Understanding Governance: pathways to sustainability

STEPS Working Paper 2

Correct citation: Leach, M., Bloom, G., Ely, A., Nightingale, P., Scoones, I., Shah, E. and Smith, A. (2007) *Understanding Governance: pathways to sustainability,* STEPS Working Paper 2, Brighton: STEPS Centre

First published in 2007

ISBN – 13: 978 185864 651 0

Thanks to Ruksan Bose and Naomi Vernon for help with copy-editing and to James Fairhead and David Leonard who kindly provided peer reviews.

Design by Wave (www.wave.coop) and Barney Haward

Printed by MCR Print (www.mcrprint.co.uk)

For further information please contact: STEPS Centre, University of Sussex, Brighton BN1 9RE

Tel: +44 (0)1273 876808

Email: steps-centre@ids.ac.uk

Web: www.steps-centre.org

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Today's world is experiencing social, technological and environmental change at an unprecedented pace, across a variety of scales. Whether around health and disease, food and agriculture, or environmental issues it is evident that social, technological and ecological processes are not only dynamic in themselves, but also interact in complex ways. The result is a variety of possible patterns - or pathways - of change. Some of these threaten and undermine the integrity of ecological systems, and people's livelihoods and wellbeing. Others may be valued as contributing to social, economic or environmental improvement or resilience - to what one can define as sustainability. In many cases, different people and groups - in different settings, at different scales, with different perspectives and priorities - will experience and value actual and possible pathways of change in very different ways. They may 'frame' and define the character of social-technological-ecological systems, and what is positive or negative about them, in very different ways. What is to be sustained, for whom and how, over what time and spatial scale, can thus be contested, often strongly.

These processes have major implications for the challenges of development, understood here as change that contributes to reduced poverty, improved well-being and social justice for marginalised women, men and children in developing countries. How, and in what circumstances, can dynamic, intertwined social, technological and ecological change contribute to processes and outcomes that are more resilient, sustainable and, socially just? How can multiple values and framings be dealt with in ways that support, rather than undermine, marginalised peoples' own perspectives and priorities?

What is clear is that a great deal depends on 'governance', which we define here in a broad sense as political processes and institutions. In both intentional and less intended ways, governance shapes how scientific and technological processes are directed, how environmental and health issues are defined and addressed, and how social consequences become distributed. They shape - and are shaped by - the interactions between people, technology and environment, and how these dynamics unfold over time. They are central to addressing par-

ticular problems around water, health or agriculture, and to the formulation and implementation of policy, plans, management and regulation. Political relationships are also part and parcel of processes of contestation over social, technological and environmental values and priorities, and how these are resolved in whose favour. In short, to understand how and why social-technological-ecological dynamics unfold in particular ways, and their implications for sustainability, poverty reduction and social justice, then we need to understand the governance processes involved.

But, beyond this broadest of definitions, how is governance most usefully conceptualised in relation to these challenges? How should governance processes be reconceived in the light of our understandings of complex, dynamic systems (see STEPS Working Paper 1 on Dynamics)? Which are the key institutions and actors, and how are their roles and relationships to be understood? And what are the implications for policy, practice and appraisal (see STEPS Working Paper 3 on Designs)? This paper takes some first steps in outlining the approach to governance and politics that the STEPS Centre will take forward in its work.

Approaches to conceptualising politics are of course as varied and deeply-rooted as the traditions of social and political science in which they are embedded. Diverse philosophical and ideological positions, as well as fundamental distinctions in strands of social theory, have spawned a huge variety of concepts and emphases. In general, we are concerned with political systems, which - according to one well-established definition in political science - can be defined as 'those interactions through which values are authoritatively allocated for a society' (Easton 1965: 21). More broadly, we are interested in what Foucault termed 'the conduct of conduct', or forms of 'activity aiming to shape, guide or affect the conduct of some person or persons' (Burchell et al 1991: 2). Both these definitions allow recognition that political processes are present throughout society, not just in formal government structures. They enable recognition both of political processes and power relations that become institutionalised, embodied in rules and practices that acquire predictability and staying power, but also of exercises of power that act on or against those institutions. As we explore in this paper, it is such a broad conception of political processes that is necessary to meet the STEPS Centre's concerns. The notion of governance, as we use it, captures such a conception, as distinct from understandings of 'government' that focus more narrowly on formal state structures and their operation. Nevertheless, as we show, the concept of governance itself has a politics and a history, and we are careful to distance ourselves from those origins and uses that have rejected or minimised state involvement, in favour of neo-liberal approaches. Rather, our concern is with understanding changing political processes that often involve the state, albeit in new ways, and their implications for

poorer and marginalised people. In this, we draw on in valuable insights from analysts working within more conventional political science remits around 'government', as well as in relation to the notion of 'governance'.

In the last few decades, literatures and approaches that attempt to relate concerns with politics and institutions to the challenges of science, technology, environment and development have blossomed. This paper takes the latter as a starting point, while acknowledging their earlier roots. While making no attempt to provide a comprehensive review, the first section outlines key tenets, assumptions and emphases that dominate this contemporary 'mainstream' literature on politics and institutions as it deals with technological, environment and development issues. We suggest that across the diversity of debate there have been some important moves. These include moving beyond the state to recognise the relevance of interactions between multiple actors across scales, concern with popular participation and the power relations it involves, and acknowledging the messiness of politics-in-practice. As we discuss, the emergence of the notion of governance has helped to reinforce and take forward such broader trends in political analysis. At the same time, and as we address in the second major section, a range of largely parallel literatures offer helpful insights and approaches in addressing issues of ecology, of risk and uncertainty, and of knowledge politics.

As we go on to argue, however, there remain some significant weaknesses and limitations in relation to our core challenges of dealing with dynamic systems, and addressing the interaction of multiple framings. Elements of these politics and governance literatures, to be useful, thus need to be combined with the insights in a range of more recent work that tries to frame governance challenges both dynamically and reflexively. We address these in the third major section of the paper, briefly reviewing approaches to the adaptive governance of dynamic systems, and to deliberation and reflexivity as means to address the interaction of multiple knowledges and framings. The final section suggests ways in which these more recent discussions can be fruitfully combined with elements of more mainstream approaches in political analysis, in a pluralistic approach suited to the STEPS agenda. This focuses, above all, on how governance might shape pathways to sustainability in ways that include the perspectives and agency of poorer and marginalised people.

Reflecting the overall approach of the STEPS Centre, the paper thus considers governance in ways that are both analytical and normative. It provides some first steps in outlining an approach to the analysis of governance, including critical assessment of why policies and interventions in relation to environment, technology and development often work against or marginalise poor people's per-

spectives and priorities. This in turn provides clues to a more normative agenda, seeking alternative arrangements. Such analysis for governance asks what kinds of political relationships and institutions are needed to respond effectively to contemporary dynamics, and to help shape pathways towards outcomes that are more Sustainable and socially just for particular groups of poor people.

2. GOVERNING TECHNOLOGY, ENVIRONMENT AND DEVELOPMENT: ELEMENTS OF THE CONTEMPORARY MAINSTREAM

STATE AND CIVIL SOCIETY-BASED APPROACHES

In addressing both public policy and regulatory problems around environment, technology and development, much work has centred on the state and on 'government', seen as 'activities undertaken primarily or wholly by bodies which operate at the level of the nation state to maintain public order and facilitate collective action' (Stoker 1998: 17). Conventional approaches to understanding government focus largely on the power of sovereign states to make policy and to influence other actors such as firms and members of the public. State authority is commonly seen as derived from the rule of law and, ultimately, from material (and military) resources. While theories of the state are of course highly diverse - from elitist and corporatist notions to Marxist and materialist theories - states are often viewed in much of this work as monolithic, relatively homogenous entities. Significant distinctions identified within the state are often confined to the classic Weberian division between elements of state organisation involved with processes of decision (politics) and processes of implementation (bureaucracy).

Such approaches conceive of the state as leading what are essentially prescriptive, top-down solutions as to how things should work (Sabatier 1986). Thus in the arenas of both environment and technology, coercive action by the state through the threat of sanctions or fines on firms or users emerged as an approach to preventing market failures (addressing incomplete information, preventing monopolies, conserving the public good). State-led regulation has also been seen as an approach to internalising externalised costs associated with, for example, environmental degradation or inter-generational equity.

Much work on state government, especially within the public administration tradition, also takes a linear, statist view of the policy process. In this agenda-setting, decision-making and implementation follow each other in an orderly way, with actors behaving rationally and instrumentally in accordance with a singular model of state aims (e.g. Easton 1965; Hogwood and Gunn 1984).

Such understandings of the role of the state can, to a large extent, be seen as co-produced with historical changes in western settings since the nineteenth century. The institutional shape of the modern state as Weber described it was established in nineteenth century Western Europe. The notion of a welfare state can be linked to the welfare legislation established in Britain and Germany in the 1870s, along with parallel assumptions of state responsibility for education in France and the US at that time (Leonard, pers. comm.) In the European context, the mass unemployment of the 1930s was significant in further emphasising a shift of responsibility for well-being from individuals to states (Stråth and Skinner 2003). Although the state was discredited in Europe in 1945, the politics of post-war reconstruction strengthened the state as an institution, and it was provided with political legitimacy within a Keynesian economics that saw the market as governable through politics. For many the Keynesian-Welfare nation state model provided substantial benefits in terms of improved healthcare, education, environmental regulation and social security and so on. Considerable national variation coexisted with a widely held belief in the legitimacy of this state model. Thus in the US the New Deal (particularly between 1932 and 1936) marked a constitutional revision which granted new powers to central government over decentralised, state level legislation (Sunstein 1990), and expanded the protection of rights to include state backed protection from the risks imposed by the market economy. These rights were extended in the 1960s and 1970s in the 'rights revolution' which legislated rights to safe workplaces, environmental protection and so on (Sunstein 1990: 322). In Europe, states were more inclined towards nationalisation and state control of management to serve social goods that were not addressed by private ownership.

Yet, state owned enterprises often performed worse than private firms in areas such as environmental performance or safety (Crosland 1956; Hannah, 2005: 95). By the 1950s, the difficulties of managing large enterprises towards conflicting public goals was recognised and there was a move towards operating nationalised firms as commercial enterprises (Ferner 1988). This led the way for a process of privatisation from the 1980s. As with nationalisation, the process of privatisation had a number of justifications, not least a belief that the governance structures of the market would be an improvement over the governance structures of the Keynesian state. However, the process of privatisation itself suffered from major governance problems (Kay and Thompson 1986), including

conflicts between workers and managers, and an inability to address the governance problems of national monopolies. As a result, in the UK and increasingly around the world new forms of corporate regulation and regulatory bodies were introduced, mirroring the apparatus of the New Deal Regulatory State (Glaeser and Andrei 2001).

It was such European models of state-led planning, control and regulation that were often exported to Africa and Asia through colonialism and post-1945 approaches to 'development' - although with great national and historical variation. In general terms, though, such models of the state fitted neatly with top-down, linear notions of development progress, with states viewed as bringing this about through the design and implementation of rational plans. Blueprint planning approaches, grand schemes for the transformation of environments and societies, and approaches to large scale technology transfer - then as now - exemplify this kind of top-down state-led model (Scott 1998).

Alongside approaches focusing on the state and corporations as primary actors in environment, technology and development, there have been longstanding concerns with 'civil society'. Thus in society-centred and pluralist strands of political science, democracy and policy processes have long been seen essentially as about competition and balance between different 'interest groups' in society (e.g. Dahl 1961). A core strand of environmental governance literature, for instance, has framed the key challenges in terms of the need to balance competing social interests (Hempel 1996). This found echoes in concerns with civil society, non-governmental organisations and new social movements that emerged strongly from the 1980s (e.g. Offe 1985). While the debate on what constitutes civil society has many strands, a dominant one - arguably the most influential in mainstream approaches to technology, environment and development - views civil society organisations as 'blocs' that either resist or oppose state power and decisions, or bring different interests into the decision-making arena (Anheier et al. 2002). Policy, planning and regulation thus come to be seen in terms of negotiation between state and society actors and entities. But each of these remains conceptualised as bounded, and associated with distinct interests.

FROM GOVERNMENT TO NETWORKS AND GOVERNANCE

In the last few decades, these simple models of government/civil society have come under growing critique. In part, this has been fuelled by evidence that top-down state-led plans, in practice, rarely work out as intended. Disappointments

over the legacy of the kinds of mid-range state planning prevalent in the 1960s, for instance, whether in health, agricultural or broader development arenas, led many to conclude just how difficult it is for states to direct new systems into being exclusively through hierarchical government measures. Disquiet over the actual and potential impacts of large, state-led development plans fuelled reactions from actors in society that often undermined the schemes themselves, bringing about failures (Scott 1988). Along with such evidence emerged approaches to conceptualising policy-making and regulation that embraced several key moves: a recognition that multiple actors usually are, and need to be, involved; that these do not comprise monolithic bounded entities (of state, corporations, civil society) but that interactions within and across them are key, creating networks and blurred boundaries; and that many issues involve multi-level action across multiple scales.

