

Learning Resource

Systems Thinking and Practice

A guide to concepts, principles and tools for FCD0 and partners



Authors

Jim Woodhill and Juliet Millican.

About this Learning Resource

This guide is the result of the Knowledge, Evidence and Learning for Development (K4D) Programme's Learning Journey on Systems Thinking and Practice, delivered during 2021 and 2022.

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Copyediting: James Middleton

Design: Lance Bellers

Contact

Email: info@k4d.info

Twitter: [@K4D_info](https://twitter.com/K4D_info)

Website: k4d.ids.ac.uk

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Acronyms	
DFID	Department for International Development
FCDO	Foreign, Commonwealth & Development Office
K4D	Knowledge, Evidence and Learning for Development
M&E	monitoring and evaluation
UK	United Kingdom

Foreword

The Heads of Profession Group in the UK Government's Foreign, Commonwealth & Development Office (FCDO) Research and Evidence Directorate have championed interdisciplinary thinking for many years. We would like to think that we model such behaviour and ways of working. Since the merger of the Department for International Development (DFID) and the Foreign & Commonwealth Office, this approach has been reinforced by a stronger element of geographical and political expertise among research analysts.

Such an interdisciplinary and systems-based approach can be found in the learning that has taken place with the support and collaboration of the Knowledge for Development (K4D) Programme on, for example, food systems and health systems strengthening. DFID also produced guidance on a whole system approach to energy.

In 2019–20, we decided that supporting learning on systems thinking in its own right was worth undertaking – an idea that evolved from within the Heads of Profession Group as a whole, not from any one 'discipline'. As a result, with K4D we ran a Systems Thinking Learning Journey in 2021, which included

a series of seven seminars, expert clinics and the publication of related learning products. In 2022, in response to demand, we ran a second phase of the Learning Journey, with a further series of five internal interactive events. Up to 400 FCDO colleagues took part in webinars that included dialogues with leading external and internal practitioners (development advisers and colleagues from Strategy, Better Delivery and Policy).

This guide is a result of the Learning Journey on Systems Thinking and Practice. We are not the first to promote systems thinking. For example, the Government Office for Science produced the *Introductory systems thinking toolkit for civil servants* (Government Office for Science, 2022) and there is a cross-government community of practice on systems thinking. However, this FCDO guide is the first that brings together a systems approach to 'development and diplomacy'. It complements the Government Office for Science publication by showing how systems thinking can be applied in FCDO and giving additional background on systems thinking and social change. We commend this guide to you.

Mark Harvey and Tom Sanderson on behalf of the Heads of Profession Group, FCDO

1 Introduction

Turbulence, uncertainty and complexity – this is a new normal for development and diplomacy. At the same time, deep shifts in political, economic and social systems are urgently needed to realise a sustainable, equitable and secure future. The existential crisis of climate change underscores this new reality and threatens so much of what development has achieved over recent decades.

To face these new realities, a systems mindset becomes ever more important. Our decision-making, governance and organisational cultures need to shift from the false security of linear, disciplinary and reductionist ways of thinking and working. Without systems thinking we risk constant cycles of reacting to immediate crises in fragmented ways, while failing to understand and deal with the root causes of the issues at hand.

You won't find a blueprint for being a systems thinker. Largely, it is a mindset of working with rather than against the way complex adaptive (human) systems function. It involves taking multiple perspectives, surfacing differing worldviews and asking questions about the whole system.

This guide offers an insight into the theoretical foundations, conceptual frameworks and facilitation tools for adopting a systems mindset and putting it into practice.

1.1 The purpose of this guide

The guide is a basic reference on systems thinking and practice tailored to the context and needs of the UK Government's Foreign, Commonwealth & Development Office (FCDO). It is an output of the FCDO Knowledge for Development Programme (K4D), which facilitated a Learning Journey on Systems Thinking and Practice with FCDO staff during 2021 and 2022.

The guide offers a common language and shared framing of systems thinking for FCDO and its partners. It explores what this implies for working practices, business processes and leadership. It also offers links to additional resources and tools on systems thinking. We hope it can support systems thinking to become more commonplace within the culture and practices of FCDO and working relations with partner organisations.

1.2 Why is systems thinking and practice important for FCDO?

Dealing with highly complex and rapidly changing events at domestic and global levels is the core business of FCDO. This requires responding to a constant stream of unexpected, complex, urgent and politically sensitive world issues, while taking UK interests into account. At the same time, FCDO's development programmes seek to bring about the fundamental changes needed to tackle poverty and inequality, and to protect the environment. This requires long-term thinking about systems change and about how systems for economic development, health, education and food, can be more equitable, sustainable and resilient for current and future generations.

The context of FCDO's work is a world of increasing contestation, interconnection and complexity. Unpredictable disruptions are becoming more commonplace through the intersecting trends of climate change; geopolitical competition and tension; increasing inequality and worsening social cohesion; pressures on global financial systems, and global health challenges. In such a context, being able to see the 'big picture' holistically and respond with a systemic understanding of the underlying causes and interconnections is vital.

The challenges FCDO faces increasingly require interdisciplinary and cross-sectoral responses from local to global levels. For this, systems perspectives are needed to help staff connect their areas of work to those of others to gain a deeper understanding of key interrelationships. Tackling complex issues requires bringing multiple different perspectives to the table. Systems thinking can help different actors better understand how their longer-term interests intersect with those of others and open up space for more constructive dialogue.

Ultimately, systems change is influenced by the power of different actors and the incentive structures of the political economy. Systems thinking is a way of helping to understand these dynamics, so that interventions and investments can be better aligned to the social and political complexity and unpredictability of how human societies function, and hence be more likely to have a positive impact.

BOX 1

FCDO staff reflections on why systems thinking is needed

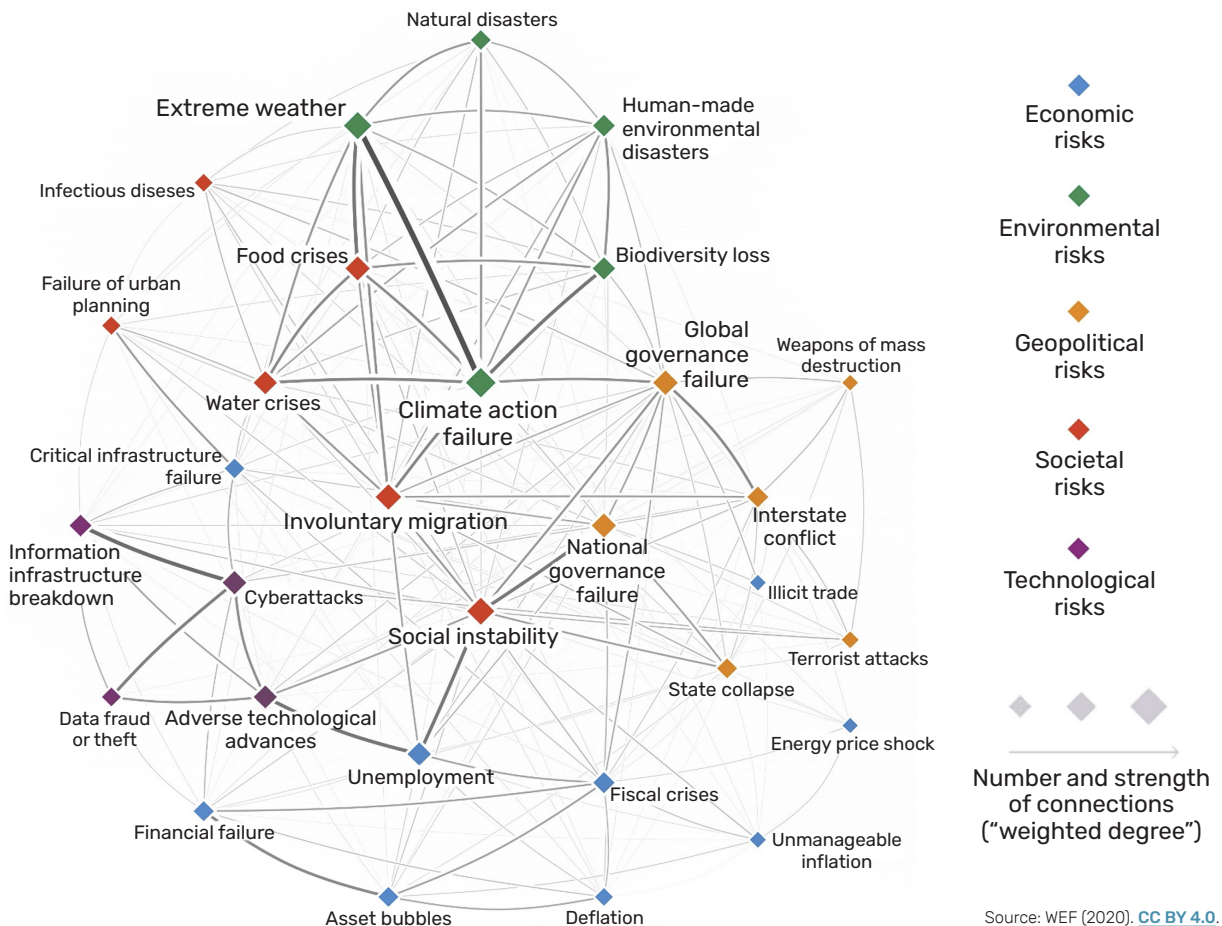
During the Systems Thinking Learning Journey, FCDO staff offered the following views:

- > 'We are continuously faced with a complex and volatile world – this is now more profound than ever.'
- > 'In FCDO, we need a big step change in how we do our thinking, acknowledging complexity.'
- > 'Systems thinking by its very character can help us navigate between macro, meso and micro issues.'
- > 'People's behaviour is governed by the system – when you transform the system the culture and behaviour are also changed.'
- > 'We need to understand the nature and distribution of power, the key actors, those excluded and how these drive change in the system. We are also part of this power dynamic and need to also look at ourselves as power actors.'
- > 'Systems thinking allows you to continuously understand the system and fine tune how you deliver on objectives.'
- > 'Policy thinking is systems thinking – we need to understand different perspectives by bringing in a range of stakeholders.'
- > 'We need to improve on how we use systems analysis of context to inform decision-making and strengthen leadership.'

Source: Authors' own, quoting FCDO Systems Thinking Learning Journey participants.

Figure 1 illustrates how interrelated a series of critical global issues at the core of FCDO's development and diplomacy agenda have become.

Figure 1. Interconnecting systemic risks for development and diplomacy



1.3 What is systems thinking and practice?

Systems thinking and practice involves aligning processes of analysis, decision-making and management with how complex and adaptive systems behave. As individuals, we all understand that our daily lives are complex, highly interconnected and often rather messy. We accept that life evolves in often unpredictable ways, driven by events beyond our control. To cope and prosper, we learn and adapt.

Yet, in our professions, organisations, and the domains of policy and governance, it seems we often pretend that complexity and uncertainty can be ignored. Disciplinary, reductionist, linear and hierarchical ways of thinking and making decisions often dominate. In part, this is a hangover from a paradigm of reductionist and mechanistic science that dominated much thinking and development in the twentieth century.

Systems thinking and practice means:

- > Looking at situations from a holistic perspective (seeing the whole system).
- > Understanding the key relationships shaping how a system behaves.
- > Accepting the uncertainty and complexity of systems, and working in adaptive, flexible and learning-oriented ways.
- > Recognising that different people and different groups have legitimately different perspectives and see 'the system' differently.
- > Seeing that the resilience and adaptability of systems is related to strong communication networks, diversity, decentralised decision-making and redundancy.
- > Working in interdisciplinary and cross-sectoral ways.

Perhaps this sounds like common sense – and largely it is. However, it is remarkable how difficult it can be to apply such thinking given organisational constraints, time pressures, and the limitations of our own and others' professional training.

1.4 What systems thinking means for FCDO business processes

To make a difference, systems thinking needs to be embedded within FCDO's core business processes. The Systems Thinking Learning Journey explored the application of systems thinking and practice in the following five key areas:

- 1 Context analysis
- 2 Programme cycle
- 3 International policy framework (including an integrated approach to diplomacy and development)
- 4 Research, analysis and evaluation
- 5 Crisis response.

A series of Learning Journey sessions explored each of these areas, with staff sharing their experiences of how systems thinking is currently being used and how it could be strengthened. [Section 5](#) of the guide is structured around these business processes and offers ways of integrating systems thinking into each one.

1.5 Using the guide

As already noted, there are no simple recipes or blueprints for applying systems thinking. Consequently, it is important as a systems practitioner to understand core systems theory and concepts, so you can approach new situations with a systems mindset. Most situations will require creative application of these ideas, tailored to the specific context. A toolbox of systems methods, techniques and facilitation tools is of little value without this deeper understanding. Given this, the guide first covers the theory and concepts of systems thinking, then looks at its application in FCDO business processes.

Before introducing systems ideas, [Section 2](#) summarises the core organisational behaviours you should expect to see if FCDO is putting systems thinking into practice. In [Section 7](#), you will find reference to a range of tools that can help you apply systems thinking, particularly when working with groups of different stakeholders. A series of case studies illustrate systems thinking and practice within FCDO. The guide also provides references to additional resources on systems approaches.

