



Understanding adaptive capacity to rapid climate change: Theories of social and organisational learning

Rapid Climate Change Project
Working Paper 1

Chris High and Mark Pelling

| | |
|---|----|
| 1. Introduction | 1 |
| 2 Adaptation and learning | 2 |
| 2.1 Social adaptation and social systems | 2 |
| 2.2 Defining Learning..... | 4 |
| 3 Social learning..... | 9 |
| 3.1 Socially conditioned learning | 9 |
| 3.2 Collective learning | 10 |
| 3.3 Policy Learning | 11 |
| 3.4 Groupthink and collective unconsciousness | 12 |
| 3.5 Social learning and social adaptation | 14 |
| 4 Learning and change in the organisational literature..... | 15 |
| 4.1 Argyris & Schön and Organisational Learning | 17 |
| 4.2 Communities of Practice | 21 |
| 4.3 The Hertfordshire School..... | 25 |
| 5 Conclusions: Learning, informal institutions and adaptation to rapid climate change | 29 |
| References..... | 31 |
| Appendix 1 – Theoretical background..... | 39 |
| A1 New Institutionalism | 39 |
| A1.1 North and NIE..... | 39 |
| A1.2 Defining institutions | 40 |
| A1.3 Organisations | 41 |
| A1.4 Further notes on North’s NIE..... | 42 |
| A2 Systems theory | 43 |
| A3 Power..... | 47 |

1. Introduction

The central aim of the Rapid Climate Change project is to establish a theoretical and methodological framework for the assessment of the institutional constraints that shape adaptive behaviour in the UK. The work so far has drawn on the New Institutional literature, and in particular the distinctions made about different kinds of institutions and their determination of individual and collective behaviour. This has been augmented by concepts

drawn from the literature on social capital, which we argue offers a mid-level theory that can be used to organise an exploration of the relationships between actors, their agency and constraining institutional contexts.

This paper identifies some opportunities for expanding the theoretical understanding of social adaptation by reviewing a range of theories of social and organisational learning. Theoretical perspectives considered in the project include those that treat learning as a socially expressed behaviour as well as those that regard learning as a socially conditioned behaviour, and we consider the relationship between the two positions. The review seeks to contribute to the broadening of adaptive theory, by constructing a perspective from which to understand the informal and unmanaged spaces that exist in all social relationships, whether in networks, communities, organisations, or national and international regimes. To this end we have chosen to focus on theory that emphasise informal networks and relationships within organisations.

The first section of this paper develops a theory of learning, one that is compatible with both social adaptation and the broad sweep of theory that we examine. The second section then presents a discussion of social learning, and reviews the different ways that learning can be conceived of as social. The third section draws on three particular strands of thinking and practice within the organisational literature, all concerned with learning. These comprise: (i) the work of Argyris & Schön (1978; 1996) on organisational learning, (ii) Wenger's (1999; 2000a; 2000b) exposition of communities of practice, and (iii) an application of complexity theory to management practice, developed at the University of Hertford (Stacey et al, 2000; Stacey, 2001; Shaw, 2002). The paper identifies several points of convergence between these lineages and between them and themes within social capital and new institutional theory and uses these connectivities to open discussion of an institutional theory of adaptation.

2 Adaptation and learning

2.1 Social adaptation and social systems

Adaptation to climate change can be seen in terms of the alteration in the state of a system that arises in response to the stressors introduced by changes in climatic conditions, and under which key variables are conserved or enhanced. Thus, we take the position that in order to speak of adaptation, one needs to specify it relative to a system, which can then be judged as adaptive or not. The idea of conservation of key variables is important, because these provide the bottom line, the breaching of which we would see as degradation rather than adaptation. Furthermore, because we take climate change as a context, this implies a shift in fundamental climatic parameters, introducing new climatic extremes. We argue that establishing that such a shift has occurred is more a matter of judgement than of hard fact, given the complexities and length of cycling of climate systems.