These changing understandings have been linked with lively debates about the role and capacities of the state. For instance in the European context, since the 1970s there has been a fundamental shift in conceptions of states that reflects both real historical changes and different political framings of those changes (Rosenberg 2001). The dominant model of state-led policy and regulation came under fire from both the right and the left for constraining economic rights through higher taxes, regulations, union power, and constraints on trade at an individual level, as well as for failing to address economic inequalities (Kymlicka and Norman 1994). Public sector reforms in the 1980s and 90s, building on these arguments, led to a shift from a hierarchic bureaucracy towards a greater use of markets, quasi-markets and networks, especially in the delivery of public services (Bevir and Rhodes 2003). Meanwhile the legitimacy of elite, technocratic decision-making came under question in the 1980s and 1990s, for instance as a series of crises led state and related political bodies such as the European Commission to be criticised as remote, undemocratic and fraudulent. This led to a shift towards an emphasis on engagement between state and non-state bodies and a strengthening of political rights (Jordan 2002).

In developing country settings, parallel and related debates have emerged, again with particular political underpinnings. Thus critique of state-led development interplayed with the economic reform agendas of the 1990s led by the World Bank and International Monetary Fund, with their emphasis on 'rolling back' the state, and privatisation of public services (e.g. World Bank 1989). This was associated with the widespread promotion of neo-liberal agendas in development through the so-called Washington consensus, with its emphasis on free competition, trade and capital movement. A broad and vociferous critique of neoliberalism has emphasised its negative effects on the poor, and tendency

to increase inequalities within localities nations and globally (Chomsky 1998; Stiglitz 2002). Such critiques have in turn fed debate about the role of the state in a post-neo-liberal development era, including an emphasis on democratic state-citizen relationships and on governmental-non-governmental partnerships in the delivery of services (e.g. Centre for the Future State 2005).

Several of these emphases are captured in a conception of 'governance' as opposed to government. Some argue that the term has strongly politicised origins, with growth in usage traceable to the 1980s and the emergence of neo-liberalism and the New Public Management both in European settings (Bevir and Rhodes 2003) and globally. Indeed The World Bank itself claims to have introduced the term into general discourse via its 1989 report *Sub-Saharan Africa: From crisis to sustainable growth* (World Bank 1989). In subsequent elaboration, the World Bank used the new language of governance to justify its move into dealing with political issues, in ways that generally supported a neo-liberal style of development (World Bank 1994).[1] While it is important to recognise these ideological underpinnings, however, for many 'governance' opens up a broader analytical and political agenda that addresses the multiple political processes and relationships through which state and non-state actors do, and might, engage, allowing for critical engagement with their effects on the poor and marginalised. This is the way that the STEPS Centre treats the term. In this sense:

> Governance is a descriptive label that is used to highlight the changing nature of the policy process in recent decades. In particular, it sensitizes us to the ever-increasing variety of terrains and actors involved in the making of public policy. Thus, governance demands that we consider all the actors and locations beyond the [central government] 'core executive' involved in the policy making process (Richards and Smith 2002).

In understanding the dimensions of contemporary governance - viewed in such broad terms - as it relates to issues of technology, environment and development, several strands of work are helpful. While some are explicitly cast in terms of 'governance' others draw on longer-established work in political science that precedes, or eschews, usage of the term.

Thus one influential strand of work reconceives the relationship between states and markets. This recognizes that complex public policy objectives, including

[1] Many thanks are due to David Leonard for insightful comments and references related to these origins of 'governance'.

government objectives for transforming social-technological-environmental systems into more sustainable forms, require co-ordinated efforts and changes amongst many different actors, institutions and artefacts (Elzen et al. 2005; Smith et al. 2005). State hierarchies struggle to direct these into being. But neither are resilient systems likely to arise spontaneously through markets. Additional governance activities must be coordinated and steered outside government hierarchies and beyond market incentives (Kooiman 2003; Rhodes 1997; Jessop 1998). As such, for these analysts the rise of the governance perspective in both public policy analysis and practice does not signal the demise of institutions of the state nor markets (Scharpf 1997), but rather a blurring between two long-established (and ideologically potent) category distinctions (Rhodes 1997).

A second strand of work attends to 'unpacking' the state and understanding the interaction of different actors within it, amongst themselves and with wider networks. Dynamic and sometimes transient networks, partnerships and soft measures, as well as harder policy instruments, emerge as preferred modes of steering and coordination in the realisation of policy objectives (Stoker 1998; Hajer and Wagenaar 2003). Networks build up around the government ministries formally responsible for a policy sector and it is through these networks that policy gets formulated and implemented (Marsh and Rhodes 1992; Smith 2000; Rhodes 1997). The state may retain an important role; however, with challenges like sustainable development it is a role distributed across multiple ministries and their associated policy networks, each with their own histories, logics and preferred modes of governing.

Such perspectives recast conventional distinctions between politics and bureaucracy, emphasising how far 'bureaucratic politics' is a messy process within a highly differentiated state apparatus. This is an insight in political science that well precedes 'governance' (e.g. Lindblom 1959). Discussion in this vein emphasises that state interests are (in practice)[2] defined, secured and maintained in heterogeneous and divergent forms. Functionally distinct administrative units build up their own expertise and networks with stakeholders inside and outside government. Each has different lines of accountability to Ministers and the private sector, distinct disciplinary and professional cultures, draws upon specific sources of information, and inhabits particular institutional arrangements. Another important and related strand in the bureaucratic politics literature emphasises the roles of street-level bureaucrats, and the discretion they

[2] Of course, what these overarching interests are seen to be depends on the particular theory of the state under consideration. The central point is that these general goals still need articulating into specific strategies and activities.

often exercise for instance in dealing with clients - becoming de facto policy makers as well as rule-followers (Lipsky 1980; Long and Long 1992). Such perspectives help to explain why planning blueprints so rarely work out as intended, as they are subverted by the realities of bureaucratic politics and interactions with assumed policy beneficiaries. Equally, interdependencies suggest that even the strongest state leadership will have to operate through networks, and will need to bargain for compromises and bring coalitions with them.

As discussed in STEPS Working Paper 1, such non-linear, dynamic complexities make it very difficult to predict policy outcomes in advance, and suggest that outcomes will stray from initial objectives (Jessop 2003); unintended consequences and 'failures' are thus inevitable. This opens up questions about the kinds of flexibility needed to deal with the full range of complexities and uncertainties involved with environmental and science-technology policy problems, whether old or new. These are questions addressed more fully in the more recent work on adaptive and reflexive governance that we consider below.

While some work on networked governance continues to take a state-centred perspective, a parallel set of literatures has applied similar re-conceptualisations to the societal realm. Moving beyond a conception of civil society and social movements as bounded organisations representing particular interests, by the mid 1980s civil society had emerged as a broader and more nuanced concept meant to encompass metaphorical space outside state, market, and institutionalised forms of religion. It was no longer viewed as monolithic but as an unequal, divided space with contradictory possibilities for democratic social transformation as well as tendencies to reinforce social hierarchies and authoritarian practices. Work on new social movements, similarly, has increasingly identified processes of social differentiation and interaction within movements, as well as the complex and fluid ways in which participants form networks and alliances across movements and with state and corporate actors (Eyerman and Jamison 1991; Tilly 1978; Touraine 1985; Melucci 1989, 1995; Tarrow 1998; McAdam et al. 2001).

Since the 1990s substantial literatures have documented such processes of networking and interaction between actors in citizens' groups, local movements and community based organisations, donor agencies, and the state in health, environment and development arenas. For instance such networks are now key in managing natural resources in forests and watersheds across much of the developing world, as well as in treatment politics in the health sector. The interrelationships and power relations within these networks are currently hot topics of debate in development and political theory. Meanwhile, there is recognition - for instance in Partha Chatterjee's notion of 'political society' (Chatterjee 2001,

see also Hann 1996; Kaviraj and Khilnani 2001) - that in practice the politics of democracy is frequently carried out not in civil society associations but in legally ambiguous, mediating spaces between the state and civil society, especially in post-colonial democracies.

Increasingly, it is also recognized that the networks involved in governance extend far beyond the nation state. The EU in its various forms, for example, has been governing economic stability in Europe for several decades, and a substantial system of international law was put in place in the post war period to break down imperial trading blocks and encourage global trade. The implications of globalization serve to exacerbate, deepen and extend complex interdependencies between state and non-state actors across multiple territorial levels (Bache and Flinders 2004). Thus work highlights the emergence and politics of citizen action in global arenas (Edwards and Gaventa 2001) and the emergence of a so-called global civil society (Keane 2003; Clark 2003). Recent work on new social movements emphasizes the breadth and diffuseness of their spatial context, involving multi-layered forms of networking and alliance (Edelman 2001; Appadurai 2000). Social movements around environment, science and technology frequently link participants in diverse local sites across global spaces, constituting forms of 'globalisation from below' (Falk 1993; Appadurai 2002; Leach and Scoones 2007). All this contrasts with the more conventional focus of social movement theory on single organisations with a single, shared agenda. It emphasizes how politics and governance in national and even in global arenas can involve bottom-up processes of participation and claims-making.

Starting from a more top-down perspective, there is also an important stream of work concerned with multi-level governance (Bache and Flinders 2004). Emerging initially from the study of supra-national institutions such as the European Union, but also looking down to sub-national political scales, this literature tries to move beyond inter-governmental relations and explore how governance arrangements at different territorial levels interrelate and interpenetrate with one another. Such arrangements have been seen as particularly important for environmental problems whose causes and manifestations frequently cross-cut local and global scales (Vogler and Jordan 2003), although similar arguments have recently been made around in the health field in the context of 'mobile microbes' and the threat of epidemics (Fidler 1998, 2003). Independently, flexible, multi-level governance has become one of the hallmarks of advocates of the adaptive governance approach to social-ecological systems (see below). The multi-level governance literature raises questions around the sources of coordination, steering and accountability in complex networks of governing actors operating across levels. Indeed, some argue that the term 'multi-level' is superfluous since adopting a governance perspective

makes one sensitive to interactions beyond the nation-state, and hence across territorial levels (Welch and Kennedy-Pipe 2004). Superfluous or not, the term multi-level does remind us how attempts at a given territorial level to deal with general governance challenges operate in a context constrained and facilitated by other governance levels, and where the dispersion of political control, complex interdependencies, and overlapping jurisdictions and competences are defining concerns (Pierre and Peters 2000).

Some associate the shift to more networked forms of governance with a decline in the power and capacity of the state (Stoker 1998). Outsourcing public administration to agencies; ceding sovereignty to multi-lateral institutions; devolving activities to community associations are in this view all considered to be examples of a 'hollowing-out' of the state by leaching power away, horizontally and vertically (Rhodes 1997). Others consider this apparent decline in state power to be overblown, globalisation-centred rhetoric (Rosenberg 2001; Dunn 1996: 196-210). Others still identify a hollowing-out to be more strategic, orchestrated in large part by the state to work in favour of sustained, even enhanced state control (Rhodes 1997; Jessop 1998). In this view the state 'manages' the risk of overload and failure by devolving some activities and powers, but retains key influence over policy agendas and strategies (Jessop 2003). As has been argued in the environmental arena, for instance, decentralisation (for instance of natural resource management activities to local organisations) may actually work to extend and enhance state power (Ribot and Larson 2005). Much depends on the power relations and lines of authority and accountability surrounding such arrangements.

In sum, then, the last few decades of work have seen a shift from a focus on state-led government and planning, to recognition of interactions and networks between multiple actors beyond the state. While many of these insights precede use of the term 'governance', they have been elaborated in recent literatures that frame their concern as with governance, and especially networked governance. Some strands of this governance literature are open to critique for their links to neo-liberal views on the declining power of the state, their over-simplistic conception of the relationship between the state and the market, and for failing to see how the shifts between state-led and networked governance are both longer term and occur in both directions. In corporate governance, for instance, there are many instances of a shift from decentralised self-governance to state control, as has happened with financial services in the UK. Nevertheless, if applied with attention to context and history - points we return to below - the insights of governance and networked governance literatures open up new questions about institutional and political relationships. They allow for recog-

nition of complex interdependencies and fuzzy boundaries across state/civil society/movements/business actors where these are emerging. They allow for recognition that these networks may be operating across local and global scales. They enable recognition of plural interactions between state and market processes in contexts of often rapid transition. All this suggests approaches to understanding policy processes as non-linear, involving more complex and sometimes unpredictable interactions between networks of actors and diverse political interests. State action and power need not be assumed away, but rather seen as reconfiguring and responding amidst broader networks. Such a perspective is, we argue, potentially more in line with and responsive to the complex dynamics of socio-ecological systems discussed in STEPS Working Paper 1 on Dynamics.

UNDERSTANDING CONTEMPORARY TRANSITIONS

Although these shifts in understandings of governance have by no means been confined to the arenas of environment, science and technology and development, they have arguably been particularly necessary for dealing with the challenges in these areas. Work on environment, technology and development challenges has thus fed fruitfully into broader governance literatures, as well as vice versa. For instance work on the governance of complex global environmental problems, such as climate change, has been at the forefront of work on multi-level governance. Similarly, issues of environment, health, technology and development have spawned many productive streams of work on civil society mobilisation and social movements.