BOX 2

An introductory systems thinking toolkit for civil servants

This FCDO Guide on Systems Thinking and Practice complements the UK Government Office for Science’s *Introductory systems thinking toolkit for civil servants*, published in 2022. The process and key tools in the toolkit are illustrated in the diagram.



Source: Authors' own. Adapted from Government Office for Science (2022). [Open Government Licence 3.0](#).

2 Organisational behaviours for putting systems thinking into practice

How do you know if systems thinking is being applied? Drawing on the discussions with FCDO staff during the Systems Thinking Learning Journey, the following seven areas emerged as key organisational behaviours you should expect to see in FCDO and its partners if systems thinking is being put into practice:

- 1 **Viewing situations holistically** – The starting point for systems thinking is to step back and take a ‘helicopter’ view of the situation you are dealing with. Try to explore, examine and tackle underlying causes of problems not just symptoms. This means working across different sectors and disciplines, and paying attention to the wider context in which your specific concerns or responsibilities are set. Given the types of issues and contexts in which FCDO engages, developing a good political economic understanding is usually a critical starting point.
- 2 **Bringing multiple perspectives to the table** – By definition, we are all limited by our experiences, training, interests and mindsets. A key to systems thinking is opening dialogue between people with different perspectives and insights. How do they see the issues they face? What are their views on how systems are functioning or not? What would constitute an improvement for them? Such dialogue includes bringing in people with different disciplinary and sector expertise, and enabling engagement between players from across government, business, civil society and science.
- 3 **Considering alternative future scenarios** – Explore how trends, uncertainties and shocks might create radically different futures, and what the implications would be for different stakeholders’ interests. Engage stakeholders in assessing what would be effective strategies for their interests, and for the system as a whole in different future scenarios. Scenario approaches are valuable in helping to understand the resilience of systems to future pressures and shocks.
- 4 **Strengthening networks, feedback and relationships** – Systems evolve and adapt based on networks and feedback between system components. A basic principle of systems practice is to **increase communication and understanding between actors**. Think about how relationships between different parts of a system can be improved, including through building trust between actors.
- 5 **Designing interventions around system dynamics** – ‘Engineering’ topdown change in human systems is largely impossible – so don’t try! Instead, explore how systems can be ‘nudged’ towards more desirable states. Look at how desirable behaviours can be amplified and less desirable ones can be dampened, and the roles that normative and punitive incentives might play. Accept that change often requires many contributing factors to align. How and when this will occur can’t be easily predicted, so patience is often needed while working on enabling conditions. Systems have stability and tipping points – try to understand these and how they can be used to support rather than block desired changes.
- 6 **Experimenting, valuing failure and learning** – Fundamental to bringing about change in complex systems is experimentation and rapid learning. This requires an appetite for risk and valuing the learning that can come from failure. As with investments, this implies that development organisations need to take risks and assess performance across the whole portfolio, rather than expecting every project or intervention to succeed.
- 7 **Managing adaptively** – Ultimately, responding to the complexity and uncertainty of how complex systems behave **requires a highly adaptive approach to management and decision-making**. This calls for good communication up and down management hierarchies, decentralised responsibility, and empowering those on the ‘front line’ to be responsive and questioning as situations change.

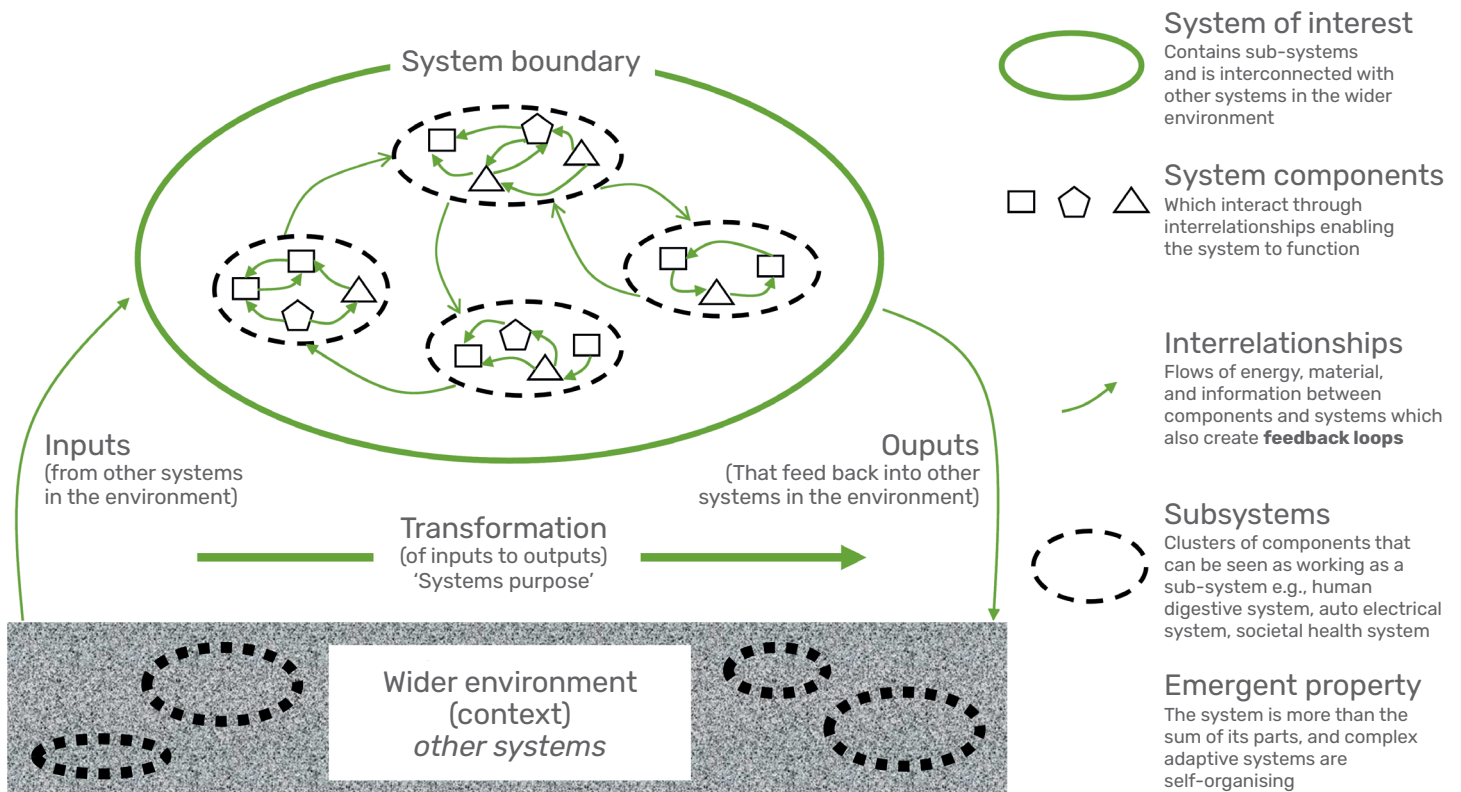
3 The core concepts of systems thinking

3.1 The key elements of a 'system'

The starting point for systems thinking involves identifying and recognising the basic elements of a 'system'. As illustrated in Figure 2, a system comprises a set of interrelated and interdependent elements that function together in a way that gives rise to an emergent property of the system. For example, all the elements of the human body give rise to the emergent

property of a living being with consciousness. The human body can be seen as having subsystems (e.g., digestive system, circulatory system, nervous system, etc.) that all interact with each other through flows of inputs and outputs and feedback mechanisms, regulating how different elements of the system interact. The outputs of one system are the inputs for another system, and these inputs and outputs can be energy, substances or information.

Figure 2. Seeing the world as 'systems'



Source: Authors' own

It is important to recognise that 'seeing the world in systems' is an artificial construct humans use to make sense of the world in which we engage. While the object or situation being observed might be considered 'real', the systems framing is simply a mental construct we use to help explain what we observe and experience. Consequently, how a system is seen, defined and explained depends on the ideas, perspectives and theories applied by those looking at it. For simple things (e.g., a rock, a tree, a

car), this is not a big issue – we mostly all agree about the nature of what we are seeing. But for human societies, interactions or systems, what is 'seen' has as much to do with what is in the minds of those looking at the situation as it does with what is 'actually' there. These are deeply philosophical and epistemological issues beyond the scope of this guide. However, the underlying implication is the value of looking at situations with the wisdom of multiple perspectives.

BOX 3

10 questions to ask that will help you with systems thinking

Distilled from the theory of systems thinking in this section, here are 10 key questions to ask when starting down the path of a systems analysis:

- 1 Given the issues or problems of interest or concern, where should the system's boundaries be set and how should the system be defined?
- 2 What is going on in the wider environment that will influence the system of interest?
- 3 Who are the key actors in the system and what are their perspectives on the system, its outcomes and how it functions?
- 4 What are the critical relationships within the system, and between the system and the wider environment that need to be understood?
- 5 What key trends and critical uncertainties are likely to shape the evolution of the system and with what possible future scenarios?
- 6 What changes in the outcomes of the system would be desirable for whom and why?
- 7 What changes in the system are logically desirable and politically feasible?
- 8 What are the why, what, how, who and when of desirable change?
- 9 What tools would be most useful in mapping or understanding the system?
- 10 Who should be involved in identifying, promoting and implementing systems change?

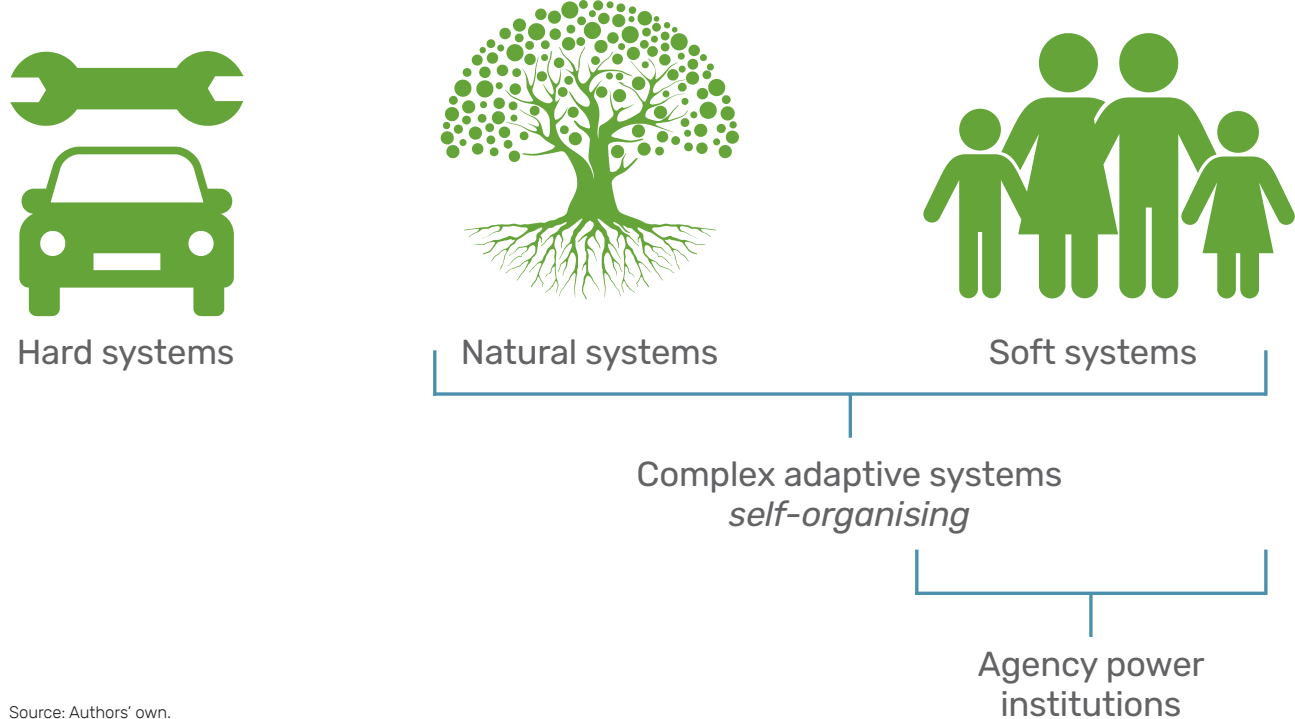
Source: Authors' own, drawing on systems theory and discussions during Systems Thinking Learning Journey.

3.2 The nature of complex adaptive systems

Systems thinking makes a distinction between hard systems and complex adaptive systems. Cars and computers are hard (mechanistic) systems – they have fixed constraints and can only operate in limited ways. A crashed car will not repair itself. Biological and human systems, by contrast, are complex and adaptive. Their living elements mean they are self-organising and

constantly evolving. You can't dismantle a biological system, and put it back together so that it functions, the way you can with a hard system. Human (or soft) systems are a special class of complex adaptive systems. Human agents are conscious of how the system behaves and their role in it, which influences their behaviour. To understand human systems, such as societies or organisations, we need to be conscious of human agency, power relations and the role of social institutions.

Figure 3. Types of systems



Source: Authors' own.