We define rapid climate change, with respect to a social system, as a counter-intuitive, exogenous stressor from the point of view of actors within the

system, or who are making judgements about that system.¹ Thus rapid climate change differs from climate change *per se*, in presenting a set of environmental stressors that run counter to established wisdom and that have not been seriously entertained or planned for. The primary example for this project is climate cooling rather than warming, but one could consider extreme warming scenarios or other examples under this rubric too. This definition of rapid climate change opens up the opportunity of empirically testing the role played by social learning in shaping adaptive behaviour by looking at past responses to previous unplanned for and counter-intuitive exogenous pressures. In this paper a theoretical framework on social learning within adaptation is presented, subsequent papers will explore supporting empirical evidence.

Our definition of rapid climate change is constructed from the perspective of social systems; that is a perspective that emphasises social actors (such as individuals, groups, networks and organisations) and their interrelationships. Thus we are primarily interested in social adaptation – adaptation as it affects or is affected by social qualities. Our intention is to initiate a discussion of the role of informal social spaces in adaptation, through a focussed analysis of adaptation observed through social systems. This is a simplification of the issues concerning adaptation, which artificially separates social from natural systems, and we recognise that natural elements within socio-environmental systems will themselves experience stress and coevolve in parallel with the social elements we are interested in. However, this is not our first concern, and we retain our primary focus on social realities, while endeavouring to avoid the traps (principally anthropocentrism) that come with it. In any case, the aim of this paper and of the wider project is not to enter into debates on the dialectics of socionature under adaptation, although there is a need for this.

In this paper a system is defined as a bounded set of elements and their interrelationships, which together comprise a whole. A social system is thus a system which consists of elements with a social nature, such as a network, an organisation or a clan (made up of families), and which as a whole reveals social properties or social processes (High, 2002, §7.1.2). The elements might themselves be considered as systems in their own right and thus subsystems of the main system. The elements of systems can be structural, such as the individual actors that make up an organisation, or process elements such as the individual speech acts that combine to make a discourse. In this paper, we usually refer to the first case (systems comprising concrete structural elements), unless we explicitly say otherwise.

There are many features associated with systems in the systems literature, such as boundary, environment, purpose and hierarchy, depending on the focus of the author (compare Checkland, 1999 [1981], with Armson & Ison, 2000, for example). However, where most systems traditions come together

¹ The advantage of this definition is that it directs attention towards the unexpectedness of the stressor in terms of the expectations typical of the system. So if a third party actor had given warning that a stressor was expected, but this had not been understood or accepted by those representing the system, then the onset of the stressor would still be rapid in our terms.

is in their agreement that awareness of a system directs attention toward the properties and processes that pertain to wholes as well as to the elements that make them up (High, 2002, §1.2.1). Systems theories therefore usually rests on an assumption that in general “whole entities exhibit properties which are meaningful only when attributed to the whole, not its parts” (Checkland, 1999 [1981]: 314).

The properties of wholes which cannot be reduced to properties of their individual constituents are known as emergent (Heylighen, 1989: 23; Checkland, 1999 [1981]: 74-82), and the general phenomenon that emergent properties exist is known as emergence, a usage ascribed to Broad (1923, cited in Checkland, 1999[1981]:78). Capra (1996: 28), says Broad coined the term to refer to “...properties that emerge at a certain level of complexity but do not exist at lower levels”. Illustrative examples of emergence in the literature include the taste of sugar and the concept of temperature as emergent properties of molecular systems that do not make sense at the atomic level (Ashby, 1956: 111; Capra, 1996: 28). The taste of sugar, because carbon, oxygen and hydrogen, its constituent elements are all virtually tasteless and temperature, because it is an aggregate property and meaningless at the level of individual atoms. This usage of emergence differs from the everyday sense of the process of something new arising as time unfolds. Instead, the movement that gives rise to emergent phenomena is through different logical levels, from consideration of the part to the whole, rather than from past to future. Having said that, the literature is not always very clear about the distinction, and systems emergence is sometimes conflated with emergence in time, as with Shaw’s (2002) description of organisational conversations in terms of the emergence of self-organisation or with Blackmore et al (2000) who use the term to denote the result of a process that cannot be predicted in advance, but which emerges from the interaction of the process with its context.

An important relationship between emergence and our project is that emergence provides a framework for exploring overlapping social structures such as social networks, in terms of scale and relationships between different perceived levels of social organisation. For example, a key research need in our project is to identify and understand the relationships between constituent actions and systems behaviour in social systems, something we explore below in the context of learning amongst individuals and groups. For example, we posit that individual adaptation is institutionalised; that is, greatly influenced by the amount of scope available for constituents to subvert or innovate from within a larger social group. Similarly, we are interested in the scope that a change in individual behaviour allows for the dynamics of organisations or societies to change.