Furthermore, appreciation of networked governance arrangements has been particularly significant in the recent political contexts of developing and transitional economies. It can be argued that dominant, mainstream understandings of government have, to some extent, always and everywhere been inadequate to capture the more complex, messy, multi-level processes of governance in the real world. But it is also the case that dominant approaches to understanding government and regulation have been co-produced with structures and modes of governing that derive largely from the experience of the advanced market economies, in a period of relative stability during the second half of the twentieth century. In a similar way, models of governance grounded in neo-liberalism and the New Public Management owe their origins to European experience, as well as the ideologies of multi-lateral institutions such as the World Bank. In many respects models of both kinds simply fail to fit the experiences of post-colonial

and transitional polities, economies and societies, as they have emerged across Africa, Asia and Latin America, while they are fundamentally challenged by contemporary processes of globalisation and privatisation in which the rapid spread of markets have not been accompanied by the extension of strong regulatory structures. Instead, as we have indicated, there is often a complicated intermingling of community and state decision-making and regulatory arrangements, informal as well as formal, which does not map neatly onto the conventional, mainstream approaches to understanding processes of regulation. Instead, this draws attention to new, emergent form of practice responsive to the dynamic complexity of different contexts.

Thus in many post-colonial and transitional settings, assumptions that dominant western models would emerge or could be developed unproblematically have proved wrong, while arrangements that were put in place have often unravelled. In many arenas, informal arrangements and diverse hybrids and blurrings of formal and informal structures have emerged to fill the gap (e.g. Wood 2004; Mackintosh 1999; Mackintosh and Tibandebage 2002). For instance pluralistic health systems have emerged in many parts of Asia and Africa in which diverse providers confound community-state categories, and almost all public sector employees engage in market activities (Bloom and Standing 2001; Leonard 2000; Van Lerberghe et al. 2002).

Similarly, in countries that have experienced transition from command to market economies, experiences have been highly divergent but have frequently challenged the assumption that western governance models work unproblematically. Some central and East European countries have rapidly established the institutions of a market economy and are integrating into the European Union, while others such as Russia have experienced economic collapse and informalisation of many activities that take place outside any regulatory framework (Reddaway and Glinski 2001). While China and Vietnam have managed more gradual processes of institutional development (Rawski 1999; Bloom 2005; Bloom et al. 2006), this has been through patterns that profoundly challenge western assumptions (North 2005).

At the same time, mainstream models are challenged by the increasing instability of global political and economic arrangements. The integration of large Asian countries such as China and India into global markets, growing incidence of violence and insecurity within and between countries and regions, and the global dynamics of disease and environment, among other factors, are creating situations that challenge conventional models of stable states in a stable world

order, demanding new ways of thinking about governance which take system dynamics and complexity seriously.

The very different trajectories in different places also suggest that understanding emergent governance processes needs an approach that is embedded in history and context. As long-established perspectives in historical institutionalism emphasise, emergent political processes need to be understood in terms that recognise the interplay of structures with the agency of many different actors, shaped by both formal and informal rules and norms. These emerge and transform in path-dependent ways, combining periods of consolidation with conjunctures when rapid change occurs (Pierson 2000; Pierson and Skocpol 2002; Thelen 2003; Fukuyama 2004). Patterns of institutional construction, consolidation and change are shaped by, and in turn shape, relations of power (Bloom 2001; Gough and Wood 2004).

Thus perspectives on networked governance need to be combined with attention to political history and context, and patterns of institutional development over time. Nevertheless, both these recent networked governance literatures and these longer-established political science traditions have paid relatively limited attention to several dimensions that are central to the challenges of governing environmental and technological issues, particularly in the dynamic contexts of such systems (see STEPS Working Paper 1). A first missing dimension lies in 'nature' itself: the character of the ecological processes, including disease ecology, that governance seeks to influence, and the precise ways that these interact with - and that nature is co-constructed with - governance. Second, contemporary mainstream politics literatures pay relatively little attention to questions of risk and uncertainty. And third, for the most part questions of the politics of knowledge have been underplayed. However, these dimensions have been addressed in a set of parallel literatures that we now go on briefly to review. As we suggest, each offers valuable insights and perspectives to the core challenges of governing dynamic, multiply-framed pathways to sustainability. Nevertheless, they too remain insufficient without integration with several newer literatures, which we go on to address later in the paper.

3. ADDRESSING THE POLITICS OF ECOLOGY, INCERTITUDE AND KNOWLEDGE

DEALING WITH ECOLOGY AND POLITICAL ECOLOGY

While mainstream work on politics has paid relatively little attention to nature and ecology per se, the sub-field of political ecology exemplifies a parallel approach concerned with fusing the analysis of ecology with the analysis of power. Political ecology is often defined broadly as the study of the relationships between environment, politics and society. With its roots in Marxian political economy, political ecology has emphasised inequality, hierarchy and (material) power in people-environment relationships. These emphases built from, and valuably critiqued, earlier approaches under the rubric of cultural ecology and ecological anthropology. These tended to represent human resource use and adaptation to (local) environments as a harmonious process underlain by a hidden adaptive function of culture (e.g. Geertz 1972, 1980). Political ecology, by contrast, engaged with Marxist studies to understand societies as marred by conflict and inequality in the presence of markets and global capitalism.

'Classical' political ecology (e.g. Blaikie and Brookfield 1987) took a largely structuralist-materialist approach to seeing how local conflicts were linked into hierarchies and webs of causation extending up to global scales. Much was based on the premise that capitalism was the root cause of environmental degradation and the domination of nature and domination of human beings went hand in hand (Vogel 1995). Later work critiqued these studies as failing to capture the multiple layers of politics, including everyday forms of resistance and civic movements (Paulson et al. 2003). Thus a post-structuralist phase focused on micro-scale understandings, experiences and cultural conceptions of environmental change, placing emphasis on everyday forms of struggle, community rights, participation, and subaltern resistance to ecological destruction (Peet and Watts 1996; Raymond and Bailey 1997). To some extent, then, these works represented a rapprochement with key emphases of emerging work in governance more broadly, with its emphases on people's own agency, and bottom-up processes of struggle. However, a repeated accusation is that political ecology has been insufficiently political, in the sense of attending to the multiple networks of politics that are part of contemporary governance. Thus, for instance, the emphasis on the local as against the regional has produced excellent studies, but little impact on international discourses of global environmental governance (Adger *et al.* 2001; Walker 2006). Political ecology has

also made little attempt to unpack the state, or engage with the functioning of state-related networks in the global economy (Forsyth 2003).

An important strand of the post-structuralist political ecology literature has critically explored the social construction of representations of 'nature', whether amongst local communities or in scientific and policy worlds (Forsyth 2003, Fairhead and Leach 1996). This critical political ecology offers fruitful convergences with nature-culture debates in other fields such as science and technology studies (Latour 1993, 2004) and anthropology (Descola and Palsson 1996), examining nature as simultaneously constructed and real and breaking down separations between society and ecology. This has led to a strand of work that examines representations and explanations of ecological processes and problems, and identifies a politics in how actors' different representations engage and compete. But not withstanding isolated attempts (e.g. Fairhead and Leach 2003), there has been insufficient recognition of a key further move: how representations of ecological dynamics and governance and management arrangements co-evolve.

This highlights the questions that have also been raised about how effectively political ecology actually deals with ecology (Peet and Watts 1996; Zimmerer and Basset, 2003; Walker 2005). Integration of biophysical predictions with social and political constructions has remained a challenge (Scoones 1999; Forsyth 2003). Early approaches tended either to adopted a priori concepts of the biophysical environment, or to have insufficient understanding of the complex and contingent ways ecological changes are produced (Vayda and Walters 1999). Political ecology has often reproduced assumptions of ecological science rooted in stability and equilibria, and in as much as it has embraced more recent ecological thinking emphasising complexity, disequilibria and instability, it has tended to do so only in rather limited ways (Scoones 1999; Zimmerer 1994; Peterson 2000). Important challenges thus remain both in understanding the interactions between actual, dynamic processes of ecological change, and complex, multi-actor governance processes; and conceptualising forms of governance that can deal adequately with emerging dynamics and complexities. As we suggest below, recent literature on adaptive governance begins to address these challenges.

DEALING WITH INCERTITUDE

Issues of risk and uncertainty - and incertitude more broadly - are also central to the challenges of dealing with complex, dynamic social-technological-ecological systems. Within mainstream literature on governance, and indeed in many policy approaches, these have most commonly been addressed through

the notion of risk. Indeed risk, largely defined as a product of consequences and probability, has become a key framework for addressing the challenges of science, technology and environment (Krimsky and Golding 1992; Royal Society 1992). Thus risk is used in an instrumental sense as part of the standard repertoire of state, policy and international agencies to address human impacts on the environment, health risks, and the likely effects on society of environmental, scientific and technological processes. Approaches to risk assessment, prediction and prevention, to be determined and weighed up through expert judgement, are part and parcel of modern governance procedures. These approaches reduce the inherently complex and uncertain dynamics of the real world and of co-evolving social, technological and ecological processes, to a narrow set of calculable probabilities (Wynne 2002; Jasanoff 1993, 1999). They ignore other key dimensions of incertitude, ranging from uncertainty to ambiguity, where there are many possible framings of the issues involved, and ignorance, where we don't know what we don't know (Stirling 1998; see also STEPS Working Paper 3 on Designs).

Several recent social science literatures take a broader conception of risk and attempt to theorise its relationships with governance. This has often taken the form of grand attempts to theorise the nature of social organisation and transformation from pre-modern to modern to late modern societies. Thus for instance Douglas seeks to explain how certain notions of danger, harm, damage, risk and threat provide symbolic boundary measures to deal with social deviance and thus achieve social order. Risk disputes in this view involve clashes in aesthetic and moral judgement, and identifications of responsibility and blame - and hence are inherently political (Douglas 1966, 1985, 1992). However, Douglas' cultural theory has a number of drawbacks in relation to our challenges of understanding governance processes in contexts of dynamic complexity and uncertainty. First, it treats risk as given, responses to which are determined by differing world-views and not by the nature of risk itself. There is therefore little opportunity to integrate concerns with ecological and technological dynamics and the risks and uncertainties these throw up. Her structural explanations of risk judgements (Douglas and Wildavsky 1982) also provide little space for people's differentiated agency, or explanation of change.

In Beck and Giddens' influential formulations of 'risk society', heightened awareness of environmental and technological risks is a defining feature of late modernity (see Beck 1992; Beck et al.1994; Giddens 1998).[3] Beck argues that the

[3] In his formulations Beck especially oscillates between a realist and constructivist positions on risk. Increasingly hazardous nature of life in modernity and its environmental impact are real for Beck, whereas for Giddens there has been a heightened perception of risk.

unprecedented character of environmental and technological risks combined with the incapacity of established institutions to deal with these, has brought about a condition of reflexive modernisation, characterised by awareness of the political aspects of risk, societal reflex and self-confrontation. Beck argues that this is leading to a fundamental transformation of structures of industrial modernity in western societies. By extension, he argues elsewhere that a 'world risk society' is emerging. While highly influential, the risk society thesis has been hotly debated. Whether reflexive modernity is emerging in the way presumed even in contemporary western societies is doubted (Bess 2003), let alone in non-western settings. Both Beck and Giddens' theorisation of risk, reflexivity and late modernity have been widely criticised for lacking empirical evidence of actual understandings of and social responses to uncertainty in different settings, and hence simplistic theorisation of the difference between early and late modernity (Lash et al. 1996; Adam et al., 2000; Caplan 2000; Leach and Scoones 2007; Wynne 1996, 2002). Nevertheless, this body of work and its ensuing debate have valuably drawn attention to the relevance of heightened intensity of real and perceived risks and uncertainties in social and political processes. It has highlighted in particular 'relations of risk definition' - including conflicts over how risks and uncertainties are framed - as central to political processes. And it has drawn valuable attention to the changing relationships between scientists and other forms of accredited experts, and publics (Wynne 2001, 2005).

To inform the challenges of governing pathways to sustainability, the insights of these works thus need to be integrated with a more grounded and differentiated understanding of how different people and groups frame risks and uncertainties, in relation to particular ecological, social and technological dynamics in particular places. And we need to conceptualise more precisely how different framings of risk and uncertainty play within networked governance processes, and how the latter might attend to them in ways that ensure sustainability. As we suggest below, recent work on reflexive governance offers some significant ways forward in this respect.

DEALING WITH THE POLITICS OF KNOWLEDGE

Conceptualisations of both society-nature interactions, and of incertitude, raise the central, and much broader, issue of knowledge as a dimension of governance. As a number of analysts argue, this has been surprisingly absent in much contemporary mainstream thinking and practice in governance, politics and policy processes (Jasanoff and Wynne 1997; Keeley and Scoones 1999, 2003; Fischer 2000, 2003). This is despite the existence of long-established 'con-

structivist' traditions in political and international relations theory that have contributed influential perspectives, such as in work on epistemic communities (Haas 1964; P.M. Haas 1989, 1992). In part, this reflects persistent assumptions about institutions and decision-making processes as being led by accredited forms of expertise, whose validity and legitimacy do not need to be questioned. It also reflects continued dominance - in many areas of environment, health, technological and development policy making - of a linear model in which truth (evidence) speaks to power. Governance and policy processes, in this view, are appropriately 'evidence-based', with evidence often constituted in relation to a singular notion of 'sound science'. The key questions are about how evidence is applied in the political process, not about how evidence is constructed in the first place, by whom, in relation to what conceptualisations of the world and what social commitments.

