Taking responsibility for complexity

How implementation can achieve results in the face of complex problems

Harry Jones

Foreword by David Booth

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Acknowledgements

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Boxes and figures

Acronyms

ABM	Agent-based Modelling
ACM	Adaptive Collaborative Management
ADB	Asian Development Bank
ALPS	Accountability, Learning and Planning System (ActionAid)
ANU	Australian National University
APPP	Africa Power and Politics Programme (ODI)
APSC	Australian Public Service Commission
CCA	Climate Change Adaptation
CoP	Community of Practice
CPR	Common Pool Resources
CSO	Civil Society Organisation (CSO)
DAC	Development Assistance Committee (OECD)
DEFRA	UK Department for Environment, Food and Rural Affairs
DFID	UK Department for International Development
EIA	Environmental Impact Assessment
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IWRM	Integrated Water Resources Management
M&E	Monitoring and Evaluation
NAPA	National Programme of Action
NGO	Non-Governmental Organisation
NICE	National Institute for Clinical Excellence
NRM	Natural Resource Management
NS6	New Synthesis Project
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OIOS	UN Office of Internal Oversight Services
OM	Outcome Mapping
PME	Planning, Monitoring and Evaluation
PRSP	Poverty Reduction Strategy Paper
RAPID	Research and Policy in Development (ODI)
RBM	Results-based Management
RCT	Randomised Controlled Trial
SNV	Netherlands Development Organisation
SUS	Brazilian Unified Health System
ToC	Theory of Change
UK	United Kingdom
UN	United Nations
UNEP	UN Environment Programme
US	United States
USAID	US Agency for International Development

Foreword

This paper is about one of the most important and perennially topical issues in the promotion of development and social change – the role of information and knowledge in improving results and ways of working.

Managers with money to spend and auditors on their heels are typically attracted to radical simplifications of reality which permit an exclusive focus on establishing measurable relationships between inputs and outcomes. They welcome approaches to monitoring and evaluation which promise either to 'demonstrate results' or to reveal forms of intervention that do not work and should be abandoned. Rigorously done, the collection of such information is seen as a central tool for implementation, providing for both the accountability to funders and the learning from experience that responsible planners need.

Another band of practical people is typically concerned with the lack of realism entailed by this style of managerialism. In all but the simplest interventions, the relationship between inputs and the desired outcomes involves systems of interaction between intelligent individual human beings and corporate actors in which there is, from a planner's point of view, a great deal of in-built uncertainty. If in such contexts the generation and use of information is restricted to 'demonstrating results', the learning both within and about processes of change is going to be limited at best. A nominal accountability to funders may be served, but very likely at some cost to the quality of the intervention.

Harry Jones belongs to the second band of practical people. His paper provides a comprehensive and up-to-date report on where this type of thinking has gone since it was last centre-stage in thinking about development policy – I am thinking particularly of the confrontation in the 1980s between 'blueprint' planning concepts and adaptive or learning-process approaches. The literature on the various issues entailed by characterising social systems as 'complex' is now large and for outsiders rather inaccessible. The implications it may have for the practical business of trying to improve change initiatives and programmes of assistance in a field like international development are far from self-evident. Harry therefore provides a useful service in exploring systematically the various types of policy challenges and action decisions to which this thinking is relevant.

The paper starts in Section 2 by reminding us of the technical meaning of 'complexity' (importantly, a complex problem is not just a complicated or difficult one). It then walks us through the 'when, where and how' of using knowledge, information or understanding in ways that are likely to improve policies and practices in the real world. There are frequent warnings about the harm that can be done by using tools of planning or monitoring that are ill-adapted to the purpose of facilitating progressive change in interactive systems. On the whole, however, the tone is up-beat and the messages practical. They are directly relevant to challenges at the top of the development-policy agenda, including enabling transformative economic growth, facilitating improvements in political governance and (an example of my own) addressing the downstream service-quality problems that continue to blunt the effectiveness of aid-financed sector programmes in many countries.

Readers of Section 3, which sets out 'practical guidance for dealing with complexity', will no doubt be inspired by some of Harry's suggestions and remain unconvinced by others. But the paper helpfully sets out the reasoning leading him from dimensions of complexity to recommended ways of working, using the same 'when, where and how' headings. Together with the richness of the cross-references to related ideas (realistic evaluation, outcome mapping, cost-effective feedback loops, and so on), this will enable users of the paper to arrive at their own conclusions and be enriched in the process.

The paper is a resource to which I, for one, will return more than once, as my immediate concerns bring me back to one or other of the many important issues on which it has wise guidance to offer.

David Booth, May 2011

Executive summary

There is a growing recognition that many problems facing policies and programmes are complex and need to be treated as such. Implementation must deal with interdependent problems, navigating nonlinear and often unpredictable change processes, involving a diverse range of stakeholders. The first half of this paper therefore aims to give readers the tools to decide in what way, and to what degree, the challenges they face are complex – and sets out the central reasons why complex problems present big challenges for traditional approaches to implementation:

- Firstly, **the capacities to tackle complex problems are often distributed among actors**: problems manifest themselves in different ways and at different levels, and rather than one organisation or hierarchy being fully in control of meeting a particular objective, action may rely on differing degrees of collaboration from a variety of actors.
- Secondly, **complex problems are difficult to predict**: many social, political and economic problems are not amenable to detailed forecasting. Where causality is not well understood success may rely on adaptation and flexibility to emerging insights, rather than trying to completely fix the shape of policy responses in advance.
- Thirdly, complex problems often involve **conflicting goals**: there may be many divergent but equally plausible interpretations of a policy issue, with different groups approaching it from different starting points or assumptions. Implementation cannot be technocratic, but requires a negotiated understanding and synthesis through communicative processes.

Traditional tools tend to be based on inappropriate assumptions for complex problems, and as such, when they are applied in the wrong context, **a number of negative side-effects** can arise. Formal implementation tools may decrease in relevance, key aspects of problems are hidden from sight, and managers may be presented with perverse incentives. The problem, however, is not (necessarily) intractable problems, or poor application of the right tools, but rather **use of the wrong tools for the job.** In recent years, the complexity sciences have improved our understanding of complex problems, and have provided concepts and ideas which incorporate both old and new insights to present alternative theories for change, greater understandings of underlying processes and, crucially, better approaches for tackling them in a strategic and direct manner.

Furthermore, the ways in which policy draws on available knowledge becomes one of the central determinants of its success. The difference is that, rather than working in a linear fashion, policy-makers must be mindful of constraints and opportunities as to **where, when and how knowledge and decision-making can best be linked**. The principles and priorities can be organised as below:

Where

Implementing agencies need to work in a collaborative mould, **facilitating decentralised action and self-organisation**. This can be done in the following ways:

- *Decentralisation and autonomy*: One key priority is decentralising policy-making and implementation, distributing power in decision-making and allowing increased autonomy for units lower down the hierarchy.
- *Engaging local institutions and anchoring interventions*: Implementing agencies may need to work with and through local organisations addressing an issue at different scales; this may be best done through co-management and power sharing.
- *Convening and boundary management*: Agencies may be able to play a unique role in facilitating processes that build trust and collaboration between key stakeholders. They must act as trustworthy stewards of these processes, including the provision of transparent mechanisms for conflict resolution.
- *Building adaptive capacity*: Capacity building is likely to be central in efforts to enable actors to capitalise on any autonomy for addressing problems. Supporting adaptive capacity networks is shown to be a central priority for stimulating emergent responses.

- *Remove the barriers to self-organisation*: There may be different types of barriers and systemic issues which are preventing actors from adapting to emerging problems: these could be related to national legislation or political systems, or issues of power, discourse and social capital.
- *Supporting networked governance*: Agencies must approach the delivery of their mandate with a networked approach to policy and governance. Accountability structures can usefully focus on holding units accountable for their mission or role description. Relationship management concern and participatory processes should be central focuses.
- *Leadership and facilitation*: Even where the capacity to act is distributed, leadership emerges as a critical variable in the success of collaborative responses. However, in the face of complex problems this leadership must be facilitative and enabling, working through attraction rather than coercion.
- *Incremental intervention*: Where a central agency does need to intervene, it should be approached in an incremental manner, starting from existing networks and taking an evolutionary approach to support, looking to 'seed' decentralised action and support emerging responses rather than implementing idealistic blueprints.

When

Implementing agencies need to deliver adaptive responses to problems, building space for interventions to be **flexible to emerging lessons**. This can be done in the following ways:

- *Appropriate planning*: Systems around ex ante analysis should be light and flexible, and focus on providing utility, for example by enhancing awareness of the key risks or lessons. Accountability can be tied to clear principles for action rather than to unpredictable results or inflexible activity plans, and rules for the adjustment of plans can be established in advance.
- *Iterative impact-oriented monitoring*: Continual monitoring of the effects an intervention is having will be critical to its success – and this should be done in order to check and revise understandings of how change can be achieved, rather than simply recording progress. It is therefore imperative to make any evaluation as utilisation-focused as possible, to ensure the requisite feedback is received to allow for timely adaptation.
- *Stimulating autonomous learning*: In the face of complex problems, evidence shows that actors are more likely to be responsive to emerging evidence where it emerges in the context of trust and ownership. Monitoring and evaluation functions must be embedded throughout implementation chains, and the autonomy to shape M&E frameworks should be devolved.
- *Implementation as an evolutionary learning process*: Experimentation through intervention may need to become the central driver of learning. This could be put centre-stage in an evolutionary implementation process, revolving around variation, where a number of different options are pursued, and also through selection, where based on feedback from the environment, some are deemed a greater success and replicated.
- *Creating short, cost-effective feedback loops*: Judicious use of participatory M&E and transparency may be important because *who* carries out the monitoring has proven a crucial determinant of effective adaptation. There are a number of local-level methods for citizen involvement in the governance of implementation available, including emerging innovation in systems for beneficiary feedback, and transparency and accountability initiatives.
- *Accountability for learning*: Measures may need to be taken to ensure policies place explicit value on learning as well as delivery: intervention must be seen as an expression of hypotheses and complex tasks may require learning objectives rather than performance goals. Promoting innovation in service delivery may require valuing redundancy and variety.

How

Implementation systems and processes must draw on an eclectic mix of sources of knowledge at many different levels and junctures. Of particular importance are tools, which allow for the **negotiation between and synthesis of multiple perspectives,** for example:

- *Decisions from deliberation*: Carefully managed and structured processes of deliberation have proven to have wide benefits on both decisions made and their subsequent implementation. These must be embedded in inclusive, face-to-face fora, focusing on eliciting reasoned and legitimate inputs to action.
- *Focusing on how change happens*: Implementation processes must tie together analytical and management efforts with explicit questions as to how change happens in their context. Ideas and assumptions underlying implementation must be made explicit in order to allow them to be purposefully tested; planning tools such as 'theory of change' and theory-based evaluation may assist.
- *Realistic foresight*: Foresight and futures techniques can be used to provide broad and realistic forward-looking analysis and fix shared structures for ongoing implementation. Tools such as scenario planning have proven invaluable in enabling organisations to be both resilient and nimble, so long as a broad range of perspectives are taken into account.
- *Peer-to-peer learning*: Rather than focusing on technocratic knowledge-transfer processes, adaptation and learning may often work more effectively through peer networks, such as through study tours or 'peer review'. Research on communities of practice has shown how the informal dynamics of linkages can be the driver of creativity and reflection.
- *Broadening dialogues*: Processes of contestation and argument may be important for informing and improving the foundations of policy and action, and implementation should look to build and work with critical voices, rather than avoiding them. Promoting reflexive research is important as is building the capacity of disadvantaged stakeholders to fully articulate their position.
- *Sense making for common ground*: a shared vision of the problem at hand is often a prerequisite for progress on complex issues. Key stakeholders must jointly negotiate concepts and models, and boundary objects such as shared models or standards can play a key role in anchoring collective action.
- *Facilitation and mediation*: Efforts to combine different sources of knowledge must tread carefully, and policy-makers must become adept in managing power in the knowledge-policy interface. Power should be shared in both analytical and decision-making processes, with space made for critical reflection and the consensual resolution of impasses and conflicts.

So where are these approaches most relevant? In some sectors, 'complex' models of implementation are well-established and proven effective; in other areas, persistent and well-recognised issues with implementation seem to bear the hallmarks of the negative side-effects of traditional tools applied to complex problems. This research has not attempted to specify what problems should be considered 'complex', but to give readers the **tools to decide for themselves whether an issue faced is complex, and to provide guidance on what to do if it is**. The extent to which any one challenge exhibits the characteristics of these three dimensions is likely to be a matter of degrees, and the relevance of the principles and priorities set out above will vary accordingly. Implementation will likely require a mixture of these principles with more traditional approaches and similarly the tools presented above have a domain of appropriate application, and need to be applied well and with sensitivity to context.

What is clear, however, is that complexity can no longer be swept under the carpet. While there is not yet one comprehensive framework, there is a growing collection of models, tools, and approaches to effectively develop interventions in the face of these multifaceted problems. These will allow those charged with implementing policies and programme to be able to more explicitly, systematically and rationally deal with the challenges that are presented. However, taking responsibility for complexity is a double-edged sword. On the one hand, there are a new set of tools to use, and/or more legitimacy given to approaches not previously seen as 'scientific' or 'rigorous'. But on the other hand, this will make areas of practice previously hidden from sight more visible, and actors will find themselves held accountable for aspects of their work which may have previously slipped under the radar. This shift may therefore represent an uncomfortable or unattractive transition. However, what is clear is that it is an essential transition in order to achieve results in the face of complexity.

1. Introduction

It has long been recognised that social, economic and political change is complex, presenting a variety of challenges for governments and organisations looking to influence it (e.g. Beinhocker, 2006; Rihani, 2005). Meanwhile, in the face of such complex problems, traditional approaches to implementing policies and programmes seem to be shrinking in importance (Bourgon, 2010a). However, there is no real consensus on what can replace them – without an alternative set of tools, those charged with implementing policies and programmes do not have much option but to stick with their traditional approaches while acknowledging their shortcomings.

In recent years, an area of academic development known as the complexity sciences has attempted to improve our understanding in this regard. Thus far, 'complexity' has provided a valuable framework for explanations as to why a variety of tools commonly used in policy-making and governance are not appropriate for tackling certain types of problems. However, there has been no real effort to use it robustly to propose alternatives (with some notable exceptions, e.g. Swanson and Bhadwal, 2009). The literature attempting to provide practical solutions is quite dispersed and narrow in scope, and has often failed to convincingly link the proposed solution to the problem of complexity.

The Overseas Development Institute's (ODI's) Research and Policy in Development (RAPID) programme's[1] interest in complexity comes from its experience in working to understand the influence of research on policy and to help a variety of actors to bridge the two – given that processes of policy change, and the influence of research on them, are highly complex. RAPID has been developing practical tools for managing complexity for some time (such as tools for planning, monitoring and evaluating policy influence, e.g. facilitating networks to improve research–policy linkages). It has become clear that, while a variety of tools exist for dealing with complexity, they are often not joined together. In addition, there are major difficulties in marrying these approaches with mainstream ways of shaping policy and practice in development agencies and elsewhere.

This guide is an attempt to fill the gaps outlined here. Initiatives to pull together a coherent picture of policy design and implementation for complex problems already exist (e.g. the New Synthesis Project, see Box 2); this paper draws in this emerging picture with a focus on international development. It looks at the academic and grey literature, as well as using discussions with experts in the field and the experiences and reflections of practitioners engaged every day in dealing with complex problems. The paper is aimed at a variety of actors, in particular:

- Decision-makers with the responsibility for shaping policy implementation in government ministries and development agencies, including within departments intended to support development work (e.g. working on performance frameworks, project approval and compliance). For these actors, it is hoped the paper will bring the beginnings of an alternative to the tried, tested and often failing frameworks of new public management.
- Individuals working with knowledge in government agencies and elsewhere, for example in evaluation, research and knowledge management. For these, it is hoped the paper will provide an advocacy tool to demonstrate the importance of their work, as well as suggestions on how to mould what they do to the needs of complex problems.
- Advisors and managers working with governments in developing countries. For these, it is hoped the paper will highlight some areas where they can better implement policies and programmes in a ways that are appropriate for complex problems.

This guide is structured in two parts, first discussing the problem and second providing recommendations. Section 2 outlines what is meant by complexity, precisely what problems it poses

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[1] www.odi.org.uk/work/programmes/rapid/default.asp.

for implementation and how traditional approaches are not suitable for complex problem. Section 3 discusses priorities, principles and tools for shaping policy and programme implementation in the face of complexity. Readers pressed for time, or already convinced of the need for policy to adapt to meet the challenge of complexity, should focus on Section 3. Section 4 concludes.

2. Complex problems and the challenges they pose

This section should enable the reader to assess whether their implementation challenge is in fact a 'complex' problem, and to identify key characteristics to mark out the appropriate tools for managing the type of complexity faced. It first describes what is meant by a complex problem, and then outlines three specific aspects of complex problems that cause problems for traditional policy implementation. It goes into detail on each of these aspects, providing explanations and ideas to help the reader identify whether their policy or programme is complex in this way (Sections 2.3-2.5).

2.1 When is a problem complex?

The fact that some problems and issues are complex has been acknowledged for some time (both tacitly and explicitly), but in recent times complexity has been discussed with increasing frequency and sophistication. Complexity theory and the complexity sciences have attempted to investigate the integral characteristics of complex systems, investigating through theory and empirical research the ways in which interconnected, unpredictable phenomena work. A previous ODI working paper outlines 10 important characteristics of complex problems, relating in particular to features of systems that can be described as complex, the nature of change in complex systems and the role of agency in complex systems (see Box 1).

Box 1: Key concepts of complexity theory

Complexity and systems
These first three concepts relate to the features of systems that can be described as complex:
1. Systems characterised by **interconnected and interdependent elements and dimensions** are a key starting point for understanding complexity science.
2. **Feedback processes** crucially shape how change happens within a complex system.
3. **Emergence** describes how the behaviour of systems emerges – often unpredictably – from the interaction of the parts, such that the whole is different to the sum of the parts.

Complexity and change
The next four concepts relate to phenomena through which complexity manifests itself:
4. Within complex systems, relationships between dimensions are frequently **nonlinear**, i.e., when change happens, it is frequently disproportionate and unpredictable.
5. **Sensitivity to initial conditions** highlights how small differences in the initial state of a system can lead to massive differences later; butterfly effects and bifurcations are two ways in which complex systems can change drastically over time.
6. **Phase space** helps to build a picture of the dimensions of a system, and how they change over time. This enables understanding of how systems move and evolve over time.
7. **Chaos and edge of chaos** describe the order underlying the seemingly random behaviours exhibited by certain complex systems.

Complexity and agency
The final three concepts relate to the notion of adaptive agents, and how their behaviours are manifested in complex systems:
8. **Adaptive agents** react to the system and to each other, leading to a number of phenomena.
9. **Self-organisation** characterises a particular form of emergent property that can occur in systems of adaptive agents.
10. **Co-evolution** describes how, within a system of adaptive agents, co-evolution occurs, such that the overall system and the agents within it evolve together, or co-evolve, over time.

Source: Ramalingam and Jones (2008).

If a system or problem displays some of these characteristics, this is a signal that it may be complex. It is also possible to come from the perspective of someone attempting to tackle a problem, based on the starting point that many policy issues may pose real challenges for anyone trying to contribute to real change, making it difficult to know where to begin any interventions, whether interventions will make a

noticeable impact and even how to measure their success. There are many different characterisations of what makes a problem complex; rather than choosing one, we present a few alternatives below.

One way of marking out these sorts of problems is to distinguish between 'simple,' 'complicated' and 'complex' problems. Glouberman and Zimmerman (2002) illustrate this by comparing the problem of baking a cake, sending a rocket to the moon and raising a child. In order to bake a cake (a **simple** problem), it is easy to use a recipe to replicate a positive outcome, with no particular expertise required. Sending a rocket to the moon (a **complicated** problem), on the other hand, requires high degrees of expertise, and must be divided into a number of tasks for specialists (e.g. engines, fuel), who must be coordinated. Nevertheless, building one rocket improves the chances of the next one functioning well, and there is a reasonable certainty of outcome. When raising a child (a **complex** problem), however, every situation is unique; previous success is no guarantee of future success; and, while expertise may help, it is not necessary or sufficient.

Another way of conceptualising complex problems comes from Ackoff (1974), who distinguished 'puzzles' and 'problems' from 'messes.' **Puzzles** have a well-defined, agreed statement of the problem, with solutions that can be tried and then abandoned or transferred to other similar problems. A **problem** has some agreeable structure, with known dimensions and variables, and has solutions that can be argued for depending on the particular constraints faced. A **mess**, however, does not have a well-defined form or structure, and there is little consensus on the most crucial aspects of the issue, let alone what goals to work towards. Messes tend to have a variety of dimensions (e.g. economic, technological, ethical, political), which are hard to separate from each other.

This is similar to the concept of a **'wicked problem'** (Conklin, 2001; Rittel and Webber, 1973). Here, every problem is novel and unique, and there are no common 'classes' of solution. The parameters for solutions are incomplete, changing and often contradictory requirements which are often very difficult to recognise. The problem cannot be understood until a solution has been attempted, but the very effort alters the understanding of the problem and may reveal or create other problems. There is also no obvious test of whether a solution has been found, or whether a solution is 'right' or 'wrong.'

