLOGIES

The things we believe, think and feel that underpin our ways of being and societal norms and rules.

THE EVERYDAY

Societies rules and norms, daily practices, behaviours, routines, ways of working and being! This includes formal and informal aspects of organisations and everyday life.

EXPERIMENTAL

The part of the system where grassroots work is happening. Experimental activity and innovations that challenge the norma are incubated here.

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PHASE 2 CO-EXPLORE

Reflection and monitoring, evaluation and learning

After co-exploring "What is?" and before moving into "What if?" questions, it is important to pause and collectively reflect. Take time to ensure that there is still shared understanding and agreement around your project goals. This is a moment for honest, open conversation. It is important to encourage those who have not spoken up to share any concerns or questions.
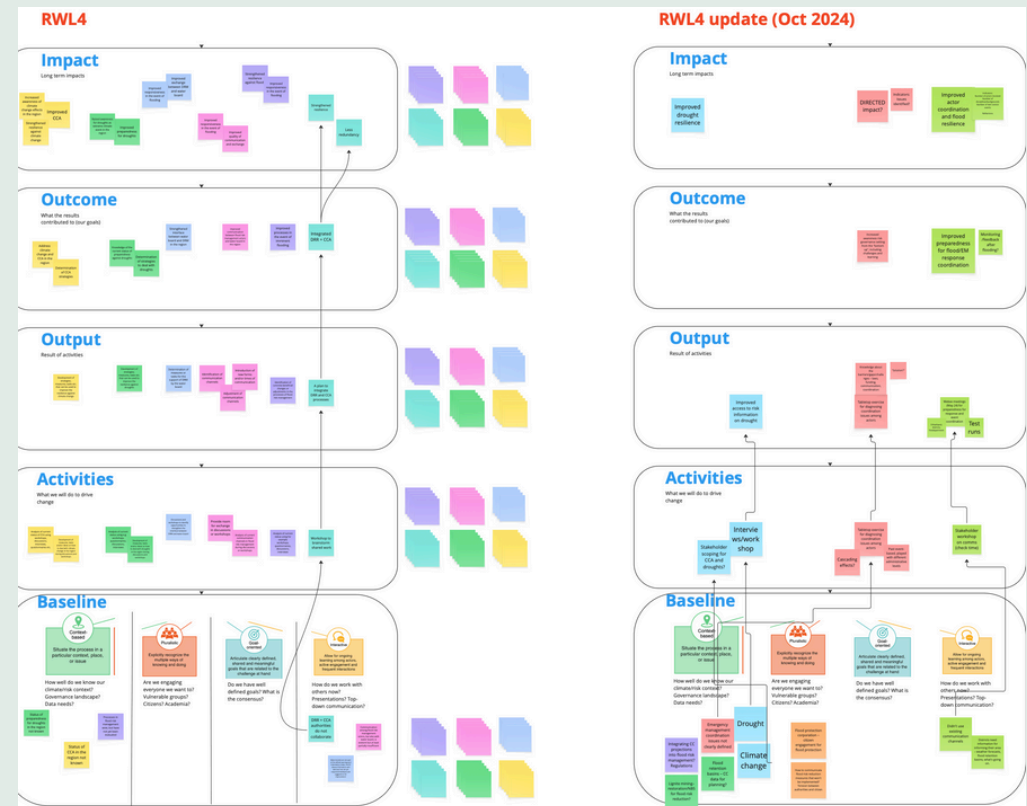
Revisit your theory of change together, thinking about the following:

- Are your intended *impacts, outcomes,* and *outputs* still relevant?
- Do your *indicators* still reflect what you are trying to achieve?
- Should anything be added, revised, or clarified?

Aim for consensus that things feel "good enough for now and safe enough to try." When the group reaches that point, the group is ready to move into the next phase.

Remember, this is an iterative process. You can – and should – return to earlier stages at any point to reflect, revise, or realign as new insights emerge.

Aim for consensus that things feel "good enough for now and safe enough to try."

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Co-design
solutions

Appraise
solutions

Co-explore
& identify
solutions

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