Approaches to governing long-term social-ecological change

Comparing adaptive management and transition management

For addressing and governing long-term social-ecological change two different framworks are available: transition management and adaptive management. They emphasise the roles of social learning and stakeholder participation in different contexts.
By Timothy J. Foxon, Lindsay C. Stringer and Mark S. Reed

Long-term socio-ecological challenges, such as addressing climate change and managing human activity in fragile ecosystems, are characterised by high levels of risk and uncertainty relating to future social, technical, environmental and economic possibilities and outcomes. Hence, improved governance frameworks are needed.

Two recent frameworks, relating to adaptive management (AM) of socio-ecological systems and transition management (TM) in socio-technical systems, have begun to address these challenges. But these frameworls have largely developed independently and, until very recently, without significant mutual interaction. It has been suggested that there exists huge potential for learning between the AM and TM frameworks (van der Brugge 2007 / Pahl-Wostl 2007). Our work aims to add to a potentially fruitful dialogue in this area, contributing towards the development of more robust and resilient governance of social-ecological systems.

Transition management approach

Transition management (TM) arose out of work to understand long-term transitions in socio-technical systems. A key theoretical step was the formulation of a multi-level framework for understanding such transitions, which analyses dynamic interactions between three levels: niches, socio-technical regimes and landscape (Rip 1998 / Geels 2005). In response to demands from policy-makers in the Netherlands, it was proposed that this could provide a useful framework for a process of shaping or modulating socio-technical regimes towards long-term sustainability goals, referred to as transition management.

Transition management has been applied to the development of Dutch energy innovation policy, the social and economic development of Dutch regions and to issues of waste management and water management. Transition management is seen in this context as a form of participatory policy-making based on complex systems thinking. A key concept is that of a transition arena, defined as "a group of people that reach consensus with each other about the need and opportunity for systemic change, and co-ordinate amongst themselves to promote and develop an alternative" (van der Brugge 2007). Key elements claimed for transition management are (Loorbach 2006):

∎ systems-thinking in terms of a range of actors and sectors interacting at multiple levels;
∎ long-term thinking with a horizon of at least 25 years as a framework for shaping short-term policy;
∎ back- and fore-casting: setting of short-term and longer-term goals based on long-term sustainability visions, scenario-studies, trend-analyses and short-term possibilities;
∎ a focus on learning-by-doing;
∎ an orientation towards system innovation and experiments;
∎ learning about a variety of options;
∎ participation of and interaction between stakeholders.

The forward-looking and iterative, learning-based process of transition management is illustrated in Figure 1.

Adaptive management approach

Adaptive management is an approach that has rapidly expanded in its application over recent years to address the complexi-

Figure 1: Iterative process of transition management
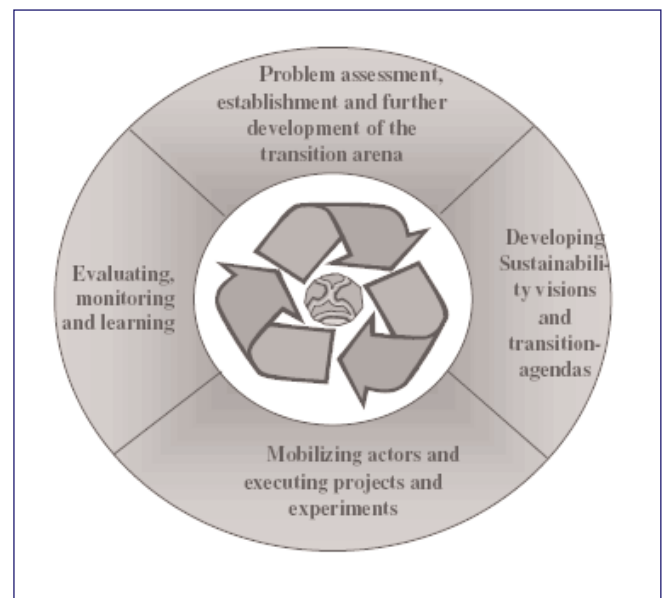
Source: Loorbach and Rotmans 2006

ty of social-ecological problems (Berkes 1998 / Olsson et al. 2004). This approach acknowledges limits to predictability, and the uncertain and pluralistic nature of knowledge about ecosystems. This in turn, leads to an emphasis being placed on learning, as interventions are designed to allow hypotheses about the functioning of a system to be tested through experimentation. In this way, the results from one generation of experimentation and study inform subsequent decisions (Stringer et al. 2006). Adaptive management processes for a particular system proceed through a cyclical process. This process consists of identifying system boundaries, the context, problems and the desired goals, developing and testing hypotheses and goals, implementing policy strategies and the monitoring of results which is leading to re-visiting of the problems and goals.