2.2   Why does complexity matter in implementing policies and programmes?

The main argument of this section, and a central argument to this paper, is that different types of issue require different approaches to designing and implementing policies and programmes. However, there are some particular features of complex problems that explain why they present particular challenges in implementing programmes and policies. In this regard, a broad body of research has categorised different types of policy issue into three dimensions:

1. For some problems, the capacity to act can come from well-defined, smoothly operating hierarchies; others cannot be controlled by one actor and involve distributed capacities and a variety of **dynamics at different levels,** with ongoing negotiations between them.
2. For some issues, there is relatively stable **knowledge on cause and effect, or the means for addressing issues;** this is less well-understood or straightforward for other issues, which are quite unpredictable.
3. For some issues, there is consensus on **the questions policy must address, or the goals it must work towards;** in others there are many plausible and equally legitimate interpretations and perspectives.

The different approaches needed for different types of problems relate to these dimensions (Hogwood and Gunn, 1984), which are essentially about when, where and how knowledge should be linked to decision-making for implementation. The first is about **where** decision-making action takes place, and what levels are linked to knowledge (e.g. national vs. local level). The second is about **when** we gain important knowledge about action, and when crucial decisions must be made (e.g. before an

intervention vs. during it). The third is about **how** decision-making can fruitfully take place and how knowledge should be integrated (e.g. instrumental and technocratic vs. dialogue-based).

Complex problems are those best characterised by the latter option for any of the three dimensions above: there is 1) limited knowledge of different levels and distributed capacities; 2) limited knowledge of cause and effect and high unpredictability; or 3) limited consensus on the questions for policy to address or the overarching goals.[2] For complex problems, there are limitations and challenges in linking knowledge with implementation: limited knowledge of different scales, limited knowledge of the future and limited understanding in the face of conflicting perspectives.

Meanwhile, 'traditional,' well-established and strongly embedded approaches to implementation rely on the policy problem involving stable hierarchies, well-understood causality and agreed policy goals. For example, taking action through regulation and legislation, standardising solutions and importing best practices is suitable where there is consensus on the goals of policy and on the means of addressing it (so-called 'well-structured problems,' Hisschemoller and Hoppe, (2001), or the domain of the 'known,' Kurtz and Snowden, (2003)). Alternatively, a technocratic response employing selected scientific inputs for analysis to improve services is appropriate where there are agreed goals but causal relationships are not fully understood ('moderately structured' problems, or the domain of the 'knowable') (Shaxson, 2009).

When traditional approaches are applied to complex issues, they are based on inappropriate assumptions. They assume that knowledge and policy implementation can be linked in a straightforward, linear manner. Below, we go into each of the three dimensions in turn, outlining the nature of complex issues according to the dimension, as well as the problems and side-effects of applying a traditional approach to implementation in each case. But a general argument can be made first. Where tools, structures and approaches for policy implementation rest on the mistaken idea that a complex problem is not complex, this will often mean these tools are irrelevant. The exercise of shoehorning a problem of one type into the shoe that fits another type of problem is of limited utility, as important aspects are systematically missed or ignored.

This not only wastes time and money, but also means the reality of implementation can become quite different from what is explicit in the various frameworks and structures – and processes become quite difficult for 'outsiders' to understand. In the face of complex problems, there is often a heightened emphasis on traditional linear and rational tools, on ensuring more rigorous targets, carrying out more in-depth reviews of scientific literature and focusing on measures to enable managers to keep a tighter watch on implementation. These reforms, intended to help improve practitioners work, seem to take them away from it instead, and seem to be driving an increasing 'dissonance between what [aid workers] do and what they report that they do' (Eyben, 2010). Staff are often involved in managing a system of representation and interpretation of information as much as the projects themselves (Mosse, 2006). Natsios (2010) reports a widening divide between those involved in development programming and those charged with managing and supporting it.

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2 Some attempts to categorise policy problems have not included the first of these three dimensions, and have labelled complex problems as those that have both no stable knowledge on cause and effect and no consensus on the goals of policy – for example, others have labelled these problems the 'domain of complexity' (Kurtz and Snowden, 2003) or a matter of unstructured or badly structured problems (Hisschemoller and Hoppe, 2001). This paper attempts to build on these analyses and has benefited greatly from the insights provided there – however, the following two judgements are made: 1) the issue of scale and distributed intelligence is a crucial dimension of complex problems irreducible to the other two dimensions. Despite being tackled explicitly and implicitly in much of the work on complexity, it is not incorporated into any of the problem taxonomies; 2) for the reasons presented below, issues that fall on the latter side of the spectrum for any of the three dimensions all present challenges for traditional policy approaches, and each has alternative approaches related to it. Also, the three issues are often interlinked, so complexity assigned according to one dimension may be linked to another. For example, with a variety of different actors required to negotiate policy responses, achieving consensus on policy goals is likely also to be an issue. Therefore, it is possible that it is better to consider complexity as a matter of degree, and to cover issues that have the latter designation for any one of the three rather than requiring a complex problem to meet all three.

Worse, than this, tools that are perfectly suitable for some problems have serious side-effects when applied to complex problems. Where incentives for staff are aligned around assumptions that problems are simple, this can lead to them being pushed towards aspects of the problem that suit these assumptions – focusing on the 'low-hanging fruit' and working with high risk aversion, which are both likely to lead (in the long run) to irrelevant programming in the face of complexity. These kinds of observation have been made elsewhere, and mark the cornerstone of the New Synthesis Project, a collaborative approach to developing a new framework for public administration that is suitable for complexity (see Box 2).

Box 2: The New Synthesis Project

The New Synthesis Project (NS6) is an international partnership of institutions and individuals dedicated to advancing the study and practice of public administration. It draws on the knowledge and experiences of senior public officials, researchers and scholars in Australia/New Zealand, Brazil, Canada, the Netherlands, Singapore and the UK to integrate key traditions and conventions and develop a unifying frame of reference for modern public administration.

It starts from the following proposition: 'public administration as a practice and discipline is not yet aligned with the challenges of serving in the 21st century. This gap has generated risk aversion in public organisations at a time when innovation and creativity in government are most needed. It has acted as a barrier to change as the remnants of the previous frame of reference limit the capacity of the state to address an increasing number of complex public policy issues in the context of our global economy, networked society and fragile biosphere.'

NS6 argues that most practitioners know from experience that the 'classical' model of public administration, and New Public Management, do not adequate reflect the reality of current practice, and instead speak to only a declining fraction of their work. However, an updated frame of reference is lacking.

NS6 is looking to provide a narrative supported by powerful examples to help practitioners face the challenges of the 21st century. It is drawing on many new concepts about complexity, networks, resilience, adaptive systems and collective intelligence, as well as from new ideas in fields traditionally associated with public administration, such as political science, law, administrative and management sciences and organisational behaviour.

Source: www.ns6newsynthesis.com.

The next subsections explore these issues for each dimension in more detail. Before that, one caveat is important. Many of these insights are not in themselves new, with various areas of theory and practice touching on them for some time. However, approaching them from the starting point of 'complexity,' and drawing on the tools from complexity sciences, has brought out similarities between analyses and provided new ways of understanding the underlying issues. For example, agent-based modelling (ABM) has brought new ways of getting a handle on how micro-level behaviours relate to macro-level patterns, through the study of emergence and self-organisation. Application of ABM is rising in the social sciences to understand how different combinations of micro-level incentives and interactions can produce macro-level phenomena, helping economists and others to look into the implications of more complex assumptions; when combined with empirical data, it provides a valuable tool for testing and falsifying theories (Janssen and Ostrom, 2006). This is helping to bring factors such as trust, ownership and local knowledge into the mainstream of economics and other social sciences, providing a legitimacy previously dismissed by those with a more quantitative bent. It is also bringing together common themes in areas not systematically linked before, and promising to enrich our understanding on how to intervene in these processes to support development.

2.3   Where problems can be tackled: distributed capacities and intelligence

Some issues are relatively similar at different scales or levels: decisions can be taken at the top or the aggregate level, and action can be coordinated by passing instructions through well-defined, smoothly functioning hierarchies. In some contexts and in the face of some implementation challenges, however, problems manifest themselves in different ways at different levels, and decision-makers at one level have only a limited understanding of the dynamics of a problem for which they have responsibility. Moreover, rather than one organisation or ministry being fully in control of meeting a particular

objective, this may require the collaboration of a variety of actors, which are truly 'controllable' by the ministry to differing extents. Action begins to resemble an ongoing negotiation, or a 'negotiated order.'[3]

For example, while a policy-maker in a national ministry may have the mandate to address internal migration, she/he may be unable to fully understand the multiple effects of the issue on different areas as well as regional policy-makers do, or to understand the factors that shape migrants' decisions as well those of people from their local community. Migration is also influenced by companies providing employment in or outside the country and sometimes by diaspora communities. Decisions must nonetheless be made and action taken to implement policies and programmes, even where it is difficult for centrally formulated policies to respect the realities of the diverse contexts in which they are to be applied, and where it is not possible for the ministry to be fully in control of what goes on.

This is about **where** knowledge resides, and where and in what ways different levels should be linked in to decision-making action. Complexity science highlights how **there is often untapped potential for change in lower-level decision-making units,** and for groups of actors not linked by formal hierarchies to 'self-organise' and work coherently towards a common goal. Lower levels can sometimes address complex problems more effectively for three main reasons. First, they often have a strong understanding of the local dynamics, with long-built and often largely tacit knowledge of the drivers of behaviour and how issues relate to these. This may be more pronounced in developing country contexts, where state agencies frequently do not have the resources, reach or context-dependent skills to adapt to the variety of different localities they must deal with (Swanson and Bhadwal, 2009). Lower levels may lack important capacities and knowledge, but in the face of this type of complexity policy implementation that gives them space for some autonomy is likely to be able to capitalise on their insights.

Second, **when rights and responsibilities in addressing a problem are given to lower levels, it is more likely they will have ownership over solutions.** Where there is limited knowledge of lower levels, decision-makers looking to shape implementation are faced with a chain of principal–agent relationships, as even formalised analyses are unlikely to capture fully the tacit understandings of actors at different levels. With a variety of alternate principals and agents at each level, it will be extremely difficult to ensure effective implementation from the top without the genuine commitment of lower levels. At these levels, management dialogues can function in a more constructive way (as opposed to being trapped by political expediencies and grand rhetoric). Individuals and organisations based in a local area are more likely to have a higher stake in providing sustainable solutions to local problems, and are more likely to be able to build up the kinds of decision-making space in which tacit knowledge of particular locations can be drawn on and integrated with other perspectives.

Collaboration and collective action, built on natural patterns of social capital and founded on trust, are central to achieving sustainable change in the face of these kinds of problems. An agency should not impose a course of action by itself, but instead should work with and influence others. This has a 'horizontal' and a 'vertical' component.' Vertically, action occurs at a number of different scales, with interactions between multiple levels of governance that must be taken into account. For example, resilience theory suggests that ignoring the effects of one scale of action on another is the most common reason for policy failure (Lebel, 2006); in addition, the literature on managing common pool resources (CPR) suggests that establishing rules at one level, without rules at other levels, will provide an incomplete system (Ostrom, 1999). There is also a horizontal component, in that power and responsibilities are often distributed and overlapping between various actors at the same scale.

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3 Theories of 'negotiated order' say there is an interconnected, co-evolutionary relationship between formal and informal institutions, between shared beliefs and actualised behaviour and between micro-level behaviour and macro-level dynamics. This brings ideas from Marx and Bourdieu, among others, together into four tenets: 1) all social order is negotiated order – organisation is not possible without some form of negotiation; 2) specific negotiations are contingent on the structural conditions of organisation, i.e. they follow lines of communication and are not random; 3) negotiations have temporal limits, and they are renewed, revised and reconstituted over time; and 4) the structure of organisation and the micro-politics of the negotiated order are closely connected. In other words, it is important to look for the possible balances and interplays between the forces attempting to organise a system from the top down and the reactions of the agents within a system to each other and to the environment in which they act (see Callaghan, 2008).

Boundedly rational actors face complex and uncertain situations, for example ones where they are without solid knowledge of the structure of a common resource and how different actions are likely to affect it; they are without clear signals about the likely behaviour of others whose behaviour is interdependent with theirs; and the climate and weather are also inherent unpredictable. A large number of development problems arise because people cannot take the necessary collective action (Ostrom, 2005). In these situations, there needs to be the building of trust, on the tails of which can come incrementally better institutions for collaboration (Ostrom, 1990). Trust is built more easily through face-to-face interactions and contact (Beinhocker, 2006; Uphoff, 1992), and proximity is usually necessary (but not sufficient) for constructive interaction (Axelrod and Cohen, 2000). Genuine participatory processes are central to ensure social capital between networks of actors affected by a problem. Devolution of power can promote reciprocity and cooperation, reinforce perceptions of common problems and common interests and strengthen shared values and identities.

There have been a number of **calls to enable action at lower levels.** For example, experience with natural resource management (NRM) shows that such approaches are most effective at lower levels. Studies into where NRM arrangements are most resilient and effective show it is important to match the scale of governance with that of the ecosystem (Berkes et al., 2003), and UN Environment Programme (UNEP) principles state that management should be decentralised to the lowest appropriate level. The importance of cooperation has been reemphasised: strong levels of trust are possibly the most important factor promoting beneficial cooperation and economic success (Harrison and Huntingdon, 2000). It may be that people acting on the belief that there are benefits to cooperation (rather than seeing life as a 'zero sum game') is a major force for development.

Even in the face of collective action problems, that is, where it might be that uncoordinated actors at lower levels pursue individual interest ahead of longer-term payoffs for all, it is clear that **traditional policy analysis has previously underestimated the potential for self-organisation** (Ostrom, 1990). Ostrom and others' work on CPR shows that surprisingly large numbers of individuals and organisations facing such problems do self-organise, forming cooperative solutions at the small to medium scale so as to manage their resources for collective, sustainable benefits (Poteete et al., 2010). Insights from this field of work are likely to be relevant for a variety of CPR problems, as well as for organising collective action to provide public goods at some scales (Ostrom, 1990).

These dynamics are witnessed in a wide variety of situations, and **models of administration and management are beginning to learn how to harness them.** For example, in the private sector, a number of companies have embedded mechanisms for 'organisational participation' – the direct involvement of employees in management decision-making (Heller et al., 1998). Sometimes implemented as part of 'high commitment' policies, this has been found to help protect comparative advantage in the context of rapid change and in markets characterised by a requirement for high-quality, specialised products (Heller et al., 1998). A review of the evidence on this shows that participation can enhance efficiency and effectiveness by resulting in better decisions (employees often have information management does not); because people are more likely to implement decisions they helped make themselves; by enhancing motivation and commitment; by improving communication and cooperation; and by improving relationships among different levels of a hierarchy.

Unsuitability of traditional tools

Many traditional approaches are not well-suited to these kinds of situation. Unfortunately, irrespective of the most appropriate level or scale to ensure an effective response to a problem, **the bulk of the effort of policy-making is often carried out at a high level within central government departments;** otherwise, an intervention is designed and negotiated within international organisations. Inputs from lower levels and scales are not heavily considered at the design stage, and implementation is seen as a matter of providing instruction and direction to lower levels in the chain of command – which will be steered to meet top-level goals. An organisation's planning and implementation often focuses on those parts of a problem which can be strictly controlled by them, and evaluation concentrates on what can be attributed to their actions alone. For example, national governments often hold power for the

management of particular ecosystems, such as conservation areas in forests, rather than allowing for meaningful contributions from actors at a district or municipality level.

Rather than negotiating action at multiple interlinked levels in response to problems that manifest themselves simultaneously in a number of different ways at a number of different scales, **actors at lower levels are treated purely as a means to an end.** An overriding focus on 'upwards accountability' means that performance is judged according to external, objective standards and rewards or sanctions are distributed accordingly. Popular accountability and management tools cast the relationships between donors and partners in a bureaucratic and contractual light, based on plans, budgets and accounts (Roche, 1999). Problems experienced in the development sector in trying to integrate participatory tools into common practice illustrate the issues here (see Box 3). A recent policy paper by the Australian government makes the following argument:

> 'Traditional hierarchical modes of decision-making, sequential approaches to problem solving and single points of hierarchy reflect the techniques and values of the industrial era in which they were developed; but governments are facing new policy challenges, difficult to identify and solve, multiple causes interacting in complex and poorly understood ways' (APSC, 2009).

Box 3: Lessons from experiences with participation

Decades of experience in attempting to incorporate participatory tools into the work of development agencies shows how they have fit poorly with dominant modes of implementation and have been marginalised and sidelined by traditional tools. They have overwhelmingly tended to be employed in an 'instrumental' manner, as tools to help achieve one's own objectives (see Rudqvist and Woodford-Berger, 1996). Rather than fundamentally altering long-established ways of working, participatory development has largely become a set of techniques and technical measures to be used to help meet existing goals.

This has functioned as another input into scientific management processes, fitting neatly into the project cycle: the scope and objectives of a project are defined, then participatory approaches involve an engagement between the agency and local people to help decide how implementation can best meet these.

Worse, participation is sometimes 'derisory': trust and compliance are ascertained simply to build a perceived institutional legitimacy, which in turn it is hoped will engineer compliance with agency-driven decisions, objectives and goals (Arnstein, 1969). In the long term, these practices serve to undermine the trust that is the basis for the functioning of even instrumental participation. Social capital and functioning collaborative institutions cannot be formed where one actor is using a participatory process as a way of furthering her/his own goals and is aiming to build trust just for this reason, regardless of the knowledge or priorities of others.

Unfortunately, in the context of complex problems, **implementing policies based on systems of compliance and control not only is undesirable but also tends to work only superficially, with the reality of the situation concealed from view.** On the face of it, we might see compliance with the contractual stipulations of log frame reports (etc.). In fact, contracted organisations are filling in such reports just to please the donors, with little pretence of representing reality, while they get on with what they see as the 'real work' quite separately from the pile of reviews they must deliver in order to receive their funding (Bakewell and Garbutt, 2004). Organisational performance frameworks tend to impose unwanted reporting requirements on partners, become paper exercises to fulfil corporate requirements rather than honest assessments of progress and lessons learnt and put pressure on individual organisations to attribute results to themselves (rather than collective efforts) (Smutylo, 2001).

Similarly, **the issue of trust and local ownership does not disappear with externally imposed solutions, but may just become less visible.** Lipsky (1983) shows how the implementation phase of policy-making is the most crucial determinant of success in developing countries, and that it is at this stage that actual policy is shaped most decisively, with a great deal of power in the hands of 'street-level bureaucrats.' In addition, without some kind of cooperation from local communities, the costs of ensuring compliance with policy will be significantly higher. It is important that there be trust in government staff and policies as fair and effective, so that policies can be workable.

By failing to draw on the knowledge of, or to achieve buy-in from, lower levels, **policies that seem to provide a workable solution** to a problem may turn out not to respect the reality of the varied contexts in which they are supposed to be applied, and **can frequently be simply irrelevant** to the ways the issue is experienced. Decisions may not be taken up at lower levels, and/or may be circumvented in various unforeseen ways. Moreover, opportunities to lead more effective action are not visible within these approaches to implementation – there tends to be an underlying assumption that lower levels and the multitude of actors within the remit of the policy-making body cannot overcome collective action problems to find their own solutions to issues (Ostrom, 1990).

Even well-intentioned attempts to step in can make matters worse. Not only are opportunities to engage in the kind of collaborative action required to address these complex problems often lost, but also agencies using the 'command and control' framework can do serious harm to emergent forms of collaboration and action. For example, national interventions to improve agricultural production in Indonesia actually caused crop failures and famine until local organisation was recognised and integrated into action (see Box 4). Harm can be done by bypassing and ignoring existing (legitimate) organisations and networks, or by simply not recognising them as such. For example, the Africa Power and Politics Programme (APPP) suggests that dominant 'blueprint' approaches tend to see indigenous forms of governance as a problem to be replaced by the 'ideal' (Western) model; failure of these 'good governance' initiatives can be explained by the fact that they do not respect deep-rooted institutions, cultural norms and values that shape the societal response to development issues (Kelsall, 2008).

Box 4: Hindering, and then helping, rice farming in Indonesia

In the 1970s, the Indonesian government decided that rice farming practices in Bali needed to be modernised as part of a massive redirection of agricultural policy. From their perspective, this was a story of the Green Revolution: acting on advice from the Asian Development Bank (ADB), they sought to introduce new, high-yielding varieties of rice, at the same time as legally mandating double- and triple-cropping of these new varieties. Despite some resistance, by 1977 70% of rice terraces in south central Bali were planted with the new varieties of rice.

Unfortunately, these policies failed to meet their most basic central aim: productivity and output dropped, with crop losses approaching 100%, as a result of explosions of pest infestations. In response to these, the government introduced further new crop varieties, but new pests then emerged. District government offices reported chaos in water scheduling and irrigation flows. Other side-effects were also seen (there has been a strong critique of the social and distributional impacts of the Green Revolution).

Meanwhile, the Balinese system of water temples, considered a minor obstacle by those government policy-makers who had any knowledge of it at all, in fact held together complex, decentralised institutional arrangements for managing rice farming (Lansing and Miller, 2003). Managing agriculture in Bali is a complex issue with multiple interdependencies. Rice is grown in paddy fields fed by irrigation systems that depend on rainfall, which varies by season and elevation and, in combination with groundwater inflow, determines river flow.