3.3 Three key aspects of systems thinking

In essence, systems thinking can be boiled down to three key elements: relationships, perspectives and boundaries (Williams & Hummelbrunner, 2010). Each is outlined below, with questions that are critical to ask when viewing a situation systemically:

1 Understand interrelationships – Systems are all about the interrelationships between the components (or actors) of the system, and how these interrelationships shape the overall system and how the overall system shapes interrelationships. Key questions to ask are:

- > What are the critical interrelationships by which we can understand the system?
- > What processes and feedback mechanisms influence these interrelationships?
- > What level of complexity do these interrelationships involve? (Figure 5)
- > In human systems what institutional mechanisms shape the interrelationships between different actors?

2 Recognise different perspectives – In human systems (or societies or organisations), no single or correct 'view of the system' exists. Different actors will see the system and its issues differently, depending on where they are located within it, and their particular beliefs and interests. Key questions to ask are:

- > What are the different ways different actors view a particular situation?

- > How do different perspectives on a 'system' influence the way actors behave?
- > How do different perspectives lead to different ideas about what is desirable in how a system functions and its outcomes?

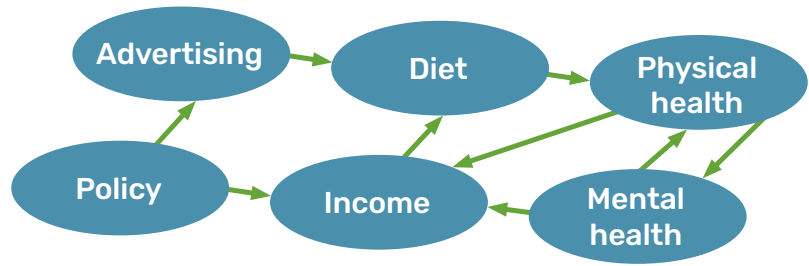
3 Establish boundaries – Using a systems perspective to analyse a problem or context requires making decisions about where to set boundaries in relation to what you are interested in influencing and what you consider to be the wider environment. If you make the boundaries too narrow, you will end up dealing with symptoms rather than causes. If you make the boundaries too wide, you will be trying to solve all the world's problems in one go (which is, of course, impossible). Boundary questions also require consideration of who to involve, who has power and whose interests are being served. Key questions to ask are:

- > What should be considered within or external to the system of interest, with what implications?
- > Who is the client or beneficiary of the system, with what implications for the purpose of and criteria for improvement?
- > Who has – or should or could have – power in the system, with what implications for decision-making?
- > What sources of knowledge are being brought to bear on understanding the system and making judgements about what constitutes an improvement? Who is bringing these?

Figure 4. The foundations of systems thinking

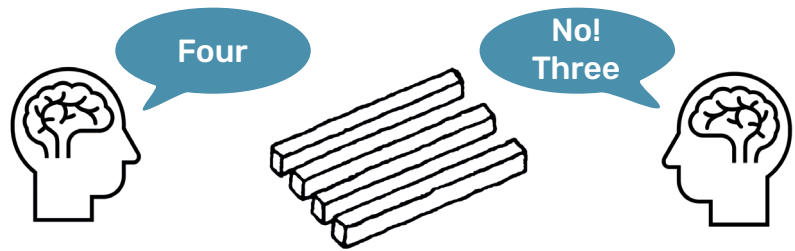
Interconnections

(understanding the cause and effect relations between different elements of a system)



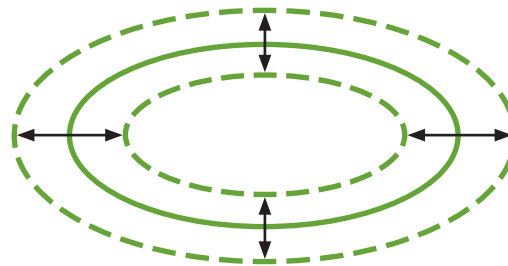
Perspectives

(recognising people have legitimate different perspectives on how they see the system)



Boundaries

(deciding where to put a system boundary - what is in and what is out)



Source: Authors' own

3.4 Understanding different types of complexity

Systems thinking and complexity are two sides of the same coin. Systems become complex when there are multiple elements, relationships and feedback mechanisms. A helpful starting point for intervening in systems is to understand the nature of different types of complexity.

Dave Snowden and colleagues (The Cynefin Company, n.d.) developed the Cynefin Sensemaking Framework (Figure 5), that distinguishes between four different domains of complexity: **clear, complicated, complex and chaotic**. In this framework, the level of complexity is related to the nature of the relationship between cause and effect:

- > **The clear domain** involves limited interactions, which are all predictable. When you toggle a light switch, the same action produces the same result every time. This is like baking a cake, which can be done by carefully following a series of instructions. If you follow best practice you can produce the same quality of cake each time.
- > **The complicated domain** has many more parts and interactions, but they still operate in clear and

predictable ways. For instance, rockets are complicated assemblies of components, but the components interact in predictable ways. If you make a second rocket, it will behave in the same way as the first. However, because of varying contexts or an increased number of interactions there might be multiple **good practices** that could be equally effective.

- > **The complex domain**, in contrast, has many elements with multiple feedback loops. This means that what happens as a result of an intervention or change can't be predicted with any certainty, though the reasons for what has happened are often apparent in retrospect. The economy is a classic example: stock markets go up and down due to many interacting factors that are largely unpredictable. Raising teenagers is another example – it is impossible to predict what might happen and when, and the uniqueness of each situation will require unique interventions. In this domain **exaptive or repurposed practices** are required, which creatively recombine and reuse existing knowledge and capabilities for different purposes.
- > **The chaotic domain** has no easily identifiable relationships between cause and effect, and there are

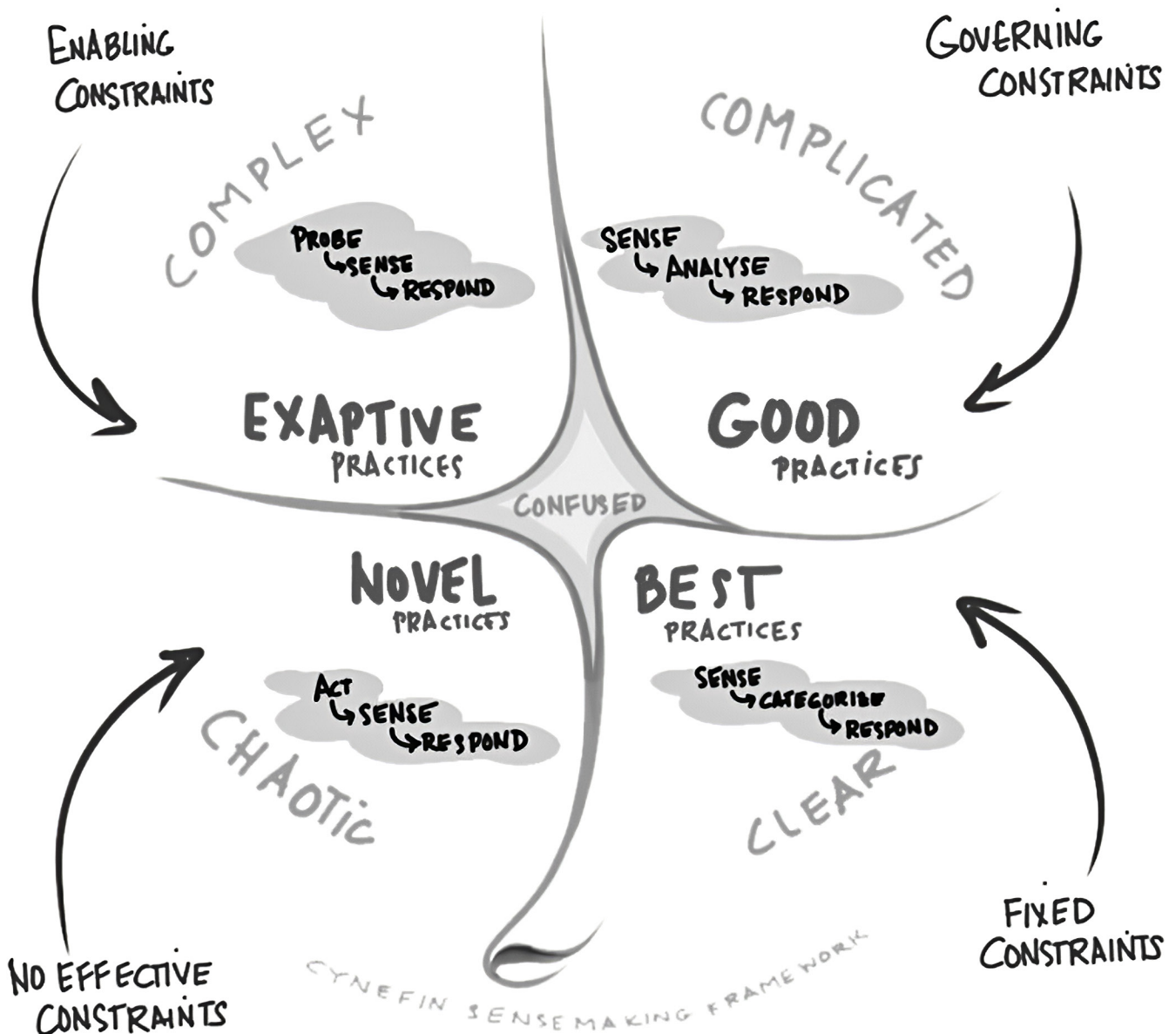
no constraining boundaries. Crises generally fall into this category. For example, where existing social rules have collapsed and people do whatever is necessary to survive. A carnival is an alternative example, where there can be freedom to behave in unusual ways without constraints. Chaotic situations call for **novel practices**.

These different domains of complexity have significant implications for how outside actors, such as development professionals, should intervene. Each context has different types of constraints. A classic mistake development projects tend to make is to try to intervene in complex situations with strategies more appropriate for clear and complicated domains. Applying pre-planned good or best practices is inappropriate

in what are often dynamic contexts and when there is no flexibility or learning process in place to enable adaptation.

In complex domains, the context of development and diplomacy, there are no 'off-the-shelf' solutions. It is necessary to test out – or **probe** – and explore what works, and to learn rapidly from an intervention. Bringing multiple perspectives and experiences to the table to assess and test how existing knowledge or techniques could be adapted to the needs of the situation is key. Regular use in development of the idea of identifying and applying 'best practices', which are effective for clear contexts but not complex ones, illustrates widespread lack of understanding about the nature of complexity and the implications for development.

Figure 5. The Cynefin Sensemaking Framework



Source: The Cynefin Company (n.d.). The Cognitive Edge method is ©2012 Cognitive Edge (USA) Inc., used under a Creative Commons Attribution-Noncommercial-NoDerivs licence: <https://creativecommons.org/licenses/by-nc-nd/3.0/>.

4 Implications of systems thinking for social change, governance and leadership

The nature of complex adaptive systems has profound implications for how to think about social change, processes of governance and leadership. For example, change in how social systems function (e.g., attitudes towards gender) are unlikely until a critical mass of people hold a particular view and the system reaches a tipping point, which in turn may create a backlash.

This means the nature of narratives – or story lines within different groups of society – and how these are developed, influenced and controlled, is critically important. In today’s complex and turbulent world, no government can offer simple and quick solutions, yet this is often exactly what the wider population expects. And, of course, this is what political leaders all too often offer. It would be a brave politician who stood up and admitted they were dealing with a complex, messy situation and that they didn’t have all the answers.

A systems understanding of social change opens up different ways of thinking about how to intervene in human systems, often necessitating adaptive management, or the ability of a programme to change course as new information arises. Development processes and administrative practices often severely constrain such flexibility, learning and adaptation.

4.1. Three shifts to apply systems thinking

Embedding the following three shifts into how development and diplomacy organisations function and organise their work can go a long way towards enabling a more systemic approach:

- 1 **From plans to learning** – If building a house or a bridge (a hard system), a clear step-by-step plan makes sense. However, when raising a family or bringing about social change, a far more adaptive, flexible and responsive approach is needed. A sense of direction and purpose, along with goals, are still needed, but the path to getting there will not be linear. It will often be impossible to know upfront what will work and what will not, so learning becomes critical. This means experimenting, testing out different ideas and options, constantly monitoring the impacts of interventions and regularly reflecting on what is working, what is not and why. This might seem obvious, yet remarkably many organisations **focus on plans** rather than **systems for learning**.
- 2 **From targets to directions** – Some say, ‘If you can’t measure it, you can’t change it’. But as another saying goes, ‘not everything that can be counted counts and not everything that counts can be counted’. This implies the need for greater use of qualitative approaches for the design and management of development interventions. In the first Systems Thinking Learning Journey session, Dave Snowden introduced the concept of **vector-based targets** and reflected on the limitations of outcome-based targets in a complex adaptive system. Vectors measure the speed and direction of travel against the energy absorbed in getting there. This approach establishes a preferable rather than optimal state and keeps open different ways of moving in the desired direction given a changing context (see [Section 4.3](#)).
- 3 **From centralised to collective responsibility** – The complexity and dynamics of social systems make it virtually impossible for a hierarchical model of command and control to work. The sheer number and complexity of interacting factors are just too great for any centralised entity to comprehend and manage. However, by creating a shared understanding of what is desirable, and establishing effective incentives, individual actors are more likely to make decisions and behave in ways that bring about desired change. Conversely, if individual actors do not support ‘rules from above’, they are remarkably creative in finding ways of ‘getting around the system’.