Yet it is precisely these, and related, questions about how different people and groups 'frame' problems - bringing to bear particular assumptions and understandings - and the politics of knowledge involved in their encounters, that have interested a growing number of social scientists across several disciplines, from anthropology to science studies. Some would argue that knowledge politics have always been significant; others that they are becoming more so as the world reconfigures as a global knowledge society. Thus as Sheila Jasanoff argues:

> Contemporary societies are constituted as knowledge societies... important aspects of political behaviour and action cluster around the ways in which knowledge is generated, disputed, and used to underwrite collective decisions. It is no longer possible to deal with such staple concepts of democratic theory as citizenship or deliberation or accountability without delving into their interaction with the dynamics of knowledge creation and use (2005: 6).

Constructivist perspectives connect forms of knowledge (whether of scientists, policy-makers, or local people) with their underlying social, political and institutional commitments (e.g. Wynne 1992; Jasanoff 2005). Insights from work in science studies help illuminate how knowledge claims derived from particular instances and sites are spread and consolidated by enrolling other actors and institutions into knowledge/power networks (e.g. Latour 1987, 1999, 2005), and how particular events and fora shape the co-production of scientific and social, political or policy positions (Jasanoff and Wynne 1997). The role and limits of expertise in policy-making have, for instance, been discussed at length by scholars aiming to understand the ways in which power acts on scientific advisors (Collingridge and Reeve 1986; Jasanoff 1990).

Recent work highlights the interrelations between particular ways of knowing (epistemologies) and governance processes. Thus at the national scale, for example, Jasanoff's study of European and US approaches to the regulation of biotechnology has coined the term 'civic epistemologies' to describe the ways in which political culture affects the production of knowledge in modern nation states (2005:15). Many studies have examined how forms of grounded local knowledge are linked to political and material claims - to resource control, to particular rights and ways of life - and how people seek to press such claims in national or global arenas, for instance in social and environmental movements (e.g. Peet and Watts 1996). Contestations over knowledge are thus integral to the power relations and struggles of social and environmental movements. Feminist political ecology (Rocheleau et al. 1996) linked these themes with an understanding of environmental knowledge, rights and responsibilities (and related struggles) as gendered (e.g. Leach 1994; Braidotti et al.1994). Similarly, feminist perspectives on science and technology have emphasised the distinct positionalities, knowledge and interests of women in relation to scientific and technological developments, mapping these optimistically as a source of agency and liberatory struggle (e.g. Harding 1991; Shiva 1989). Whether around environment or science and technology, these feminist works - and other work on rural people's knowledge, for instance (e.g. Richards 1985; Scoones and Thompson 1994) - draws attention to the embeddedness of forms of knowledge in experiences of ecological and technological processes; and the intertwining of knowledge with social, material and political claims.

These works support a view that experiential expertise is a valid contributor to decision-making, along with forms of official or accredited expertise (Collins and Evans 2002); and that effective solutions to the challenges of environment, technology and development should embrace the incorporation of local and popular knowledge - even into global environmental governance. Thus Jasanoff and Martello (2004: 347) argue that 'politics in the global order requires taking on board the divergent ways in which the world's peoples have chosen to make sense of nature and the environment'. Yet the need for framing of global analyses in sustainable development to cater reflexively for local notions of sustainability presents a continuing challenge - one that we pick up below.

Some consider the politics of knowledge as part of national and global networks, arguing that shared problem-framings are increasingly central to binding social movement networks and solidarities amongst people and institutions across globally-interconnected spaces (Melucci 1995). Building on the tradition of policy network analysis, the advocacy coalitions approach (Sabatier and Jenkins-Smith 1993) focuses on the role of shared beliefs in holding networks together. The notion of epistemic communities (Haas 1989) extends this focus, demon-

strating the possibility that where an (environmental) policy debate cuts across normal political allegiances, agreement can be facilitated through a common epistemological background.

A key strand of work on knowledge and governance has followed Foucault's lead in conceptualising power and knowledge as inseparable; mutually constituted as discourse. Thus particular ensembles of power, institutions, language and practices construct issues in certain ways and act on them to produce particular material effects. Many studies in the environment, health, technology and development arenas have now explored the interaction of powerful state and global discourses with local perspectives. While there may be negative outcomes for local livelihoods, bodily control and social justice, sometimes productive counter-politics are generated (see for example Fairhead and Leach 2003; Leach and Mearns 1996; Keeley and Scoones 2003; Scoones 2005; Moore et al. 2002).

The power/knowledge concept is extended in Foucault's notion of governmentality (Burchell et al. 1991: 2) or the 'technologies and rationalities' of government. This emphasises not just knowledges, the regulations based on them and the practices that regulation seeks to govern, but crucially, also the transformations of subjectivities, or changes in conceptions of the self, that accompany the institutionalisation of new strategies of power and regulation. As Agrawal (2005) puts it in his study of forest governance in Kumaon, India, 'Governmental strategies achieve their effects, to the extent they do so, by becoming anchors for processes that reshape the individuals who are a part and the object of governmental regulation' (Agrawal 2005: 219) . Studies using some version of a governmentality optic to examine processes of development (e.g. Scott 1998) and environment and development (e.g. Agrawal 2005; Fairhead and Leach 2003) in non-western settings point to the processes of categorisation and simplification that render social and environmental processes 'legible' for state government (Scott 1998). But they also reveal how people contest and resist such categories and their effects - this is partly why large-scale planning schemes of the kind Scott describes so often fail.

Related approaches draw on the concept of biopower to elucidate, as Jasanoff (2005: 247-8) puts it, 'the state's appropriation of the human and biological sciences as instruments of governance, put to use in sorting and classifying people according to standardized physical, mental, and social characteristics. Through these techniques, states and state-like institutions are able both to articulate broad social agendas - for example, to reduce disease, poverty, ignorance or violence (all defined or redefined, according to standardised biological

markers) - and also to discipline people into accepting science-based classifications of themselves and their behaviour, as part of the natural order of things.' As Hacking has argued, scientific disciplines and techniques such as statistics are in this way an integral 'part of the technology of power in a modern state' (1991: 181; see also Hacking 1990). Yet modern biopolitics is also argued to generate a new kind of counter-politics, as 'a prime instance of ...the "strategic reversibility" of power relations, or the ways in which the terms of governmental practice can be turned around into focuses of resistance: or....the way the history of government as the "conduct of conduct" is interwoven with the history of dissenting "counter-conducts"' (Burchell et al. 1991: 5).

Yet, insightful as these power/knowledge approaches are, most studies in this vein focus on the state. Rather less attention has been given to the emerging dynamics of power/knowledge in today's multi-sited, multi-levelled governance networks, of the kind emphasised in the parallel literatures on networked governance. Connecting these up - bringing a power/knowledge optic into networked governance debates - is thus a key challenge.[4]

4. INTEGRATING THE ADAPTIVE AND REFLEXIVE TURN

The literatures we have considered so far in this paper each bring some key insights to the challenges of governing technological, environment and development issues in a dynamic world. These challenges are partly analytical; understanding what is already going on in settings, and amidst sets of issues, that do not conform easily to the terms in which debates about government originally emerged, or indeed to the dominant terms used by the policy-makers and managers 'doing' the governing. The latter often provide little purchase given rapid and increasingly unstable processes of change, the political contexts of developing and transitional economies, the emergence of interactions and

[4] The potential to do this is actually highlighted in the concept of governmentality itself. Thus Agrawal (2005: 223) suggests that 'a careful consideration of the concept of governmentality provides useful tools to sidestep the state-society distinction... Instead of examining the boundaries and definitions of state and society, an analysis of governmentality orients attention toward the concrete strategies to shape conduct that are adopted by a wide range of social actors and how these actors collaborate or are in conflict in the pursuit of particular goals'. Entities such as state, society or community are seen as historically produced through processes of governmentality and its counter-politics, as contingent outcomes, rather than self-evident building blocks.

blurred boundaries between multiple actors across diverse local and global sites, and the intertwining of socio-political with technological and ecological dynamics in contexts of uncertainty and of diverse knowledges. Conventional approaches may sustain a myth of a world manageable through neat state-civil society-international institutions and distinctions, through scientific expertise, and through uniform approaches to problem and risk assessment based on singular views of evidence. But the melee of real-life dynamics and interactions, and of everyday practice amongst citizens, bureaucrats, and people crossing public-private boundaries suggests a far more dynamic, complex and messy world in which knowledge and notions of the problem are contested. Analytically, we need concepts and approaches that can capture critical dimensions of these processes that bear on the construction of pathways to Sustainability.

But the problem with analyses of governance that are out of touch with real political processes runs deeper since myths of governance can also become myths for governance. Approaches based on static, singular views of problems and solutions, and of powerful institutions putting them into action, tend to shore up those very institutions - to be co-produced with them. Much governance is, in practice, built upon such myths, and needs them as a source of justification. Yet the resulting interventions put into play forms of power and governmentality that might not entirely wipe out the scope for counter-politics, but will circumscribe its agency and effects. While these myths may expediently sustain a sense of order and control, at least in the short term and at least for some, this is often a fragile, problematic and ultimately illusory order. It may deny and suppress the dynamism of human-nature-technology interactions and the multiple framings of these, and in this, marginalise further the perspectives of people already poor and marginalised. To think about governance for pathways to sustainability, we need approaches that can recognise and reflect on these processes, and consider alternatives.

In this context, a number of the moves in the literatures considered in earlier sections have been useful. The move from government to networked, multi-levelled governance has been helpful in recognising multiple interactions across scales between types of 'actor' whose status and boundaries are often fuzzy. This potentially opens up scope to recognise poorer people's agency in mobilisation and networking, and to address the power relations that enable and constrain this. Insights from literatures on political ecology, on risk and the risk society, and on the politics of knowledge and governmentality go some way towards addressing gaps in the mainstream literature, enabling important attention to ecology, uncertainty and knowledge/framing. However, as we have already indicated, each of these contributory literatures also has certain limitations. They

have also, to date, not been integrated very effectively with each other. Thus we are left with some significant weaknesses in relation to our core challenges of dealing simultaneously with dynamic ecological/social/technological systems, and addressing the interaction of multiple framings in governance.

In this section, we outline two further areas of work that attempt explicitly to respond to dimensions of these challenges, focusing respectively on addressing dynamic systems through adaptive governance, and addressing multiple framings through deliberative and reflexive governance.

ADAPTIVE GOVERNANCE OF DYNAMIC SYSTEMS

Recent work on adaptive governance, emanating in large part from the work of the Resilience Alliance (see Olsson et al. 2006), helps address some of the key challenges of dealing with ecology in a dynamic way, addressing the intertwined nature of dynamic social-ecological-technological systems, and taking account of the uncertainties inherent in these.

It has largely been failures in conventional modes of governing social-ecological relations, such as the management of water basins, agro-ecosystems, and other common pool resources, that have led to calls for 'adaptive governance' (Folke et al. 2005; Dietz et al. 2003). There has been less explicit focus on disease ecology or health-related issues - although the dynamics in play in the health field (see STEPS Working Paper 4) are just as suited to an adaptive governance approach as are environmental and agricultural issues. As Olsson et al put it: 'adaptive governance relies on polycentric institutions that are nested, quasi-autonomous units operating at multiple scales' (Olsson et al. 2006). Such forms of governance are deemed appropriate to situations of rapid change and high uncertainty. Thus:

> We focus on transformations within the social domain of the SESs [socio-ecological systems] that increase our capacity to learn from, respond to, and manage environmental feedback from dynamic ecosystems. Such transformations include shifts in social features such as perception and meaning, network configurations, social coordination, and associated institutional arrangements and organizational structures. Transformations also include redirecting governance into restoring, sustaining, and developing the capacity of ecosystems to generate essential services (Olsson et al. 2006: 2).

Rather than seeking any grand theory of how to govern complex systems, adaptive governance is essentially experimental in nature, seeking to build capabilities based on past experiences and a commitment to social learning. Adaptive governance arrangements are conceptualised to consist of self-organising and self-enforcing networks of individuals, organisations and agencies that have the capacity for flexible, collaborative and learning-based approaches to managing ecosystems. This means breaking away from routines that are no longer appropriate to the problem, and experimenting, adapting and reviewing new measures in a search for more resilient social-ecological relations (Folke et al. 2005). As such, adaptive governance aims to intervene in a complex socio-ecological system and guide it to some more favourable state or trajectory – transformability - or maintain it in a desired state or trajectory – resilience (Walker et al. 2006). Adaptive governance accepts that the outcomes of intervention will remain uncertain, and strategies for anticipating unintended consequences rest upon the emphasis on flexibility and learning.

In a study contrasting governance strategies in five case studies of socio-ecological systems under stress, and enjoying varying degrees of success, Olsson et al. (2006) identify three basic phases for moves towards adaptive governance. The first phase is preparatory and involves the perception amongst key constituencies that the system is 'in trouble' and needs some form of change in approach to its 'management'. These stress or crisis situations open up windows of opportunity for the second phase, which is the 'transition to a new social context for ecosystem management', namely adaptive governance (ibid: 3). It helps if advocates of new, adaptive governance measures have a portfolio of projects primed and ready to take advantage of opportunities when these occur. This is a highly unpredictable dynamic, but when some purchase for adaptive governance is realised, then the third phase builds up the resilience of the nascent new direction.