By controlling the flow of the river into terraced fields, farmers are able to create pulses in important processes. For example, the cycle of wet and dry phases alters soil pH, with numerous effects on the quality of the soil. Cooperation between farmers with adjacent terraces can create a sufficiently large fallow area to deprive rice pests of their populations, but if too many farmers follow an identical process there may not be enough water for all, especially as there are weirs only every few kilometres. Water sharing and pest control are opposing constraints – an optimal level of coordination depends on local conditions. As such, parallel to the physical system of terraces and irrigation works is an equally complex social system, based on networks of temples dedicated to agricultural deities and the Goddess of the Lake. Farmers associations linked into these temples use the larger network to coordinate cropping patterns and phases of agricultural labour (Lansing and Miller, 2003).

Informed and inspired by a generation of anthropological fieldwork, Lansing and Miller use a simple game-theoretic model to simulate interactions between farmers and their environment, illuminating the emergence of cooperative behaviour among Balinese farmers.[4] The 'fitness value' or payoff of different farming strategies

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[4] Simulation models are uniquely appropriate for addressing issues of adaptation and determinism in the development of complex social systems. Extending the use of simulations in biology, which might focus on the co-evolution of algae and Antarctic sea ice, this analysis moved from natural ecosystems that evolved through a process of 'blind' natural selection.

changes as a result of complex interactions between irrigation networks and the domesticated ecology of the rice terraces. A spontaneous process of self-organisation occurred when temples were allowed to react to changing environmental conditions over time in a simulation model. Cooperative networks emerged that bore very close resemblance to actual temple networks. As these networks formed, average harvest yields rose to a new plateau. Subsequently, the irrigation systems that were organised into networks were able to withstand ecological shocks such as pest outbreaks or drought much better than those that lacked networks. The networks have a definite structure, which leads to higher sustained productivity than would be the case if they were ordered randomly.

As such, water temple networks are a self-organised system for cooperation and collaboration between farmers, shaped by a process of agents co-evolving to a changing environment. Green Revolution policies, blind to these self-organised local arrangements, disrupted existing patterns of interaction, which explains their catastrophic failure in the Bali context. The destruction of the temple system by the ADB-sponsored government programme is now remembered by the Balinese farmers as a time of *poso* (hunger and harvest failure). The government now supports the role of water temples in pest control, but the episode is an important illustration of the dangers of applying the wrong approach in the wrong context. Approaching agricultural reform as primarily a technical matter missed the importance of structures for coordination and collaboration, and disregarding local knowledge and understandings meant policies did more harm than good.

Even where a ministry or agency does attempt to engage with local institutions, further harm can be done to emergent collaboration. 'Programmed failure,' whereby agencies force actors to work to unrealistically optimistic goals or timeframes, can play a strong role in degrading trust and genuine involvement (Ruitenbeek and Cartier, 2001). In other cases, participation and consultation are undertaken simply in order to engineer compliance. A vast amount of research shows that human behaviour is based on norms of 'strong reciprocity';[5] where people see others as violating cooperative norms, the best that can be hoped for is them sticking around to make sure they 'get their due' from the process. More likely is their non-engagement.

Another insight comes from a study on capacity, change and performance (Baser and Morgan, 2008), which highlights that the way capacity develops is not amenable to more technocratic and rational approaches, in which organisations are viewed as machines and capacity in terms of 'gaps,' which are often put down to resource shortfalls. ODI's work on facilitating networks has produced similar findings about the **dangers of 'blueprint' or 'deficit-based' approaches,** which fail to recognise and engage with existing networks of interactions (whether formal or informal), instead trying to create or control structures that cannot be created or controlled by one actor (Mendizabal, 2008).

2.4   When to take key decisions: unpredictability and emergent change processes

Many social, political and economic problems are not amenable to detailed forecasting. On a number of issues, processes of change will inevitably entail events and trends that have not been predicted or taken into account; there will always be some amount of discontinuity and surprise. For example, implementing strategies to mitigate and adapt to the future impacts of climate change on a country must work with a number of levels of uncertainty – on the likely impacts inherent in climate data but also on the likely reaction, for example from farmers or other groups, to changing ecosystems.

Services must nonetheless be delivered and programmes must work without robust, stable knowledge on cause and effect. For some issues, it is not well-understood what the most appropriate means are for addressing a problem. This means the full effects and side-effects of policies cannot be fully

Systems of interest to anthropologists are by definition shaped by conscious human intentions. Life in the sea ice of Antarctica is thought to have evolved opportunistically through the random effects of natural selection.

[5] One of the strongest (most triangulated) findings for the complexity sciences is that, nearly universally, people are 'conditional co-operators' and 'altruistic punishers.' This has been explained as 'do unto others as you would have them do unto you (conditional cooperation); if others don't do unto you, nail them, even at personal cost to yourself (altruistic punishment).' Studies of game theory and ABM have shown strong reciprocity to be a highly 'fit' evolutionary strategy for adaptive agents, and evidence from controlled experiments, empirical studies and anthropological fieldwork has confirmed its universality from Middle America to the Peruvian rainforest. There is even evidence to suggest a generic and biochemical basis for the behaviour.

anticipated; only some aspects of the future can be foreseen, and many possibilities may be equally plausible in advance. A policy that is optimal under the conditions of first implementation may be less so given the continual flux of change. In addition, our goals may change, as well as our understanding of how to achieve them.

This is about **when** we gain important knowledge to inform action, and when crucial decisions must be made – for complex problems, crucial insights emerge only during an intervention, and it is not possible to be fully confident that policy/programme decisions will be correct *ex ante*. This means that **greater attention must be paid to concerns throughout an intervention, rather than prior to it.** Limits may be placed on the value of knowledge production and use before an intervention, with the bulk of this effort instead being applied during the course of the intervention. Since the context in which a policy or programme is operating is changing continuously, and it is not possible to plan for all eventualities, success can depend on assessing and adapting to emerging signals and changing situations: policy and programming must become better at learning.

Regulations for project and programme approval that place all the emphasis on a large volume of detailed technical assessments prior to the disbursement of funds may not always be appropriate. These kinds of issues have been witnessed in development and public policy more generally for a long time. For example, Porter et al. (1991) argue that development is 'a moving, evolving multi-faceted thing, and if it was possible to offer an answer today, it would be inappropriate by tomorrow.' There have been calls for quite some time to shift the balance of efforts away from *ex ante* assessment – Easterly (2006) famously made strident criticisms of 'planners' in development organisations, but some time before that a number of experts were already calling to see development as 'process' (Mosse et al., 1998), in order to respond to the complexity of the challenge, with Milton Esman making an influential call to this effect back in 1980. The following quote puts it well:

> 'Our society and all of its institutions are in continuing processes of transformation [...] we must learn to understand, guide, influence and manage these transformations. We must make the capacity for undertaking them integral to ourselves and our institutions. We must, in other words, become adept at "learning". This "learning" should not be seen as a one-off event or a case of acquiring new knowledge or skills, rather it involves ongoing practice and reflection on one's own experience. Since knowledge of "best practice" cannot be easily imported from elsewhere, all organisations must involve themselves in learning as a "continuous, on-the-job process"' (Chapman, 2004).

Ongoing learning and adaptation are crucial when engaging in the politics of reform, as Merilee Grindle has systematically demonstrated. Focusing on social sector reforms in Latin America, she has shown that sometimes small but often significant 'room for manoeuvre' arises from the dynamic and fluid nature of reform processes, which can (at different moments in the process, some predictable and some not) present opportunities for motivated and responsive actors to make decisive interventions and succeed 'against the odds' in securing reforms (Grindle, 2004). Similarly, recent work on sector budget support suggests that a lack of continuous engagement, dialogue and adjustments by professional staff has led to a 'missing middle,' adversely affecting the quality of those reforms (Williamson and Dom, 2010).

Unsuitability of traditional tools

Many structures, systems and approaches to implementing policies and programmes are not well-suited to such problems. Policy is often driven by an *ex ante* process of clarifying objectives (assumed to be unambiguous), identifying alternative means of achieving them and modelling the associated costs and benefits, selecting the optimum trade-off and then implementing (Chapman, 2004). The more difficult the problem, the greater the perceived need for careful planning, intricate assessment and consultation and negotiation with partners and interest groups *before* anything is done. **Implementation is firmly fixed in advance,** with programmes and projects tied to specific activities and outputs that result from extensive, even multiyear, negotiations. Efforts during implementation are then restricted to following a rigid preset schedule and plan of activities. Monitoring and evaluation (M&E) are seen implicitly as a tool for control and compliance first and foremost, with less concern

devoted to their potential for helping interventions adapt based on lessons from implementation (Bakewell and Garbutt, 2004).

These approaches **assume that causality is well-established, and that the dynamics of the problem being addressed are readily predictable.** For example, a well-known critique of popular planning methods such as the log frame is that they assume higher powers of foresight than are in fact possible, meaning that projects and programmes are overly rigid from the outset owing to detailed goal definition and action planning, and require specific performance targets for variables that are not possible to predict with such accuracy (Bakewell and Garbutt, 2004).

Box 5: Results-based management

RBM swept across the public sector in Organisation for Economic Co-operation and Development (OECD) countries in the 1990s as part of extensive public sector reforms (OECD DAC, 2000). It has also been adopted to a greater or lesser extent by most bilateral and multilateral development agencies (Hailey and Sorgenfrei, 2004). While there are a number of different formulations of exactly what it involves, generally it is a broad organisational performance management strategy that emphasises the measurement of results at various levels, and the use of that information to prove and improve performance. The idea is that it can be the basis for replicating successful projects, scaling up and doing more of what works and scaling back on things that don't work, based on alignment with budgeting procedures, management decisions and individual incentives. It is thus hoped that RBM will enable implementation processes to become more adaptive to evidence about what works.

Unfortunately, the evidence is that RBM has not functioned well as a feedback loop, especially for complex problems. Experience shows that agencies using RBM tend to have success in formulating and clarifying high-level goals and objectives; aligning programme- and project-level goals; and performance measurement, monitoring and reporting. However, repeated evaluations show that there is frequently very little use of performance information for accountability, or for decision-making and project/programme adjustment (Thomas, 2007).[6] The 'utilisation problem,' which dampened hopes of improving policy through evaluation from the 1970s onwards, has been recurrent in relation to RBM and performance frameworks. This is not special to the development sector, but also is a common finding where performance management has been introduced in the public sector worldwide (OECD DAC, 2000; Thomas, 2007).

Recent reviews of the use of performance frameworks in developed country settings show that a large amount of frameworks and indicators are of poor quality (OIOS, 2008). It is unlikely that this is wholly a matter of appropriate tools being poorly applied – and is possibly more a sign that inappropriate tools are being used. RBM relies on the fact that goals can be defined and specified unambiguously in terms of clear quantifiable indicators, that funding can be driven by predicted results and that the effects of an agency's work can be aggregated neatly into some overall attributed impact. These are inappropriate assumptions for complex problems, and this almost seems to be an attempt to 'assume away' the problem of messy, complex issues.

On the one hand, the result of these unrealistic expectations can be to make **implementation tools irrelevant.** Despite extensive efforts being put into processes of analysis, assessment and consultation before an intervention, implementation presents a series of new and unexpected challenges. Strategies are made and plans written, and then they are left on the shelf until reporting cycles come around, with the 'real' work going unrecorded. Practitioners then pay little attention to the log frame until it is time to report, at which point efforts generally focus on reproducing what the log frame promised (rather than on a process of genuine investigation of the effects of the intervention) (Bakewell and Garbutt, 2004).

Learning and adjustment does nonetheless go on throughout the lifetime of a programme or policy, but the realities of **flexibility and adaptation that go into effective development work on the ground are unseen at higher levels.** Planning, monitoring and evaluation (PME) is necessarily a tick-box exercise (to fit in with unrealistic assumptions embedded in the tools) drawing efforts away from the 'real work,' to justify projects *ex post* and explain how everything went according to the plan initially set out (whether or not this was in fact the case). Studies show how, even in contexts with high-capacity organisations, *ex ante* impact assessments, if employed in a rigid manner, become simply a 'hoop' to

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[6] An evaluation of RBM across the UN system found performance information was 'of little practical utility to programme managers and operational decision-making' and 'achievement or non achievement of programme objectives ultimately has few consequences for resource allocation, work planning or assessment of managerial performance' (OIOS, 2008).

jump through – a kind of ritual seen as a necessary step in 'scientific' management but one with very little real use. Plans then go out of the window as problems shift and the context moves on. This is because, instead of being well-ordered processes where ideas are debated and then translated into concrete action, many policy initiatives, of all sizes, are driven by crises or unforeseen events, with far-reaching decisions made in 'real time.' Simple, preset indicators often bear little relation to the underlying change processes.

This means that implementing agencies generate reams of barely relevant information, causing **information overload and a potentially serious waste of time and money.** In many instances, RBM has even hindered the use of results information to improve practice. Many formal and informal incentives within public service organisations push individuals and teams to try to achieve success within short timeframes and to try to claim responsibility for it (Smutylo, 2001). Studies have shown that, in this context, M&E is often carried out to 'prove not improve': for example, monitoring activities frequently revolve around reporting on expected indicators as predefined in a log frame, rather than providing real space to look at the unfolding effects and side-effects of an intervention (Bakewell and Garbutt, 2004). Impact evaluations are used most frequently to legitimise existing spend, rather than to provide direct inputs into programmes and decision-making (N. Jones et al., 2009c).

Worse than this, **these tools can have adverse effects on interventions.** On the one hand, fixing implementation to a high level of detail in advance means project managers will find it difficult to respond to emerging opportunities or to adapt in response to changing circumstances – being 'locked in' to specific deliverables that may no longer be so relevant. Moreover, in the context of complex problems, excessive focus on accountability for results can damage the effectiveness of interventions in the short and long term (Ebrahim, 2005). The idea that setting specific and challenging goals for individuals can improve performance works only when it is based on certain conditions, and can have adverse side-effects otherwise: where goals are too narrow compared with the nature of the problem being addressed, or too short in term, they can create perverse incentives; where they are too challenging, they can reduce risk taking as well as motivation and commitment (Ordonez et al., 2009).

Many commentators have argued for some time that it is inappropriate in complex situations to hold projects/programmes to account for 'impacts' which may not be feasibly predictable, and over which an individual programme may have only a limited amount of influence (Earl et al., 2001; N. Jones et al., 2009c). In the face of complex, multidimensional problems, where change may come about over long timeframes and as a result of a combination of efforts,[7] setting appropriate goals seems to be a highly difficult task; in the face of novel problems, which are again more likely to be complex problems, the task is even harder. It is not surprising, therefore, that a comprehensive synthesis of the literature on the effects of goal setting finds that setting specific targets and goals in the face of a complex task tends to inhibit learning, degrade performance, dissuade individuals from trying alternative methods, stifle creativity and flexibility in implementation and create a culture of reduced collaboration and relationship building (APSC, 2009; Kamarck, 2007). It may be, then, that it is not appropriate to impose RBM as a way to deal with complex problems in many cases.

Moreover, M&E at the moment tends to be carried out in a context whereby something not going to plan is seen as a 'failure,' as an embarrassment on the part of staff, rather than as an opportunity to improve understanding of a problem. This leads to defensiveness in front of evaluators or, where staff monitor indicators and carry out reviews themselves, a lack of willingness to take a genuine step back to reflect on what has worked well and what not, to ask why things have occurred and to examine the processes that have led from an intervention to different intended and unintended impacts. Worse than this, **the incentives for implementation may be skewed to focus on 'low hanging fruits,'** taking a risk-averse approach and focusing predominantly on elements of issues that are not complex (to the detriment of the overall delivery of results).

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[7] 'A common mistake in complex systems is to assign blame or credit to a small part of the system, when in fact the entire system is responsible; one of the most important elements of any policy discussion is the specific incentives facing individual agents' (Axelrod and Cohen, 2000).

2.5 How are problems understood? Conflicting perspectives and divergent goals

Sometimes there are many plausible but equally legitimate interpretations of a policy issue, and an array of seemingly conflicting evidence. Different groups come from different starting points or assumptions, and propose measures that set out to meet different objectives. Complex issues are messy and multidimensional, with a variety of competing perspectives and interlinked forces and trends. Decision-makers face ambiguity, where the available knowledge and information support several different interpretations at the same time: information might be contradictory and contested and it is not clear what is most relevant or how it might be interpreted. For example, setting appropriate goals for policies to reduce the negative impacts of developed country supermarkets on developing countries might be particularly difficult, due to the need to negotiate between a wide variety of dimensions: for example buying cut flowers from areas of the world which are relatively 'dry' may seem to be bad due to putting greater pressure on scarce water resources and diverting them from more socially pressing needs, however significant shifts in buying patterns are likely to hit small producers hard; alternatively action on labour laws may be hard to implement in the face of downward pressure on prices and competition between supermarkets.

However, programmes must be implemented even without a consensus on the goals of a policy, even though it may not be possible to tightly define the specific problem or question that policy should address. This is about **how** to link an intervention to the concepts, understandings and information required to make it successful, how decision-making can take place fruitfully and how to link the knowledge required to guide policy and practice. In the face of complex problems, a broad conception must be taken of 'knowledge' and a wide range of perspectives may be needed to properly understand the issues at hand. Different academic disciplines and different approaches to understanding problems all rely on embedded assumptions, which may be useful for looking at certain aspects of an issue but not others. More broadly, different 'ways of knowing' all bring different strengths and weaknesses to bear on a problem, and it is not appropriate to suggest there is any one scale of what constitutes *the* most 'robust' knowledge or 'rigorous' methodology for understanding problems.

Work on the links between science and society emphasises that complex policy problems require a new approach to knowledge production: moving from Mode 1 knowledge production, which is predominantly academic, investigator-initiated and discipline-based, to Mode 2, which is context-driven and problem-focused, mobilising a range of theoretical perspectives and practical methodologies (Gibbons et al., 1994). Funtowicz and Ravetz (1992) argue that complex problems (which they define as being where facts are uncertain, values in dispute, stakes high and decisions urgent) require a 'post-normal science', with scientific experts required to share the field of knowledge production with an extended peer community (stakeholders affected by an issue and willing to enter into dialogue on it such as activist groups, think tanks, media professionals or even theologians and philosophers). Extensive action research carried out by the Australian National University (ANU) suggests that, for complex problems, five key contributors bring the knowledge necessary for long-term, constructive decisions and processes of collective governance: key individuals; the affected community; the relevant specialists; the influential organisations; and people with a shared holistic focus (Brown, 2007).

In these contexts, the challenge of drawing on knowledge and information for **decision-making cannot proceed in a mechanistic or instrumental way, but is instead interpretive.** As Kuhn showed in his work on scientific revolutions (1962), decisions between perspectives and frameworks drawing on different underlying assumptions and values involve contextual and subjective judgements and interpretation. Looking at this issue from a more practical point of view, effective management in the face of complex problems is linked to the ability of managers to *interpret* information, rather than the abundance of accurate information (Snowden and Boone, 2007). Extensive empirical research on decision-making has emphasised the central role of sense making in the face of complex problems (Kurtz and Snowden, 2003), as a way to begin to bring together divergent discourses and perspectives.

Moreover, **contrasting perspectives may well be part of the problem that must be addressed.** For complex issues, action is often required by a number of actors, who may see their interests as being at loggerheads with those of others, or who may not buy into the importance of an issue (to differing degrees); conflicting actors may base their position on equally conflicting visions of the problem and its solution. However, a variety of sources (e.g. Heclo, 1978) show that the ways people understand their own interests are not static or uniform, but rather are shaped by their experiences and expectations, and their different ideas and beliefs; and that values and beliefs are often a driving force for sustaining coalitions and catalysing action (Sabatier and Jenkins-Smith, 1993). Promoting action and change may therefore require that these perspectives change, so people and institutions can learn and evolve in terms of the way they understand and tackle problems. For example, Ostrom (1992) shows that, where a set of actors have shared beliefs, norms and preferences, with a variety of direct relations and interactions, they will be more likely to work towards institutional transformations for their common good. Perceptions of shared interests, ideas and values are central to inclusive action; this highlights the importance of building social capital between actors.

This means that different actors need to be involved in shaping the response to a problem, coming together to **deliberate and negotiate understanding and action** on an issue. Such deliberative processes have been shown to have transformative effects; those who are being affected by problems need to be involved in identifying the important elements of the relevant system, as well as in defining and managing their solutions (Funtowicz and Ravetz, 1992; Röling and Wagemakers, 1998). Alternatively, studies of 'deliberative democracy' in political theory suggest that reasoned processes of fair communication and inclusive deliberation lay the foundation for public accountability (Habermas, 1984) – as such, working towards a reasoned, public account that justifies a policy is a necessary extension to representative democracy (Delli Carpini et al., 2004).

These **dialogues can become central elements in the change process,** to resolve conflicts and build the capital required. Altering beliefs can help to 'mobilise the power and the resources to change things' by looking to 'unlock resources claimed by the status quo' (Westley et al., 2006). Opening lines of communication itself alters incentives; communication can/could lead to collaboration; and other equilibria may be found.