4.2 Thinking about socio-technical transitions

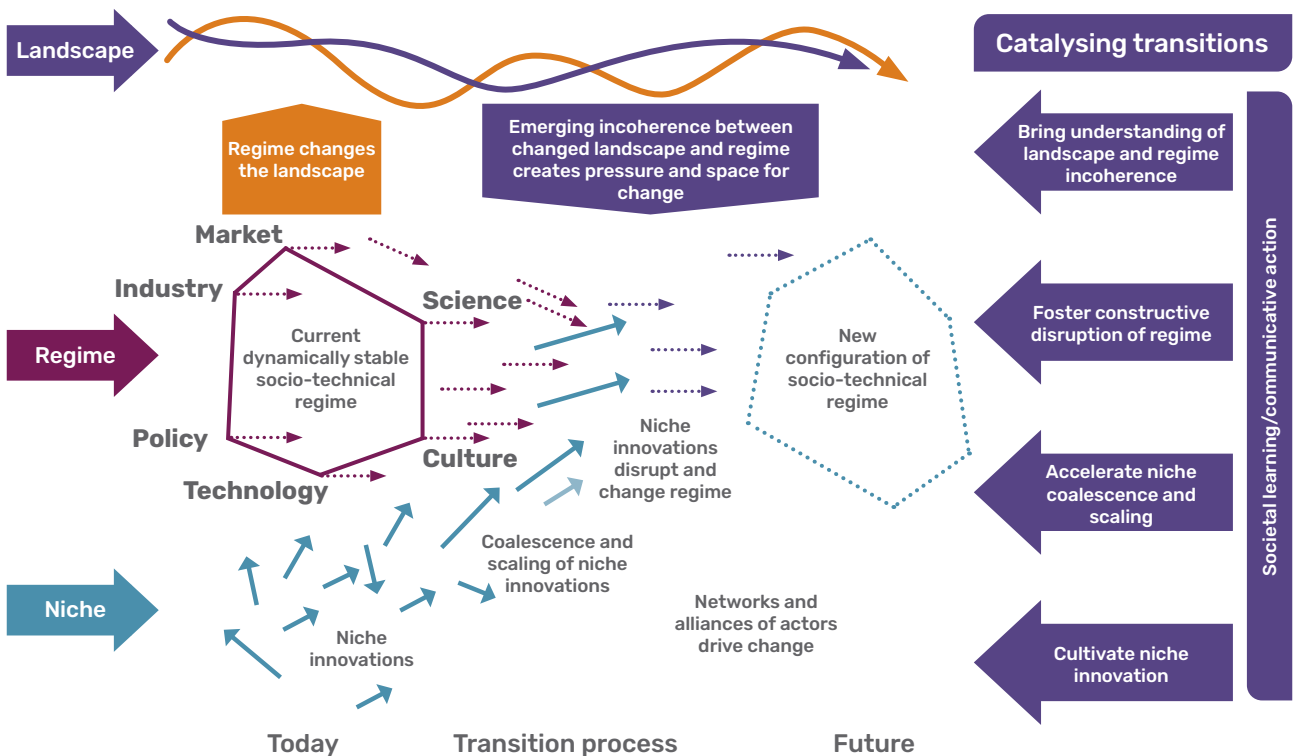
A valuable complement to systems thinking is transition theory. Throughout human history we see a constant transitioning from one socio-technical dynamic to another. Think of the transition from horse and cart to the internal combustion engine, the ending of slavery, the current transition from fossil fuels to renewables or changing gender roles. Understanding how transition processes occur and integrating this with systems thinking offers the potential to intervene in ways that can direct and speed up desirable transitions, and dampen less desirable ones.

As illustrated in Figure 6 below, transition theory describes how a regime of markets, science, culture, technology, policy and industry becomes 'locked in', with particular groups benefiting from this regime and using their power to maintain it. However, over time this regime will start to become incoherent, amid a changing landscape of environmental and social factors (e.g., it is becoming clear that the fossil fuel energy sector is incoherent with a stable climate; this incoherence is increasingly being acknowledged and triggering change). At the same time, niche innovations are always occurring, which over time can coalesce and scale, resulting in disruption of the existing regime. This two-way pressure on the regime, from a changing context and niche innovations, causes the regime to evolve and a new configuration to emerge.

From a policy, advocacy or activist perspective there are four key ways to think about intervening to nudge change:

- 1 Help to make apparent and explicit to a wide range of actors the emerging disconnect between the existing regime and the social and environmental landscape. This includes making clear how this disconnect threatens the longer-term interests of particular groups and society at large. This occurs, for example, through focused research, public education, effective use of media or processes of stakeholder dialogue. Foresight and scenario analyses can be a valuable way of enabling stakeholders to understand the long-term consequences of the negative features of the current system or regime for their interests.
- 2 Invest in and support a diverse range of innovations (hedging), even though the success of any single innovation cannot be guaranteed. **Accepting failure is necessary!**
- 3 Support processes that identify, coalesce and scale innovations that can help to demonstrate desirable and feasible alternatives to the existing regime, and contribute to disrupting it.
- 4 Foster processes explicitly designed to disrupt the existing regime and shift power balances such as coalitions for change, active civil society groups, critical journalism, or co-opt leaders of different groups who can be respected champions for change.

Figure 6. Transitions theory



Source: Authors' own. Adapted from Schot & Geels (2008) and Leeuwis et al. (2021). Reproduced with permission.

4.3 Towards vector-based theories of change

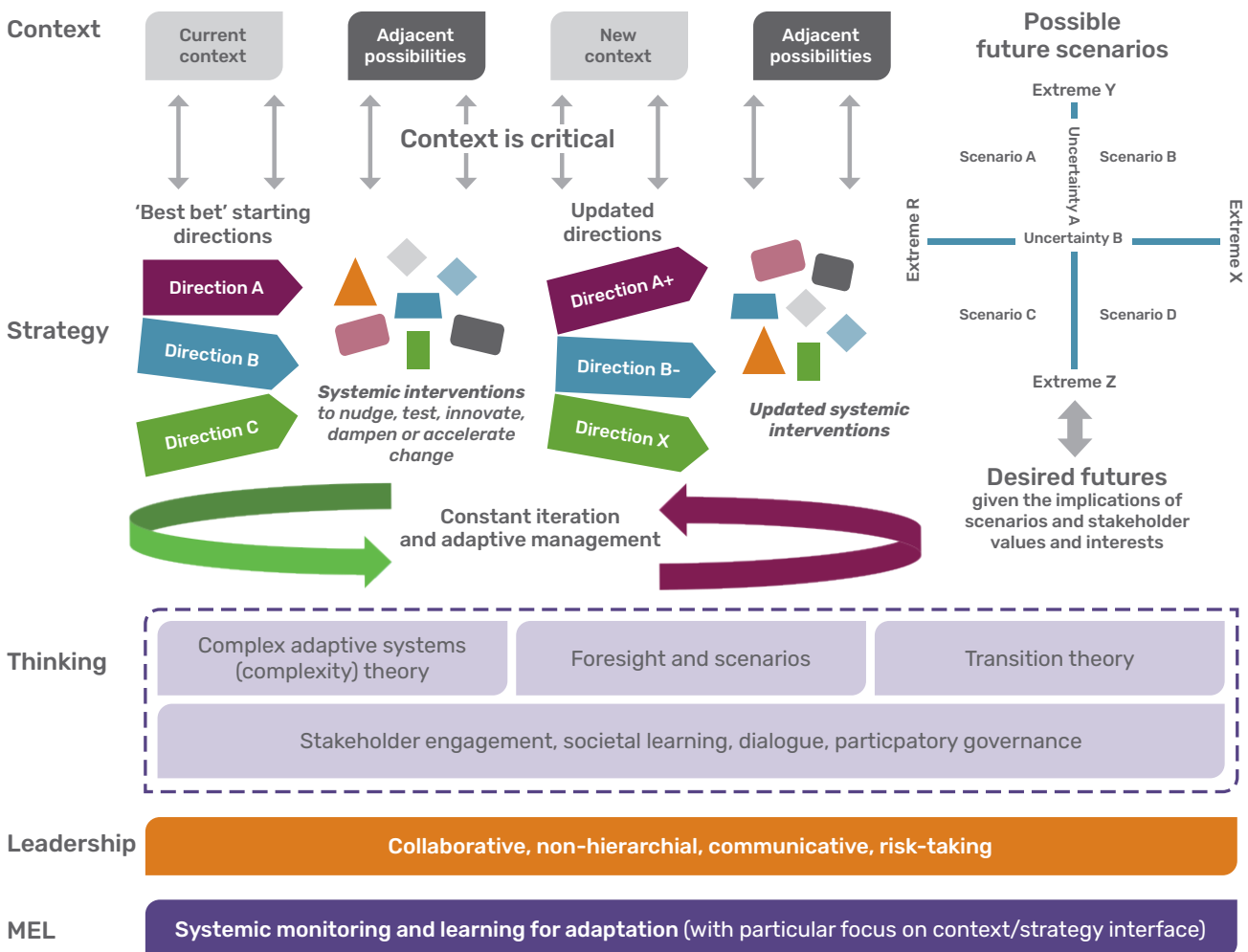
Classic strategic planning and development project design seeks to establish a vision, clear goals and outcomes, then develop a logic of intervention intended to achieve the outcomes. This logic is then often expressed in specific measurable results – for example, a logframe – which then leads to models of results-based management. In clear and even complicated contexts, such a linear approach can work. However, in the complex domains of development and diplomacy, this is rarely practical or effective.

Classic planning tends to **assume the wider context is static** or only changes in predictably linear ways, which is never the case. A vector-based theory of change is an alternative way of thinking about designing and managing interventions in complex systems. As illustrated, key features of this approach include:

- 1 Exploring the future in terms of multiple possible scenarios, given critical uncertainties.
- 2 Examining desired futures in terms of stakeholders' values and interests.
- 3 Identifying broad directions for positive change.
- 4 Looking for realistic opportunities to nudge change within the existing context (the adjacent possible), rather than creating unrealistic ambitions for change.
- 5 Constantly monitoring and assessing the changing context to adjust directions and interventions.
- 6 Designing systemic interventions that align with how complex adaptive systems evolve.

Such an approach has significant implications for the type of monitoring, evaluation and learning that is required, and the underlying thinking and leadership.

Figure 7. Vector theory of change for systems transformation



Source: Authors' own.

⑤ Embedding systems thinking into FCDO business processes

This section examines how systems thinking and practice can be embedded into five core FCDO business processes: context analysis; the programme cycle; international policy development; research, analysis and evaluation, and crisis response. The insights provided are largely drawn from the views of FCDO staff raised during the Systems Thinking Learning Journey sessions held on each of these areas.

5.1 Context analysis

Assessing context is a critical starting point, whether for developing a country strategy, designing a programme, developing policies or responding to a crisis. A systems view of the situation in which you intend to intervene will dramatically increase the likelihood of a positive impact. However, systems thinking informs us that the context will likely be constantly changing in unpredictable ways, calling for a **constant reappraisal** of the best course of action. This makes continual monitoring and assessment of the context vital to adapting and responding to changing circumstances.

Key to a systems approach to context analysis is mapping the complexity of relations, clarifying where to put systems boundaries and developing a deep understanding of the wider environment.

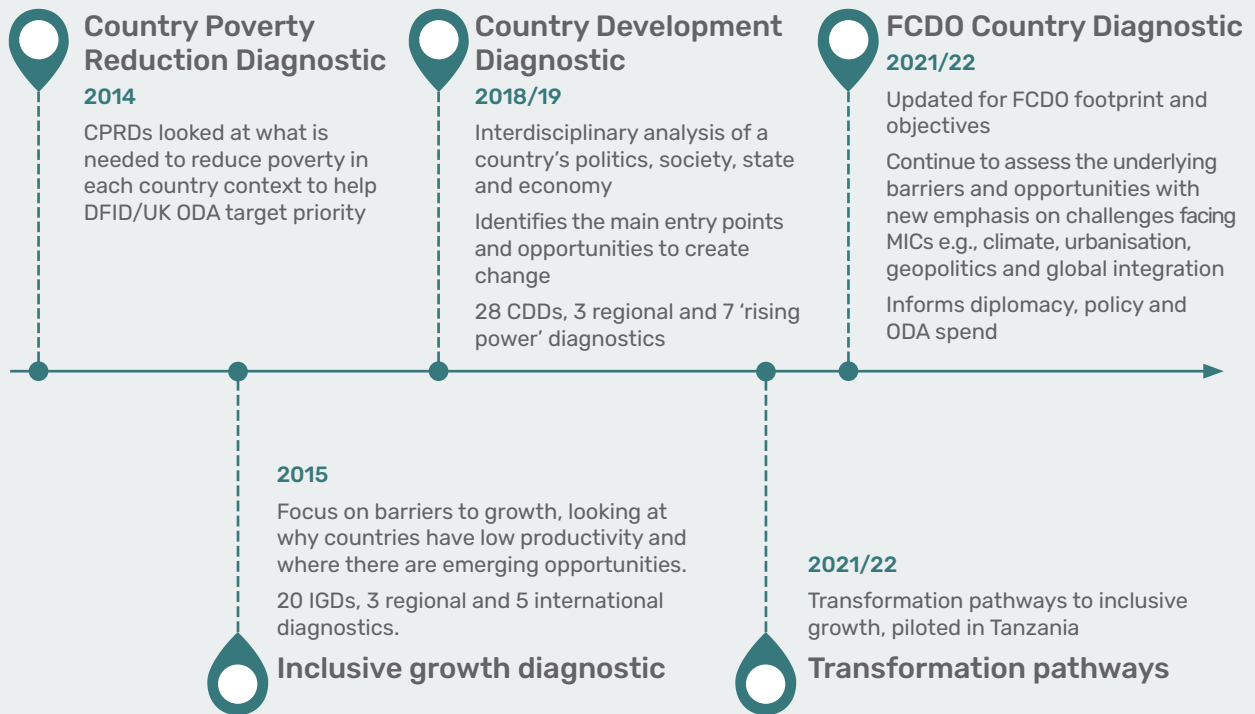
Insights from practice for integrating systems thinking into context analysis

- > Understand actors in the system and their different perspectives.
- > Engage key stakeholders in helping to assess the situation and bring different perspectives to the table, and to develop a shared understanding of the context.
- > Consider all the important social, technical, economic, environmental, political, legal and ethical (STEEPLE) aspects and how they interact.
- > Examine in detail the interests, values and relations of different actors in the system and how this may impact on interventions.
- > Examine underlying systemic causes, rather than responding to obvious symptoms.
- > Invest in analysing the political economy of the situation.
- > Conduct foresight and scenario analysis to understand the longer-term impact of current trends and the possible impacts of critical uncertainties.
- > Consider how different actors frame issues and concerns, and how different narratives influence the situation.
- > Put in place analysis and processes to keep assessing the context.