2.2 Defining Learning

The systems view of adaptation explored in the previous section has strong resonance with a view on learning developed in the context of sustainable development (High, 2002), in terms of underlying theory and constructivist epistemology. The theory defines learning as a transformation in the *potential* for behaviour of an actor in response to experience, as seen from the

viewpoint of an observer (after High, 1998; Ison et al, 2000). The actor in question could be an individual actor, a formal organisation, an informal group or even a non-human actant such as elements of technology or nature, as long as they are viewed as capable of behaviour and changing behaviour in response to experience². This broad definition is deliberately designed to encompass a number of strands of learning theory, including those that situate learning outside of the individual and within social groups. This provides a link between social adaptation and the literature on social and organisational learning that we seek to include in our framework, as it enables a view of learning that transcends individual behaviour.

The judgement of an observer is a critical component of the definition, and this has both epistemological and ethical consequences. In terms of stating whether learning has occurred, acknowledging viewpoint enables the delineation of a range of perspectives that (in their own terms) accept that learning has occurred (or not). Attention is therefore directed beyond simply what has been learnt, towards the institutional forces and actor attributes that direct capacity and ability to learn, and that determine who recognises whether learning has taken place. A learner's own perspective on their learning could be accepted, as could the views of others, which may differ. The observer-led aspect of the definition emphasises the choices made by an observer and can be understood in terms of the boundaries of their attention and the underlying *weltanschauung* (worldview) that provides the act of learning with purpose and meaning, from their point of view.

The definition refers to changes in behaviour, a point of convergence between many different theories of learning (Ison et al, 2000: 43). However, rather than the behaviourist (cf Gross, 1996: 156-172) focus on 'objective', externally validated, physical behaviour, we accept behaviour in the widest sense as that which learners do. Following Maturana & Varela (1992) and Ison et al (2000), we accept the inclusion of internal actions as 'behaviour'. That is, as humans, we can learn in relation to different modes of interacting with the world: emotional and conceptual as well as physical. Our learning corresponds to differences in the way that we act (consciously or unconsciously) within these modes, which in turn arise in response to our ongoing experience. The judgement of what constitutes behaviour lies with the observer in question, but the definition does not rule out internal and tacit activities such as conscious or unconscious cognition, emotional affect or the formation and operation of personal relationships, for example.

Two points are worth paying attention to. The first is that in terms of seeing adaptation as learning, this theory highlights both material adaptation and more intangible adaptation strategies too. For example, an adaptive response that could be seen in terms of this definition of learning is where an individual works to promote changes in a discourse by joining an interest group or political party, or by contributing to the discourse in an individual capacity. Considering different viewpoints could also highlight situations where a

² Note that we are making not claim that the nature of responding to experience is the same across different kinds of actors, although Goleman (1998) has reviewed some of the different ways that social activities can be treated as analogous to individual human cognition.

discourse has changed, but material adaptation has not taken place. Following on from this, the second point is that we can see learning itself as a behaviour. This opens up the question of whether we can learn to learn (or learn to be adaptive), what Bateson (2000 [1972]) calls deuterio-learning. Thus adaptive capacity could be increased by adaptations which increase flexibility, a more generic adaptive response than one which focuses on one particular stressor, possibly to the detriment of the capacity to respond to unexpected events.

Identifying different realms of behaviour is important in sharpening our focus on the site(s) where social adaptation can be observed; not only in material actions, but in contrasting attitudes or views that have not been allowed translation into action. The possibility of action in the public and private realms of open or hidden action has been noted more broadly by Giddens (1984) as front and back regions. Front regions are spaces of open conflict but also surveillance. Back regions allow concealed expressions of discontent but could also be reservoirs of potential adaptive capacity. So, Pred & Watts (1992) identify the behaviour of marginalized actors who need to keep low visibility in the face surveillance by more powerful actors, and the potential importance of private language as a mechanism for resistance. Ni Laoire (1997) suggests that silence should also be perceived as a form of hidden resistance so that silence can indicate a refusal to participate as active, rather than necessarily a sign of indifference or apathy. But we are also interested in the extent to which hidden and silent behaviour is proactive rather than reactive, or an essential feature of co-operative social life, rather than an indication of resistance and struggle.