Conditions identified as important for adaptive governance include an ability to consider alternative system configurations, and strategies for choosing between alternatives; creating knowledge and social networks committed to change; trust-building and sense-making processes, and leadership in mobilising support and managing conflicts. More problematically, however, profound disagreements and polarized interests are deeply problematic for adaptive governance strategies. Such cleavages hinder the kind of consensual knowledge production, voluntaristic strategic action, and shared mission that scientists advocating adaptive governance see as essential for effective socio-ecological management. Politicisation of issues or knowledge about them is considered problematic, as this undermines the independent authority of scientific knowl-

edge, and hinders the identification of common ground (Olsson et al. 2006). Rather, adaptive governance approaches assume that consensus building on goals is possible, and that these goals will become evident to all through better scientific knowledge of the problem. Consensus is assisted by the experimental nature of adaptive governance: initial goals will be checked and monitored as events unfold, and opportunities for their revision are built into the process. In this respect, adaptive governance may be quite inadequate to deal with the clashes of framing that arise around many social, technological, environmental and health issues, whether or not these are made explicit. They invite the danger of simply upholding dominant 'expert' views and supporting those in power, marginalising the perspectives and priorities of the poor.

Ideas about how adaptive governance might arise are inspired by work on 'policy entrepreneurs' and 'political windows' (Kingdon 1995). This emphasises the importance of timing and wider conditions to enable the initiation of adaptive governance (as an alternative to established approaches and routines), and the role of building supportive 'social capital' to take it forward. Recent arguments by Olsson et al. (2006) identify the importance of informal, 'shadow networks', whose coordinated efforts to develop alternatives, build the case for adaptive governance, and identify and exploit political opportunities, are seen as essential. The assumption is that knowledgeable argument, combined with favourable conditions, will convince powerful state and non-state actors and institutions to come into line. However, the complex historical and political trajectories of existing governance arrangements, and the influence these have over the way 'windows of opportunity' open, shape and close progress, is not explored in depth, nor are the ways that socio-political legacies, power relations and interests may complicate, distort or simply block adaptive governance aspirations.

Work on adaptive governance has also tended to focus on local scales. Whilst sometimes calling for coordination across multiple scales, primarily as a way of trying to safeguard local ecosystem management from higher-level socio-political, economic and ecological dynamics, work on and advocacy for adaptive governance remains weak in addressing these broader scale processes.

A final difficulty is a lack of attention to the politics of knowledge. Adaptive governance is built upon recognition of the complex, uncertain dynamics of systems. Both lay and scientific knowledge about these dynamics is, as constructivist perspectives remind us, socially situated, partial, plural, contingent and often contested (Mehta et al. 1999, 2001). Adaptive governance claims to offer a way of dealing with this situation, treating 'knowledge uncertainties' as part of the realm of uncertainties to which governance must flexibly respond.

But this ignores more fundamental questions and perhaps contestations over how 'the system' is framed in the first place, and what is to be sustained for whom and why. Implicit in some of the literature is a self-evident goal and an image of a natural system 'out there' knowable through science. Sometimes actors' different 'mental models' are acknowledged, but as partial constructs that can be verified empirically, and which can contribute to more scientific and formal models of the system further down the line (Walker et al. 2006). In other words, each is seen as part of the same epistemological jigsaw, and not as a different world view in the way that the STEPS focus on framings would emphasise.

In sum, proponents of adaptive governance present it as a flexible, learning strategy that offers important advances in dealing with the complexities and uncertainties of socio-ecological-technological systems. However, there is limited consideration of questions of power, knowledge and framing. With respect to these dimensions, insights from recent literatures on deliberative and reflexive governance are helpful.

DELIBERATIVE AND REFLEXIVE GOVERNANCE

In contrast with many contemporary mainstream approaches and with adaptive governance, deliberative and reflexive approaches consider the question of goals to be much more problematic and contested. In this, they build - both implicitly and explicitly - on many of the insights of constructivist approaches to knowledge and knowledge politics. Governance is seen to be as much about shared problem construction as it is about collective solutions. Indeed, the two are intimately and recursively linked. Since 'various groups of people conceive of the world in different ways' (Hajer and Wagenaar 2003: 11), different actors will frame the 'object' of governance and its boundaries differently. How these different framings are interactively and mutually negotiated has an important bearing in reflexive governance. As such, governance and the 'object' to be governed are inter-subjectively negotiated: governance arenas and social-technological-ecological systems are 'co-constructed' (Smith and Stirling 2006).

Like adaptive governance, reflexive governance is aware of the inevitability of unintended consequences arising from earlier interventions. But it goes further to consider the effects that such reflection has upon the governing actors, and how they come to terms with the impossibility of having full and complete knowledge of the governed object (Voss et al. 2006; Smith and Stirling 2006). Adaptive governance involves a more reflective 'broadening out' of attention in appraisal (see STEPS Working Paper 3). This addresses a wider and more dynamic range

of issues, options, interactions, uncertainties and possibilities than are normally considered in more conventional, instrumental approaches to governance. But this quality of more comprehensive reflectiveness over the implications of governance interventions, does not fully address the implications of reflexivity (Stirling 2006). Reflexivity proper, by contrast, refers also to a capacity to engage with the ways in which framings of what constitutes 'the system' are themselves plural, contingent and conditioned by divergent social values, economic interests and institutional commitments. Thus reflexive governance is also open to, and seeks accommodations with, ambiguity over sustainability goals and differentials of power, control or influence over implementation strategies. Goals are rarely determined once and for all, since knowledge, values and interests in social-technological-ecological systems evolve and develop over time. Indeed, even at a given point in time, closure around sustainability solutions for some groups may simply reframe the sustainability problem for others.

Voss et al. (2006) recommend a number of strategies to advance reflexive governance. These include integrated (transdisciplinary) forms of knowledge production; adaptive strategies and institutions; anticipation (explorative evaluation) of the possible long-term effects of different action strategies, the use of iterative, participatory processes in goal formation, and the interactive development of strategies to reach goals. Each of these broad strategies in itself involves many challenges. The strategies are not intended to reduce complexity, but to help learn better how to live with it.

One strategy that researchers arguing for deliberative governance have identified is the development of simplifying storylines and narratives about issues that facilitate dialogue, argumentation and engagement with problems (Fischer and Forester 1993). Such arguments are tested, re-constructed and developed through day-to-day practice (Schön and Rein 1994).

> [Stories and arguments] are assessed in communities of people who are knowledgeable about the problem at hand, and who are all too conscious of the political, financial and practical constraints that define the situation for which they bear responsibility. These are people who realize that stories and arguments are always provisional, never the last word on the situation. They hold up until the situation changes, constraints are tightened or relaxed and/or a better story is told. Action, thus, structures and disciplines understanding (Hajer and Wagenaar 2003: 14-15)

Rather than devise strategies for how governance practitioners ought to behave with respect to complex problems, deliberative governance begins by trying to understand how practitioners actually behave and cope with these problems, focusing on their practical judgements, interpretations and deliberations. In following this emphasis on practice-oriented sense-making of complex policy problems, deliberative governance approaches thus pick up on many important features of the more recent governance literatures that we identified earlier - including new spaces and networks for governance, more dynamic and fluid processes, conditions of radical uncertainty, interdependencies in action, and the significance of actors' everyday practices (Hajer and Wagenaar 2003).

This deliberative approach to governance embraces constructivist perspectives on knowledge. Difficulties in separating facts from values, and analysis from the normative aspects of social life, come to the fore, as part of a post-positivist turn in social science (Fischer and Forester 1993; Flyvbjerg 2001):

> Such a social science is based on a turn from the dominant emphasis on rigorous empirical proof and verification to a discursive, contextual understanding of social knowledge and the interpretative methods basic to acquiring it ... Rather than altogether rejecting the empirical methods of the social sciences, [the deliberative argument] is that the issue is how to situate them within the context of normative concerns that give the findings their meaning (Fischer 2003: 211).

Accordingly, deliberative governance has to be concerned, reflexively, with the social processes that define and give meaning to accounts of both the governed object and interventions aimed at improving or sustaining that object. Analysis is considered as stimulating debate and improving argumentation, rather than settling debate and arriving at definitive solutions.

A range of strategies is identified for 'doing' deliberative governance (Fischer 2003; Flyvbjerg 2001). These include facilitating interpretative interactions between different perspectives; reformulating and rendering participatory the relations between analyst, citizen and decision-maker, and recasting the role of the 'expert' as a facilitator of public learning. They include moving to consensus through a discursive synthesis of competing views, and recognising dissent as a legitimate discursive contribution. Deliberative governance advocates multi-methodological, contextually-situated approaches to appraising and generating system and policy goals, and democratizing policy evaluation in ways that include analysis of normative goals. The validity of any one interpretation is tested against earlier interpretations and is accepted or rejected through dialogue between them.

There is a risk that this requires deliberative governance to approach the conditions of Habermasian ideal-speech and communicative rationality (Habermas 1987). To his credit, Flyvbjerg (2001) emphasises the need to analyse power relations in discourse as part of the process, hoping that, through Foucauldian explorations of the power relations behind differing interpretations, research and reflection can sharpen the democratic content of dialogue – explaining why some interpretations and not others are taken forward and agreed/imposed as the basis for public decisions. Addressing the relations of power and framing within deliberative governance procedures - as well as in processes of participatory democracy and development more generally - is therefore critical (see Stirling 2005; STEPS Working Paper 3). However, in some cases the positions and claims of marginalised people may fail to feature in any form of institutionalised deliberative practice. Rather than hope optimistically to 'bring them in', it is important also to acknowledge counter-politics in relation to the state or global agencies that operate outside such arenas, whether through subtle forms of subaltern resistance or more organised forms of mobilisation and movement. A focus on such dissenting, agonistic politics is an important complement to the focus on argumentation, deliberation and reasoning, and one that may be in tension with such consensus-driven processes (Mouffe 2005, 2006).

According to Hajer and Wagenaar (2003), in practice space for deliberative governance is currently opening in situations where there is an institutional vacuum, such as in new problem domains. As they argue, 'The new vocabulary of governance rides the back of political strategies of cooperation that play out at the margins of traditional classical-modernist political institutions' (ibid: 3-4). In situations where formal routines of mainstream governance are less institutionalised, there may be greater space for more deliberative approaches. Emerging social-technological-ecological dynamics offer many such situations. Yet there can be tensions between the detailed and situated narratives that deliberative approaches produce, and the policy community's demand for 'pithy and succinct research findings' (Sharp and Richardson 2001: 200). It is also the case that even around 'new' problems, there are often elements of older governance arrangements and expectations, with established institutions. Analyses within a power/knowledge lens help to reveal such tensions.

This suggests that deliberative governance has to be explored in relation to more institutionalised, and less reflexive governance processes. On the one hand, we need to consider what conditions enable an opening up of more rigid governance arenas so as to permit deliberative governance; and, having identified power relations that hinder deliberation, what scope and processes help bring about improved forms of deliberation that include the interests and perspectives of poorer people. On the other hand, we need to recognise that

for certain issues and settings, deliberative approaches may be unrealistic and inappropriate. Counter-claims, conflict and contestation in relation to power and political economy may continue to demand alternative, radical democratic political strategies of mobilisation and resistance that enable the poor to exert their agency in relation to modernist political institutions (Laclau and Mouffe 2001).

The literatures concerning adaptive, deliberative and reflexive governance therefore display many parallels, convergences and overlaps. Yet there are also some quite distinct differences, with some important implications for practical processes of governance. Table 1 below summarises the key distinguishing features of these inter-related approaches to governance for sustainability. Key issues around the distinction between reflective 'broadening out' and reflexive 'opening up' in appraisal are addressed in STEPS Working Paper 3 on Designs.

Table 1: Comparing adaptive, deliberative and reflexive approaches to governance

APPROACH TO GOVERNANCE	MAIN FOCUS	KEY PRESCRIPTIONS
ADAPTIVE	dynamic (not static) systems unintended effects uncertainty and complexity	'broadening out' of appraisal reflective precaution adaptiveness of commitments
DELIBERATIVE	exclusion by power discursive process narratives	more inclusive participation transparent public reason prioritises social learning
REFLEXIVE	contingency social construction framing by power	humility over basis for action reflexivity in knowledge claims 'opening up' of appraisal

5. TOWARDS AN APPROACH TO GOVERNANCE OF/FOR PATHWAYS TO SUSTAINABILITY

In sum, the discussions in earlier sections suggest a range of questions that are central if we are to understand how governance processes are shaping, and being shaped by, dynamic, social-technological-environmental systems - and normatively, how they might do so in ways that produce better outcomes for poorer and marginalised people. How are multiple actors interacting across local and global scales, through what forms of network and blurred boundaries? How have particular governance arrangements emerged in particular political contexts, through what contingencies and path dependencies? How is governance responding adaptively to the interlinked dynamics of social-technological-ecological systems? How do different actors frame systems and their goals, and what forms of power/knowledge and deliberation shape the interaction between framings? How are knowledge of system dynamics and governance arrangements co-constructed, and how, reflexively, might this be recognised so as to open up the possibility of alternative (co-constructed) arrangements? These are not new questions, but as we have argued above, to date they have been addressed in rather separate, poorly-connected literatures.