BOX 4

Iterations of the UK government’s approach to diagnostics

Diagnostics analysis, currently being used by some within FCDO, is a tool that enables programme staff to look across a system, involving interdisciplinary teams and considering objectives beyond those tied to individual projects. The image below, shared during a Systems Thinking Learning Journey session by a team working in country diagnostics, shows how the process has evolved since 2015.



Source: Authors’ own. Based on FCDO diagram presented during Systems Thinking Learning Journey session.

What methods and tools can be used for systems analysis of a context?

Many different practical methods and tools that can be used to assess a situation with a systems view (see [Section 7](#) for a list of systems tools and links to guides on how to use them). These can be used in participatory processes with stakeholders or by researchers to guide their analysis.

Creating ‘rich pictures’ as a visual representation of the overall context can be a great way to start. The process of developing a rich picture is particularly powerful in the early stages of working with different stakeholder groups and helps to expose common

and different views. **Stakeholder mapping**, which identifies different stakeholders’ interests, influence, roles, responsibilities and attitudes, is an important foundation for any systems analysis. **Stakeholder analysis** helps to give a deeper understanding of how different actors influence social and political systems and what this might mean for the effectiveness of different interventions. **Causal loops diagrams** are a valuable tool for looking more deeply at the interrelationships and flows between a system’s components. Problem tree analysis provides a deeper understanding of the underlying cause of a problem and the systemic consequences.

“The trick is to identify the binding constraint to positive change in a specific country”

Systems Thinking Learning Journey participant

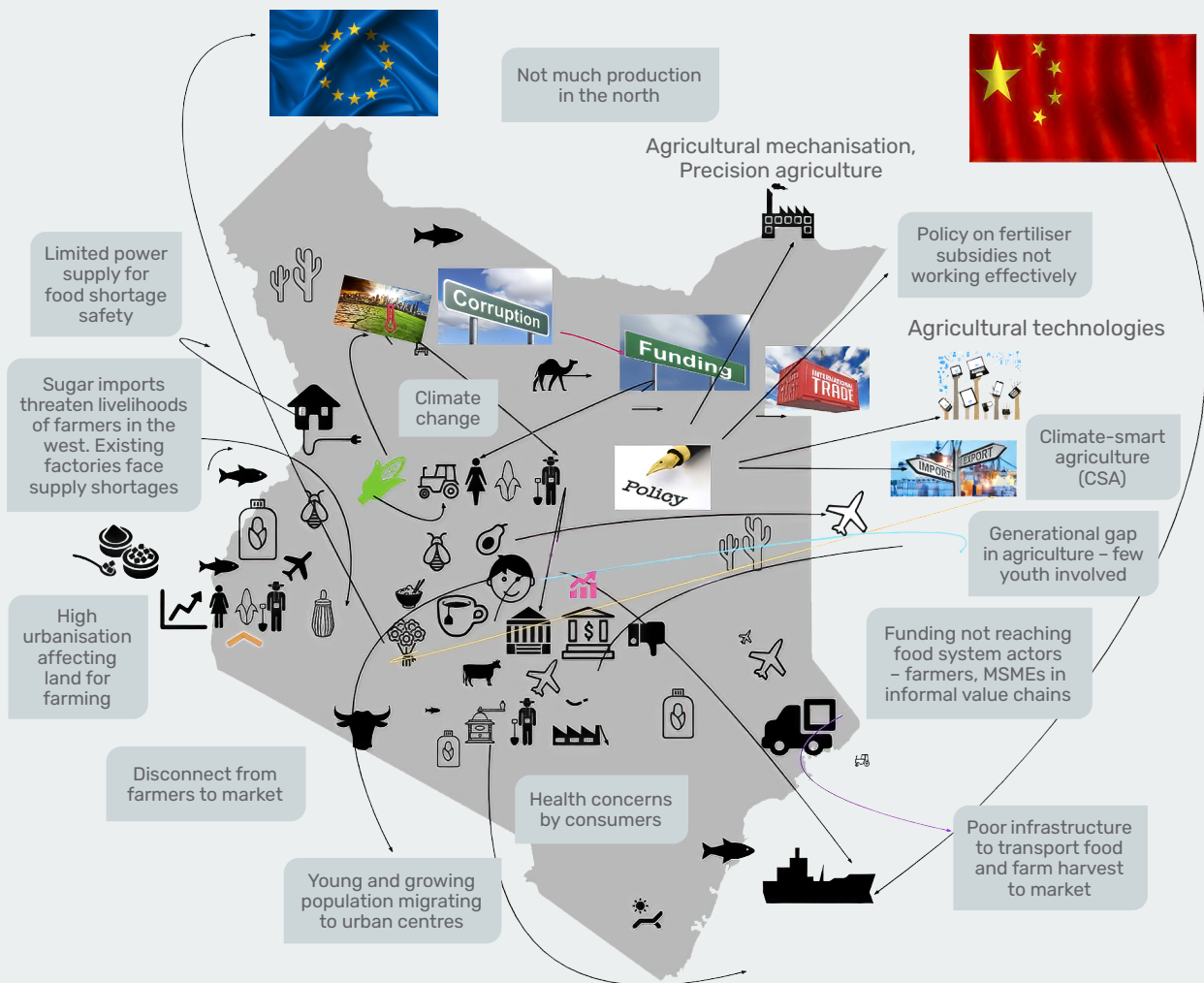
BOX 5

Visualisation tools for using systems thinking in context analysis

A key part of systems thinking is enabling actors in the system, or analysts, to visualise the whole system, see key relations and recognise stakeholder dynamics. The four systems thinking tools below are valuable for undertaking a context analysis. More tools are given in [Section 7](#).

Tool 1. Rich pictures – to help stakeholders understand the whole system

The illustration below is an example of a rich picture drawn during a virtual workshop. It shows issues affecting the future of food systems in a country.

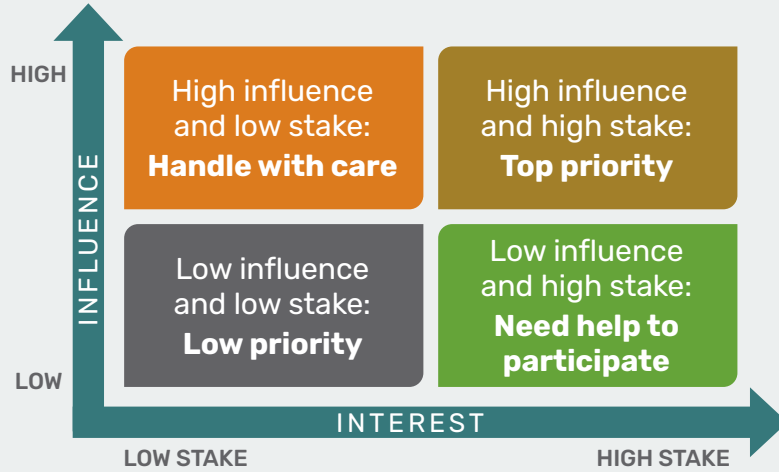


Source: Authors' own.

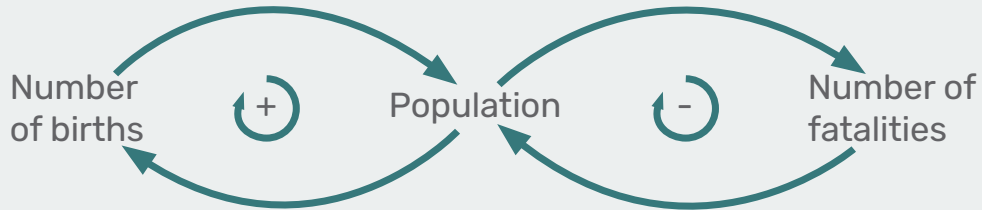
Box 5 continues on page 22 ➤

BOX 5 Continued

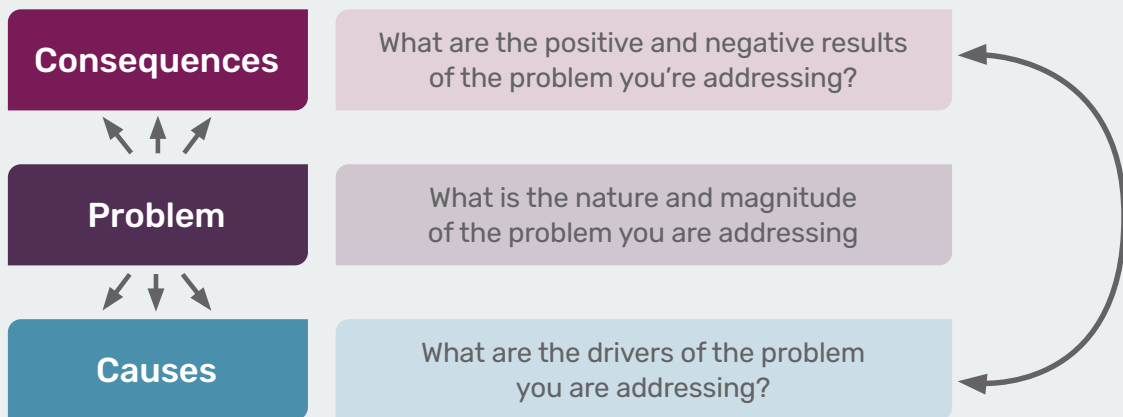
Tool 2. Stakeholder mapping – to understand influence and interests



Tool 3. Causal loop diagrams – to understand system relationships and feedback loops



Tool 4. Problem tree analysis – to distinguish between causes and effects in systems



Source: Authors' own.

Context analysis within FCDO is often carried out by research analysts who specialise in a particular country, region or thematic area. The case study in Box 6, which was shared during the Systems Thinking Learning Journey, provides an example of how a research analyst can make

a valuable contribution by connecting programme planners to different systems operating in a particular area and how their interventions might impact these. This is particularly important in complex or fragile environments where any intervention can cause further instability.

BOX 6

Case study: Ethiopia and the role of a research analyst in connecting systems

FCDO employs research analysts to provide long-term regional and domestic expertise on contexts, and to maintain networks within countries and broader academic communities. They work directly with policymakers, both on geographic desks and in country offices to help them understand external operating contexts. This includes working on:

- > Levels of analysis, at country and/or regional levels, with an eye on the broader context, bringing different lenses to bear on a cross-sectoral landscape.
- > Economic issues, demographic issues and tipping points.
- > Internal political contexts, and formal or informal rules of engagement.
- > Key actors, including winners and losers, commitments and incentives.

This is particularly important in a fragile or shifting context. Ethiopia, for example, has moved from being a developmental state with visionary leadership and fast growth, poverty reduction and a green revolution favoured by donors, to a conflict country with a civil war in the north. Government leadership, originally seen as strong-willed and committed to radical development, with a large bilateral aid programme, was a victim of its own success. Over five years from 2014, a younger, more informed population led to ethnicised protests because of inequalities in development programmes, which in a fragile geopolitical context led to sudden disintegration of political and social stability.

A research analyst is able to connect these different activities and changes together to provide a deeper understanding of the context that would be difficult for a single programme officer or adviser to see. Systems thinking is fundamental to this work. Governance advisers can draw on such analysis to provide cross-cutting advice to programme teams, taking account of vertical and horizontal linkages across systems.

Source: Presentation by FCDO staff member during the Systems Thinking Learning Journey.

5.2 Embedding systems thinking in the programme cycle

A core priority and challenge for FCDO is investing the UK aid budget in ways that optimise impact, achieve value for money and ensure accountability. The programme cycle involves all stages of such investments including design, management, and monitoring and evaluation (M&E).

Across the international development sector, tension exists between being responsive to the complex and

dynamic context of aid investments, and the constraints of how bureaucratic organisations function. In particular, the need for accountability in public investments has tended to drive top-down, linear planning, a focus on results-based management, using predetermined indicators, and low levels of risk taking.