Unsuitability of traditional tools

Project and programme implementation, under approaches such as RBM, relies on **specifying narrow sets of goals, presumed to be unambiguous and measurable in terms of a few quantitative indicators.** In the face of difficult issues, assessments tend to focus on producing a number of tightly defined, narrowly focused analyses, which look in depth at specific dimensions of an issue (e.g. in the form of a series of separate assessments), generally sent to different departments for consideration and/or sign-off (e.g. environmental assessments may be considered in bulk by one department, which does not see other aspects of each proposed intervention). Reams of results indicators are produced (with differing levels of meaningfulness), based on the idea that the solution to effective management is abundant information, with decision-makers given little space or time to pay attention to interpreting it. More technically minded policy-makers and researchers often dismiss the relevance of local knowledge, too often seeing citizens affected by a problem or living in an area as requiring knowledge transfer and training, and local practices as requiring 'modernisation,' irrespective of the ways in which they are appropriate for local circumstances, let alone values and history (Chambers, 2008).

Research, knowledge and information are generally included as if they are a purely technical input, providing a neutral steer and **instrumentally useful for meeting pre-agreed goals and questions.** The 'instrumental' approach to knowledge production looks for academic research to summarise in a few clear action points as atomised inputs into seemingly 'common sense' problems, looking to 'control out' the role of context. For example, systematic reviews, which have become more and more popular with development agencies, frequently employ a 'meta-narrative' approach (with some notable exceptions), which focuses on providing answers as to which (parts of) programmes have the maximum effect on an outcome when averaged across the maximum number of contexts. This has been criticised

as inappropriate in the face of complex social problems, because a number of different causal mechanisms may be operating across the different programmes, because mean outcomes are overly simplified measures and because the role of contextual factors become concealed (Pawson, 2002).

These problems are not all a result of the implementation frameworks: many argue that traditional science and research themselves are not well-equipped to deal with complex challenges, being divided into 'silos' and disciplines focusing on specific dimensions and aspects of societal problems (Clark, 2007). These structures have emerged from particular approaches to analytical thinking since the 18th century, which require the division of knowledge into its constituent parts rather than paying attention to more holistic questions.

Since these approaches to providing knowledge for policy are based on underlying assumptions that are inappropriate for complex problems, they can often prove of **limited relevance to design and implementation.** Expensive appraisals and careful reviews of the research often capture just a narrow range of the issues at stake. Where disagreements in the evidence base are recognised (e.g. contested definitions or problems and various perspectives suggesting contrasting priorities for action), there is little guidance to help staff draw anything useful from this. If explicit attention is paid to how a problem is framed, this tends to be done informally in small circles of power, with the task perceived as having an internally consistent solution; more generally, the voices and perspectives of a variety of groups are not considered. The instrumental approach to knowledge for policy means advice is 'decoupled' from the theoretical and explanatory frameworks on which it relies, meaning that key assumptions are hidden, making context-sensitive policy judgements in fact harder to make (Cleaver and Franks, 2008).

These tricky issues cannot be 'wished away': decisions on framing issues and differentiating between competing knowledge claims will always arise for complex issues, even if they are implicit or hidden. **Assumptions that may seem common sense to one actor could be drastically wrong,** or inappropriate for some contexts, and should be open to scrutiny and discussion. This process of sense making may otherwise be done unconsciously or implicitly by decision-makers, who (as all people are) are likely to have certain biases and assumptions, along with unquestioned beliefs and paradigms. Alternatively, it may be done in closed spaces that are not accessible by other actors who have relevant perspectives to add, which are hence excluded, such as when lobbyists target decision-makers in closed spaces in order to 'frame' the issue as they prefer it.

It is universally acknowledged that formal research can be only one input of many into policy decisions; decisions must be based not just on 'scientific evidence' – that is, knowledge gained through formal research – but must draw on a variety of factors, including values; political judgement; habits and tradition; and professional experience and expertise (Lomas et al., 2005). Where there is consensus here, it may be sufficient for individual decision-makers to make judgements, but not where this would be to ignore important contrasting perspectives. Technical studies may attempt to mask difficult political judgements made, but the façade is unlikely to convince all actors involved in the issue, whose buy-in to a solution is likely to be needed to ensure that intention is translated into action on the ground (e.g. Ferguson, 1995). Moreover, in the face of controversial issues, scientific and analytical inputs are unlikely to solve the matter, as different camps simply talk 'past' each other, relying on different underlying assumptions and goals. Here, the use of research in policy can in fact serve to intensify the controversy, and drive conflicting camps to greater extremes (van Eeten, 1999).

2.6 Summary

Based on the above, the reader should now have a greater understanding of what a complex problem is, and what aspects of complex problems make the implementation of traditional approaches less appropriate. More importantly, it should now be easier to see *in what way and to what degree the implementation challenge presented to you is complex.* **Position on any of the three dimensions is likely to be a matter of degrees,** with considerable grey areas between 'stable' and 'uncertain' causal knowledge for example. It is also likely that **different aspects of a single intervention** are simple,

complicated or complex. However, making some judgement on these matters is an important step towards shaping implementation. Section 3 of this guide provides the principles, priorities and tools for meeting this challenge of complexity.

Before proceeding, there is one point worth considering: are there some issues, or aspects of certain issues, that can objectively be assigned as 'complex'? Commentators have variously called for development as a whole (Rihani, 2005), the challenge of achieving growth (Beinhocker, 2006) and promoting governance (Jessop, 2003) to be seen as complex. In addition, many of the tools described below have been developed in areas such as NRM, where there is a close link between, say, the environment and social goals – it could be that these issues have an added a layer of complexity, or that strong scientific modelling of the ecosystem and clearer interdependence of different dimensions makes it harder to deny the inherent complexity. This guide does not attempt to answer these questions, but it is worth bearing them in mind as we go.

The guide instead focuses on outlining the appropriate tools for different types of problem. The starting point is the three dimensions that mark how an issue presents itself to a particular organisation or institution attempting to tackle it. Arguments can be presented and evidenced as to whether responsibilities are distributed, causation is clear and goals are agreed; assessments can be made as to whether the side-effects of using traditional approaches to complex problems are visible. The following questions are provided to assist the reader in deciding whether their policy/programme is facing a complex problem.

The following questions may help you assess the extent to which your intervention faces a complex challenge in terms of the **distribution of capacities**:
- Do the intended goals require working in collaboration with a variety of actors, or can they be achieved by one agency alone?
- Does the intervention work across highly varied contexts? How well-understood is the functioning of the programme instruments in each different context where it is being applied?
- Is it attempting to work with or through other actors, e.g. for service delivery, capacity building, etc.? To what extent can this work be readily understood by an 'outsider'?
- Would results be sustainable without the continued involvement of my agency? Who is meant to be responsible for continued work after the project, and what level of 'ownership' do they currently have of this task?

The following questions may help you assess the extent to which your intervention faces a complex challenge in terms of the **predictability of change processes**:
- How well-known are the ingredients for achieving the changes which your intervention is aiming for? Can they be confidently mapped in advance, or is identifying 'what works' in your context generally only easy in retrospect?
- To what extent will programmes need ongoing adaptation by implementing staff? Are change trajectories well-known or unpredictable? Are potential negative 'side-effects' of this type of intervention well-understood, or do they differ widely from place to place?
- Are over-riding programme goals readily achievable within the allotted timeframe, or will you be more likely to achieve incremental outcomes? How clear is it, *in advance,* what these incremental outcomes might be, which could be readily achievable in the context, and when these changes represent 'successes'?
- To what extent can it be foreseen which programme activities will be most successful? Will there be an unpredictable pace of change in some areas, with periods of no discernible change followed by tipping points or windows for significant change?

The following questions may help you assess the extent to which your intervention faces a complex challenge in terms of **the nature of the goals**:
- Is there broad agreement on the appropriate aims of your type of programme between stakeholders? Do different groups of stakeholders have preferences for achieving different

goals? Are these goals likely to be achieved in tandem or will trade-offs need to be made along the way?

- Is the central problem to be addressed defined in a similar way by most stakeholders, or are there contrasting and competing ideas of what is the 'most important' feature of an issue?
- Does the academic literature revolve around stable, agreed bodies or knowledge, or do different conceptualisations compete? Is the available knowledge broadly consistent, or is there contestation in what counts as legitimate knowledge?

In the end, though, this assignment of 'complexity' is left open to judgement. This could be a matter of a new issue that existing institutional arrangements have not yet found a way of dealing with; it could be an essential and unavoidable feature of the issue; or it could be somewhere between the two. Going back to the original example of baking a cake, it might be that your oven is faulty, and the reaction should be to approach the baking of the cake in a different manner to begin with, by looking to learn how to use it. On the one hand, it could be that it misbehaves in a predictable manner, or requires a 'dab hand' to operate it, in which case it then becomes more like the 'known' or 'knowable' problems described above. On the other hand, it could behave entirely unpredictably, in which case baking would require a much more iterative, attentive approach.

When a problem is agreed as complex, there are clear implications for adjusting the way an organisation deals with it to take into account this complexity and ambiguity. It could be that, in the future, this same problem (or a part of it) can be dealt with in a more straightforward way. On the other hand, it could be that the problems persist, and capacities for dealing with complex problems will become increasingly important in the organisation.

3. Practical guidance for dealing with complexity

In the face of the challenges complex problems pose, people could be forgiven for becoming cynical about chances of being able to tackle issues or achieve economic or social goals. Complexity could be an excuse to dodge the responsibility for failing to achieve goals, as it seems unsurprising that many policies fail to address the problems they are designed to combat and that large ambitions are abandoned to avoid creating further unforeseen problems. In particular, it might seem that 'knowledge' is less useful to the policy process than was initially supposed, as the 'rational' model of policy-making, which is centred around intentionally guiding institutions towards achieving common goals, begins to look like not just an unrealistic description of the policy process but also in fact an irrelevant ideal.

However, it would be wrong to take such a sceptical stance. The central contention of this paper is that the main problem is not intractable problems, or poor application of the right tools, but rather **use of the wrong tools for the job.**[8] And, while the traditional 'toolkit' for policy implementation is not sufficient to address complex problems, the complexity sciences are beginning to give us alternative theories for change, greater understandings of underlying processes and, crucially, better approaches for tackling them. It is vital that actors charged with implementing policies and programmes in the face of complexity take responsibility for choosing an appropriate approach; there are a number of insights into how to address complex problems in a strategic and directed manner.

The rest of this section is devoted to outlining how this can be done. It outlines **principles and priorities as to where and when policies and programmes need to be shaped, and then a variety of tools on how to manage implementation.** The last section discussed limitations in traditional rational approaches to intervention – owing to limited knowledge of different scales, limited knowledge of the future and limited understanding in the face of conflicting perspectives. However, rather than seeing knowledge as something unattainable, or not useful, when tackling complex issues, it becomes one of the most crucial resources for effective design and implementation: the ways in which policy draws on available knowledge becomes one of the central determinants of its success. The difference is that policy-makers must be mindful of constraints and opportunities as to where, when and how knowledge and decision-making can best be linked.

Before continuing, it is important to present some qualifications, caveats and 'health warnings', to guard against a misinterpretation of this guide or its contents. First, complexity **requires a shift in perceptions as to what are 'scientific' or credible tools and approaches to implementation.** Many of the priorities complexity highlights are not new; part of the value of complexity is that it helps us draw together a common narrative and framework on understanding that has been building up in the social sciences for decades, highlighting links and similarities that may promote further innovation and tool development. Complexity is an area of growing scientific and practical importance, based on rigorous empirical studies as well as theoretical development. It is already bringing a variety of strong lessons to longstanding fields such as macroeconomics, and is beginning to prove that certain assumptions embodied in traditional approaches to policy implementation and management are not applicable universally. By adding further weight to certain calls, for example for a wider view of 'knowledge' for policy, or for a focus on 'process' as a scientific approach that is potentially equal to that of managing for results, it may help to ensure that important stakeholders keep a balanced view of what constitutes effective and responsible intervention. It may also help bring into the mainstream things that were not considered such, making lessons from implementation and 'rules of thumb' more legitimate. This may be particularly important in times of pressure on budgets.

Second, clearly, the priorities and tools presented are not magic bullets. Just as with the 'traditional approaches,' they have **a domain of appropriate application, and need to be applied well and with sensitivity.** They cannot hope to solve every implementation challenge, and some of the propositions represent a 'work in progress,' in the sense that they have not all been tested extensively. Also while

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[8] Even the highly critical evaluation of RBM at the UN assumes that it is a case of poor implementation rather than the wrong tool for the job, OIOS (2008).

the toolkit offers a variety of important principles to bear in mind and areas to consider, it is not yet clear which implementation arrangements are most suitable for specific circumstances. The material needs to be picked up by innovative decision-makers worldwide and tested and improved thoughtfully.

Third, implementation is likely to require **a mixture of these tools and more traditional approaches.** Shaping policy will always be a matter or degrees, and a negotiation between bottom-up and top-down structures, between planned and emergent responses and between technical and participatory guidance. The following represents an attempt to redress the balance and provide a much-needed toolkit for half of that equation.

It is also likely that different types of complexity (according to the three dimensions set out in the previous section) may require a greater emphasis on different sections of the guidance presented here. For example, a highly distributed programme that focuses on relatively well-known outputs, such as vaccinations, may require a focus on the 'where' components more than the 'when' components. A relatively centralised programme operating in the face of high uncertainty may best focus on 'when.' However, the approaches do have some features in common, as they are building on similar principles and understandings (programming in the face of a lack of knowledge). As such, they are likely to complement each other. Rather than operating according to some kind of 'policy cycle' in complex problems, it could be that decision-makers consider a 'cube' of interfaces between knowledge and policy. These interfaces need to be cared for and linked up if possible – with one dimension being where (macro, meso, micro), one being when (before, during, after) and one being type (research-based and technical knowledge, practical knowledge such as evaluations, citizen knowledge and participation, etc.) (see Figure 1).

Figure 1: The cube of interfaces between knowledge and policy
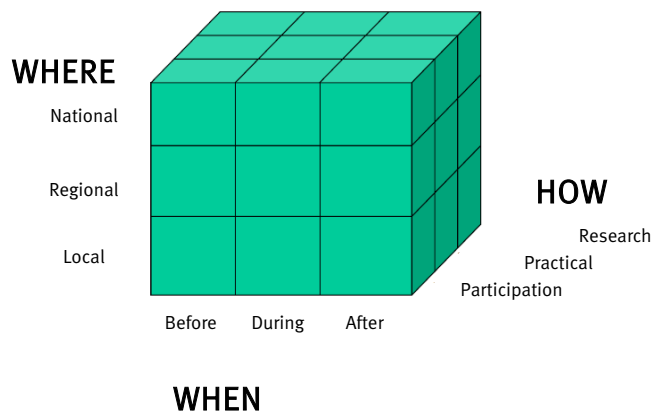
3.1   Where? Facilitating decentralised action and self-organisation

Implementing **agencies will need to work in a collaborative and facilitative mould.** Emerging insights from research into adaptive governance shows that successfully managing complex problems requires an acceptance of polycentric institutional arrangements, with management power shared between many nested and quasi-autonomous decision-making units operating at many different levels (Folke et al., 2005). Recent empirical and theoretical research points to the hitherto unrecognised value of more loosely structured governance arrangements which rely on emergent and voluntary coordination, collaboration and partnerships (ibid), linking smaller governance systems to form dynamic networks capable of addressing macro-level issues (Brondizio et al., 2009). Such autonomous, self-organised systems, conceptualised as 'polycentric governance,' have been shown to enhance innovation, learning, adaptation, cooperation and trustworthiness, and can help achieve more effective, equitable and sustainable outcomes at multiple levels.[9]

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[9] Moreover, some argue that, in order to tackle complexity, we need complexity in our governance systems, through polycentrism and redundancy – the 'diversity hypothesis,' similar to the law of requisite variety. (Duit et al., 2010).

So, tackling complex policy problems requires multi-level governance systems that work at multiple, interlinked levels, promoting learning and cooperation. Part of this will require increased attention to how to capitalise on the effectiveness of lower levels in addressing problems, and looking at how to promote ownership and trust at many levels. Implementation should thus focus on enabling and facilitating emergent, decentralised and self-organised responses to a problem. Although this does not fit with traditional implementation approaches, there are a number of ways in which management and accountability can be handled.

3.1.1   Decentralisation and autonomy

Especially with complex problems, there is too often a mismatch between the scale of what is known about the world and the level at which decisions are made and actions taken.[10] One way of enabling lower levels and smaller scales is **decentralising policy-making and implementation**. Attention should be paid to the scales at which different aspects of a problem are best perceived, and where the incentives (and the potential for collective action) lie for addressing it in a sustainable manner.

Having decisions made close to those most affected is a way to provide better and quicker feedback and ensure decision-makers are well-informed about problems, the effects of (proposed) interventions and the nature of different interests (Swanson and Bhadwal, 2009). A central finding of the literature on adaptive governance is that the devolution of responsibilities, rights and access to resources to local management bodies can contribute to addressing complex policy problems and local adaptive management, by 1) better capitalising on local understandings of a resource or locality (devolution of management rights and power sharing promotes participation, Folke et al., 2005); and 2) promoting innovation and experimental learning, stronger internal enforcement of rules and decisions (through mutual observation and social incentives) and improved higher-scale risk management through local redundancy (Ostrom, 2005). These insights, developed primarily by looking at CPR management, are nonetheless relevant for a very wide set of imperfectly excludable resources (Dodds et al., 2007).

This is not simply about giving as much power as possible to the lowest level possible; there needs to be an **assessment of the best levels of decision-making authority for different aspects of a problem, and at what level to build collective action and institutional coordination.** For example, research on institutional 'fit' shows that jurisdictional boundaries of governing bodies for ecosystems should coincide with ecosystems' limits (e.g. river basin management), nested and interacting at various scales. For example, CPR users, closely connected to the system, are in a better position to adapt and shape ecosystem change than remote levels of governance, and those with a long-term stake in sustainability are more effective at managing such resources (Swanson and Bhadwal, 2009).

Distributing power for and involvement in decision-making throughout an organisation can be done in a number of ways. Lessons can be drawn from public sector models but also private sector experiences with 'the network organisation' (Miles and Snow, 1986) and 'network-centric organisations' (van Alstyne, 1997). This involves granting considerable individual autonomy and integrating various channels for participation in key decision-making processes, and has improved cost-effectiveness, timeliness and productivity in some contexts (Heller et al., 1998). Alternatively, 'Total Quality Management' principles adopted in manufacturing and service industries, in the private and then public sectors, casts the 'quality' of a product or service as the responsibility of all employees. This is implemented by empowering employees with mechanisms for solving problems and improving performance distributed across a variety of levels rather than simply the domain of supervisors or inspectors (Reid and Sanders 2007).

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[10] This is seen in the dual problem of large-scale scientific knowledge that has little relevance to local decision-makers (e.g. global climate models that are at a resolution that is not useful to sub-national decision-making), and local, tacit or indigenous knowledge that is not seen as credible by national or international actors (e.g. artisanal fishing knowledge that is not taken into account in international treaties on fisheries). The general result is the production of scientific and technical information that lacks salience, credibility or legitimacy in the eyes of critical players at different levels (Cash et al., 2003).

Incorporating this within the accountability frameworks of an agency or ministry could revolve around granting an 'earned autonomy.' Certain benchmarks for performance are set, along with minimum requirements for programmes to achieve in order to prove their competency. Units are then allowed freedom to make decisions on a variety of matters, such as programme priorities, reporting structures and processes and staffing. In this situation, a centrally given policy would look to 'establish the direction of change, set boundaries not to be crossed, allocate resources and grant permissions where units can exercise innovation and choice' (Chapman, 2004).

3.1.2   Engaging local institutions and anchoring interventions

In many instances, the implementing agency may not have the capacity to address complex problems on its own (at a particular scale), or not without the cooperation and collaboration of others. It is important to **engage and work with or through local organisations** that are already addressing the policy problem at the requisite scale. A substantial body of research lends weight to the idea that, while national governments play an important role in setting the scene, local organisations are responding more directly to local needs and increasing local capacity to cope with change (Bigg and Satterthwaite, 2005).

The ongoing programme of work by the APPP suggests that a central aim should be to **anchor public action in local realities** (Booth, 2010). Anchoring requires two things: first, that institutions and behaviours are arrived at locally and address obstacles that have arisen as a result of local problem solving; and second, that new arrangements draw on institutional elements that are inherited from the past, or draw on the toolkit of cultural ideas and norms.

Local institutions such as municipal governments (where well-anchored), farmers unions, women's savings groups, indigenous peoples movements or citizens associations hold an advantage over larger-scale institutions, which comes from being more firmly anchored in local realities and better-placed to respond quickly to changes, based on location-specific knowledge. Such organisations are also frequently better-embedded in local norms and have more legitimate actors for mobilising community action or resolving conflicts (Uphoff, 1992). By working with local and grassroots organisations, government may be able to garner trust and further contribute to the different levels of collaboration required in order to improve institutional capacity and resilience in the face of complex problems.

One clear response is simply to work through such organisations, for example by contracting them to deliver services. Another approach is **co-management,** whereby government agencies share powers and responsibilities with local organisations and groups (Carlsson and Berkes, 2005). The model has emerged in response to many cases of NRM problem in which government officials have the authority to take decisions but lack the requisite local knowledge and also the capacity to ensure compliance with their decisions (Brondizio et al., 2009). Co-management allows the policy response to a complex problem to capitalise on the effectiveness of various organisations, proceeding through cooperation between those with authority and representative organisations. A third response is to improve the interplay between different institutions at various levels and scales. This could be through a variety of cooperative or contractual undertakings or, where there is recourse to central mechanisms to solve conflicts, in a way that helps them function coherently and with consistent patterns of behaviour.