The paper has outlined some major shifts in approaches to understanding politics - from state, society and corporation-centred approaches, to an emphasis on networked governance and latterly adaptive, deliberative and reflexive governance. This is of course not a linear history. The various strands have roots in long and continued traditions of social and political theory - from structural to actor-oriented and post-structural traditions; from Durkheimian and Habermasian traditions emphasising consensus and shared values, to Marxist, Gramscian and critical theory traditions built around understanding conflicts and clashes of interest. These diverse traditions throw light on some key, unresolved questions and tensions in thinking about governance for sustainability and social justice. For example, what are the roles of and relationships between reflexive and deliberative approaches, and participatory/procedural democracy more generally, and more established political strategies of resistance and mobilisation? What are the roles of and relationships between emergent fluid networks, and strong institutions including formal organisations - of the state, corporations, civil society, and the international world? These are tensions and unfolding relationships that need to be tracked historically. Ultimately, we need to understand their implications for poorer and marginalised people, and for their opportunities to exert their own agency in politics.

With risk, uncertainty, complexity and dynamics so dominating the development policy challenges of the future – whether around social, technological, economic or environmental issues – a significant, and new, research, policy and practice agenda opens up around defining new perspectives on governance that puts these issues of dynamics centre stage. The fundamental elements of such an agenda are already in existence, as the reviews of past work in this paper have shown. But there is much work to do, both at conceptual/theoretical and practical/policy levels. Such an agenda, in turn, presents some basic challenges to mainstream ways of thinking and doing, so embedded in long-standing institutional practices. Whether in rethinking the governance of innovation for development or systems of regulation for sustainability, such a recasting of the governance debate will require the systematic building of new theory and practice. Table 2 gives a summary of the approaches to understanding governance outlined in the paper, noting some of the contrasts between them. These are in essence building blocks of a new approach for addressing the governance challenges of sustainability.

Table 2: Contrasting approaches to governance: a comparison of emphases

	A: State-society-corporate politics	**B: Networked governance**	**C: Adaptive, deliberative, reflexive governance**
Entities and spaces	Distinct, bounded organisations and interest groups (states; international organisations, civil society/movement, corporation). Formal arenas and spaces.	Multiple actors, fuzzy boundaries, networked interactions across scales; multiple spaces (claimed, everyday, interstitial).	Shifting solidarities and interdependencies, institutions re-negotiated through adaptation and deliberation; marginal, transient and inter-institutional spaces.

Emphases from social theory	Structures; formal rules and codes; relationships based on givens (e.g. sovereignty, assumed trust).	Actor-orientation; agency (e.g. of bureaucrats, citizens); informal rules and norms; structuration of institutions through practice; path-dependency.	Institutions, agency and relationships (re) negotiated through adaptation and deliberation.
Power and knowledge	Power as material political economy; sovereignty; centralised; competing political interests. Knowledge as 'truth speaks to power'; objective evidence and sound science; expertise constituted through official channels and hierarchies.	Power as dispersed (capillary) and operating through networks; power 'to' act as well as power over.	Power/knowledge as co-constituted through discourse; framings; multiple knowledges and forms of expertise including citizen and experiential; knowledge politics; co-construction of knowledge with institutions and governance processes.
Dealing with uncertainty	Plans and blueprints; assumptions of certainty and stability in social-technical-ecological systems; technical approach to risk.	Multiple interactions and contingencies in political process recognised as creating uncertainty in governance processes and outcomes. Little attention to ecology/ technology. dynamics and uncertainties.	Radical uncertainty due to social-technological-ecological dynamics (adaptive governance) and interaction of framings (reflexive governance). Learning, argumentation, deliberation.

Each of columns A, B and C can be understood as providing a different lens through which interactions between actors in governance processes can be understood: in terms of interaction between state, corporate and society organisations; in terms of networked governance involving multiple actors, interactions and blurred boundaries, and in terms of adaptive, deliberative and reflexive processes in which knowledge politics are central. As we have argued, many of the elements in column C are key if we are to address the governance challenges of complex, dynamic social-technological-environmental systems. However this does not mean that the approaches summarised in columns A and B are valueless - far from it. Many of the forms of organisation and power highlighted in column A - states, international organisations, corporations, material power and political economy, as well as networks - remain highly relevant and influential around issues of environment, health, and agriculture. For different issues and settings, elements of each column may thus be appropriate. Our overall approach thus needs to embrace a plurality of ways of understanding and engaging in governance, considering explicitly what works where, how and for whom.

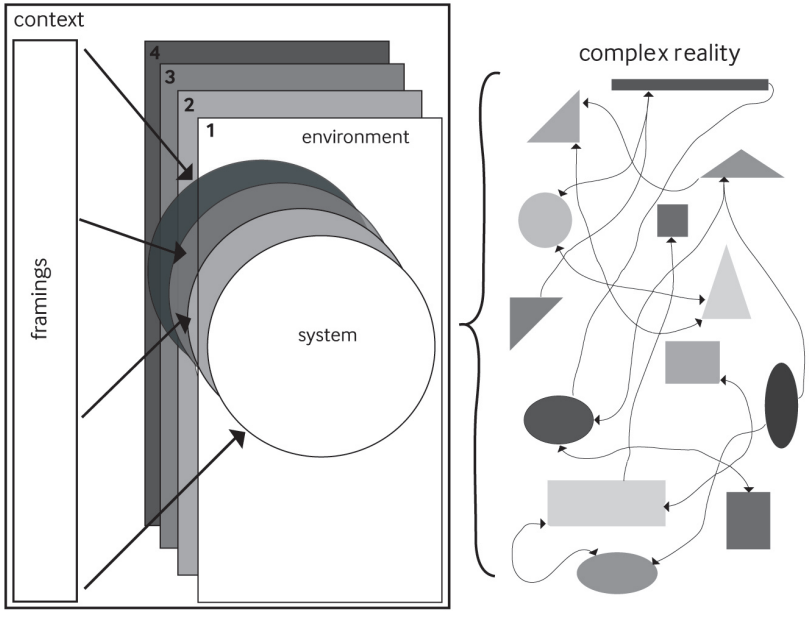
Analytically, we also need to attend to interactions between elements highlighted in each column. Thus, for instance, in some settings the material political economy that gives power to certain state agencies may limit the scope for citizen agency or for more deliberative approaches. In other cases, what may start as fluid networks linking citizen knowledge and experience with supportive international actors, as seems to be emerging around HIV/AIDS treatment, may over time consolidate into organisational 'blocs' linked to the material power of pharmaceutical companies. In short, the kind of approach to governance that we need in this age of uncertainty needs to embrace the interactions between elements in all thee columns.

At the same time, cross-cutting all three columns is the importance of political history and context. Particular governance arrangements emerge in the context of particular political histories, whether locally, nationally or globally. As comparative studies have emphasised, the influence of historical legacies and historically-contingent interactions is key in shaping what kinds of interactions between actors emerge in policy processes or regulation (Wilks and Wright 1987). Diverse histories can lead to diverse forms of political culture which shape the ways scientific or policy issues are approached (Wynne 1989; Jasanoff 1990, 2004). Such perspectives on political history and culture have yet to be fully appreciated in discussions of deliberative and adaptive governance, but critically need to be. Importantly, this needs to reach beyond the national scale comparisons that have dominated recent discussions to appreciate how diverse

constellations of epistemology and ways of doing politics have emerged historically in different localities across the world. In short, by taking political histories and cultures seriously, we need to treat these, too, as multi-scale and dynamic.

How might such an understanding of governance relate to the overarching question of sustainability and pathways to achieving it, with which this paper began? To address this question, a simple heuristic diagram – introduced in STEPS Working Paper 1 on dynamics - is helpful (Figure 1). This starts (on the right) with a complex, dynamic world of myriad interactions between ecological, social, political and technological processes, in rapid transition. Elements of this can selectively come to be understood as a 'system' in its environment - a farming or food production system in a changing climate; or a vaccine delivery system in relation to a particular disease, for instance. There are indeterminacies and complex dynamics both within the system and in the environment, but over time the system can undergo a pathway of change towards sustainability, or otherwise.

Figure 1: An analytical heuristic of a complex system



Governance - or political and institutional processes - can be understood as important at several stages in such pathways. First, they shape framings of the system and its environment; how it is bounded, and which structures and functions are deemed important and valuable. There may thus be multiple versions, or framings, of the system, held by different people or groups in society and co-constructed with institutions and power/knowledge; and governance will shape which framing prevails, or how they are negotiated. Second, in a similar way, governance intervenes in the construction and negotiation of system goals: what system properties are valued and to be sustained, for whom, over what time scales. This is inevitably contested. So whereas 'sustainable' refers, in a colloquial and general sense, to a quality of being 'capable of being maintained at a certain rate or level' - in turn requiring that the four qualities of stability, durability, resilience and robustness are all met (see STEPS Working Paper 1), we also need to recognise different, specific versions of Sustainability. Which prevails, or how they are deliberated, is a matter of and for governance.

Dimensions of governance are also important at other points identified in this heuristic. Third, they are part of the context in which system dynamics unfold: both in providing the broad political context and culture in which a system is framed and governed, and in contributing particular institutional or political disturbances to the system. Such external disturbances of political origin might take the form of short-term shocks (e.g. a boycott of a vaccine led by allied civil society and local government leaders), or longer term stresses (e.g. starving of investment to a health system linked to corruption).

And finally, but perhaps most centrally, governance intervenes in - in a sense becomes part of - system dynamics themselves, affecting the pathways that unfold. Complex systems dynamics integrally involve interactions between (socially constructed, multiply framed) ecological and technological processes, with multiple actors, institutions and power relations, emanating from and acting across different scales.

The nature of governance processes acting at all these 'stages' will shape the kinds of pathways that emerge, and whether they lead to Sustainability, as valued by poorer and marginalised groups. At one extreme, governance might be associated with 'lock-in' to a single powerful version of the system and its goals: organisations and power of the kind highlighted in column A framing the problem in particular ways and pushing top-down plans justified by narrow technical expertise. In as much as this leads to Sustainability, it is likely to reflect the values of the powerful, and may be resisted politically by counter-movements. At the other extreme, governance processes - of a more reflexive, deliberative kind - might enable the negotiation of system framings and Sustainability goals.

Provided that power relations are addressed, such approaches offer the possibility of intervening reflexively and adaptively in systems dynamics to ensure that multiple pathways are kept open, and that the particular system properties that contribute to Sustainability for the poor are preserved.

6. CONCLUSIONS - ELEMENTS OF A STEPS APPROACH TO GOVERNANCE

The crucial challenges for development around environmental and technological issues relate to whether or not the complex, dynamic systems involved are moving along pathways to Sustainability. In turn, it is critical that such pathways lead to improved livelihoods, well-being and social justice for poorer and marginalised people. Governance is central to such pathways, and to where they lead: in framing the system and the Sustainability goals to be achieved, as part of the context in which pathways unfold, and as part of complex systems dynamics themselves.

Yet, as this paper has shown, there are many ways of conceptualising the political and institutional processes that constitute governance, broadly defined. Approaches to understanding are often co-constructed with the practices of policy-makers, state agents, managers and organisations in 'doing governance'. Some, we have suggested, grounded in static models of organisations, authority and expertise, are fundamentally unsuited to analysing the contemporary institutional and political processes in and around complex systems as they are actually unfolding today. Alone they are thus normatively inappropriate for constructing forms of governance that will be effective in shaping pathways to Sustainability. But by integrating insights from a range of further literatures - on networked governance, on political ecology, on risk and uncertainty and on the politics of knowledge - and by attending to recent work on adaptive, deliberative and reflexive governance, we have suggested elements of the kind of overall approach needed. In sum, this needs be plural, drawing selectively on and combining elements across the rows of table 1, as particular issues and cases require, while attending to the following five dimensions:

- *New political entities and spaces*. Recognising the significance of multiple actors, networks, entities and spaces, formal and informal, more fixed and more transient, across different scales.

- *Structuration and practice*. Recognising the importance of enduring institutional structures but also the agency of citizens, bureaucrats and particular political actors, requiring an appreciation of structuration (Giddens 1986) and the ways that relationships are built and re-negotiated through practice.

- *Power and knowledge*. Recognising the significance of both political economy and dispersed, capillary forms of power, power/knowledge and discourse, requiring attention to the politics of knowledge and framing, and reflexivity.

- *Dealing with uncertainty*. Acknowledging radical uncertainty in social-technical-ecological processes and in governance processes themselves, requiring adaptive and deliberative approaches.

- *Political history, culture and context*. Appreciating the importance of particular political histories and cultures for the emergence of and operation of governance.

All these dimensions need to be part of the STEPS Centre's approach to the analysis of governance. They are crucial to see how and why pathways of change in relation to health, agriculture, environment and their interactions are unfolding in particular ways. They are crucial to understand existing governance arrangements, their capacity or otherwise to deal with complex systems dynamics, and their implications for the poor and marginalised. And in turn, they are crucial to inform analysis for governance - in seeking alternative institutional and political processes that promote pathways to Sustainability, poverty reduction and social justice.