As well as taking a broad view of what behaviour is (and hence what can be learned), our view of learning is further modified by reference to potential behaviour. Doing so adds another layer of judgements when analysing a claim that learning has taken place. Under this definition of learning, the advent of a latent potential for behaviour is a valid reason to accept that learning has taken place. Therefore, learning is signified not only by a change in behaviour (recognised by the self or others), but also by actors recognising that a change in behaviour (by the self or others) is possible, which allows an examination of the evidence for this claim. The definition thus corresponds to the way that the everyday understanding of learning is subjectively situated. So, for example, one hopefully *learns* to survive parachuting through drills and training before ever getting into an aeroplane with the intention of jumping out again before it has landed. For some observers the only real test of whether learning happened is that a parachutist successfully glides down and rolls at the appropriate moment, but there are legitimate points of view from which the learning took place before the act, perhaps including those of the instructor and the jumper.

Seeing adaptation in these terms means recognising that a system could be adapted to a particular stressor without actually being challenged by it. This could be constructed in terms of pro-active adaptation, adapting to events that are considered likely or possible. However, we can also look at latent behaviour in terms of deuterio-learning, as described above. That is, we suggest that the process of becoming more able to adapt can itself be a

learning process, if we consider adaptation to be part of the behaviour of the system in question. Thus not only can adaptive behaviours be seen as a result of learning, but adaptive capacity too.

Our focus on constructing the learner as an actor that could be interpreted as an individual or a social entity is important, because it links individual learning to social processes of change that emerge at the collective level; the adaptation of an organisation, a family or nation, for example. Thus social adaptation can be seen as collective learning; recognised through changes in the behaviour of social groups. The key is the idea that if an actor behaves, or has the potential to behave, differently as a result of experience³, then learning can be said to have taken place. This part of the definition is also dependent on viewpoint, because judgements about the capacity of an actor to behave (or even that an actor exists as a coherent entity) depend on viewpoint. In other words, different observers such as external researchers and different members of an organisation could disagree on whether adaptation has taken place or not, with no intrinsically valid criteria for deciding the issue. If it is necessary to make some collective judgement, then the issue is negotiating a decision criterion that allows some form of accommodation⁴ between different interests. This of course immediately raises questions about power, knowledge and participation.

So for example, one can talk about how a company learns to satisfy its customers or a dictatorial government learns to oppress its population, or at least recognise that other observers interpret their experience in these terms. In so doing, one is expressing a viewpoint that the company or government is coherent in its behaviour and that its behaviour changes in response to its environment or internal dynamics. However, other observers might disagree, either that the actor is acting in a concerted manner (Sabatier's work on policy coalitions demonstrates how government policy actions can be decomposed, for example, Sabatier & Jenkins-Smith, 1993; Sabatier, 1999), or how or whether learning has taken place. Thus, seeing adaptation in terms of this theory of learning highlights how different viewpoints on adaptation differ.

³ The source and nature of what might be accepted as experience covers a range of possibilities. What we do not discuss in this paper is the feedback between the behaviour of an actor and what it experiences within its environment. That is the role of active learning strategies, experimentation and chance in determining different experiences that give rise to learning. This is not excluded by our theory, but (for the moment) left open to discovery within our empirical work. We draw on High (2002), Ison & Russell (2000a) and Kersten (1995) for methodology and practice in terms of creating opportunities for learning.

⁴ Checkland (1990: 29-30) considers accommodation to be the most general case of the alignment between different interests. Conflict might still exist (unlike consensus, which is considered a special case of accommodation), but it is subsumed to the extent that different parties agree a course of action that they are able to go along with. North refers to something similar without calling it accommodation when discussing how institutions are renegotiated (or not): "Institutional equilibrium would be a situation where given the bargaining strength of the players and the set of contractual bargains that made up total economic exchange, none of the players would find it advantageous to devote resources into restructuring the agreements. Note that such an situation does not imply that everyone is happy with the existing rules and contracts, but only that the relative costs and benefits of altering the game among the contracting parties does not make it worthwhile to do so" (North, 1990: 86).