3.1.3   Convening and boundary management

Self-organised responses may face collective action problems, so one priority for intervention is to **facilitate processes that build trust and collaboration between key actors.** One priority may be to broker deliberation and negotiation at different scales in order to catalyse collaborative efforts. A range of work suggests that deliberation (as described above) can play a key role in enabling and building social capital and catalysing collective action (Swanson and Bhadwal, 2009).

Implementing **agencies will need to work as stewards of these processes,** in a way that seeks to maintain public trust (Daniels and Walker, 1996). A number of factors must be taken into consideration in order to enable the kinds of social and institutional learning required. One key issue relates to who is

included. Work on multi-scale problems suggests it is crucial to ensure the representation of all actors with an interest in the task at that level (Marshall, 2008; McKean, 2002). This is about who bears the costs and benefits of a situation or proposed action, as well as where with the ability to influence it lies. The literature on NRM suggests that agreement is likely to be needed between a wide variety of users of the resource, particularly actors who have a high level of dependence on it and those with an overlap between user group and residential location. It is also crucial that the process be conducted in the spirit of true collaboration. Trust can be fragile, and social capital cannot be formed where one actor is using a deliberative process as a way of furthering her/his own goals, aiming to build trust just for this reason, regardless of the knowledge or priorities of others (as is common with the 'instrumental' view of participatory processes, where ownership is seen as a means to the end of implementing one actor's pre-decided goals).

Mechanisms for conflict resolution are also likely to be important, and mediation should be a priority for interventions. Many complex issues entail conflicts of interest between different actors. If managed intelligently, these can be a positive force for change in societies, as actors and norms of behaviour can reorganise into more sustainable and equitable patterns (Warner, 2001).

Effective decentralised and emergent action requires actors to be engaged in multidirectional discussion and learning with peers and with different knowledge communities. It is key to have structures and processes that underpin communication within and between different levels of society, so actors are able to gain the information and knowledge required to adapt to changing circumstances and to learn about addressing complex problems. It will be important to improve collective information about issues, problems or resources to be managed (Ostrom, 2010). The cost of knowledge (e.g. transaction costs in searching for information, finding partners in collective action, building networks and social capital) is a key factor in the political economy of cross-scale linkages (Adger et al., 2005).

Sustainable communication and learning may require the continuous management of 'intermediary functions.' ODI research on the challenge of linking science and policy in developing countries has found very strong demand for the brokerage of information and knowledge between the scientific community and the policy community, in order to overcome problems such as the mismatch of timescales and incentives on either side of the boundary and a tension between democratised knowledge and specialised expertise (N. Jones, et al., 2008). This is also a matter of mediating between different scales, as knowledge is stored, used and perceived differently at different levels (Cash et al., 2003). Recent research into these intermediary functions provides the following categories of function: informing, consulting, matchmaking, engaging, collaborating and building capacity[11] (Michaels, 2009).

Intermediary organisations that focus explicitly on intermediary (or 'bridging') functions between different arenas, levels or scales are able to address this problem, and may well represent the most sustainable way of doing so. In a number of different areas, intermediaries can facilitate decentralised action by promoting communication and ownership. For example, scientific intermediaries are seen as central to meeting the challenges of climate change adaptation (see Box 6). In agricultural development, intermediary functions (carried out by organisations such as non-governmental organisations (NGOs) and applied research institutes) can play a key role in linking 'supply' and 'demand' for knowledge (represented crudely by researchers and farmers, respectively), finding out what producers and their customers want and searching through the stocks of knowledge to find what best meets the need (Arnold and Bell, 2001).

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[11] *Informing* – disseminating content to targeted decision-makers and decision influencers; *Consulting* – seeking out known experts to advise on problems that have been specified by the user of knowledge; identifying who would benefit from expert advice, what advice is needed and the most appropriate forms of communication; *Matchmaking* – introducing each side to people or organisations they would not otherwise meet; identifying the expertise needed, who can provide it and how best to foster communications; *Engaging* – helping frame the discussions; ensuring all appropriate actors are involved for the life of the decision-making process; *Collaborating* – helping both sides of the discussion jointly frame the process and negotiate the substance of the issue to address a particular problem; *Building capacity* – stewarding long-term relationships; fostering organisational learning; co-producing knowledge.

Box 6: The need for intermediaries to improve action on climate change adaptation

This is the message emerging from work on mainstreaming climate change adaptation (CCA), for example. Rather than risking National Programmes of Action (NAPAs)[12] becoming a process of governments consulting a small pool of (often foreign) 'experts' in a technocratic exercise, there are calls for organisations and processes that ensure a broad consultation on the issues. Intermediaries bridging climate science into policy debates are needed to build ownership and embed NAPAs within policy processes by ensuring that dialogues include a broad range of actors and interest groups, yet are nonetheless sufficiently informed by the science on climate change and its impacts.

Source: H. Jones et al. (2009).

3.1.4   Building adaptive capacity

Capacity building is likely to be a key element of strategies to address complex problems at the right levels. One aspect is that decentralising tasks within government will often require building capacities at lower levels of organisation – in local government bodies and elsewhere. There may be a 'chicken and egg problem,' whereby there is reluctance to decentralise tasks to lower-level units until they have proved their capacity to carry them out, even though it is impossible to do this until decentralisation has actually occurred. One solution is to begin by decentralising simpler tasks for which lower-level capacity is clearly evident or for which the costs of failure would not be severe (Marshall, 2008).

In many instances, capacity building should focus on local institutions and collaborative enterprises that are already engaged in tackling the problem. **Adaptive capacity,** defined as 'the property of a system to adjust its characteristics or behaviour, in order to expand its coping range under existing climate variability, or future climate conditions' (Brookes and Adger, 2005), has had a good deal of attention as part of responding to the challenge of CCA. It is also likely to be of general importance in responding to a wide variety of complex problems (Baser and Morgan, 2008).[13] As such, emerging knowledge on the determinants of capacity should be high priority: it is shaped by the ability of institutions to learn from experience, by flexibility and creativity in decision-making and by responsive power structures that consider the needs of all stakeholders (Gunderson and Holling, 2001).

Communities' and local organisations' adaptive capacities could also be promoted by helping **improve feedback about their local environment.** The poor position of many communities owes to a lack of information about the environment, meaning they are not in the best position to deal with new problems affecting them. However, 'many agents […], without seeing the dynamics of the larger system, can produce a self-organising strategy that effectively deals with a complex and out of control environment' (Hemelrijk, 2005). Therefore, local-level and 'rapid feedback' indicators 'help individuals, agencies and businesses make the best choices for their own actions,' and they can 'work together to improve the system [and their position in it] so long as they get feedback and so long as they have the capacity to respond' (Innes and Booher, 2000).

As well as building the capacity of individuals, communities and organisations, it may be important to build collective capacity by **supporting networks** that address an issue or area of practice. Supporting the development of networks is a way to ensure that actors from a variety of levels, contexts and backgrounds are able to communicate on an issue, and helps build shared understandings and social capital that may foster (or be a starting point for) collaborative action (Swanson and Bhadwal, 2009). Providing actors the opportunity to hold discussions will give them a chance to communicate, build trust and coordinate.

3.1.5   Remove the barriers to self-organisation

One priority in enabling a decentralised response to an issue is to **tackle barriers and systemic issues that may be preventing actors from adapting to emerging problems** and restricting the fruitful

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[12] Currently being made in the mould of poverty reduction strategy papers (PRSPs) as a mechanism for incorporating CCA into domestic policy processes in Southern countries.
[13] The 'capacity to adapt and self-renew' (including learning, strategising, adaptation, repositioning and managing change) to be one of five core competencies required for an organisation or system to survive.

production and use of knowledge at different scales. There are likely to be a number of different variables according to the particular policy issue as to what facilitates an 'enabling environment.' One example, on agricultural innovation, is as follows: whether there is a good level of innovation in a country is often best explained by certain 'framework conditions,' such as ways of working; aspects of culture; the social value placed on entrepreneurship; regulatory and legal frameworks; taxation and incentives; and the banking ethos (Arnold and Bell, 2001). Infrastructure (transport, telecoms, business support) often forms the major constraint to productive innovation. For example, bad roads may stop farmers getting products to market or coming together with fellow farmers.

Actors self-organising to address common problems depends on a number of factors external to the group itself, such as whether there is **enabling national legislation** giving communities and groups of actors the autonomy to form collaborative institutions and put in place various rules, and whether there is provision and cooperation from government in such arrangements. Working to over constraints in this regard may be a necessary condition in facilitating effective autonomous responses to an issue.

As well as technical and formalised concerns, more deep-rooted issues of power, politics and culture may function as systemic barriers to the production and use of knowledge (N. Jones, et al., 2009b). First, **power relations** can play a big role in shaping actors' preferences, capabilities and scope for innovation or engaging in collective responses to problems. This relates not only to individual levels of empowerment and self-confidence to initiate change or participate in collective enterprises with others, but also to whether actors have the power to counteract or overcome resistance to change. Deeply embedded structural constraints, such as those to do with gender, caste and class relations, are also likely to play a role in stymieing innovation and adaptive responses to problems.

Second, **political and governance arrangements** may be decisive in enabling or restraining emergent responses. These will shape the policy response context by affecting whether there is an evidence-based culture, whether elites can critically consume and apply research findings and whether there are likely to be intermediary actors.

Third, **discourse** can play a role in promoting or stifling the use of knowledge at different levels, either generating demand through the strategic framing of issues or limiting the range and breadth of understanding on a specific phenomenon.

Fourth, **social capital** is often key to the emergence of adaptive responses, providing networks through which people can self-organise, and represents the basis of trust, collaboration and social learning. Therefore, inter-community characteristics (e.g. homogeneous vs. heterogeneous, dense vs. thin and historically rooted vs. newly formed associational life) and levels of social cohesion can be a crucial parameter constraining or promoting emergent responses.

As well as providing enabling legislation and addressing these other barriers (or at least explicitly recognising them as central barriers to enabling a full response to a complex problem), it could be that public education could have a beneficial effect. For example, in relation to stimulating emergent NRM, a 'dezombification' campaign could improve things by making agents capable of learning and conscious that they are; providing education and building awareness about the management of complex systems and reinforcing ideas of complex systems management; and emphasising the need to collaborate in order to achieve common benefits (Ruitenbeek and Cartier, 2001). This resonates with concepts of popular education – empowering socially or politically marginalised people to take control of their learning and affect social change (Freire, 1970).

3.1.6   Supporting networked governance

Since traditional command and control approaches are less relevant for complex problems, implementation must draw on other ways to embed accountability, as well as different ways of thinking about responsibility and mandate. What this implies is **a networked approach to policy and governance.** A number of experts in public sector management have hailed this as an emerging form of

policy implementation,[14] and it has also recently been proposed as key to improving the work of international development agencies (Barder, 2009). Governance by network involves agencies working with a variety of institutions, engaging service providers and other organisations (including civil society organisations (CSOs), local government agencies, etc.) and collaborating with a variety of actors who have the capacity, knowledge and legitimacy to address a particular problem (Kamarck, 2007). In the UK, the Institute for Government have recently argued that, since policy-making and implementation are intrinsically linked, with outcomes changing throughout implementation and central government are unable to directly control how changes happen, it must instead work towards 'System Stewardship', helping to oversee the ways in which policy is adapted and attempting to steer actors towards certain outcomes if appropriate (Hallsworth, 2011).

Given that most complex issues encountered *do* require the voluntary collaboration of different actors and institutions, it is crucial to build up relationships. Strong social capital and positive institutional links between the actors involved are needed, and arrangements for joint or delegated action should be negotiated. Relationships need to represent something more like agreements and fair partnerships based on shared principles, values and aims (Roche, 1999). This means **relationship management should be seen as a key activity,** along with related skills and systems (Eyben, 2006). This is echoed in the literature on organisational participation and promoting collaboration within organisations, which shows that attempts to tackle problems in a decentralised manner must be supported by training in relationship skills, such as communication and conflict resolution (Harvard Business review, 2009).

Accountability structures should focus more on holding teams, units or organisations responsible for their mission, rather than solely for delivering outcomes. Research has shown that, in facing complex tasks, accountability based on principles rather than outcomes has a positive effect on cognitive efforts put into decisions (Lerner and Tetlock, 1999). This could mean, for example, NGOs and other partners being funded based on, and evaluated against, their core values and mission rather than outcomes they may not be able to predict or control. Similarly, approaches to the networked organisation in the private sector emphasise the value of focusing on the functional descriptions of different teams or units, with 'role clarity and task ambiguity,' achieved by defining roles sharply but giving teams latitude on approach (Gratton and Erikson, 2007).

Organisations becoming good 'listeners' and **participatory processes need to be central** to implementation and management: coherent and sustainable polycentric arrangements require the building of open lines of communication and linkages between different institutions and fora. One priority is for programme evaluations shaped around consultations with partners and beneficiaries. In this, there are areas of promising good practice, such as ActionAid's Accountability, Learning and Planning System (ALPS), which is stimulating ongoing change in the agency's planning, strategy, appraisals, annual reports and strategic reviews, bringing them more in line with principles of downward accountability. This has included revolutionary new practices, such as scrapping the requirement for formal annual reports from country offices in favour of annual participatory review and reflection processes, which engage the poor and other stakeholders in honest and open dialogue. Also, individual performance appraisal should focus on systems such as '360 degree appraisal.'

Building trust within organisations or teams is also important, and can be supported by a variety of policies. Focusing performance bonuses on teamwork and collaborative success is one approach Evans and Wolf, 2009), with organisational participation shown to be promoted where compensation is built on collective achievements (e.g. profit sharing). 'Signature' relationship management practices have proven highly successful, ensuring that new teams and units are populated in part by people who already know and trust each other (Gratton and Erikson, 2007). Informal dynamics are also important, so efforts should be made to build a sense of community, to co-locate key staff and to emphasise organisational symbols and culture. Methods should be put in place to effectively manage conflict in a

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[14] One of three emerging forms of policy implementation: reinvented government built around performance-managed bureaucracies, governance by network and governance by market (Kamarck, 2007).

consistent way, and should be an integral part of business processes such as planning and budgeting (Weiss and Hughes, 2005).

3.1.7 Leadership and facilitation

Even with a complex problem where the capacity to tackle issues is distributed, an agency, individual or organisation can still look to drive action on an issue – but must employ different tools. **Leadership emerges as a critical variable** in driving and shaping collaborative responses to problems.

For example, a review of the empirical literature on management of watershed partnerships shows that leadership was the second-most-frequent factor in successful adaptive governance and collaboration (behind adequate funding) (Leach and Pelkey, 2001). Recent work reviewing our understanding of systems of knowledge and action highlights leadership as one of the four key pillars of success (Holmes, 2010).[15] In adaptive governance, leaders have proven to fulfil the function of agenda setters, popularising issues and lining up support by building trust; linking actors and initiating partnerships; and managing conflict (Folke et al., 2005). Without such leadership, there can be inertia and a lack of collaboration in the face of complex problems (Scheffer et al., 2003).

A different kind of approach must be taken to leadership in complex problems. While command and control may work in systems with relatively stable cause and effect linkages, in the face of complex problems **leadership must rely more on facilitation and empowerment, promoting ownership and catalysing self-organisation** (Snowden and Boone, 2007). This opens up new channels and spaces for an organisation to attempt to pursue its goals, influencing actors over which it holds no formal authority (on a horizontal as well as vertical level). Attention must be paid to managing relationships as well as meeting tasks, and leaders may need to display the kinds of behaviours they wish to inspire in others (e.g. collaboration and sharing) (Gratton and Erikson, 2007).

This is similar to concepts of **'soft power'** (Nye, 2004), where actors attempt to achieve goals through attraction and cooption rather than coercion, and 'servant leadership' where leaders view their task as that of serving others, looking to enable followers to become wiser, more autonomous, and better able to serve (Greenleaf 1991). Drath et al. (2008) argue that leading on a goal or issue needs to focus on working towards three key outcomes: direction (widespread agreement on overall goals, aims and mission); alignment (of the organisation and coordination of knowledge and work); and commitment (willingness of members of a collective to subsume their individual interests).

One of the central tasks of leading on an issue then becomes **communicating a compelling vision of the required change** (Best and Holmes, 2010). This is about strategically *framing* an issue, and developing and communicating new ways of conceptualising a problem and its solution. Strategic framing and discourse is a central technique of social movements, used to catalyse processes of empowerment and action. The language used to convey a new idea or practice can shape the audience's understanding of the problem, the impetus for action and the scope of options available for redress or change. For example, the adaptation of notions of women's empowerment derived from highly individualistic Northern contexts to more collectively oriented but hierarchal Asian contexts involved a creative reframing of feminist demands. Calls for equal employment rights in East Asia have typically been couched as 'maximising women's human resources for national development' or as 'male protection laws,' in the sense that they would preclude men from having to shoulder responsibility for household wellbeing alone (N. Jones, 2006).[16]

When delegating work within an agency, this task then becomes one of collaboratively building a shared, motivational vision, and then **using it to set the central goals** or direction of an initiative, around which innovative responses and behaviours can emerge (Chapman, 2004).

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[15] Alongside evidence and knowledge, organisational networks and communication.
[16] Forsyth (2003), in his work on 'critical political ecologies,' cautions, however, that strategic framing by social movement activists can also have a potentially negative side, through the misuse of scientific facts. As a result, it can be important to critically assess the power dynamics underlying the creation of scientific knowledge and 'facts' (Keeley and Scoones, 1999).

3.1.8 Incremental intervention

Inevitably, there will still be some work that a central agency must carry out, and/or action that needs to be taken unilaterally. Meanwhile, even if, as a whole, action to address a problem must be emergent, this does not mean that nothing can be done to help this. As an analogy, free trading markets are emergent, and yet there can still be a role for public policy to ensure the conditions for emergence are maintained intact (Ruitenbeek and Cartier, 2001). While many goals can be met through self-organised action, **some goods may still need to be provided by the 'top' level:** larger/higher governance units may be needed to reduce the strategic behaviour of agents avoiding rules, by providing neutral spaces for mediation and goods that can be contracted out, as well as supporting actors to self-organise, as mentioned above (Ostrom, 2010).

A different approach to intervention will be required. Genuine collaborative institutions and networks are not so easy to bring into existence or control. Lessons from working with networks show these live on or perish according to their own internal dynamics, because the potential for learning comes largely from the informal side, rather than being controlled by management or formal structures. Rather than looking to create a new network on an issue, the first step should be to recognise and engage with existing networks of interactions (whether formal or informal) and to facilitate them, work with them or manage *in relation* to them. This should be part of some general requirements placed on interventions, to ensure they 'do no harm' to emergent collaboration and action (Ruitenbeek and Cartier, 2001).

Capacity building should not be carried out as part of a 'deficit-based' or blueprint-based approach. Rather, **it should be approached in an 'incremental' manner,** combining a degree of formal strategic intent with a flexible design; taking an evolutionary approach to supporting programmes; working harder to ensure ownership is retained by responding to organisations' motivations, identities and needs; and being creative about options for support, embedded in the political, social and cultural norms within which they operate (Land et al., 2009).

It may be, therefore, that funding action on the issue must be seen as 'seeding' emergent action. Rather than investing solely in 'sure fire success,' complex situations require a broad range of strategies, including making investments that may not bear fruit for a significant amount of time, and where the final outcome is quite uncertain. **Rather than conceiving of policy and delivery as mechanistic, a better approach might come from using the metaphor of gardening and tending to a meadow** (Curtis, nd): there is no grand design, but there are plenty of opportunities for a variety of actors to influence what flourishes, especially with seasonal patterns; action is about tending to different species with deep or shallow roots, seeking or giving shade and encouraging beneficial species such as bees and earthworms, etc. Governments should provide economic incentives (and others) for social aims, and mechanisms need to be developed for decentralised funds to support capacity and action at the local level. SNV's Local Capacity Development Fund represents pioneering work in this field, allowing demand-oriented support in a way that empowers local organisations and gives them services tailored to their needs (Tembo, 2008).

Box 7: Stimulating decentralised action on irrigation in Sri Lanka

In the Gal Oya irrigation scheme in Sri Lanka, cooperative practices and structures emerged that greatly improved the size and efficiency of irrigated rice production. In 1981, funded by the US Agency for International Development (USAID), young institutional organisers were recruited to act as catalysts for farmer organisation. Living alongside farm households, they began their efforts at field channel level, where 10-20 farmers would be cultivating from a common source of water, beginning groups at a pace the farmers were willing to accept, functioning informally and in an *ad hoc* manner at first until members wanted a more formal structure.

Over time, more complex formal and informal organisational structures grew. In 1985, when the programme ended, about 12,500 farmers were cooperating through these organisations, for improved water management but also in solving other issues, such as crop protection and employment creation. The Gal Oya had previously seen 30 years of water stealing and conflicts between farmers. Such was the success and sustainability of these structures that, in 1997, over a decade after the end of the official programme, and against expert predictions that there was not enough water, farmers achieved a better-than-average crop.