Development investments face two particular challenges in relation to bringing about change in complex adaptive systems. First, given the complexity of the development context and the time change takes,

/// To have maximum systemic impact, FCDO needs the processes and mechanisms for a fully joined-up approach to context analysis, policy development and implementation ///

Systems Thinking Learning Journey participant

even with the most rigorous, systems-oriented and interdisciplinary analysis, designing an intervention that considers all the factors that will lead to success or failure is virtually impossible. Second, even if this were possible, the context is constantly changing in ways that are often unpredictable, quickly making starting assumptions about change processes unreliable and outdated. Further, the intervention itself is likely to have unexpected effects on the context. These factors have led to a growing discussion about the need for adaptive processes of programme management.

A related challenge comes with contracting implementing partners to deliver aid investments, whether these are non-governmental or international organisations, consultancy firms or others. Historically, implementing partners were often contracted to deliver set, measurable inputs, activities or outputs. However, often this did not lead to the desired higher-level outcomes and impacts of a programme being achieved. In response, there has been a shift to give greater attention to results and outcomes, which comes with significant difficulties for simple measurements that can be linked back to legally enforceable contracts. Further, as pointed out above, knowing exactly how to achieve particular outcomes and impacts up front may be impossible, making contracting even more challenging.

Challenges such as these don't have simple solutions. However, in principle a systems-oriented approach requires good partnerships with implementing partners, alongside any contractual arrangements, combined with systems that incentivise implementing partners to manage for impact rather than just delivering simplified and easily measured outputs and results. This, in turn, requires ongoing engagement between funders and implementing partners, underpinned by effective processes of learning.

Insights from practice for integrating systems thinking into the programme cycle

- > Develop programme cycle management around an assumption of the need to be adaptive, responsive and flexible.

- > Manage development investments with a **portfolio mindset**, which allows for a degree of risk and failure provided the overall portfolio represents an acceptable 'return on investment'.
- > Assume that the design phase is just the starting point, and that initial assumptions and plans about what can be achieved and how will need to be modified and iterated during implementation.
- > Base programme design on systems context analysis, which considers political economic factors and power relations.
- > Engage beneficiaries, potential implementing partners and multidisciplinary teams of experts in the design process.
- > Focus design on desired impacts and outcomes, while allowing flexibility for how these can best be achieved during implementation.
- > Develop effective partnerships with implementing partners and contractors that focus on a shared understanding of and commitment to the wider systems change that is being sought.
- > Ensure there is sufficient internal expertise and capacity to manage programmes adaptively.
- > Consciously establish learning systems within projects, country portfolios and sectors.

Taking a portfolio approach

Private sector investors and entrepreneurs operate with a portfolio mindset and recognise they need to take risks. The focus is not on the success of each investment but the success of the overall portfolio. Investment is increased in those things that are working and withdrawn from those that are not. This is the way entrepreneurs cope with complexity and uncertainty. Such entrepreneurial ways of operating are more difficult for public entities, yet a portfolio approach to investment within projects, country programmes or the overall development budget has unrealised potential. However, this requires adaptive management and flexible contracting structures, along with different ways of communicating about development investments to political leaders and the wider public.

“The reality of dealing with complex systems is that often you need to experiment. You need to try things out to discover what factors are at play and how they can be influenced. The way we're conditioned within government organisations is to lock as many things down as early as possible and offer certainty and security about how we're going to do things”

Systems Thinking Learning Journey participant

Establishing learning systems

Adapting programmes and projects to be effective within a complex environment requires constant cycles of reflection, learning, communication and adaptive decision-making. This requires going beyond conventional M&E, which often just checks delivered outputs and outcomes against what was planned for each individual programme. The entire implementation team needs to be engaged in critical reflection about how programmes and projects are contributing to the overall purpose of the portfolio: what is working, what is not and why.

This requires deep understanding by all involved about the higher-level intentions of the programme and the assumed theory of change. An environment needs to be created where everyone is encouraged to speak up and share their observations, experiences of and ideas about how to make improvements, overcome emerging difficulties and be honest about insurmountable obstacles. Management, meeting, engagement and decision-making processes all need to be oriented towards encouraging and enabling a learning culture where there is no blame for failures that happen because of an evolving context.

Enabling flexible implementing and contracting modalities

Developing flexible yet accountable contracting modalities between funders and implementing partners presents a significant challenge to embedding systems approaches into the programme cycle. Yet, adaptive management can be better supported by establishing good partnerships, having effective technical supervision, encouraging regular in-depth periodic review and reflection processes, and using contractual arrangements that allow workplans to be regularly updated.

FCDO researchers frequently use different approaches to political economic analysis to map context. Figure 7 illustrates the importance of understanding context to inform policy, develop strategy and plan interventions to achieve desired change.

The case study in Box 7 illustrates how an adaptive approach was integrated into market systems programming. The one in Box 8 focuses on a LearnAdapt project that specifically sought to create systems and processes for adaptive programming in a development context.

BOX 7

Case study: How to integrate adaptive programming into an FCDO context – Market systems programming

UK aid has a long history of investing in market systems programmes designed to explore how to intervene in particular markets in ways that improve the outcomes of those markets for the poor. Systems thinking has been used to identify specific market interventions that could unlock opportunities for large numbers of poor producers, entrepreneurs and consumers. Central to this work has been looking at value chains from a systems perspective to understand relations between different actors in the system and the enabling or constraining factors of support services and the wider institutional environment.

These programmes often have very focused M&E systems to track the immediate benefits of projects to target groups. However, despite the systems orientation, it appears in hindsight that for some programmes a focus on short term-results has led to opportunities being missed for longer-term systemic change. This has also related to private sector suppliers being paid to deliver on very focused, short-term outcome targets and hence not having an incentive to consider how programmes could contribute to wider systemic changes. When dealing with complexity, we don't know for sure which outputs and outcomes will end up being most significant in achieving the overarching goals. This calls for more sophisticated M&E systems, linked with good programme oversight, and an adaptive approach to project and programme management.

This experience led FCDO staff to reflect on the need to think about programmes as systems and be aware of David Snowden's warning from one of the Systems Thinking Learning Journey sessions: 'Failure repeats itself, successes tend not to'. This illustrates the importance of having M&E systems that provide the qualitative information that is necessary to understand failures. Further, it suggests the value in taking an overall programme portfolio approach and building a systemic perspective of how the coherence and impact of individual programmes and projects can be assured within a wider programme context.

Source: Presentation by FCDO staff member during Systems Thinking Learning Journey Session.

BOX 8

Case study: LearnAdapt

LearnAdapt was a three-year collaboration between the FCDO's Better Delivery and Emerging Policy, Innovation, Capability (EPIC) programme, the Overseas Development Institute (ODI), Brink, Feedback Labs and the Centre for Public Impact. It ran from April 2017 to November 2020, to create systems and processes for adaptive programming for greater development effectiveness. Adaptive management is a way to manage and mitigate risk. The programme illustrated the need for better partnership models; collaborations between in-house and external expertise; and new approaches to procurement, including less reliance on large grants and pre-set targets, and more attention given to building the evidence base for adaptive programming. The collaboration also found that adaptation and change management look very different in a humanitarian context than in a development context.

The programme resulted in a series of key lessons for adaptive management, which align with the messages in this guide:

- > Development is not linear but complex, uncertain and context specific.
- > Development actors need to work in ways that are based on deliberate experimentation, learning and adaptation to inform decisions and drive effective development.
- > Trust and relationship building across all relevant stakeholders are among the most critical enabling factors for adaptive management.
- > Adaptive management requires rethinking accountability requirements, results frameworks, value for money considerations, performance markers, and procurement and contracting mechanisms, so that they align with ways of working that are more flexible and responsive.
- > Senior managers leading adaptive programmes for donors need to create space for experimentation and learning, rather than for delivering on predetermined targets.
- > Leadership, champions, institutional incentives, a supportive management culture and appropriate mindsets are essential to encourage adaptive ways of working.
- > Adaptive management is resource intensive and requires skill, commitment, time for building trust and investments in learning, and a more nuanced approach to risk.

Source: Authors' own, created using data from Laws et al. (2021).

5.3 Systems thinking in international policy development

The challenges for effective policymaking in an international context are escalating in an increasingly interconnected, turbulent and risky world, as illustrated by the recent Covid-19 pandemic, war in Ukraine and increase in food prices. At the same time, all policymaking is set against the backdrop of the existential crisis of climate change, with a set of risks and dilemmas that humanity has never faced before. For FCDO, this brings multiple challenges and the need to work in an integrated way across global policy issues, and policy engagement with partner countries and UK domestic policy. Policymakers shared the points below during Systems Thinking Learning Journey discussions on how they had integrated systems thinking into policy.

Insights from practice for integrating systems thinking into policy

- 1 Clarify policy goals, with a focus on underlying causes rather than symptoms.
- 2 Start with a systems perspective on how different policy domains interconnect.
- 3 Use an in-depth and system-wide context analysis to understand policy issues as far as possible.
- 4 Identify the key stakeholders in a situation, and how their interests and positions will influence policy options.
- 5 Work across government silos and create cross-sectoral and interdisciplinary teams as appropriate.
- 6 Explore how to frame or re-frame policy issues to get different interest groups' engagement and buy-in.

“We just need to recognise that everything we work through is seriously complicated. That’s why we’re doing it when nobody else in the world is doing it. But that means there’s probably not going to be a blueprint for success, so we can’t just take something off the shelf”

Systems Thinking Learning Journey participant

- | | |
|---|--|
| <ul style="list-style-type: none"> 7 Establish long-term policy goals, even if the immediate means of achieving them may not be clear. 8 Make explicit and bring to the fore the return on investment from alternative policy options. 9 Work to develop indicators of policy progress that value human and environmental wellbeing. 10 Use foresight and scenario analysis to help leaders and influential actors better understand the likely consequences of current trajectories, | <ul style="list-style-type: none"> future uncertainties and risks, and alternative pathways. 11 Connect policymaking to the economic incentives that drive political decisions and citizens’ behaviours. <p>The case study in Box 9, drawn from discussions during the Systems Thinking Learning Journey, illustrates key elements that can impact on policy, such as using high-profile moments or events, presenting strong evidence, thinking politically, and understanding context.</p> |
|---|--|

BOX 9

Case study: Achieving policy around net zero

A session during the Systems Thinking Learning Journey on using systems thinking in policy processes, looked in particular at country diagnostics and global diplomacy in developing policy around climate change, a major issue across the whole of the UK Government. This was set within the context of the geopolitical challenge of countries of the global North being most responsible for climate change, having the most resources to mitigate climate change, and currently experiencing far fewer effects compared to countries of the global South. Achieving net zero requires long term action and commitments, while many countries, including the UK, work within short-term political systems.

This situation was discussed as a classic example of how systems thinking can be applied to complex diplomatic negotiations at global and national levels. There was recognition that specific moments can have high impact (such as the opportunity for the UK to host the Glasgow Climate Change Conference (COP26) in October–November 2021) and that it is important to recognise and build on these, while creating an evidence base from feedback loops of complex problems; and thinking politically, by identifying the key players needed for change to happen, and those who have the greatest capacity to undermine change if they are not on board.

Understanding the political constraints of change within a country is always key. Diagnostics include multiple objectives, interdisciplinary teams and looking across programmes. Rather than designing activities on a programme-by-programme basis, this can help make connections that get to the root of problems, such as understanding binding constraints on growth and development. FCDO is increasingly using such diagnostics in its different portfolios.

Source: Presentations by FCDO staff during Systems Thinking Learning Journey session.

5.4 Systems thinking in research, analysis and evaluation

Research should focus on the most powerful questions – it's important to start by asking why countries are not able to resolve the issues they face. A systems approach needs depth and breadth to build full awareness of the underlying dynamics that lock behaviours in place, either enabling or constraining change. This requires interdisciplinary research strategies that integrate with all FCDO's disciplinary cadres.

M&E indicators are often pre-defined, geared towards the needs of donors rather than implementing partners, and look downwards and inwards, rather than upwards and outwards. Time-bound, project-specific measurements are geared towards specific outcomes rather than long-term systemic impacts. A systems approach offers a more holistic consideration of intended and unintended consequences, and a better overview of potential risks.

Insights from practice for integrating systems thinking into research analysis and evaluation

> Start with a strong theory of change about how

the situation could be improved and understand the implications for different actors affected by the situation.

- > Recognise that in some situations immediate responses to crisis issues will be required and a systems wide response may not initially be feasible.
- > Data is important, but only collect data that serves a learning need.
- > Invest in gathering qualitative information at scale – consider alternative methods of data collection and analysis (e.g., SenseMaker – Box 12).
- > Rethink solutions – sometimes an indirect approach will prove more efficient than a more direct one, avoiding unexpected blocks and hurdles; systems analysis can help identify these approaches.
- > Don't celebrate too soon – make sure the change you have introduced is a lasting one.
- > Beware of claiming impact for a single programme or organisation – multiple factors contribute to changing systems.

BOX 10

Asking the right questions to achieve systems change – Reflections of an FCDO staff member

Often when we look at a development problem, it's very tempting to jump too quickly to a solution. You see a problem. You want a quick result. Sometimes that's the right thing to do. Sometimes you need to get something done quick. But when you've got longer, when you've got the opportunity, research can prompt you to ask, 'Why is that problem not being fixed by the partner country?' What incentives do people not have to fix it, or what capacity constraints do they have? And you continue to ask why, and so research is about helping you to ask the right questions and to understand what the root cause of that problem is. What can we address that will allow the system to deliver for the long term?