In an adaptive management approach, system boundaries are often defined as a delineated spatial area, for example a watershed, forest or river catchment, which may encompass multiple social and ecological processes. Within those boundaries, a variety of stakeholders are engaged to help ensure policy reflects many different values and viewpoints. These perspectives are important in both the exploration of a management problem and in goal setting, experimentation and management planning. In this way, participatory processes and information flows aim to enhance social learning and build adaptive capacity.

The iterative nature of the adaptive cycle means that each stage offers the potential to involve different stakeholder groups and the opportunity for them to learn from each other. This results in the development of a social as well as scientific process, as communication and information can pass in multiple directions between multiple stakeholders at different times. In taking such an iterative, cyclical approach, management processes, institutions and policies can be adapted, as circumstances change,

Figure 2: Illustrative adaptive management process

Source: Adapted from Reed et al. (2006)

knowledge about the system is accrued and learning takes place, as illustrated in Figure 2.

Comparison of the two frameworks

Both AM and TM draw on complex systems thinking, which analyses how systems of diverse, interacting elements give rise to emergent, structural properties. This emphasises the evolutionary, path-dependent nature of change and the impossibility of detailed control and management. The philosophy proposed by both AM and TM is an iterative, learning-based approach to managing complex systems, characterised as "learning to manage by managing to learn" (Pahl-Wostl 2007). This is achieved through the application of repeated experimentation and revising of future directions based on learning from these experiments. They also both emphasise the involvement of a wide range of stakeholders in decision-making and the need for institutional changes to provide arenas for learning and adaptive decision-making. However, there are important differences of emphasis and context between the two approaches, suggesting the potential for mutual learning, particularly in relation to five key factors:

❚ Setting of goals
❚ Increasing participation in decision-making
❚ Addressing spatial and time-scales for change
❚ Analysing governance processes
❚ Stimulating institutional change

Setting of goals: AM focuses on building capacity for anticipatory and reactive management to enable maintenance of systems functions, whereas TM emphasises developing ability to steer long-term changes in functioning of socio-technical systems. Lessons from TM could inform AM on the role of innovation in enhancing adaptive capacity. Furthermore, these lessons could inform on the need to develop resilience in the face of long-term, gradual changes to external environments and internal preferences, as well as short-term shocks, and on the involvement of stakeholders in developing and assessing pathways to desired future states, as well as in relation to more immediate management decisions.

Participation: A strength of AM is that it has well-developed processes for input and participation from multiple stakeholders, whereas TM has largely focussed on developing public-private partnerships. Lessons from AM could inform TM how participatory co-management could lead to better decision-making, by ameliorating potential negative outcomes, and how diversity is important in building and maintaining capacity to manage risks. More explicit use of multi-stakeholder and participatory processes within TM could also help to avoid capture by dominant actors within existing regimes.

Scale: Scale is an important consideration within AM, particularly when the socio-ecological system of focus crosses multiple scales. The experimental element of the AM approach means that it remains vulnerable to issues relating to scaling-up ➔
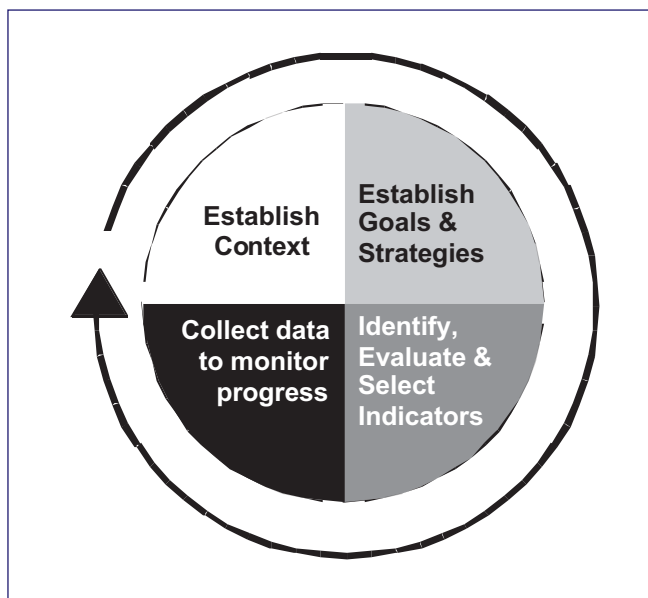
„A dialogue between adaptive and transition management could lead to a better governance of social-ecological systems."