Our perspective does not claim that individual and collective behaviour are qualitatively the same, but allows us to explore the differences and relationships between the theoretical perspectives that recognise behaviour and learning at these different levels. In the case of the adaptation of a system to climate change, adaptation can be seen in terms different levels of learning operating at a range of system-hierarchic scales: the behaviours of components and subsystems of the system, as well as changes to the emergent properties of the system, and this can be used to unpack different adaptive trajectories. For example, an adaptive strategy to climate change which resulted in the strengthening of the multi-lateral system of international governance, but which set back an individual country's position, with the exception of one region, could be understood in terms of its effects at different levels. Other more relational concepts of scale could also be used as the basis of different levels of adaptation. For example, it may be that adaptive behaviour emerging at one scale – say the local – is the result of learning that has been ongoing amongst a range of actors (individuals or groups) networked across a range of scales – say actors with a common interest arranged into an informal group but comprised of local, regional and national stakeholders.

Linking adaptation to learning theory is helpful, because the challenge of understanding the adaptation of social units to rapid climate change is that by definition the stressors will be unexpected.⁵ The position is one of trying to understand collective responses to something that is likely to play out differently than expected; a theme that has been explored within several theories of learning. These range from pedagogies which recognise that learning "...does not necessarily result from teaching" (Ison, 1990: 3), and that learning outcomes cannot be totally specified in advance (Ison, 2000), to theories which focus on the capacity of communities and organisations to respond to an uncertain future (Korten, 1980). For this project, which seeks to build theory for social adaptation, the most interesting of these theories are those that speak of learning in social terms. To this end, in the following section the paper presents a review of different understandings of social learning, before examining three lineages of the management literature that take social learning as a central concern. These are compared and links made to the themes of adaptation, institutions and social capital that have already been identified as key concepts in this project.

⁵ This answers the question: Need one concentrate on adaptive capacity to specific stressors, or are there more generic capacities that are adaptive across a range of interacting stressors? We don't know what the most important stressors are before the event, and hence need to work on the latter category – generic adaptive capacity, at least in terms of a range of possible stressors, the extent of which it is then fruitful to question. An interesting question, which begs a serious look, is whether contingency planning to meet specific assumed threats actually decreases generalised adaptive capacity – do we trip over our own plans and assumptions? This is an observation that will be integrated into the empirical section of this project.

3 Social learning

Because we are interested in adaptation and how it is socially transformed or generated, we have chosen to draw on theories of learning that recognise a social dimension or context to learning, something that not all learning theories do (cf Jarvis et al, 1998: 37-45). Social learning can be understood in a number of different ways though. In biology, for example, social learning relates to the phenomenon observed across many species that animals can learn by observing one another (eg Choleris & Kavaliers, 1999; Fritz & Kotrschal, 1999), avoiding the need to learn everything through direct experience (Kameda & Nakanishi, 2003).⁶ In the social sciences there are essentially two ways in which learning can be considered social: (i) in the sense that individual learning is conditioned by its social environment, (ii) in the sense that social collectives such as organisations can be said to learn in their own right. These perspectives are considered below, as are ways that they can be combined.

3.1 Socially conditioned learning

There is a longstanding interest in the social sciences, within sociology and social psychology for example, in the extent to which learning is determined by culture and socialisation (Jarvis et al, 1998: 44). For example, the opportunities of a rural stakeholder to adopt particular livelihood strategies are constrained in terms of social and cultural possibilities as well as physical and economic ones. Thus, livelihood strategies are often gendered to various degrees (cf March et al, 1999), and it may simply not be possible (or at least not simple) for a woman or a man to take on a livelihood strategy or social role that is usually assigned to the other gender. Similarly age, social class and cast can open or close particular pathways for adaptation (Pelling, 1998).⁷ Therefore social learning can be seen in terms of social influence on learning opportunities, mediated through institutions.