Uphoff describes two forms of social capital that were fundamental to this success. Structural forms such as roles, rules, procedures and precedents, as well as social networks, establish ongoing patterns of interaction. These supported decision-making; resource mobilisation and management; communication; and conflict resolution. These were often cemented in formal roles, and supplemented with sets of rules, developed by the farmers themselves,[17] that saw instances of non-cooperation and selfish behaviour replaced by norms of cooperation and amicable resolution of conflicts of interest.

Cognitive forms of social capital, such as norms, values, attitudes and beliefs, are more internal and subjective, but represent shared symbols and meaning and embed trust and reciprocation. Promoting action was often a matter of encouraging those values and social institutions that would facilitate cooperation. For example, *shramadana*, which means 'donation of labour,' is a set of norms, beliefs, procedures and precedents recognised by Hindus and Buddhists in South Asia. While this was not being drawn on in 1980, the practice was mobilised in order to get farmers to rehabilitate irrigation channels, gates, roads and bridges.

Uphoff describes the effect of this social capital as mutually beneficial collective action. This should be seen as an emergent property, as it is stable (as seen by the continued development of the irrigation management institutions), impossible to control (the USAID-funded staff worked as catalysts, according to the pace and wishes of the local farmers) and difficult to predict (when they began their work, nobody could have foreseen that such structures would be in place over 15 years later, at such a large scale). It produced results that were clearly more than the sum of its parts: from the same fixed water source, thanks to the institutional innovations, farmers were able to achieve substantial increases in the area irrigated, and in the productivity of the water and the land, as well as the exceptional 'crop against all odds' in 1997.

Source: Uphoff (1996); Uphoff and Wijayaratna (2000).

3.2 When? Building adaptive and emergent responses

In complex problems, there will often be unavoidable uncertainty, and effective policy-making depends on local expressions of desired changes and of adaptation to local contexts. It is therefore crucial to better align implementation tools and approaches with realities on the ground, and plans must be seen as permanently provisional. When looking into future events, past a certain level, planned-for detail should be balanced with the understanding that even the best plans may quickly become irrelevant.

A greater burden of the generation and use of knowledge for implementation needs to be shifted to occur **during the intervention.** There is a number of ways this can be done to help make implementation more adaptive – ongoing learning about the effects of interventions should be encouraged, and implementation needs to recognise it is about not only providing answers to problems but also expressing hypotheses and asking questions.

3.2.1 Appropriate planning

Although strategy and planning are still desirable and relevant in the face of uncertainty, it is crucial to ensure that levels of uncertainty and ambiguity are accepted as a *de facto* part of the policy-making process. There are some straightforward implications of this: **light and flexible systems around *ex ante* analysis** are needed to facilitate responsive, appropriate interventions. For example, taking the lead in convening a group of actors may require some commitment of funds, although the precise nature of the policy solution that will be agreed may not be decided until further down the line.

In complex problems it is still worthwhile carrying out *ex ante* analyses of a problem, its causes, its consequences and its contextual setting, but this should be based on lessons about what is effective in shaping successful projects on the specific problem. For example, environmental impact assessments (EIAs) are often embedded in national laws, and compulsory for set types of projects (those that are, based on experience, likely to have significant environmental impact). There is some flexibility over smaller projects or ones where the environmental impact is less easy to predict in advance. It may be useful to generate certain **'do no harm' tools** for certain sectors, to help minimise potential negative impacts on certain outcomes that may otherwise be forgotten or poorly understood.

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[17] Rules are an element emphasised by Ostrom (1990) as critical for effective collective action.

Ex ante assessment and planning tools may be **aimed predominantly at enhancing the knowledge, awareness and capacities of decision-makers through the process of carrying them out,** rather than being attempts to map out the future (ibid). For example, Drivers of Change was developed within the UK Department for International Development (DFID) (Booth et al., 2006), motivated by the fact that donor organisations frequently explained away the failure of their programmes by pointing to a lack of political will for change among aid recipients, without examining the underlying reasons for this lack of will. This can be used as a learning exercise to enable a better appreciation of the interlocking causes that make progressive change so difficult in some of the poorest developing countries.

The locus of accountability should shift away from fixing detailed action plans and budget allocations before intervening: it is better to embed flexibility and adaptation in order to allow interventions to react to ongoing learning and unexpected conditions, so there must be space to improvise (Pina e Cunha and Vieira da Cunha, 2006). One way of doing this is to **provide core funding to trusted units or partners with a proven track record and/or seed funding to those with potential,** and **giving resources based on intuitively developed plans with broad outcomes** in order to allow project/programme staff to adapt to unfolding circumstances (Reeler, 2007).

Another way of doing this is to anchor accountability to **clear principles for action** ('if, then'-type statements), providing a benchmark to measure performance against which does not make action inflexible. US marine operations work according to three such principles, which govern decision-making in complex and unpredictable environments: 1) capture the high ground; 2) stay in touch; and 3) keep moving. In this way, decentralised decision-makers can be very clear about the principles to which they will be held accountable, while having principles rather than set plans enables adaptive responses to emerge (Ramalingam and Jones, 2008). As mentioned earlier, holding teams or organisations to account for functional roles, or to clear statements of missions or values, is one way of doing this.

Another way of doing this is to **build in rules for the adjustment of plans** in advance. Planning processes will need to look at likely variations in future conditions that will affect the operation of the policy, ask how it will need to be adjusted and predefine this adjustment (Swanson and Bhadwal, 2009). During implementation, there must be monitoring of the key indicators, which will trigger the appropriate adjustment when needed. Alternatively, processes for review and evaluation could be triggered based on threshold values of certain outcomes that are monitored, or stakeholder feedback and the availability of critical new information. This can feed back into policy by recommending adjustments to make it robust across a range of newly anticipated conditions, developing indicators that will trigger future (predefined) adjustment or triggers for future analysis.

3.2.2 Iterative impact-oriented monitoring

The relaxation in *ex ante* requirements can be replaced by a greater focus on assessment and design throughout implementation. **M&E efforts are crucial** to the success of a policy or programme. This is not revolutionary – M&E is already recognised as a major instrument in the implementation of policies, projects and programmes worldwide. For complex problems, however, it is important to look at the effects of programmes on their surroundings – moving from monitoring and evaluation based on outputs (immediate goals such as building schools, training nurses or making credit available) to look at outcomes and impacts (what happens outside the direct work of the programme and contributes to people's lives) (Riddell, 2008). Instead of asking whether an intervention is doing the right thing, or doing it in the right way, it is about asking whether it has the right effects.

M&E must be used to **revise understandings of how progress can be achieved,** not just to record progress against predefined indicators. Once it is recognised that *ex ante* assessment is always likely to give an incomplete picture of how to achieve change, how to work towards goals and what 'success' might look like, many of the tasks associated with planning must become ongoing and iterative. This way planning, monitoring and evaluation can be linked together and feed into each other.

This insight is at the heart of **adaptive management,** which is based on the idea that knowledge about how change happens and what might make an effective policy for addressing complex problems is necessarily incomplete. It focuses on helping those formulating and implementing policy improve and develop their understanding of how the world works through ongoing cycles of evaluation, assessment and adjustment of change models and activities. It is now increasingly being applied to more social and civic issues (Lee, 2007) (with greater attention being paid to the emerging field of 'adaptive governance' (e.g. Folke et al., 2005).

Similar insights are built into **outcome mapping** (OM), an approach to PME of social change initiatives developed by the International Development Research Centre (IDRC) in Canada (Earl et al., 2001). OM is a set of tools and guidelines that steer project or programme teams through an iterative process to identify their desired change and to work collaboratively to bring it about. It emphasises that effective PME activities are cyclical, iterative and reflexive. Ongoing monitoring activities resemble re-planning exercises, enabling teams to revisit their various aims and objectives and adjust their understanding of how to achieve change if necessary.

Generating learning about the effects of an intervention is one matter; for it to lead to responsive action and adaptation, it must be fed into policy and practice. This means **it is crucial to ensure that lessons from M&E are taken up.** In the complexity sciences, this is conceived of as creating a feedback loop between implementation experience and future action which steadily brings the reality of policy/practice closer to the intended functioning and to the achievement of goals.

A variety of methods and approaches, already well-known to development practitioners, can help to ensure that emerging evidence of the effects of an intervention are reflected on and integrated into implementation. Action research, action learning methods and appreciative enquiry are just a few of these. **Evaluation should be more utilisation-focused** – employing the intended users and uses of evaluation as the drivers of how, when and where it is carried out and the questions it investigates. By placing users in key roles to shape and manage evaluation processes, they stand a better chance of facilitating judgement, decision-making and action (Patton, 2010). In order to ensure they provide the requisite feedback for adaptation, evaluation and research policies, processes and studies should be judged by the utility and actual use of the information provided.

3.2.3 Stimulating autonomous learning

Theory and practice show that, in complex problems, improved links between knowledge and policy (i.e. strengthened feedback loops between implementation and lessons from experience), come from **enhanced personal links between knowledge producers and users, in an atmosphere of trust and reciprocity** (Michaels, 2009). Therefore, promoting the ongoing adaptation of interventions to unfolding events and signals needs to focus on promoting buy-in and ownership throughout the implementation chain or network – increasing uptake of evidence through 'internal' incentives.

This highlights the importance of **embedding M&E in policies and programmes.** Timing is often the most crucial factor in facilitating the uptake of evaluations (N. Jones et al. 2009c), and so, especially given the unpredictable nature of change in complex settings, having full-time capacity for M&E within implementation teams will be crucial. This could be done by providing teams with drawdown M&E advice or capacity, for example having an internally focused 'evaluation help desk' there to help teams design and implement M&E where needed. However, given the need to ensure 'intelligent customers' as well as buy-in, it may be crucial to ensure that one or more members of an implementation team has the required skills and capacities too.

One way forward that promises to take into account all of the above can be found in work on **developmental evaluation** (Patton, 2010), which involves embedding evaluators in implementation teams for some time. Rather than focusing on testing and validating programme models, the intention is to support the development of innovations and the adaptation of interventions; it is carried out in the

mindset of providing a 'reality test,' engaging policy/programme staff in the process and nurturing their hunger for learning and building their ongoing capacity to think and engage evaluatively.

Another priority for improving ownership of M&E involves **allowing devolved units to shape their own M&E processes and frameworks** rather than them being forced to use one particular tool or other. Although it will be crucial to ensure that M&E and learning are central pillars in implementation and management, choices over how to do this should be decentralised where possible. At the moment, choice of M&E framework is often highly restricted and indicators are often standardised, for example. Again, actors at all levels will need guidance in choosing the best method for their situation.

Schön (1973) discusses a US regional medical programme which reformed implementation using a systems theory model. Programme design was already decentralised, and longstanding problems in the original scheme were resolved by devolving performance evaluation to the regions also. Agencies still had to carry out M&E and demonstrate performance, but allowing them to do this on their own terms, respecting differences in context, experience and opportunities, helped generate a great deal more enthusiasm and commitment to change, and ultimately was a key factor in programme success.

Institutional context and relationships are key. RAPID's case study on the development of the sustainable livelihoods methodology (Solesbury, 2003) shows that a close and ongoing relationship between policy organisations and academic organisations was central to reorienting practice. Similarly, one key function for think-tanks is to provide a 'safe' space for political parties to discuss and test ideas, and then to look at how to turn them into a policy programme (Mendizabal and Sample, 2009).

3.2.4 Implementation as an evolutionary learning process

In the context of complex problems, and given the limits placed on planning and *ex ante* analysis, **intervention itself becomes a crucial driver of learning** (whether this is of a policy, programme or project, carried out by an international agency, national government or local people). As well as taking advantage of opportunities for learning that arise naturally (as with 'natural experiments'),[18] learning through intervention can be done in an active manner. For example, 'active' adaptive management involves carrying out some interventions and perturbations of the system deliberately, in order to test hypotheses and generate a response that will shed light on how to address a problem. This is also the underlying premise of policy 'pilots,' whereby a proposed approach is tried out on a small scale in order to understand if it 'works' (Cabinet Office, 2003).

However, one major criticism of pilots is that too often they are not allowed to 'fail,' and hence they provide less opportunity for learning. The importance of ensuring that you can learn from an intervention is emphasised in Snowden's concept of **'safe-fail experiments'** (2010): these are small interventions designed to test ideas for dealing with a problem where it is acceptable for them to fail critically. The focus, then, is on learning from a series of low-risk failures. As an approach to implementation, this involves the following steps. First, elicit ideas for tackling the problem from anyone who has one, and design safe-fail experiments to test each. Next, flesh them out, cost them and subject them to challenge and review – with the aim of keeping experiments small but carrying out a broad number of them. Crucially, for each experiment to be valid, it should be possible to observe whether results are consistent with the idea or whether the idea is proved wrong. Another suggestion is to focus not on confirming or falsifying ideas: learning comes from cognitive dissonance – **seeking surprise** and looking into events and outcomes that were wholly unexpected at the outset of an intervention (Guijt, 2008).

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[18] The concept of 'natural experiments' marks out instances in the course of policy implementation that offer particularly rich opportunities for learning, such as when two very groups very similar in many ways were and were not affected by an intervention, which gives an opportunity to estimate the effect that that intervention had (White et al., 2006). For example, squatters outside Buenos Aires were awarded title to the land on which they were squatting, with compensation paid to the original owners. Some owners disputed the settlement in court; these squatters did not obtain the land title. Which squatters got a title or not had nothing to do with their characteristics. Hence, non-title holders and title holders can be compared to examine the impact of having title on access to credit (there was none) and investing in the home (there was some).

The idea of experimentation is at the centre of what is termed by some an **'evolutionary' approach** to implementation, advocated by David Ellerman, former Chief Advisor to Joe Stiglitz at the World Bank (2006) and Owen Barder (2010). The two basic processes are variation, where a number of different options are pursued, and then selection, where, based on feedback from the environment, some are deemed a greater success and replicated.

As part of an evolutionary approach, the first step is to **promote variation** and try many different things in response to a problem, with 'trial and error' as the central aim of a policy. Given the inherent uncertainty of planning, it is most appropriate to facilitate a wide variation of small-scale interventions, allowing a 'breadth first' approach to exploring solutions (Ellerman, 2004). Research shows this kind of approach is more likely to achieve success in the long run in complex environments. Beinhocker (2006) argues that strategy should be seen not as a single 'big bet' but rather as a portfolio of experiments, by setting an overriding goal and then simultaneously pursuing a multitude of diverse sets of plans, each of which has the possibility of evolving towards that goal. This is another way for central policy-making bodies to capitalise on the effectiveness of lower levels: tackling problems by sponsoring or supporting a number of small-scale interventions; setting the most appropriate scale of intervention to be selected; but then allowing for considerable variation in how the issue is approached.

The challenge is then to carefully monitor and evaluate the effectiveness of different approaches, and to provide mechanisms to **select successful characteristics,** which are then the basis for the next round of evolution and variation. The main role of the central agency or top-level body would be to assist the M&E, possibly synthesising lessons learnt across all projects and looking for what makes for successful projects in different contexts (Snowden, 2010). This could then be communicated back to the lower levels, made public and serve as a benchmark for performance in the next stage of funding – step-by-step 'ratcheting up' the performance of the whole (Ellerman, 2004).

This kind of strategy has been used not just for social problems but also to tackle technical issues. For example, a company used these processes to develop a new nozzle for foam: a set of (random) variations on the initial prototype were tested and the most effective chosen; a set of random variations on that improved nozzle were tried and tested and the most effective chosen for further replication; and so on. Through this process, the company was able to improve the performance of the nozzle significantly, in the face of prohibitively difficult fluid dynamics. In addition, this process was far more successful than having a team of experts design the optimum nozzle (Barder, 2010).

3.2.5   Creating short, cost-effective feedback loops

A third approach is to improve feedback between actual performance and future implementation by ensuring it is grounded in short, quick loops, based in solid incentive structures. For example, in the management of CPR, the choice of monitors is crucial: the trust required to support and transform collaborative institutions is difficult to build on large scales (Ostrom, 2010). Also, *regular* monitoring by individuals or organisations with the capacity to impose informal sanctions is possibly the most crucial factor in determining whether arrangements have succeeded in managing resources sustainably.

Essentially, this is about judicious use of **participatory M&E** approaches and transparency initiatives. Keeping monitoring at the ground level ensures that monitors have a strong appreciation of the local dynamics and reasonable expectations about what can be done in a context; putting monitoring information in the hands of those who stand to benefit from the intervention ensures feedback loops are short and strong. Participatory M&E involves 'methods where the primary stakeholders of an intervention [...] are active participants [taking] the lead in tracking and making sense of progress towards achievement of [...] results at local level, drawing actionable conclusions' (Hilhorst and Guijt, 2006). If used correctly, these methods offer a quick, relatively cheap way of gathering the necessary information about performance, thereby achieving 'appropriate imprecision' (Chambers, 1983).

Moreover, there are some exciting developments in **local-level methods for participatory involvement in the governance of implementation.** International NGOs and other agencies have

achieved startling success by building CSOs' capacities in methods such as participatory budgeting, participatory expenditure and service delivery monitoring and participatory budget tracking (Chambers, 2008). One particularly relevant subgroup is **methods for beneficiary feedback.** This is a 'systematic approach to collecting the views of […] key stakeholders about the quality and impact of work undertaken by an […] agency, generating quantitative data' (Jacobs, 2010). These have the potential to achieve success in some contexts – for example, a randomised controlled trial (RCT) attributed large, concrete changes in service delivery to the facilitated use of report cards and public meetings (Bjorkman and Svensson, 2009).[19] With initiatives beginning to explore the potential of information and communication technology (ICT) such as SMS to scale these methods up, they could prove invaluable in the future.

Transparency and accountability initiatives designed to put relevant information in the hands of local people are also mushrooming, and have been shown to increase the responsiveness and improve the delivery of services *in some contexts* (McGee and Gaventa, 2010).[20] Just the release of information can put in place new feedback loops and change incentives substantially. Another RCT (Reinikka and Svensson, 2005) shows that a newspaper campaign to publish information about monthly transfers of funds under an education capitation grant scheme managed to improve enrolment and change a situation whereby schools received only 20% of funds to one where they received an average of more than 80%. Also, rapid feedback indicators (for example daily updated information on food prices in local markets) have shown to be significant tools in improving community development and generating sustainable cities, informing interventions but also allowing individuals, agencies and businesses to make the best choices for their own actions (Innes and Booher, 2000).

Many of these tools are just being examined in mainstream development practice, and there has not been the chance to assess comprehensively their real, long-term value or the factors that facilitate their effectiveness. It will be important to draw lessons from past experience with participatory tools and to pay attention to context, as – just like with any other tool – they are likely to reflect the political economy of application. The insights of the previous section about genuine collaboration and equitable relationships must be heeded in order for these to be able to deliver the desired benefits.

3.2.6 Accountability for learning

The shift in approach required is to see **intervention as an expression of hypotheses and assumptions.** At the same time as attempting to deliver a service or achieve a goal, it is important to do all that is possible to look at the questions a policy poses and to seize opportunities to assess how robust and relevant those hypotheses are. This idea is at the heart of approaches to policy-making that see policy as an experiment. For example, Rondinelli (1993) proposes that development policies be seen as 'social experiments,' arguing that taking into account the underlying uncertainty in delivering change through policy, development projects should be used to learn as we would from experiments, in order to redefine problems and solutions along the way.

In the short term, there may be a trade-off between learning and achieving objectives, so some 'slack' may be required to enable an intervention to be based on a better understanding of the situation; what is crucial is that **policies place explicit value on knowledge and learning** as an outcome of activities, and that this learning be channelled directly back into policy development. There are some ethical issues here, which more traditional approaches to policy experimentation have already examined in detail. These are not issues that should be dismissed lightly: there will always be difficult trade-offs between delivery and learning in complex problems, but there are also some ways of mitigating these.[21]

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[19] The RCT attributed the following results: service delivery improved with waiting times decreased, absenteeism plummeted, clinics were used more, 40-50% more children vaccinated, 33% fewer children under five died.

[20] The authors' note that the mechanisms through which transparency are thought to lead to accountability are on the whole untested, but this is largely because many initiatives are relatively new.

[21] For example, RCTs involve randomly assigning an intervention to some beneficiaries while also studying certain indicators in a set of potential beneficiaries who do not receive the intervention. The issue here is that it could be seen as denying the intervention to some people and prioritising something nebulous as 'testing a hypothesis' ahead of delivering crucial services and (in some situations) potentially saving lives. There are two considerations here. First, it is possible to actively design

The incentives around M&E are crucial: where recognising that not everything went to plan is seen as a 'failure' that has to be avoided, staff are unlikely to reflect genuinely on issues. An alternative approach is to see that, where a project seems to be starting to 'flag' on performance measures, this is an opportunity for learning and further assistance – for example triggering additional support and expertise. The way M&E is integrated with accountability requirements is also crucial. As we have seen, RBM may not be appropriate in the face of complex problems: measuring the effects and impact of implementation is important, but individual, team or organisational performance must not be judged solely on whether outcomes were achieved – outcomes are frequently outside the exclusive control of any one actor and so being held accountable for them is counterproductive (Lerner and Tetlock, 1999). The evidence is not conclusive, but **complex tasks may require learning objectives rather than performance goals** (Ordonez et al., 2009).