REFERENCES

Adam, B., Beck, U. and Loon, J.V. (eds) (2000) *The Risk Society and Beyond: Critical Issues of Social Theory*, London: Sage

Adger, W.N., Benjaminsen, T.A., Brown, K. and Svarstad, H. (2001) 'Advancing a Political Ecology of Global Environmental Discourses', *Development and Change* 32.4: 681

Agrawal, A. (2005) *Environmentality: Technologies of Government and the Making of Subjects*, Durham: Duke University Press

Anheier, H., Glasius, M. and Kaldor, M. (eds) (2002) *Global Civil Society*, Oxford: Oxford University Press

Appadurai, A. (2000) 'Grassroots Globalisation and the Research Imagination', *Public Culture,* 12: 1-19

Appadurai, A. (2002) 'Deep Democracy: Urban Governmentality and the Horizon of Politics', *Public Culture* 14: 21-47

Bache, I. and Flinders, M. (eds) (2004) *Multi-level Governance*, Oxford: Oxford University Press

Beck, U. (1992) *Risk Society: Towards a New Modernity*, London: Sage

Beck, U., Giddens, A. and Lash, S. (1994) *Reflexive Modernization.Politics, Tradition and Aesthetics in the Modern Social Order*, Cambridge: Polity Press

Bess, M. (2003) *The Light-green Society: Ecology and Technological Modernity in France, 1960-2000*, Chicago: University of Chicago Press

Bevir, M. and Rhodes, R. (2003) *Interpreting British Governance*, London and New York: Routledge

Blaikie, P. and Brookfield, H. (1987) *Land Degradation and Society*, London: Routledge

Bloom, G. (2001) 'Equity in Health in Unequal Societies: Meeting Health Needs in Contexts of Social Change', *Health Policy* 57.3: 205-224

_____ (2005) 'Health Policy during China's Transition to a Market Economy', in R. Guald (ed.) *Comparative Health Policy in Asia-Pacific*, Maidenhead: Open University Press

Bloom, G. and Standing, H. (2001) *Pluralism and Marketisation in the Health Sector: Meeting Health Needs in Contexts of Social Change in Low and Middle-income Countries*, IDS Working Paper 136, Brighton: IDS

Bloom, G., Fang, J. *et al.* (2006) 'China's Rural Hospitals in the Transition to a Market Economy', unpublished paper, Brighton: IDS

Braidotti, R., Charkiewicz, E., Häusler, S. and S. Wieringa (1994) *Women, the Environment and Sustainable Development: Towards a Theoretical Synthesis*, London: Zed Press/INSTRAW

Burchell, P., Gordon, C. and Miller, P. (eds) (1991) *The Foucault Effect: Studies in Governmentality*, Chicago: University of Chicago Press and Hemel Hempstead: Harvester Wheatsheaf

Caiden, N. and Wildavsky, A. (1974) *Planning and Budgeting in the Poor Countries*, New York: John Wiley

Caplan, P. (ed.) (2000) *Risk Revisited*, London: Pluto Press

Centre for the Future State (2005) *Signposts to More Effective States*, Brighton: IDS

Chatterjee, P. (2001) 'On Civil and Political Society in Post-colonial Democracies', in S. Kaviraj and S. Khilnani (eds.), *Civil Society: History and Possibilities*, Cambridge: Cambridge University Press: 165-178

Chomsky, N. (1998) *Profit Over People: Neoliberalism and Global Order*, New York: Seven Stories Press

Clark, J. (2003) *Globalizing Civic Engagement: Civil Society and Transnational Action*, London: Earthscan

Collingridge, D. and Reeve, C. (1986) *Science Speaks to Power: the Role of Experts in Policymaking*, New York: St Martins

Collins, H.M. and Evans, R. (2002) 'The Third Wave of Science Studies: Studies of Expertise and Experience', *Social Studies of Science* 32.2: 235-296

Crosland, A. (1956) *The Future of Socialism*, London: Johnathan Cape

Dahl, R. (1961) *Who Governs? Democracy and Power in an American City*, New Haven: Yale University Press

Descola, P. and Palsson, G. (eds) (1996) *Nature and Society: Anthropological Perspectives*, London: Routledge

Dietz, T., Ostrom, E. and Stern, P. (2003) 'The Struggle to Govern the Commons', *Science* 302:1907-1912

Douglas, M. (1966) *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*, London: Routledge

_____ (1985) *Risk Accessibility According to the Social Sciences*, New York: Russell Sage Foundation

_____ (1992) *Risk and Blame: Essays in Cultural Theory*, London: Routledge

Douglas, M. and Wildavsky, A. (1982) *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers*, Berkeley: University of California Press

Dunn, J. (1996) *The History of Political Theory and Other Essays*, Cambridge: Cambridge University Press

Easton, D. (1965) *A Systems Analysis of Political Life*, New York: John Wiley & Sons

Edelman, M. (2001) 'Social Movements: Changing Paradigms and Forms of Politics', *Annual Review of Anthropology* 30: 285-317

Edwards, M. and Gaventa, J. (2001) *Global Citizen Action*, London: Earthscan

Elzen, B., Geels, F. and Green, K. (eds) (2005) *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy*, Camberley: Edward Elgar

Eyerman, R. and Jamison, A. (1991) *Social Movements*, Cambridge: Polity

Fairhead, J. and Leach, M. (1996) *Misreading the African Landscape: Society and Ecology in a Forest-savanna Mosaic*, Cambridge: Cambridge University Press

_____ (2003) *Science, Society and Power: Environmental Knowledge and Policy in West Africa and the Caribbean*, Cambridge: Cambridge University Press

Falk, R. (1993) 'The Making of Global Citizenship', in J.B. Childs, J. Brecher and J. Cutler (eds), *Global Visions: Beyond the New World Order*, Boston: South End

Ferner, A. (1988) *Governments, Managers and Industrial Relations*, Oxford: Blackwell

Fidler, D. (1998) 'Microbialpolitik: Infectious Diseases and International Relations', *American University International Literature Review* 14: 1-53

_____ (2003) 'Antimicrobial Resistance: a Challenge for Global Health Governance', in K. Lee (ed.), *Health Impacts of Globalization*, Basingstoke: Palgrave Macmillan

Fischer, F. (2000) *Citizens, Experts, and the Environment: The Politics of Local Knowledge*, Durham, NC: Duke University Press

_____ (2003) *Reframing Public Policy: Discursive Politics and Deliberative*

Practices, Oxford: Oxford University Press

Fischer, F. and Forester, J. (eds) (1993) *The Argumentative Turn in Policy Analysis and Planning*, Durham, NC: Duke University Press

Flyvbjerg, B. (2001) *Making Social Science Matter: Why Social Science Fails and How it Can Succeed Again*, Cambridge: Cambridge University Press

Folke, C., Hahn, T., Olsson, P. and Norberg, J. (2005) 'Adaptive Governance of Social-ecological Knowledge', *Annual Review of Environment and Resources* 30: 441-473

Forsyth, T. (2003) *Critical Political Ecology*, London: Routledge

Fukuyama, F. (2004) *State Building: Governance and World Order in the Twenty-First Century*, Cornell: Cornell University Press

Geertz, C. (1972) 'The Wet and the Dry: Traditional Irrigation in Bali and Morocco', *Human Ecology* 1: 34-39

_____ (1980) 'Organisation of the Balinese Subak', in E.W. Coward (ed.) *Irrigation and Agricultural Development in Asia: Perspectives from the Social Sciences*, New York, Cornell University Press: 70-90

Giddens, A. (1986) *The Constitution of Society: Outline of the Theory of Structuration*, Berkeley: University of California Press

_____ (1998) *The Third Way: The Renewal of Social Democracy*, Cambridge: Polity Press

Glaeser E. L. and Andrei, A. (2001) *The Rise of the Regulatory State*, Harvard Institute of Economic Research Working Papers 1934, Cambridge, MA.: Harvard Institute of Economic Research

Gough, I. and Wood, G. (2004) *Insecurity and Welfare Regimes in Asia, Africa and Latin America: Social Policy in Development Contexts*, Cambridge: Cambridge University Press

Haas, E.B. (1964), *Beyond the Nation-State: Functionalism and International Organization*, Stanford: Stanford University Press

Haas, P.M. (1989) 'Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control', *International Organization* 43: 377-403

_____ (1992) 'Introduction: Epistemic Communities and International Policy Coordination', *International Organisation* 46: 1-36

Habermas, J. (1987) *The Theory of Communicative Action*, Boston, MA: Beacon Press

Hacking, I. (1990) *The Taming of Chance*, Cambridge: Cambridge University Press.

_____ (1991) 'How Should We Do the History of Statistics?' In G. Burchell, C. Gordon and P. Miller (eds), *The Foucault Effect: Studies in Governmentality*, Chicago: University of Chicago Press and Hemel Hempstead: Harvester Wheatsheaf

Hajer, M. and Wagenaar, H. (2003) 'Introduction', in M. Hajer, and H. Wagenaar (eds), *Deliberative Policy Analysis*, Cambridge: Cambridge University Press

Hann, C. (1996) 'Introduction: Political Society and Civil Anthropology', in C. Hann and E. Dunn (eds), *Civil Society: Challenging Western Models*, London: Routledge

Hannah, L. (2005) 'The State Ownership of Industry', in R. Floud and P. Johnson (eds), *The Cambridge Economic History of Modern Britain, Volume III: Structural Change and Growth, 1939-2000*, Cambridge: Cambridge University Press

Harding S. (1991) *Whose Science? Whose Knowledge? Thinking from Women's Lives,* Buckingham: University Press

Hempel, L. (1996) *Environmental Governance: The Global Challenge*, Washington D.C: Island Press

Hogwood, B. and Gunn, L. (1984) *Policy Analysis and the Real World*, Oxford: Oxford University Press

Jasanoff, S. (1990) *The Fifth Branch: Science Advisers as Policymakers*, Cambridge, Massachusetts and London: Harvard University Press

_____ (1993) 'Bridging the Two Cultures of Risk Analysis', *Risk Analysis* 13: 123–129

_____ (1999) 'The Songlines of Risk', *Environmental Values* 8.2: 135-152

_____ (2005) *Designs on Nature*, Princeton NJ: Princeton University Press

_____ (ed.) (2004) *States of Knowledge: the Co-production of Science and Social Order*, London: Routledge

Jasanoff, S. and Martello, M. L. (2004) 'Conclusion' in S. Jasanoff and M. L. Martello (eds), *Earthly Politics: Local and Global in Environmental Governance*, Cambridge MA and London: MIT Press

Jasanoff, S. and Wynne, B. (1997) *Handbook of Science and Technology Studies*, London: Sage Publications

Jessop, B. (1998) 'The Rise of Governance and the Risks of Failure: the Case of Economic Development', *International Social Science Journal* 155: 29-45

_____ (2003) 'Governance and Meta-governance: on Reflexivity, Requisite Variety and Requisite Irony', in H.P. Bang (ed.) *Governance as Social and*

Political Communication, Manchester: Manchester University Press

Jessop, B. and Sum, N-L. (2006) *Beyond the Regulation Approach: Putting Capitalist Economies in Their Place*, Cheltenham: Edward Elgar

Jordan, A. J. (2002) *Environmental Policy in the European Union: Actors, institutions and processes,*
London: Earthscan

Kabeer, N. (ed.) (2005) *Inclusive Citizenship: Meanings and. Expression,* London: Zed Books

Kaviraj, S. and Khilnani, S. (eds) (2001) *Civil Society: History and Possibilities*, New Delhi, Foundation Books

Kay, J.A., and Thompson, D. J. (1986) 'Privatisation: A Policy in Search of a Rationale', *The Economic Journal* 96.381:18-32

Keane, J. (2003) *Global Civil Society?* Cambridge: Cambridge University Press

Keeley, J. and Scoones, I. (1999) *Understanding Environmental Policy Processes: A Review*, IDS Working Paper 89, Brighton: IDS

_____ (2003) *Understanding Environmental Policy Processes: Cases from Africa*, London: Earthscan

Kingdon, J.W. (1995) *Agendas, Alternatives, and Public Policies*, 2nd ed., New York: Longman

Kooiman, J. (2003) *Governing as Governance*, London: Sage

Krimsky, S. and Golding, D. (eds) (1992) *Social Theories of Risk*, Westport, CT: Praeger

Kymlicka, W. and Norman, W. (1994) 'Return of the Citizen: A Survey of Recent Work on Citizenship Theory', *Ethics* 104.2: 352-381

Laclau, E. and Mouffe, C. (2001) *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics*, 2nd ed., London: Verso

Lash, S., Szerszynski, B. and Wynne, B. (1996) *Risk, Environment and Modernity: Towards a New Ecology*, London: Sage

Latour, B. (1987) *Science in Action*, Cambridge, MA: Harvard University Press

_____ (1993) *We Have Never Been Modern*, Cambridge, MA: Harvard University Press

_____ (1999) *Pandora's Hope: Essays on the Reality of Science Studies*, Cambridge, MA. and London: Harvard University Press

_____ (2004) *Politics of Nature: How to Bring the Sciences into Democracy*, Cambridge, MA.: Harvard University Press

_____ (2005) *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford: Oxford University Press

Leach, M. (1994) *Rainforest Relations: Gender and Resource Use Among the Mende of Gola, Sierra Leone*, Edinburgh: Edinburgh University Press

Leach, M. and Mearns, R. (eds) (1996) *The Lie of the Land: Challenging Received Wisdom on the African Environment*, Oxford: James Currey

Leach, M. and Scoones, I. (2007) *Mobilising Citizens: Social Movements and the Politics of Knowledge*, IDS Working Paper 276, Brighton: IDS

Leonard, D.K. (2000) 'Lessons from the New Institutional Economics for the Structural Reform of Health Services in Africa', in D.K. Leonard (ed.) *Africa's Changing Markets for Health and Veterinary Services: the New Institutional Issues*, Basingstoke: Macmillan Press