of outcomes. For example, large-scale systems may exhibit properties that cannot be detected or perhaps do not even take place at smaller scales. The scale of focus is usually sector-specific in TM, for example energy or water, and the future goal is to move society as a whole towards a more sustainable energy or water system. This means that less emphasis is placed on the scale issue, but it is still important in relation to how experiments which are successful in niches can be scaled up to challenge dominant regimes. This is demonstrated by the difficulties faced by attempts to diffuse experiments in sustainable transport solutions (Hoogma et al. 2002). Lessons from AM could inform TM by increasing awareness of causes of difficulties in scaling-up small-scale solutions, whilst lessons from TM for AM could include an emphasis on long-term, cumulative processes of change and on the importance of building momentum for change amongst actors and institutions within a system.

Governance: AM does not have a single governance centre, but rather, a process of multi-level governance evolves within the system boundaries. TM makes use of a specific macro-meso-micro level framework, based on landscapes, regimes and niches. Lessons from AM could inform TM on how change depends on broader governance contexts and a political system that is open to public participation in environmental decision-making. These form part of the landscape context in TM. Lessons from TM could inform AM on the use of a clear multi-level framework which has proved useful in analyzing a range of different transitions, and so its application to AM processes could be investigated, as suggested by Pahl-Wostl (2007).

Institutional change: Both approaches recognize the need for changes to current institutions so that they are able to facilitate the type of long-term, iterative, learning-based and participatory approaches needed to guide the management of complex systems towards sustainability. Both approaches argue that neither top-down command-and-control management nor bottom-up free-market, laissez-faire processes are adequate in face of short-term and long-term challenges to the sustainability of current social-ecological and socio-technical systems. Both AM and TM can be seen as attempts to create institutional frameworks to achieve positive change in complex multi-level and multi-stakeholder systems, in the face of severe risk and uncertainties. Despite the positive advances achieved by both approaches, creating such institutional frameworks remains elusive in practice. This may be because the requirements of both AM and TM processes are at variance with many of the institutional structures of the organisations charged with implementing environmental policy. For example, decision-makers may feel uncomfortable committing themselves to implement and resource the as-yet unknown outcome of an AM or TM process. In many cases, to do so would represent a radical shift in the organisational culture of government agencies and other institutions.

This short review has highlighted the potential for a rich and productive dialogue between AM and TM approaches. Ultimately, this could inform the development of more robust and resilient governance of social-ecological systems.

References

Berkes, F. / Folke, C.: Linking Social and Ecological Systems. Cambridge 1998.

Geels, F. W.: Technological Transitions and System Innovations: A Co-evolutionary and Socio-Technical Analysis. Cheltenham 2005.

Hoogma, R. / Kemp, R. / Schot, J. / Truffler, B.: Experimenting for Sustainable Transport: The approach of Strategic Niche Management. London 2002.

Loorbach, D. / Rotmans, J.: Managing Transitions for Sustainable Development. Understanding Industrial Transformation. Views from Different Disciplines. Dordrecht 2006.

Olsson P, / Folke, C. / Berkes, F.: Adaptive co-management for building resilience in social-ecological systems. In: Environmental Management 34/2004, S. 75 - 90.

Pahl-Wostl, C.: Transitions towards adaptive management of water facing climate and global change. In: Water Resources Management 21/2007, S. 49 - 62

Rip, A. / Kemp, R.: Technological change. In: Rayner, S. / Malone, E.L.: Human Choices and Climate Change. Columbus 1998.

van der Brugge, R. / van Raak, R.: Facing the adaptive management challenge: insights from transition management. In: Ecology and Society 12, 2/2007, S. 33. Internet: http://www.ecologyandsociety.org/vol12/iss2/art33

Reed M.S./ Fraser, E.D.G./ Dougill, A.J.: An adaptive learning process for developing and applying sustainability indicators with local communities. In: Ecological Economics 59/2006, S. 406-418.

Stringer, L. C. / Dougill, A. J. / Fraser, E. / Hubacek, K. / Prell, C. / Reed, M. S.: Unpacking "participation" in the adaptive management of social-ecological systems: a critical review. Ecology and Society 11, 2/2006, S. 39. Internet: http://www.ecologyandsociety.org/vol11/iss2/art39

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