Governments and aid agencies must allow greater diversity in practice – RBM may still be appropriate for some areas of work but not for others. Another possibility is to **use performance frameworks that are 'multidimensional,'** such as the UK Department for Environment, Food and Rural Affairs' (DEFRA's) 'stretching the web' tool, which compares projects on a range of measures in a number of dimensions, or the 'balanced scorecard' approach and the 'performance prism,' which involve taking into account aspects such as stakeholder satisfaction; internal processes and strategies; and innovation and learning; as well as achievement of objectives (Hailey and Sorgenfrei, 2004).

Finally, variation is something that bureaucracies do not deal with well: they may view it as promoting inconsistencies and waste. In complex problems, it is crucial to **ensure sufficient redundancy** over (static measures of) efficiency; while it may be clear in hindsight which projects are successful and which did not individually provide good 'value for money,' when faced with significant uncertainty it is only sensible to invest in a broad range of options before focusing resources on those that have proven to work (Beinhocker, 2006). Promoting and incentivising **innovation in service delivery** will be vital.

Variation should be seen as the engine of learning; learning gained from a 'failed' project should be valued highly; and ensuring sufficient redundancy should be seen as the only responsible approach to programming in complex domains. Aside from exhortations to 'allow for variation,' another suggestion is that agencies operate with 'parallel project selection,' where there are a number of 'decision centres' in the agency, and acceptance by any one is sufficient for the project to be funded (Ellerman, 2006).

Box 8: Decentralised health care provision in Brazil

Responding to decades of institutional fragmentation, administrative discontinuity and lack of access to health care, an advocacy effort known as the Sanitary Movement managed to have health enshrined in Brazil's 1988 Constitution as a citizen's right, with the state responsible for providing universal and equal access to health services. The Brazilian Unified Health System (SUS) was then established in 1996. The system grew from the grassroots, based on decentralised universal access and public participation. Responsibilities and decision-making were devolved to the municipality level. Community participation is integrated at a variety of levels, such as through health councils, and strong popular support has helped ensure the system's continuity.

Research has shown that local experimentation and innovation have been a major factor in the system's success and adaptability. Innovation has been encouraged in two areas: service provision (e.g. community members' participation as auxiliary workers) and governance (e.g. intergovernmental cooperation). Examples include:

- Use of health councils to allow community and stakeholder participation in health care planning and delivery;
- Deployment of auxiliary workers, who are members of local communities employed to work as the assistants of health professionals;

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policies so as to learn about their effects without necessarily denying services to those who need them. For example, RCTs sometimes employ a 'pipeline' design, where the intervention is rolled out to one group before another, rather than instead of. Second, in situations where planning cannot be complete, with the best will in the world it may simply not be possible to understand how best to deliver crucial services without some directed learning, and it could be more unethical to pour large amounts of public resources into a course of action that represents only an initial guess at how to tackle the problem (this idea is at the heart of policy pilots, for example, which are carried out before interventions are rolled out at a large scale).

> - Family health modules, which were originally organised in simple formats targeting lower-income populations and poverty-hit regions but now are more sophisticated and have expanded into major metropolitan areas;
> - Diversification and structuring of the Family Health Strategy into networks to promote the transformation of older primary care centres into 'policlinics';
> - Adoption of new emergency care structures that emerged in Brazil's southeast in other metropolitan areas.
>
> The SUS is financed by general taxation and coordinated by the Ministry of Health, which is responsible for ensuring some uniformity of procedure and manages compensatory financial mechanisms to help reduce regional disparities.

Source: Bourgon (2010b).

3.3 How? A toolkit for negotiated learning

This section outlines some mechanisms for linking knowledge and action in policy implementation. On the one hand, the main task is to find useful tools and approaches, which for any one policy or programme is likely to involve an **eclectic mix.** Ensuring utility in M&E will require significant flexibility in what methods are used, and there are a growing number of alternatives – for example, ACT Development (2009) outlines 24 methods that offer relevant approaches for different needs and contexts. In complex problems, it is often impractical to focus on simple, predefined indicators to understand the effects of action. For example, RAPID's experience in M&E of the influence of research on policy shows that a wide range of information must be drawn on and synthesised, opportunistically as well as through planned data collection methods (Young and Mendizabal, 2009).

In addition, it is important to **draw on different sources of knowledge at many different levels and at various junctures during implementation.** For example, using scientific knowledge to contribute to improved agricultural productivity is likely to need scientists working closely with local communities in culturally sensitive ways (Leach and Scoones, 2006). Another example of how to incorporate scientific knowledge comes from evidence showing the value of having a cadre of staff with professional competencies working at the country level in development agencies (Mendizabal et al., 2010). A variety of tools have been developed to feed citizens' perspectives into policy at a variety of levels and moments. As we have seen, CSOs have achieved success in methods such as participatory budgeting and participatory budget tracking (Chambers, 2008); other initiatives such as citizens' juries and social audits have proved successful in reviving and enhancing institutions of local governance and collective action. Approaches to participation in the private sector include 'representative participation,' whereby groups of employees are involved in decision-making with management through consultative committees, work councils and representation on company boards; and 'employee involvement,' formalised means for feeding different perspectives into decision processes such as 'problem solving groups,' 'total quality management' and 'decision-making teams' (Heller et al., 1998).

Meanwhile, a complexity focus also brings into focus some specific areas where there are clear differences from traditional approaches. Some tools are particularly appropriate for messy problems with a number of different dimensions and contrasting perspectives, not just on courses of action but also in relation to the framings of a problem.

3.3.1 Decisions from deliberation

In the face of complexity, **'deliberation' should be a central process guiding decision-making,** by mobilising and combining various perspectives and drawing on many types of knowledge. This involves carefully designed processes where different types of evidence are combined and weighed up in a reasoned fashion, through an inclusive and transparent dialogue (Lomas et al., 2005). The aim is to make decisions that are relevant, feasible and implementable by combining different perspectives and building consensus prior to a decision (Culyer and Lomas, 2006). Key stakeholders should be brought together to discuss and consider appropriate action and policy responses, sharing knowledge, considering different perspectives on an issue and reaching reasoned, consensual decisions where possible. Another characterisation of this kind of process is 'collaborative learning' (Daniels and

Walker, 1996), or a process of 'collective inquiry' – a kind of collaborative action research working towards a shared ideal and collective governance and decision-making (Brown, 2007).

A wide range of areas of practical experience and theoretical reflection shows deliberative process can have a number of **beneficial effects on decision-making and implementation.** Work on social learning gives a substantive rationale for inclusive deliberation, arguing that collective discussion and incorporating a multiplicity of points of view improve the quality of decisions, policies and assessments produced. Multi-stakeholder deliberation prior to action has proven to build commitment and enhance the ability of units to adapt in the face of unpredictable problems. For example, in India, deliberative processes, incorporating multiple perspectives and building cohesion and experience, were the main factors explaining the differential response of community adaptation to climatic variability, being the most operative explanation for residents requiring less recourse to debt and maintaining feed stocks and production, even in drought conditions (Bhadwal, 2008). Moreover, a central challenge of evidence-based policy in health is not to develop the evidence needed for policy, but rather to develop more systematic, rigorous and transparent methods for identifying, interpreting and applying evidence in different decision-making contexts (Dobrow et al., 2006). On a more practical note, Cash et al. (2003) argue that these processes can increase credibility, by bringing multiple types of expertise to the table; salience, by engaging end users in defining data needs; and legitimacy, by providing multiple stakeholders with more transparent access to the information production process.[22] Box 9 shows two contrasting examples of deliberative processes.

Box 9: Contrasting deliberative processes

One example of a deliberative process integrated at a high level into policy-making can be seen at the National Institute for Clinical Excellence (NICE) in the UK. In order to evaluate new health care technologies, NICE invites formal submissions from interested parties and holds consultations and invited commentaries from consultees and commentators (with a careful demarcation between the two); systematic reviews; technical modelling exercises; and multi-party representation in the large deliberative committee, which hears witnesses. There are also appeal possibilities and various support groups, some using consensus methods on controversial issues and others advising who to consult (Culyer and Lomas, 2006).

At the other end of the scale, 'adaptive collaborative management' (ACM) has proven a highly effective method for forest user groups to manage their resources. It involves bringing together a range of community stakeholders, technical experts and implementing agencies to engage in proactive processes of reflection and adaptation. The centrepiece is collective learning processes between actors, which involves managed processes of reviewing and interpreting the available indicators and knowledge and feeding this into activity plans (McDougal et al., 2009).

There are some practical considerations in implementing deliberative approaches. Generally, they require **face-to-face meetings,** typically combinations of workshops, consultations and roundtables (etc.), at which actors convene to discuss and debate pressing issues. They require **detailed and in-depth discussion and carefully structured and managed processes,** allowing groups of people to engage in reflection, interaction and learning. As such, general informal policy discourse, often mediated by elites or the media, does not count as a deliberative approach. This means it is not easy to 'scale up' deliberation. However, as we have seen, learning and action must take place at a variety of scales (rather than just *en masse* at one level) and be embedded at related and possibly nested levels of governance; these processes, with appropriate representation throughout, could allow scale-up of deliberation to be carried out.

Deliberative processes must be **action-oriented** rather than functioning as just a 'talking shop.' They need to be aimed at an explicit decision, or at a decision context on which they will have a direct bearing (Cash et al., 2003), so as to address specific problems in a clear-cut and managed way rather

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[22] It should be noted that, although there are similarities between deliberative processes and participatory approaches, and although in many situations an approach could be described as both participatory and deliberative, the two diverge in important ways. Participatory processes are focused largely on engaging the poor in 'bottom-up' processes of decision-making and policy formation, and are often aimed at helping to orient programmes towards pro-poor priorities, in order to make development processes more representative, giving citizens the power to determine the course of their own development. Thus, they have different starting points and different practical implications (more on this to follow). The importance of ideas of representation and of normative perspectives on participation will be revisited in a new light in the next section.

than simply being a source for generating ongoing perspectives on an issue (Michaels, 2009). As such, while deliberation specifically requires a departure from straightforward majority rule, it is important to embed within it mechanisms to combat the danger of discussions stalling and failing to reach a consensus, and also the conservatism that can sometimes be inherent in consensus approaches.

Participants should also **have a role in 'doing'** as well as discussing, to ensure that new possibilities are explored and reflected on immediately. Literature on social learning shows that participants should be involved in carrying out policies or actions, for example actively testing models or hypotheses in the field (N. Jones et al., 2008). For example, the literature on agricultural innovation shows that agricultural reforms often should be carried out not in a top-down, 'transfer of technology' approach, but rather using the 'field as a laboratory,' developing and testing new methods and technologies with practitioners as well as working in controlled conditions. This allows for the combination of scientific knowledge with tacit knowledge of local circumstances and indigenous technical knowledge, and centres on embedding two-way, interactive and deliberative processes. It can make reforms more relevant and more likely to be adopted and have an impact on poverty reduction (Lundvall et al., 2002).

3.3.2   Focusing on how change happens

In the context of limited or incomplete knowledge about cause and effect, implementation processes must tie analytical and management efforts to explicit questions as to how change happens in their context. Since it cannot be taken for granted how change will happen, it is very important to make explicit ideas and assumptions underlying implementation, and to test and reflect on this purposefully.

One tool for the PME of projects and programmes is **developing a 'theory of change'** (ToC)[23] – a model of how it is that the project/programme activities are envisaged to result in the desired changes (Whelan, 2008). A ToC is an essential tool for M&E of complex activities from the perspective of enhancing decision-making and improving projects in an iterative way, but also from the point of view of reporting and accountability to external stakeholders:

- **Improving projects:** In complex situations, project and programme managers face ambiguity, where the available knowledge and information support several different interpretations at the same time. This means teams need to come together to question their models of change, their underlying assumptions and the relevance of their goals. It is important to explicitly discuss the framing of an issue and whether interpretations truly follow from available data, as well as what is missing or uncertain.
- **Accountability and reporting:** Providing a clear statement of strategy and direction, and analysing a project's expectations for change, is an important part of evaluating that project.[24] Moreover, once a ToC is completed, it then also lays out a number of dimensions and intermediate outcomes against which the project's influence can be measured, and a variety of areas that may provide key performance indicators to assist in judgements as to whether it is achieving the intended outcomes.

There are ToCs implicitly embedded in most PME tools. It is crucial to **choose tools that have a ToC that fits the context and problem of application.** For example, OM is based on an actor-centred ToC, which is relevant where actors are the driving force for change – for example where policy-influencing actors and their relationships, networks, perspectives and interests are key factors in shaping outcomes. Gearing the ToC around actors provides a clear and concrete focus for M&E activities, measured by the changes in behaviour, actions and relationships of those individuals, groups or organisations with whom the initiative is working directly and seeking to influence (Smutylo, 2001).

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[23] This is referred to in various ways, for example as a 'logic model,' 'programme theory' or 'roadmap.'
[24] Evaluators often have to construct the ToC from the assumptions and ideas implicit in a project's conception and implementation if there has not been one constructed explicitly already, but this may often be 'too late' for it to provide the strategic benefits it could have

Moreover, it will frequently be wise to explicitly **develop ToCs for the particular programme** – otherwise causal connections may be left implicit and untested. For example, the 'causal chain' approach to planning (e.g. in a log frame) is based on the assumption that change is best understood through a succession of events and outcomes, but the actual theoretical content and hypotheses about causal links generally tend to remain implicit (Sridharan and Nakaima, 2010). Rogers (2008) provides a wealth of guidance about how to fit ToCs to complex challenges, such as incorporating simultaneous causal strands (two or more chains of events that are all required in order for the intervention to succeed) or alternative causal strands (where a programme could work through one or another path). The emphasis should not necessarily be on making things highly intricate, rather on trying to provide a realistic and intuitive model that clearly sets out a team's assumptions and ideas about change.

Preferred methods for evaluation may need to shift in order to ensure a better understanding of complex problems. First, **theory-based evaluation** and **programme theory evaluation** (e.g. Funnell and Rogers, 2011) are the natural partner to ToC approaches to planning. Moreover, in complex contexts that are likely to involve change being produced by the interaction of a variety of forces, tools such as the log frame and econometric impact evaluation, based on a 'successionist' understanding of causality, are not so relevant. Other, equally legitimate, approaches to understanding change and causality in the natural and social sciences, with corresponding methods for impact evaluation, are:

- 'Generative' causality, involving identifying underlying processes that lead to change (e.g. assessing causality by understanding people's operative reasons for their actions or behaviour change, Bhola, 2000);
- A 'configurational' approach to causality, looking at how outcomes follow from the combination of a fruitful combination of attributes (Pawson, 2002).[25]

Based on a configurational understanding of causation where a certain number of factors are seen as conditions required for success, it is valuable to look at instances that represent different combinations of these factors being present and absent and analyse which conditions truly are necessary and sufficient. It is particularly crucial to look into instances where all of the factors are present but the 'success' criterion is not. This is the approach taken by **'qualitative comparative analysis,'** a method pioneered by Charles Ragin (1989).

Generative approaches are particularly relevant for understanding how programme mechanisms interact with various different contexts: Pawson's (2002) **'realist evaluation'** considers how a programme may function by means of various different causal mechanisms, which would interact with various potential contexts in order to produce an outcome. For example, the literature shows that the influence of research on policy will play out in very different ways depending on whether the government happens to have an interest in the issue or the capacity to respond (Carden, 2009). The corresponding method for systematic review, 'realist synthesis,' may be a highly useful approach to bring together the relevant evidence to address complex problems.

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[25] It is also possible to assess the counterfactual using non-experimental theory-driven methods, such as 'process tracing,' which examines causation as part of a theory focusing on a sequence of causal steps.

Box 10: Improving irrigation in Nepal

An innovative programme in the central hills of Nepal shows how implementation can take into account the need for self-organisation, and how learning the needs for implementation can respect complexity.

Efforts to improve irrigation systems in South Asia have tended to approach this in a technocratic fashion, hiring external water engineers to construct modern systems to replace those farmers have built. However, despite substantial investments, there has been limited long-term success. An intervention programme for 19 irrigation systems in the central hills of Nepal by the Water and Energy Commission Secretariat and the International Irrigation Management Institute took a different approach. Rather than attempting to impose solutions on farmers, the programme was sensitive to the need for self-organisation in the following ways:

- *Mapping existing efforts:* In advance of implementation, an inventory of all existing farmer-managed irrigation systems was prepared. It was analysed for potential to expand and potential impact of expansion.
- *Farmer-led planning:* Farmers provided full (ranked) priorities for irrigation system improvements, and had veto over any engineering plans not consistent with their preferences. They and drew up their own rules for managing the systems and works.
- *Working on the basis of commitment:* Willingness of farmers to be involved was a prerequisite of the programme. There was a requirement for a local management body or group and the identification of local leaders. Funding was not provided in full for improvements.

In line with this, tools for linking knowledge with implementation were embedded in the following ways:

- *Multi-skilled implementation teams:* Teams of engineers, overseers, agriculturalists, social scientists and people with construction skills worked in tandem with local decision-making groups to manage works.
- *Peer-to-peer learning:* Farmers' skills were improved through farmer-to-farmer training tours. They were designed to transfer experiences from well-managed systems through site visits and informal exchanges, and farmers from well-managed systems acted as consultants.
- *Facilitated deliberation:* The integration of new ideas was facilitated through guided discussions between farmers and by coinciding training tours with meetings of local decision-making bodies.

In addition to this, an evaluation of the programme was designed to take into account the complex configuration of forces shaping the programme's impact, rather than viewing change as a simple additive process. It focused on understanding how unfolding patterns of irrigation performance were shaped by a number of key variables in different contexts. Using qualitative comparative analysis, the evaluation found that investments in infrastructure improved the technical efficiency of systems only in the short term, with improvements in efficiency withering away in the face of harsh physical environments. However, these infrastructure improvement works did catalyse sustained improvements in water adequacy, by providing incentives for collective action and opportunities to build functioning working relationships, which persisted long after the programme.

Source: Lam and Ostrom (2009).

3.3.3 Realistic foresight

For aspects of interventions that do have to be fixed in advance – often high-level goals or balances of investment – planning processes must be creative, evidence-informed and based around methods that are appropriate to the context of complex problems. Despite unavoidable uncertainty, decisions do often have long-term consequences, and future alternatives require present-day choices. Forward thinking is often preferable to crisis management, and may not preclude the need to monitor environments closely; rather, it may help make an organisation or programme more nimble when the time comes for action.

An area that has been a major strategic concern for private sector organisations for decades, for Singapore for many years, for the UK policy environment for the past 10 years and increasingly for the public sector elsewhere relates to **'foresight' and futures techniques** (Bochel and Shaxson, 2007). This is a well-developed field of practical and theoretical work which focuses on 'the ability to create and maintain *viable* forward views and to use these in *organisationally useful* ways' (Slaughter, 2003, emphasis added).

There are a variety of tools serving a variety of purposes. For example, horizon scanning and trend/driver analysis help teams look for challenges and opportunities; scenarios and visioning focus

on assessing future social, political and economic contexts; roadmaps and backcasting help to define ideal actions; and models and simulations help to explore the dynamics of future options (Ramalingam and Jones, 2007). One key insight for applying futures techniques is that it is **essential to draw on a range of perspectives from a variety of stakeholders**, in order to ensure sufficient creativity and to avoid the problems of 'group think' (ibid.).

To better understand the potential, we look at one tool in particular. **Scenario planning** involves developing detailed pictures of plausible future worlds, constructed to encompass a broad span of possible futures, in order to ensure plans will cope with the many different ways in which the future could pan out. Against these scenarios, informed judgements can be made to produce decisions and policies that are robust under a variety of circumstances. If planning processes first identify the key contextual factors that will affect policy performance, then a series of possible scenarios can be developed as to how these factors might evolve. Proposed options can be 'wind tunnelled' against these to make it possible to explore how the policy will be affected if/when these change. Box 12 presents a recent example of tools for using scenario planning in development work.

Box 11: The pro-poor scenario toolkit

The Institute for Alternative Futures and the Rockefeller Foundation have developed a 'pro-poor scenario toolkit,' intended to provide guidance for learning and decision-making in the face of high uncertainty, placing poor populations at the centre of concerns for the future. It takes an 'aspirational futures' approach, which charts the future into three different zones:

- A zone of 'conventional expectation,' reflecting the extrapolation of current trends;
- A zone of 'growing desperation,' proposing a problem-plagued future embodying a group's greatest fears and concerns;
- A zone of 'high aspiration' – a future characterised by surprising successes.

The toolkit provides guidance in facilitating scenario development and is at www.altfutures.org/pro_poor.

Scenarios and futures techniques encourage a move away from looking for 'optimal' policies or strategies: 'any strategy can only be optimum under certain conditions,' and 'when those conditions change, the strategy may no longer be optimal' (Mittleton-Kelly, 2003). As such, it may be preferable to produce strategies that are robust to future variability rather than optimal for one possible future scenario. This could be seen as a 'possibility space' in which the future will unfold, allowing a programme to give a balanced evaluation of a range of strategies. Scenarios have also been found to improve understanding of the dynamics of change, to give clues and signposts about the timing and nature of key moments of change and to enable perception of a wider range of strategic opportunities than might otherwise emerge (Ralston and Wilson, 2006).

3.3.4 Peer-to-peer learning

Work in many areas, for example social learning and on the links between research and policy, suggests that people tend to genuinely take on board messages from research or evaluation when they trust the sources from which it comes, when they have had some kind of sustained contact with the research/evaluation process and where they feel responsible for deciding for themselves how it has relevance to their particular context and challenges. An example of this can be seen in Box 13.