Lindblom, C. (1959) 'The Science of "Muddling Through"', *Public Administration Review* 19 (Spring): 79–88

Lipsky, M. (1980) *Street-Level Bureaucracy: Dilemmas of the Individual in Public Services*, New York: Russell Sage

Long, N. and Long, A. (eds) (1992) *Battlefields of Knowledge: the Interlocking of Theory and Practice in Social Research and Development*, London: Routledge

Mackintosh, M. (1999) 'Informal Regulation: a Conceptual Framework and Application to Decentralized Health Care Systems', in M. Mackintosh and R. Roy (eds), *Economic Decentralization and Public Management Reform*, Cheltenham: Edward Elgar

Mackintosh, M. and Tibandebage, P. (2002) 'Inclusion by Design? Rethinking Health Care Market Regulation in the Tanzanian Context', *Journal of Development Studies* 39.1: 1-20

Mamdani, M. (1996) *Citizen and Subject: Contemporary Africa and the Legacy of Late Colonialism*, Kampala: Fountain Publishers

Marsh, D. and Rhodes, R.A.W. (1992) *Policy Networks in British Government*, Oxford: Clarendon

McAdam, D., Tarrow, S. and Tilly, C. (2001) *Dynamics of Contention*, Cambridge: Cambridge University Press

Mehta, L., Leach, M. and Scoones, I. (2001) 'Environmental Governance in an Uncertain World', *IDS Bulletin* 32.4, Brighton: IDS

Mehta, L., Leach, M., Newell, P., Scoones, I., Sivaramakrishnan, K. and Way, S.A. (1999) *Exploring Understanding of Institutions and Uncertainty: New Directions in Natural Resource Management*, IDS Discussion Paper 372,

Brighton: IDS

Melucci, A. (1989) *Nomads of the Present: Social Movements and Individual Needs in Contemporary Society*, Philadelphia: Temple University Press

_____ (1995) 'The New Social Movements Revisited: Reflections on a Sociological Misunderstanding', in L. Malhue (ed.) *Social Movements and Social Classes: the Future of Collective Action*, London: Sage

Moore, D.S., Pandian, A. and Kosek, J. (eds) (2002) *Race, Nature, and the Politics of Difference*, Durham: Duke University Press

Mouffe, C. (2005) *On the Political*, London and New York: Routledge

_____(2006) *The Return of the Political*, New York: Verso

North, D.C. (2005) *Understanding the Process of Economic Change*, Princeton: Princeton University Press

Offe, C. (1985) 'New Social Movements: Challenging the Boundaries of Institutional Politics', *Social Research* 52: 817-868

Olsson, P., Gunderson, L.H., Carpenter, S.R., Ryan, P., Lebel, L., Folke, C. and Holling, C.S. (2006) 'Shooting the Rapids: Navigating Transitions to Adaptive Governance of Social-ecological Systems', *Ecology and Society* 11.1: art.18

Paulson, S., Gezon, L. and Watts, M. (2003) 'Locating the Political in Political Ecology', *Human Organization* 62.3: 205-17

Peet, R. and Watts, M. (1996) *Liberation Ecologies: Environment, Development and Social Movements*, London: Routledge

Peterson, G. (2000) 'Political Ecology and Ecological Resilience', *Ecological Economics* 35.3: 323

Pierre, J. and Peters B.G. (2000) *Governance, Politics and State*, London: Macmillan

Pierson, P. (2000) 'Increasing Returns, Path Dependency, and the Study of Politics', *American Political Science Review* 94: 251-267

Pierson, P. and Skocpol, T. (2002) 'Historical Institutionalism in Contemporary Political Science', in I. Katznelson and H.V. Milner (eds), *Political Science: The State of the Discipline*, New York: Norton: 663-721

Rawski, T. (1999) 'Reforming China's Economy: What Have We Learned?', *The China Journal* 41: 139–58

Raymond, B. and Bailey, S. (1997) *Third World Political Ecology*, London: Routledge

Reddaway, P. and Glinski, D. (2001) *The Tragedy of Russia's Reforms: Market Bolshevism Against Democracy*, Washington: United States Institute of

Peace Press

Rhodes, R.A.W. (1997) *Understanding Governance*, Buckingham: Open University Press

Ribot, J. C., and Larson, A.M. (eds) (2005) *Democratic Decentralisation through a Natural Resources Lens*, London: Routledge

Richards, D. and Smith, M.J. (2002) *Governance and Public Policy in the United Kingdom*, Oxford: Oxford University Press

Richards, P. (1985) *Indigenous Agricultural Revolution: Ecology and Food Production in West Africa*, London: Hutchinson

Rocheleau, D., Thomas-Slayter, B. and Wangari, E. (eds) (1996) *Feminist Political Ecology: Global Issues and Local Experiences,* London and New York: Routledge

Rosenberg, J. (2001) *The Follies of Globalisation Theory: Polemical Essays*, Verso, London

Royal Society (1992) 'Risk Analysis, Perception and Management', Report of a Royal Society Study Group, London: The Royal Society

Sabatier, P. (1986) 'Top-Down and Bottom-Up Models of Policy Implementation: A Critical Analysis and Suggested Synthesis', *Journal of Public Policy* 6: 21-48

Sabatier, P. and Jenkins-Smith, H. (eds) (1993) *Policy Change and Learning: An Advocacy Coalition Approach*, Boulder, CO: Westview Press

Scharpf, F.W. (1997) 'Introduction: The Problem-solving Capacity of Multi-level Governance', *Journal of European Public Policy* 4.4: 520-538

Schön, D. and Rein, M. (1994) *Frame Reflection: Towards the Resolution of Intractable Policy Controversies*, New York: Basic Books

Scoones, I. (1999) 'New Ecology and the Social Sciences: What Prospects for a Fruitful Engagement?' *Annual Review of Anthropology* 28: 479-507

_____ (2005) *Science, Agriculture and the Politics of Policy: The Case of Biotechnology in India*, Hyderabad: Orient Longman

Scoones, I. and Thompson, J. (eds) (1994) *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice*, London: Intermediate Technology Publications

Scott, J. (1998) *Seeing Like a State. How Certain Schemes to Improve the Human Condition Have Failed*, New Haven: Yale University Press

Scott, A. (1990) *Ideology and the New Social Movements*, London: Unwyn

Hyman

_____ (2006) *Environmentalism and Technology*, SPRU Electronic Working Paper Series 149, Sussex: University of Sussex. . Available at: http://www.sussex.ac.uk/spru/1-6-1-2-1.html

Sharp, L. and Richardson, T. (2001) 'Reflections on Foucauldian Discourse Analysis in Planning and Environmental Policy Research', *Journal of Environmental Policy & Planning* 3: 193–209

Shiva, V. (1998) *Staying Alive: Women, Ecology and Development*, London: Zed Books

Smith, K. (2000) 'Innovation as a Systemic Phenomenon: Rethinking the Role of Policy', *Enterprise and Innovation Management Studies* 1.1: 73-102

Smith, A. and Stirling, A. (2006) *Inside or Out? Open or Closed? Positioning the Governance of Sustainable Technology*, SPRU Electronic Working Paper Series148, Brighton: SPRU, paper for workshop on 'Governance for Sustainable Development: Steering in Contexts of Ambivalence, Uncertainty and Distributed Control', Berlin, 5-7 February 2006. . Available at: http://www.sussex.ac.uk/spru/1-6-1-2-1.html

Smith, A., Stirling, A. and Berkhout, F. (2005) 'The Governance of Sustainable Socio-technical Transitions', *Research Policy* 34: 1491-1510

Standing, H. and Bloom, G. (2002) 'Beyond Public and Private? Unorganised Markets in Health Care

Delivery', background paper for the World Bank World Development Report 2004

Stiglist, J.E. (2002) *Globalization and Its Discontents*, New York: Norton

Stirling, A. (1998) 'Risk at a Turning Point?' *Journal of Risk Research* 1.2: 97-109

_____ (2000) *On Science and Precaution in the Management of Technological Risk*, Seville: Institute for Prospective Technological Studies

_____ (2005) 'Opening up or Closing Down? Analysis, Participation and Power in the Social Appraisal of Technology', in M. Leach, I. Scoones and B. Wynne (eds), *Science and Citizens: Globalization and the Challenge of Engagement*, London: Zed Press: 218-231

_____ (2006) 'Uncertainty, Precaution and Sustainability: Towards More Reflexive Governance of Technology', in J. Voss and R. Kemp (eds), *Sustainability and Reflexive Governance*, Cheltenham: Edward Elgar: 225-272

Stoker, G. (1998) 'Governance as Theory: Five Propositions', *International Social Science Journal* 50.155: 17-28

Stråth, B. and Skinner, Q. (eds) (2003) *States and Citizens: History, Theory, Prospects*, Cambridge, UK; New York: Cambridge University Press

Sunstein, C. (1990) *After the Rights Revolution: Re-conceiving the Regulatory State*, Cambridge, MA.: Harvard University Press

Tarrow, S. (1998) *Power in Movement: Social Movements and Contentious Politics*, 4th edn, Cambridge: Cambridge Studies in Comparative Studies

Thelen, K. (2003) 'How Institutions Evolve', in J. Mahoney and D. Rueschemeyer (eds), *Comparative Historical Analysis in the Social Sciences*, Cambridge: Cambridge University Press

Tilly, C. (1978) *From Mobilization to Revolution*, Reading, MA: Addison-Wesley

Touraine, A. (1985) 'An Introduction to the Study of New Social Movements', *Social Research* 52.4: 749-87

Van Lerberghe, W., Conceicao, C., Van Damme, W. and Ferrinho, P. (2002) 'When Staff is Underpaid: Dealing with Individual Coping Strategies of Health Personnel', *Bulletin of the World Health Organisation* 80.7: 581–4

Vayda, A. and Walters, B. (1999) 'Against Political Ecology', *Human Ecology* 27: 167-79

Vogel, S. (1995) 'New Science, New Nature: The Habermas-Marcuse Debate Revisited', in A. Feenberg and A. Hannay (eds), *Technology and the Politics of Knowledge*, Bloomington: Indiana University Press: 23-42

Vogler, J. and Jordan, A. (2003), 'Governance and the Environment', in F. Berkhout, M. Leach and I. Scoones (eds), *Negotiating Environmental Change: New Perspectives from Social Science*, London: Edward Elgar

Voss, J-P., Bauknecht, D. and Kemp, R. (eds) (2006) *Reflexive Governance for Sustainable Development,* Cheltenham: Edward Elgar

Walker, B.H., Anderies, J.M., Kinzig, A.P. and Ryan, P. (2006) 'Exploring Resilience in Social-ecological Systems through Comparative Studies and Theory Development: Introduction to the Special Issue', *Ecology and Society* 11.1: 12

Walker, P. (2005) 'Political Ecology: Where is the Ecology?', *Progress in Human Geography* 29.1: 73-82

_____ (2006) 'Political Ecology: Where is the Policy?', *Progress in Human Geography* 30.3: 382-395

Welch, S. and Kennedy-Pipe, C. (2004) 'Multi-Level Governance and International Relations', in I. Bache and M. Flinders (eds), *Multi-Level Governance*, Oxford: Oxford University Press: 127-44

Wilks, S. and Wright, M. (1987) *Comparative Government-Industry Relations*,

Oxford: Clarendon

Wood, G. (2004) 'Informal Security Regimes: the Strength of Relationships', in I. Gough and G. Wood (eds), *Insecurity and Welfare Regimes in Asia, Africa and Latin America: Social Policy in Development Contexts*, Cambridge: Cambridge University Press

World Bank (1989) *Sub-Saharan Africa: From Crisis to Sustainable Growth*, Washington, DC: World Bank

World Bank (1994) *Governance: The World Bank's Experience*, Washington DC: World Bank

Wynne, B. (1989) 'Establishing the Rules of Laws - Constructing Expert Authority', in R. Smith and B.

Wynne (eds), *Expert Evidence: Interpreting Science in the Law*, London and New York: Routledge

_____ (1992) 'Misunderstood Misunderstanding: Social Identities and Public Uptake of Science', *Public Understanding of Science* 1: 281-304

_____ (1996) 'May the Sheep Safely Graze? A Reflexive View of the Expert-lay Knowledge Divide', in S. Lash, B. Szerszynski and B. Wynne (eds), *Risk, Environment and Modernity: Towards a New Ecology,* London: Sage Publications: 44-83

_____ (2001) 'Creating Public Alienation: Expert Cultures of Risk and Ethics on GMOs', *Science as Culture* 10.4: 445–481

_____ (2002) 'Risk and Environment as Legitimatory Discourses of Technology: Reflexivity Inside Out?', *Current Sociology* 50.3: 459-477

_____ (2005) 'Risk as Globalizing "Democratic" Discourse? Framing Subjects and Citizens', in M. Leach and I. Scoones (eds), *Science and Citizens: Globalization and the Challenge of Engagement,* London: Zed Press: 66-82

Zimmerer, K. (1994) 'Human Geography and the "New Ecology": the Prospect and Promise of Integration', *Annals of the Association of American Geographers* 841: 108-25

Zimmerer, K. and Bassett, T. (2003) *Political Ecology: An Integrative Approach to Geography and Environment-development Studies*, New York: Guilford Press