And I think it's similar for evaluations. When evaluations are adding most value, it's when they are asking that difficult question, the more fundamental question. It's a common mistake when we evaluate programmes that we look at whether the programme delivered its outputs and maybe achieved some immediate outcomes. But we can get far more of a difference if we ask, 'Has that programme changed the system?'

Whether it's water, whether you're working on emissions reduction, a humanitarian system, whatever it is, has that programme changed the system in a way that the country or local actors can solve the problem in a way that's likely to last? Wherever you work, it falls upon us as researchers and evaluators to have the discipline to make sure we ask that difficult question – it's not always the question we're asked to answer. Someone says, 'Can you tell us if this solution will work?' But, actually, if we take a step back and say, 'What do we really want to know? Can the system fix this problem?' – that is where we can be transformational.

Source: Presentation by FCDO staff member during Systems Thinking Learning Journey session.

The case study from Uganda in Box 11 combines learning from a specific moment (Uganda Week) with opportunities to bring research and evidence together using a systems approach.

BOX 11

Case study: Introducing systems thinking during Uganda Week in DFID

In October 2018, DFID's Research and Evidence Division and DFID Uganda piloted a new approach to research engagement and uptake, and cross-portfolio learning, in 'Uganda Governance Evidence Week' (Uganda Week). It included events and workshops to facilitate engagement between DFID and UK government staff, researchers, Ugandan practitioners and policymakers, civil society organisations and donors to consider the policy and programme implications of the research DFID commissioned and funded.

The week enabled the group to think comparatively and systemically about governance and politics in Uganda, deepen cross-portfolio learning and discuss future research priorities. Discussions centred on the dynamics within governance subsystems, and linkages between subsystems; and how, together, these inform our understanding of governance and politics in Uganda. Wider themes that also emerged included informality, 'pockets of effectiveness', unintended consequences of reform, and adopting a multidisciplinary and political settlements approach. These were relevant to many countries in which DFID operated, increasing understanding of the sorts of conditions under which positive reforms can occur.

Key conclusions included:

- > Imposing 'blueprint' or generic prescriptions without accounting for the particularities of the context will, in all likelihood, be ineffective, especially if the functionality of informal practices is not taken into account in devising solutions to improve formal governance functions.
- > We should recognise that formal and informal systems, and formal and informal rules and relationships, operate simultaneously, and that we need to consider the effect of reforms in one area on the performance of the other. 'Nudging towards the light' could be more effective and politically viable than aggressive disruption, though this has not been rigorously tested.
- > Most pockets of effectiveness identified in the research occur in new policy and executive functions, particularly those linked to economic performance, and by their nature can be delivered by a few dynamic actors with specialist skills.
- > Service delivery systems are by nature complex, involving moving parts, functions, actors, interests and layers. Change requires a joined-up approach, spanning local and national government, something that is a challenge in resource-scarce contexts.
- > Reform may have unintended consequences that can undermine change or even cause a net deterioration in the wider system.

Source: Evans et al. (2019).

BOX 12

Using stories and narratives as an alternative to indicator-based M&E

SenseMaker is a method of inquiry developed to unpack and explore the complexity of people's experiences through stories they share, giving them a greater voice. Starting from stories of people's lived experiences, which are self-interpreted by the storytellers themselves, patterns emerge from among multiple voices.

These patterns also shed light on the structures and mental models that explain observed events and phenomena. Such depth can help identify appropriate pathways and innovations to deal with complex problems. These patterns are analysed using supporting software and through collective interpretation processes with stakeholders. Involving more people can lead to better insights for continual collaboration, learning, adaptation and accountability.

Source: Gujit et al. (2022).

5.5 Systems thinking in crisis response

Crises and conflicts can no longer be seen as needing short-term emergency response. Events such as the Covid-19 pandemic, the Arab spring and the Ukraine/Russia conflict show that volatility, uncertainty, crisis and ambiguity are longlasting and have longlasting impacts. In FCDO, systems thinking has an important role in developing crisis preparedness and helping to understand ways out of crisis situations.

Core principles in addressing crises include surfacing assumptions (critical in the very early stages), taking time to gather different perspectives from relevant actors, and being as clear as possible about the potential ramifications of the context as it unfolds. While every crisis situation is unique, commonalities include a sense of messiness, chaos and confusion about who is doing what.

Taking time to think through a systems approach can avoid responding to the loudest voices and most obvious needs, instead using a triage approach to understand where the greatest need lies. When intervening in crisis situations, applying a 'do no harm' lens and using systems analysis to assess risks is important. However, in more complex contexts it may be hard to assess who will be harmed by interventions. In some cases, it will be a question of what results in the least harm. The systems principle of bringing multiple perspectives to the table can be especially critical when trying to develop rapid responses to a crisis situation. The humanitarian system itself has evolved since the early 2000s to become less chaotic and more predictable, but this can also make it more bureaucratic and less able to respond nimbly to changing dynamics.

Insights from practice for integrating systems thinking into crisis response

- > Take account of what existed before. There will have been some kind of system before the crisis – don't assume it no longer exists.
- > Identify the building blocks for a functioning system taking into account what was in place before the crisis, what is needed during the crisis and what will be needed for recovery (see the table in Figure 8, which was used in Haiti, as one possible tool).
- > However, a crisis means circumstances have fundamentally changed and existing models won't fit the new situation – make room for many new perspectives and feed these into decision-making.
- > Step back and analyse the new context in a systemic way – train teams in systemic context analysis as part of crisis preparedness.
- > While the systems for humanitarian response are designed to deal with messiness and facilitate clear command and control, the cluster approach creates silos, isolating different areas, and deals with these separately; it's important to ensure necessary coordination mechanisms are in place and functioning.
- > People perceive problems differently (for many people, instability is preferable to stability, which can marginalise the majority) – aim to understand the situation rather than only focusing on the apparent problem.
- > Don't jump to conclusions too fast – **see the world the way it is, not the way you want it to be.**

Discussions during the Systems Thinking Learning Journey session on crisis emphasised the importance of having framework to guide rapid assessment and action alongside effective leadership.

1 Stepping back to review the situation – FCDO staff emphasised the importance of undertaking the best systems analysis you can when engaging in a crisis situation, and avoiding the temptation to react without adequately considering priorities and consequences.

Two approaches for doing this are illustrated below. The first is a framework for responding in the health sector during a crisis, but this could be adapted to other sectors. Variations can be used to chart different systems and the impact of a crisis on them.

Figure 8. Responding to crises – Health systems framework

	Pre-crisis	Impact of crisis	Initial response
Leadership and governance			
Health workforce			
Health financing			
Medical products			
Health services			
Health information			
Community interface			

Source: Authors' own. Adapted from table shared by FCDO staff member during Systems Thinking Learning Journey session.

The second is the Chilcot Checklist (a product of cross-Whitehall lessons from the Chilcot Inquiry), a structured checklist inspired by surgical checklists but reoriented to political crises and longer-term

strategies. Scenario planning can also be helpful for crisis situations, to map out different ways the situation could unfold and with what implications for FCDO.

Figure 9. The Chilcot Checklist

- 1 VISION: WHY DO WE CARE?**
What does this mean for British interests? What are the risks of acting or doing nothing, including in the longer term? What is different now?
- 2 ANALYSIS: WHAT IS HAPPENING NOW?**
What are your sources of ground truth/evidence? Have assumptions been exposed to analytical tools or external challenge?
- 3 SCENARIOS: WHAT MIGHT HAPPEN NEXT?**
Have you looked at a range of options, and scenarios and consequences that could flow from these?
- 4 OPTIONS: WHAT SHOULD WE DO?**
Have you designed your options collaboratively, built in challenge and presented Ministers with clear Information on risks, opportunities and costs?
- 5 LEGAL IMPLICATIONS: HOW DO WE ENSURE ACTION IS LAWFUL?**
What is the wider legal context? Are Ministers aware of any legal risks? What are the policy implications? How will you ensure that any international legal basis remains sound if circumstances change?
- 6 POLICY AND STRATEGY: WHAT DOES SUCCESS LOOK LIKE?**
Does a clear strategy, and a feasible course of action that will meet policy objectives, exist? Is the approach supported by analysis?
- 7 RESOURCE: WHAT DO WE NEED TO DELIVER?**
What are the resource implications of your options?
- 8 PLANNING AND DOING: HOW SHOULD WE DO IT?**
Have you planned for a range of possible contingencies? Who is accountable and responsible for what?
- 9 POLICY PERFORMANCE: HOW WILL YOU MONITOR PERFORMANCE?**
How will you measure and evaluate success/failure?
- 10 EVALUATION: IS THE POLICY WORKING?**
When and how will you review this policy? Has the context changed? Have UK objectives/interests changed? Do you need to change direction?

Source: Authors' own. Based on Ministry of Defence (2017). Reproduced under Crown Copyright.

2 Leadership in crisis situations – Systems leadership in a crisis situation is vitally important. Despite the pressures, taking a systems perspective and bringing in the views and perspectives of different stakeholders remains critical. Reactive command and control approaches need to be resisted in favour of taking more of a humanitarian, coordinating approach. Thinking ahead and understanding

how immediate interventions will affect longer-term response and recovery options is vital for effective interventions. In many crisis situations, FCDO may not be able to exert control and will need to facilitate engagement across multiple different actors. As with development and diplomacy more broadly, this requires a good systemic political economic understanding of the context.

6 Overcoming institutional barriers to systems thinking and practice

Any organisation has challenges in putting systems thinking into practice – FCDO and its partners are no different. However, despite constraints, ways do exist to integrate systems approaches into FCDO's work, as illustrated by the case studies in this guide. Institutional barriers, and their root causes, must be well understood if they are to be overcome. In part, the challenge is to become a 'systems hacker' and be creative about introducing simple practices and processes that can help move organisations towards a culture of systems thinking.

Large public institutions have historically been organised on a disciplinary basis, with hierarchical decision-making, and accountability driven by narrow results-based planning. Processes for organisational learning, along with stakeholder analysis and engagement, are often limited by time, resources and organisational culture. Further, staff may not have the skills and experience to lead and facilitate effective systems thinking processes.

Drawing on the Systems Thinking Learning Journey sessions, here we list ways to encourage, support and integrate systems thinking within organisations:

- > Senior management should **regularly acknowledge systems thinking and practice as important** to achieving the organisation's goals and mission.
- > Develop practical mechanisms and processes for **integrating systems thinking into organisational functions** – for example, as outlined in [Section 5](#).
- > Develop and **value a culture of organisational learning**, including space for experimentation, critical reflection and open feedback.
- > Invest in **intra-disciplinary and multi-stakeholder processes** for analysis, policy development and programme design.
- > Make the ability to lead systems approaches to change **an explicit part of jobs descriptions and performance appraisal**.
- > Invest in the **capacity of staff** to think and act systemically.
- > Support the development of systems thinking and practice **capabilities in partner organisations**.

/// So how do we make it OK to experiment and learn, and then adapt as we go? I think part of that is about making sure that the governance culture and the culture of the organisation allows and supports that ///

Systems Thinking Learning Journey participant

Having specific and measurable indicators of progress and performance will always be an important part of management. However, systems thinking and practice requires this to be integrated with a strong focus on

the quality of relationships, adherence to overarching principles of a systemic approach to management, and effective communication.

BOX 13

Case study: Using scenario analysis to develop a strategic framework for the Middle East and North Africa

A K4D Learning Journey held in 2020 used a systems approach to identify potential future scenarios in the Middle East and North Africa (MENA) region. Its objective was to develop a robust and comprehensive understanding of the likely key trends in the region to 2030, and to assess the potential risks and opportunities of those trends for UK interests. The scenarios contributed to a strategic framework, with a ten-year outlook, to help the UK respond effectively to key events, changes and challenges in the region, so as to maximise the impact of its engagement.

Working online over five separate sessions, representatives from across the UK Government shared expertise and information between departments to answer the following key questions:

1. What are the key trends driving fundamental change in the region?
2. What are the most likely future scenarios for the region?

The use of a futures and scenario development approach added richness to existing country diagnostics and assessments of enduring challenges in the region, building on input from economists and governance, conflict and health advisers.

Mural, an online digital whiteboard and card clustering programme, was set up with templates for scenario analysis and proved highly effective in enabling collaboration. During the process, two graphic artists mapped discussions, creating 'rich pictures' representing geopolitics, social cohesion, security and conflict, regional security, and a final image of certainties and uncertainties.

Figure 10. Illustration of issues integrated into scenario analysis (Middle East and North Africa Region)



Source: Authors' own. Output of K4D Learning Journey on FCDO scenario planning for Middle East and North Africa Region.

7 Tools for getting started with systems analysis

The starting point for supporting colleagues and partner organisations to work in a more systems-oriented way is simply **to ask good 'systems questions'**. What are all the factors we should be considering? Are we taking a 'big picture' perspective? How do different stakeholders see the situation? Are we bringing interdisciplinary expertise into our analysis? Have we understood the underlying causes of what we see? This guide offers a set of such questions.