Box 12: Opening the black box of governmental learning

The Independent Evaluation Group of the World Bank has brought theoretical and practical perspectives together in the 'learning spiral,' a concept for organising learning in governments (Blindenbacher, 2010). This provides a guide to managing learning events, helping governments learn from past practices to avoid mistakes and adopt successful practices from others. It places peer-to-peer learning at the centre of the process, so actors can learn from each other through a continuous exchange, in which knowledge is validated and updated in real time and based on the latest experiences. Ensuring a sense of social belonging among learning actors can lead to continuous exchanges and long-term knowledge exchange. The learning spiral consists of an eight-stage process:

- Before: The **conceptualisation, triangulation and accommodation** stages are considered the preparatory stages, where the specific challenge is defined; the knowledge framed; the selection and invitation of the participants completed; and a sense of trust between the learning actors and the event facilitators, and between the participants and the learning process, established.
- During: The **internalisation, re-conceptualisation and transformation** stages represent the core of the didactical procedures. Learning actors review and adapt the new knowledge according to their personal needs, then change their individual and organisational thinking and behaviour in an elaborate inter- and intra-personal procedure.
- After: In the final **configuration** stage, all developed knowledge is made available and accessible to everybody involved in the learning activity as well as to a wider audience. The new knowledge further serves to help frame another spin of the learning spiral.

Both formal and informal linkages between actors can provide effective channels for two-way flows of knowledge and communication between individuals and organisations, horizontally and vertically. Networks can facilitate the transfer of explicit, codified knowledge such as publications or manuals, as well as tacit knowledge that is context-specific, woven into the experiences in which it is generated. These spread in a different manner: explicit knowledge is faster to pass on and often requires externally driven incentives; tacit knowledge is (hence) more difficult to transfer, with incentives driven by positive social relationships and cultures of reciprocity (Osterloh and Frey, 2000). In order to best foster social learning, there needs to be a mix of quick and slow communication processes. More efficient and faster communication means better short-term and worse long-term performance, as 'group-think' might easily set in. Inefficient networks are better at exploration than an efficient network, supporting a more thorough search for solutions (Lazer and Friedman, 2005).[26]

RAPID research suggests that **networks can have six functions** in improving communication and strengthening the links between knowledge and policy: *filter* (helping members find their way through often unmanageable amounts of information), *amplify* (making little-known or little-understood ideas more widely understood), *invest/provide* (providing members with the resources, capacities and skills they need), *convene* (bringing together different people or groups of people), *community building* (networks promoting and sustaining the values and standards of the individuals or organisations within them) and *facilitate* (helping members carry out their activities more effectively and learn from their peers) (Mendizabal, 2006).

The **informal dynamics of networks** can be the most important for learning. Literature on communities of practice (CoPs) and complexity perspectives on management emphasise how 'shadow systems' of informal, social relationships permeate domains and are critical sources of adaptive capacity and learning. These are networks that arise in response to a common concern, problem or interest, which come together to fulfil both individual and group goals and to deepen their knowledge and expertise by interacting in an ongoing basis (Wenger et al., 2002). They engage in social learning, shared practice and joint exploration of ideas – collective communication that helps build shared understandings of a situation and transform underlying views, attitudes and values (Muro and Jeffrey, 2006). They can provide a 'social container for linking and learning between practitioners, knowledge producers and policy processes to analyse, address and explore solutions to problems' (Hearn and White, 2009).

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[26] This is shown on a grand scale in Diamond's (1999) analysis of the development and spread of the major agricultural innovations over the past 3,000 years, which shows that the topography of Europe impeded but did not fully obstruct communication, fostering heterogeneity and greater opportunities for exploration. Mainland Asia, by contrast, became effectively one functional unit.

It seems likely that this kind of approach will bear more fruit in terms of improving decision-making in the face of complex problems than more formalised, external incentives. In addition, where a good deal of knowledge is tacit, coming from hard-earned experience and observation, accountability to an external actor who will find it hard to fully grasp the situation will be difficult. However, it will not be easy to deliver implications and recommendations from evaluation or research to potential users in the form of a few indicators or two bullet points of recommendations (Cleaver and Franks, 2008). As such, many processes, such as programme design and planning or programme review and evaluation, may be undertaken most fruitfully with the involvement of networks of peers – e.g. through **study tours or organised 'peer review.'**

3.3.5 Broadening dialogues

Processes of contestation and argument may be important for informing and improving the foundations of policy and action, and implementation should look to build and work with critical voices, rather than avoiding them. Burawoy (2005) has famously argued that linking social scientific knowledge and policy requires both **critical and 'reflexive' research** as well as more 'instrumental' consultancy-type work. These problematise prevailing trends, discussing values and ideology and the underlying goals of policy, as opposed to drawing on different sources in order to understand how to fulfil specific goals. As well as aiming this at an academic audience, it is important to engage the wider public in such discussions to communicate different perspectives in the public and policy dialogue (Harris-White, 2007; Livny et al., 2006).

Especially in situations where different perspectives compete for the definition of a problem, or where issues of the distribution of costs and benefits are at stake, it may be crucial to **build the capacity of relevant stakeholders** (or their representatives) **to participate in negotiations and collaboration.** For example, the discussion of scientific findings may be of use so parties can develop stronger arguments or test the claims of those with whom they disagree (Michaels, 2009).

One fundamental barrier to the incorporation of multiple perspectives is that some group of actors systematically lack the capacity to engage in important processes of communication, discussion and deliberation. In the innovation systems literature, this is discussed in terms of strengthening the 'demand pull' by potential users of new knowledge, enabling them to articulate their needs more effectively and translate these into 'effective demand,' and increasing their power to 'buy' the knowledge they need. In agriculture, this often involves supporting the emergence of sustainable knowledge and service markets (Arnold and Bell, 2001). However, this may also involve deep power imbalances between actors and require efforts to empower groups and amplify their voice. Some groups may also be excluded from networks of relationships and social capital that benefit others. As such, while balancing the 'demand side' may involve cooperative relationships, it may also involve conflict, as initiatives to empower grassroots actors and promote their access to resources and opportunities for voice in general community decision-making meets with opposition (N. Jones et al., 2009b). Therefore, it is particularly important to **promote research and advocacy by organisations that can speak groups that are systematically disadvantaged** from having their voice heard.

The ideal would be to see this and participatory methods as bringing a new **and autonomous 'discourse'** to the policy, which would allow alternative framings of issues and an exploration of where policy-makers may share priorities with local people (Morgan, 2008; Powell, 2006). Unfortunately, three factors mean such work may be difficult to carry out in Southern contexts in particular: political freedoms may restrict the operation of organisations that would carry out such work; funding may be more difficult to find; and the frequently highly unequal distribution of skills and resources in society may ensure that powerful groups maintain the upper hand in policy debates (ibid). Capacity building for NGOs and other actors that work to hold governments accountable for the way knowledge is used may be important (H. Jones, 2009).

3.3.6 Sense making for common ground

While it is crucial to ensure a wide range of perspectives on an issue are heard, progress on governing complex issues requires that programmes **work towards a shared framing of the problem** at hand. As argued above, decision-making in complexity requires considerable interpretation and judgement – weighing up the relative importance of different perspectives and aspects. This fundamental steer for policy and decisions must not be left entirely up to one decision-maker's discretion; underlying assumptions must also be open to examination and challenge (Klein et. al, 2006) and multiple perspectives and types of knowledge must be included and weighed up in an inclusive manner.

It is therefore high priority to ensure that framing and conceptualising a problem is an inclusive, communicative process. It is likely that this will need to be carried out with a variety of actors, including not just policy actors but also those from academic disciplines and professional groups. Citizens and others need to be able to challenge and interrogate the positions of expert outsiders and/or domestic elites (van der Hove, 2000).

'Boundary concepts' facilitate collective processes of sense making and attempts to bridge perspectives and work towards shared understandings of problems. These are ideas that are relatively loose but refer to the same object, phenomenon or quality across different disciplines, professional groups or perspectives, with deep and specific meanings within each group or discipline (Löwy, 1992). As opposed to strictly defined terms, which can be agreed between small groups in order to shape highly coherent approaches to learning or acting, boundary concepts allow 'weak ties' for discussion, communication and negotiation across boundaries and between groups – permitting some level of coordination without consensus. On the downside, this vagueness allows space for very different interpretations, hiding conflicting ideals and practices. Some examples of boundary concepts are efficiency, vulnerability and control of natural resources.

New **concepts and models can be jointly negotiated** in order to provide a common approach to implementation. Molle (2008) uses the example of Integrated Water Resources Management (IWRM), which was conceived of in the face of a chaotic situation with the aim of promoting coordinated responses from sectors, ministries and professional groups, which were otherwise fragmented or unintegrated. IWRM represented the 'photo negative' of this situation, which was persuasive for all parties but also glossed over tensions somewhat, and in some cases has been used by various interests to legitimise their actions (although they often simply carry on doing what they were doing before). Nonetheless, these kinds of concept and framework represent a first stage in addressing complex issues by offering an acceptable common ground for stakeholders to engage.

There are also various calls to focus on producing **'boundary objects,'** which will be owned by various actors and have real operational implications – for example shared models, scenarios, assessments or standards. Cash et al. (2003) show how a co-produced model of the dynamics of acid rain proved critical in fostering an agreement on collaboration to address it. This chimes with Ostrom's (1990) emphasis on the role of a **'joint image' of a problem to serve as a basis for negotiations about future action,** and literature on linking science and policy, which shows it will be important to move from boundary concepts to boundary objects by negotiating concrete, operational structures and processes around ideas (Allen, 2009).

3.3.7 Facilitation and mediation

The structure of collaborative efforts and of the process of synthesis becomes as important as the individual analyses (Haynes, 2003). **Efforts to combine different sources of knowledge must tread carefully** in order to give genuine space to different perspectives: the design of collaborative processes is not neutral, and could easily influence the weight given to different contributions. Each different type of knowledge works according to a different epistemology. For example, they are based on different approaches to inquiry (e.g. scientific observations vs. practical questions of costs and benefits), different standards for validation (e.g. methodological rigour and generalisation vs. representativeness and resonance for community stories) and different explanatory frameworks (e.g. causal and statistical

analysis vs. lived experience and sense of identity). It is no mean feat to design a process that gives respect to different contributions: attention must go to the way participation is structured and different inputs and contributions are framed, as well as to the various standards and frameworks explicitly and implicitly governing the process. As such, **policy-makers need to become much more adept at understanding and managing power in the knowledge–policy interface** (N. Jones, et al., 2009a).

A number of areas of good practice in **how to manage constructive deliberation** are emerging from the various ongoing efforts. The following characteristics are important (Brown and Tyler, 2009):

- Participation must be voluntary, including a broad range of stakeholders affected by the decision who must be committed to the process;
- Discussions must be structured and led by skilled facilitators, and guided by explicit rules and procedures;
- All participants have an opportunity to speak, with all contributions respected, and with speakers identifying their own and others' values and judgements and balancing enquiry and advocacy;
- In order to facilitate the learning process, participants must engage on the basis of communication and open discussion. As far as is possible, proceedings need to be transparent and accessible.

Most importantly, **power should be shared** in deliberative processes, and different actors should have a fair chance to influence the process and the outcome, especially in relation to decision-making, management, communication and conflict resolution. **Critical reflection** is important: participants need to come together to question their models of change, their underlying assumptions and the relevance of their goals, and it is important to question whether interpretations truly follow from available data and identify what is missing or uncertain.

The literature on participation has a good deal of guidance on how to redistribute power throughout a decision-making process. Action needs to be framed jointly by the stakeholders, giving all actors who will be affected by the procedural rules of the process a say in setting them. Once ground rules are established jointly agreed through some sort of formal give and take, they cannot be subject to unilateral change (Arnstein, 1969). The goals and substance of a policy need to be negotiated between actors, with joint analysis and shared responsibilities for planning and decision-making through structures such as joint policy boards and planning committees (Cornwall, 2008).

The institutional setup of such processes will be important. Experience shows that creating a new structure or entity is often more effective than situating processes within existing institutional arrangements. Brown (2007) argues that a crucial ingredient for success is establishing patterns of connection and collaboration that replace existing hierarchies. It is likely that these new arrangements will need to involve **multiple lines of accountability** in order to ensure they address the interests, concerns and perspectives of a variety of actors.

In particular, there need to be **clear and fair mechanisms for resolving impasses and conflicts** and trade-offs between different aspects in a consensual way. Research has shown that deliberative processes can sometimes focus usefully on just conflicts of interests, and can be a powerful tool for resolving them in a mutually beneficial way (see Box 10).

Box 13: Facilitating interest-based negotiation

Facilitated processes of interest-based negotiation can encourage rules which actors see as legitimate, fostering more meaningful participation and higher conformity with the rules; issues can be transformed as actors develop shared concepts and perceptions; perceived patterns of costs and benefits shift, and with this the deadlock.

Warner (2001) investigated how community-based NRM organisations such as agricultural cooperatives and village councils, or collaborative efforts between actors such as forest user groups and local government wildlife departments, have responded to external shocks and developments such as new irrigation technology, new legislation and increasing affluence among subsections of the local community. There are striking similarities between the processes Warner describes[27] and emerging good practice for deliberative processes as discussed above[28] – for example, features that foster social learning can move actors away from conflicts being seen as essentially 'zero sum' and involving adversarial bargaining, which can very frequently cause deadlock.

Experience with such a programme run by CARE International (Warner, 2001) shows that external actors such as aid agencies can assist by providing training to local organisations in the relevant techniques (such as process design, trust building and consensual negotiation skills), or broker processes of interest-based negotiation. In Venezuela, a third party facilitated dialogue and negotiation between a gold mining company, international NGOs and local community groups in order to promote small-scale mining.

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[27] The study suggests complexity theory offers a framework for understanding how these organisations have responded to the development pressure faced, why they have resulted in more productive forms of cooperation in some situations and been overwhelmed in others and how organisations can be assisted to manage and adapt in the face of these increasing pressures.

[28] This involved negotiation that is voluntarily undertaken; involves prior (and continuous) trust and confidence building; is inclusive, by seeking to identify and involve all relevant stakeholders necessary to the task of organisational restructuring; is directed towards exploring the 'underlying interests' that lie beneath the surface of people's immediate and often emotional 'positions' and 'demands,' since there are many more solutions to meeting an 'interest' than there are to a 'position'; seeks out 'common ground' within these underlying interests and uses this a base for building consensus; employs joint problem solving to generate new and creative solutions; aims to increase the size of the 'pie' before it is divided up; encourages the formulation of integrative solutions that combine the needs and interests of a number of parties; fosters mutually acceptable, i.e. win-win, outcomes, rather than simply minimising trade-offs or reaching compromise; is seen as legitimate in the eyes of the various organisational memberships, with the decisions taken seen as transparent and accountable; and tests the solutions for financial, political, social and technical 'feasibility' and 'desirability.'

4. Conclusion

As this publication is intended as a practical guide, the conclusions are not its most important aspect. Nevertheless, below are offered some thoughts and questions as to what the principles and priorities for tackling complexity might mean for governance and public administration generally, and for development agencies specifically. It is worth noting again that what is presented above is still a work in progress. We offer a way of naming and identifying the problem of complexity, but further research is needed to identify which problems should be treated as complex as well as the relevant balance of 'complex' and traditional tools in different areas. Building comparable frameworks for studying complex systems (e.g. Ostrom, 2009) is also important. Moreover, complexity does not offer all the answers: there are many 'unknowns' and important questions as yet unanswered (more on this below). One important gap lies in testing solid accountability mechanisms for networked governance.

However, complexity does offer a way of participating in ongoing thinking and ideas, with a variety of individuals and organisations worldwide putting considerable effort into developing and testing practical tools. There are also a number of efforts to bring together such efforts, such as the New Synthesis Project (see Box 2), which is hoping to develop workable new models for government in the face of complexity. This offers a wide variety of opportunities for engaging in and contributing to ongoing dialogue and learning in an important area.

4.1 What are the implications for governance and public administration?

In the face of complex problems, any single 'answer' to a problem is unlikely to be sufficient for long: the processes and capacities involved in steering interventions need to be cared for and valued. One clear implication is the need for further emphasis on 'governance' in development:

> 'In the face of intensification of societal complexity [...] [we should see governance as] the complex art of steering multiple agencies and institutions which are operationally autonomous from one another and structurally coupled through [...] reciprocal interdependence. [...] Governance appears to have moved up the theoretical and practical agenda because complexity undermines the basis for hierarchical top-down control' (Jessop, 2003).

However, complexity implies that **the scope of 'governance' needs to widen considerably.** Even if they do not immediately appear as such to Western eyes, structures of governance already exist within developing countries. Rooted in day-to-day, ground-level realities are various norms and values around accountability, collaboration and decision-making, often in the form of highly developed institutions. Rather than transplanting or building from scratch a preconceived model of Western democracy, with attendant regulatory frameworks, bureaucratic bodies, etc., agencies need to 'go with the grain' of the society in order to improve governance. This is the challenging idea at the heart of the APPP: Kelsall (2008) argues the slow progress of the 'good governance' agenda is a result of Western institutions and approaches sitting ill alongside certain traditional core ideas and values in sub-Saharan Africa.[29]

The scope of governance work also needs to expand to **take into account the central role of knowledge.** One way of understanding this comes from the New Synthesis Project, who argue that systems for 'exploitation' (utilisation of current knowledge) need to be balanced with those for 'exploration' (looking for new possibilities) in order to create robust governance. The former involves hierarchy, third-party enforcement, institutional rules, generalised trust and reciprocity; the latter might include network structures and independent institutions like think-tanks, universities and an unbiased mass media (NS6, 2010).

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[29] This chimes with the call to approach problems by working with existing emergent, self-organised structures. For sub-Saharan Africa, the priority needs to be taking beliefs around power, accountability and social morality, such as the role of extended families and 'big man' paradigms of leadership, as the starting point for improving governance. The five-year APPP is investigating ways policies can go with the grain in this way, by building governance around these norms and institutions.

Further development in this area may help to close the divide between knowledge-based approaches to policy-making – the idea of making the 'best' policy – and representative and accountable policy-making. This is a divide embodied by the 'technocratic' mould of policy-making, whereby often well-meaning professionally trained groups effectively subvert national structures of accountability and representation in order to ensure a 'well-informed' policy is created. However, there is clearly a long way to go in terms of improving our understanding of the relevant institutions, and also in terms of public attitudes towards government: regional differences may be seen as valuable 'variation' by some but as a 'postcode lottery' by others, and what one may argue is ensuring redundancy others may see as inefficiency and waste. These are not just issues of perception either, as central government's role in promoting equity and fairness could become harder if local variation is required for effective policy.

Finally, the critical role of trust and social capital may imply that countries with less of this, for example with high inequality, will be less able to govern complex problems, or may have further to go before beginning to address them. Alternatively, it could mean such countries are more likely to encounter them (e.g. where there are diverging perspectives and goals). Perhaps, as trust and capital are built around a problem, solution or specific issue, it may become less 'complex,' as solutions become institutionalised. It could be that increased acknowledgement of complex problems could itself be a sign of increased societal segmentation. The direction of causation is not clear, but this suggests a range of contextual variables to consider as foundations for the good governance of certain problems.

4.2   Implications for aid agencies

What does this say about the set-up of international development agencies? Looking at the insights presented in this paper, the following speculations seem relevant:

- In terms of 'where,' there appears to be increased recognition of the importance of decentralised structures (e.g. greater power given to country offices), of working in ways to improve local ownership (PRSPs) and of promoting governance through large, decentralised basket funds. There has also been considerable focus on networks over the past decade. However, there are difficulties in allowing room for staff to manage in a collaborative and incremental manner.
- The great emphasis being placed on the need to evaluate impact shows that the complexity of change is to a certain extent being recognised. However, initiatives are still based largely around the (unrealistic) ideal of the policy cycle, meaning ownership is often lacking and many managerial and operational structures are poorly set up to deal with admitting uncertainty – and also seem to be getting worse.
- The importance of a variety of sources of knowledge has long been recognised. However, participation seems in danger of slipping off the radar of some high-level decision-makers within agencies, compared with the need to 'prove' impact. There seems to be a lack of systems to draw on to share participatory knowledge within agencies (Beardon and Newman, 2009): initiatives to support practical lessons from implementation must be continued.

Overall, there needs to be greater recognition that **development is a knowledge industry,** including readjusting the skills base and organisational structures accordingly – for example flat organisational structures; a diversity of staff with a variety of formal and informal communication systems; and rewards for interaction and sharing are all important.

However, it could be argued that the insights from complexity run counter to the direction of movement, certainly within bilateral development agencies. Greater calls for measurement, impact and (simplistic views of) domestic accountability are massively at odds with what is required in order to perform effectively in the face of complex problems. Development seems to be in danger of heightened schizophrenia, as reflections on the complex nature of the work and habits required to operate effectively in these situations are driven further underground, only to emerge in the form of a big 'push back' against reforms that are supposed to be improving development work (Eyben, 2010). As Natsios

(2010) argues, these political trends may simply mean less ability to deal with complex problems or to produce long-lasting transformational changes. If we take this pessimistically, it could be that the best hope for development lies in less bureaucratic organisations.

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