Beyond asking the right questions, numerous tools can be used to help bring a systems perspective into analysis and stakeholder dialogue. Individuals can use these to do their own thinking, but they are mostly used in a meeting or workshop context where the objective is to generate a shared systems-level understanding among a group of stakeholders. Significantly, many of these tools are highly visual and help to illustrate and analyse systems relationships and dynamics.

Detailed explanations of how to use the full set of tools is beyond the scope of this guide. However, numerous other resources are available that list systems

facilitation tools and provide detailed instructions for their application. As a start, we refer you to two resources. The first is the UK Government Office for Science online resource [*An introductory systems thinking toolkit for civil servants*](#). The second is the [*MSP Tool Guide - Sixty tools to facilitate multi-stakeholder partnerships*](#), which accompanies [*The MSP Guide - Designing and facilitating effective multi-stakeholder partnerships*](#). As this FCDO guide emphasises, a critical part of systems practice is bringing different stakeholders together to explore the wider system, question assumptions, build trust and relationships, and to collectively experiment and reflect. The MSP tools and guide are two resources that can help you to design and facilitate effective systems thinking processes.

Table 1 lists 14 different tools that have proved to be particularly useful in helping teams and stakeholder groups analyse a situation and make decisions using a systems mindset. More detailed explanations of how to use the tools are available through the links – most of these come for the Introductory systems thinking toolkit for civil servants or the MSP Tool Guide.

Table 1. Tools for systems thinking and analysis

Tool	Purpose	Process
<u>Rich pictures</u>	To engage a group of actors in visualising an entire situation from a systems perspective to develop a shared understanding of key elements and relationships of a system	Together, people discuss all the elements of the system they feel need to be considered and, on a large sheet of flip chart paper or a virtual board, illustrate them with pictures and symbols
<u>Conceptual models</u>	To capture the most important elements and relationships of a system in a clear visual diagram as a basis for explanation and further analysis or modelling	Using analysis and stakeholder input, agree on the most critical aspects of the system and draw these as a clear and logical diagram
<u>Stakeholder analysis</u> <u>Stakeholder identification</u> <u>Stakeholder characteristics & roles matrix</u>	To identify key actors in the system and assess their importance, influence, values, interests, roles and responsibilities	Identify all the different stakeholders and use tables and graphs to summarise the information

Table continues on page 34 ►

Tool	Purpose	Process
<u>Power analysis</u>	To develop a deeper understanding of the types of power different actors hold and how this influences the system	Can be analysed in many different ways – one approach is to look at power in terms of visible, hidden and invisible forms
<u>Causal loop diagrams</u>	To rigorously understand system variables, links between them and positive and negative feedback loops – such diagrams can be the basis for quantitative modelling or qualitative understanding	Identify key variables (which can be identified using rich pictures and conceptual models), then draw in links showing how one variable affects another – keep adding variables and links until a sufficiently detailed diagram has been produced
<u>Cause and effect diagrams</u> (fishbone or Ishikawa diagrams)	To clarify all the possible causes that lead to a certain effect – this is helpful in ensuring system interventions tackle underlying causes	Use a fishbone structure with the effect at the ‘head’ and draw in all the possible causes as ‘bones’, grouping similar or related effects together
<u>Problem tree analysis</u>	To deeply understand the causes and consequences of a particular issue or problem and to see how causes and consequences cluster	Start with a core perceived problem or issue; identify the causes of the problem, which are the roots of the tree; then identify the consequences of the problem, which are the branches of the tree
<u>Institutional analysis</u>	To explore the institutional factors that influence behaviour in a human system including formal and informal rules, policies, culture and values, and established patterns of behaviour	Helpful in analysing institutions in terms of how they influence the way people and organisations behave
<u>Four quadrants of change</u>	To gain an understanding of different dimensions of systems change related to individual views and capacities, interpersonal relationships, social and cultural factors or structural factors	Explore with stakeholders the degree to which they see an issue being influenced by individual views and capacities, interpersonal relationships, social and cultural factors or structural factors, and assess the implications for facilitating change
<u>Ritual dissent</u>	To engage stakeholders in gaining critical depersonalised feedback about ideas for change to improve decisionmaking in a rapid-fire manner – it works on the principle that people learn more quickly from critique than polite agreement	One group shares its ideas with a recipient group, then turns away and listens carefully as the recipient group critically scrutinises the ideas for faults – the sharing group receives feedback, then uses this to improve its ideas
<u>Scenario planning</u>	To explore plausible alternative futures that could come about based on critical uncertainties about the future	Key trends and critical uncertainties are identified – the uncertainties are used to identify different scenario story lines about the future
<u>Theory of change map</u>	To map out the assumed necessary conditions and required actions to achieve a desired outcome or goal – this helps to understand the types of system changes needed	Provide clarity on the outcome or goal, then engage stakeholders in exploring what would be necessary to achieve this – look at all the necessary conditions, not just what a particular intervention can deliver

Source: Authors' own, drawing on the Introductory systems thinking toolkit for civil servants and the MSP Tool Guide, and other sources as shown in the links.

Bibliography

Abercrombie, R., Boswell, K., & Thomasoo, R. (2018). *Thinking big: How to use theory of change for systems change*. New Philanthropy Capital.

Abercrombie, R., Harries, E., & Wharton, R. (2015). *Systems change: a guide to what it is and how to do it*. LankellyChase Foundation and New Philanthropy Capital.

Banerjee, B., Claborn, K., Gaskell, L., Glew, L., Griffin, J., Hovmand, P., Mahajan, S. L., McClure, D., Naranjo, L.G., Pereira, L., Rieder, E., Ryan, M., Sharma, A., Shaw, R., & Zou, A. (2019). *The art of systems change: eight guiding principles for a green and fair future*. World Wildlife Fund. <https://www.worldwildlife.org/publications/the-art-of-systems-change-eight-guiding-principles-for-a-green-and-fair-future>

Brouwer, H., Woodhill, J., Hemmati, M., Verhoosel, K., & van Vugt, S. (2019). *The MSP guide: how to design and facilitate multi-stakeholder partnerships* (3rd ed.). Practical Action Publishing.

Cabaj, M., & Tamarack Institute. (n.d.). *What we know so far about: sets of principles for evaluating systems change efforts*.

Checkland, P., & Scholes, J. (1999). *Soft systems methodology in action*. Wiley.

Christie, A. and Green, D. (2019) 'The Case for an Adaptive Approach to Empowerment and Accountability Programming in Fragile Settings', Synthesis Report, Itad and Oxfam in association with IDS. https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/14556/A4EA_Adaptive_Management_Synthesis_Paper.pdf?sequence=1&isAllowed=y

Dreier, L., Nabarro, D., & Nelson, J. (2019). *Systems leadership for sustainable development: strategies for achieving systemic change*. CR Initiative at the Harvard Kennedy School. <https://www.hks.harvard.edu/centers/mrcbg/publications/fwp/crisept2019>

Evans, P., Marquette, H., Patel, A., & Pedley, D. (2019, 12 February). *The machinery of government and the mechanics of governance: findings from the Uganda governance evidence week*. FCDO Research. https://medium.com/@DFID_Research/the-machinery-of-government-and-the-mechanics-of-governance-findings-from-the-uganda-governance-e218f2248d39

Foresight4Food.net. (n. d.). *Foresight4Food.net*. <https://foresight4food.net/>

Geels, F.W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1, 24–40. <https://doi.org/10.1016/j.eist.2011.02.002>

Government Office for Science. (2022). *An introductory systems thinking toolkit for civil servants*. UK Government. <https://www.gov.uk/government/publications/systems-thinking-for-civil-servants/toolkit#introduction-to-systems-thinking>

Green, D. (2016). *How change happens*. Oxford University Press. Oxford

Green, D. (2022). (Re)making the case for adaptive management. From power to poverty blog. Oxfam. Oxford. <https://frompoverty.oxfam.org.uk/remaking-the-case-for-adaptive-management/>

Green, D. (2022). (Re)making the case for adaptive management part 2: What to read? What Constitutes Evidence? Where are the Gaps?. From power to poverty blog. Oxfam. Oxford. <https://frompoverty.oxfam.org.uk/remaking-the-case-for-adaptive-management-part-2-what-to-read-what-is-evidence-where-are-the-gaps/>

Guijt, I., Gottret, M.V., Hanchar, A., Deprez, S., & Muckenhirn, R. (2022). *The learning power of listening*. Practical Action Publishing. <https://doi.org/10.3362/9781788532006>

Kania, J., Kramer, M., & Senge, P. (2019). *The water of systems change*. FSG.

Kennedy, E., Gladek, E., & Roemers, G. (2018). *Using systems thinking to transform society: the European food system as a case study*. Metabolic.

Laws, E., Pett, J., Proud, E., & Menocal, A.R. (2021) *LearnAdapt: a synthesis of our work on adaptive programming with DFID/FCDO* (2017–2020). ODI. https://cdn.odi.org/media/documents/learnadapt_summary_note_2021.pdf

Leeuwis, C., Boogaard, B.K., & Atta-Krah, K. (2021). How food systems change (or not): governance implications for system transformation processes. *Food Security*, 13, 761–80. <https://10.1007/s12571-021-01178-4>

Lindsley, B. (2022a). *35 greatest systems thinking books of all time*. <https://bryanlindsley.com/greatest-systems-thinking-books/>

- Lindsley, B. (2022b). *75 systems thinking tools proven to give deeper insights*. <https://bryanlindsley.com/systems-thinking-tools/>
- Midgley, G., & Lindhult, E. (2021). A systems perspective on systemic innovation. *Syst Res Behav Sci*, 38, 635–70. <https://doi.org/10.1002/sres.2819>
- Miller, R., Poli, R., Rossel, P., Tuomi, I., Ehresmann, A., Béjean, M., Vanbremeersch, J.-P., Kamara, K., Acheron, A.V., Akomolafe, B., Arellano, A., Bergheim, S., Cagnin, C., Candy, S., Cedeño, O., Leroy, S., Cruz, S., Djindingar, N., Eyakuze, A., & Simard, N. (2018). *Transforming the future: anticipation in the 21st century*. Routledge. <https://doi.org/10.4324/9781351048002>
- Ministry of Defence. (2017). *The good operation: a handbook for those involved in operational policy and its implementation*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/928601/FCDO-Governance-TCF-Sept2020.pdf
- Mulgan, G. (2021). *Thinking systems: how the systems we depend on can be helped to think and to serve us better*. STEaPP Working Paper Series 32.
- ODI. (2020). *LearnAdapt: a synthesis of our work on adaptive programming with DFID/FCDO (2017–2020)*. Briefing Note. <https://odi.org/en/publications/learnadapt-a-synthesis-of-our-work-on-adaptive-programming-with-dfidfcd0-20172020/>
- Omidyar Group. (2017). *Systems practice*.
- Ramos, E.G., Hynes, W., Müller, J.-M., & Lees, M. (2020). *Systemic thinking for policy making: the potential of systems analysis for addressing global policy challenges in the 21st century*. No. SG/NAEC(2019)4). New Approaches to Economic Challenges. OECD Publishing.
- Schot, J., & Geels, F.W.(2008) Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technology Analysis & Strategic Management*, 20(5), 537–54. <https://doi.org/10.1080/09537320802292651>
- Senge, P.M. (2006). *The fifth discipline: The art & practice of the learning organization*. Doubleday. <https://blog.12min.com/the-fifth-discipline-pdf-summary/>
- Snowden, D., & Rancati, A. (2021). *Managing complexity (and chaos) in times of crisis. A field guide for decision makers inspired by the Cynefin Framework*. European Commission. <https://doi.org/10.2760/353>
- Social Change UK. (2019). A guide on the COM-B model of behaviour. Social Change UK. https://social-change.co.uk/files/02.09.19_COM-B_and_changing_behaviour_.pdf
- Syed, M. (2019). *Rebel ideas*. John Murray Press. <https://www.matthewsyed.co.uk/resource/rebel-ideas-the-power-of-diverse-thinking>
- The Cynefin Company. (n.d.). *About – Cynefin framework*. The Cynefin Co. <https://thecynefin.co/about-us/about-cynefin-framework/>
- UNDP Global Centre for Public Service Excellence. (2014). *Foresight as a strategic long-term planning tool for developing countries*.
- Wasafiri. (n.d.). *SystemCraft: how to tackle our toughest problems*.
- WEF (2020) *The global risks report 2020*. World Economic Forum (WEF). <https://www.weforum.org/reports/the-global-risks-report-2020>
- Williams, B., & Hummelbrunner, R. (2010). *Systems concepts in action: a practitioner's toolkit*. Stanford University Press.
- Woodhill, J., & Hasnain, S. (2021). **A framework for understanding foresight and scenario analysis**. Working draft. Foresight4Food. Oxford.

USEFUL LINKS

- An introductory systems thinking toolkit for civil servants**, UK Government Office for Science
- The MSP Guide: Designing and facilitating effective multi-stakeholder partnerships**, Wageningen University & Research
- 35 Greatest Systems Thinking Books of All Time**, Bryan Lindsley
- 75 Systems Thinking Tools Proven To Give Deeper Insights**, Bryan Lindsley
- The Global Learning for Adaptive Management initiative (GLAM)**, Overseas development Institute
- The Cynefin Framework**
- Foresight4Food**

Contact

Email: info@k4d.info

Twitter: [@K4D_info](https://twitter.com/K4D_info)

Website: k4d.ids.ac.uk