That is not to say that individual learning is only institutionally *constrained*. There is evidence of the benefit of socially conditioned learning within the education literature, where it is argued that working within a group context facilitates learning. The claim is that faster and deeper learning results from collaborative learning with peers compared to 'receiving' learning through the transmissions of an instructor (Joiner, 1989; Elwyn et al, 2001, §11). A similar

⁶ In human psychology, this view of learning has been refined and developed by Bandura (cf Griffin, 1991 for a summary) who was interested in learning by vicarious observation. In terms of adaptation, this suggests that adaptive strategies can spread laterally through a population, in the manner suggested by the literature on diffusion of innovation (cf Nutley et al, 2002, for a review) or explored by Burton et al (1993) in the context of cultural and bio-physical adaptations in human and socio-environmental systems in response to environmental hazard)). However, the idea that this is straightforward or that it knowledge is transferred has been extensively critiqued in fields such as cognition (Maturana & Varela, 1992), agricultural extension (Scoones & Thompson, 1994; Ison & Russell, 2000a) and policy change (Sutton, 1999; de Vibe et al, 2002).

⁷ See Burton et al (1993) or Wisner et al (2003) for examples of explanations using this perspective in accounting for societies and individuals learning to cope with risk from natural disaster.

theme can be found in the literature on team learning, where the focus is on the processes by which teams become able to provide a space for effective learning (Bennett, 2001), sometimes characterised in terms of trust and safety. In the organisational literature, this tends to lead to a focus on organisations as environments that enable or inhibit individual learning, through their culture, structure or sanctioned practices (Wang & Ahmed, 2003).

Thus, theories of social learning that deal with the socialisation of learning processes open up questions about the effect of different institutional regimes on individual learning behaviour. In terms of the RCC project, we could ask which social variables affect the learning of individuals and how this relates to adaptive capacity? For example, the provision of an environment in which the learning and adaptivity of individuals is enabled rather than inhibited could be seen as part of a social system's adaptive capacity, but what can we say about the qualities of such environments? We wish to tease out the differences between the adaptive capacity of individuals, and the adaptive capacity of various types of social assemblages (e.g. organisations, communities, nations), and how different levels of social aggregation affect one another.

3.2 Collective learning

The definition of learning proposed above covers both individual and collective learning under one framework, and therefore allows us to explore standpoints that grant agency and learning to social entities. This paper is particularly concerned with the management literature on organisational learning, but there are other academic traditions that take the idea of collective learning seriously, and some ideas from policy studies and psychology are considered below.

Within the management literature, discussion of organisational learning is at least 25 years old (Argyris & Schön, 1978; Argyris, 1992: 8). Indeed, it is not uncommon to see statements such as "In short the organization must routinely learn and relearn about its environment, and learn new ways to change and implement policy and process" (Henderson, 1997 :100), which grant organisations the capacity to learn in their own right. Such statements are not always supported by evidence that it is the organisation that learns, and that this level of analysis is even necessary.

However, there are case studies that support the idea that an organisation can act in ways that none of its individual members are even aware of at the time. For example, Hutchins (1996) details the actions of a ship's crew dealing with a loss of steering and navigation in a narrow channel. Faced by a situation outside of their normal operating parameters, the crew needed to develop a solution to cope with the new challenges they faced, and for which they were unprepared. The solution emerges from their joint action and Hutchins argues that that it was the crew as an organisation which 'discovered' a mode of operation (behaviour) that addressed the challenge: "Prior to its discovery by the system as a whole, however, the final configuration appears not to have been represented or understood by any of the participants. To the extent that the acquisition of a useful adaptation to a

changing environment counts as learning, we must say that this is a case of organizational learning” (ibid: 53-54). The example thus supports the idea that understanding collective learning is not the same as understanding individual learning, and that there are emergent processes at the organisational level, which one can perceive in terms of learning.

A question raised by the collective view of social learning is to ask what we gain or lose by adopting such a viewpoint? The importance of interrogating the viewpoints that make sense of particular types of learning is illustrated by the observation of Argyris and Schön (1996) that examining the potential for an organisation to learn requires distance from the organisation in question. They argue that even though one can treat organisations as learners, to do so tends to treat organisations as impersonal agents and potentially conceals the actions of practitioners who operate within the organisational context (a key audience for the authors). Thus even though Argyris and Schön (1996) recognise the view of organisations as learners as valid, they are wary of adopting it themselves because of its practical consequences. This observation and similar enquiries into the implications of different viewpoints has possible methodological significance for the project. It suggests that analytical choices and the language used by researchers have consequences for the relationships involved in engaging with research stakeholders, something we shall return to in our methodological paper.

3.3 Policy Learning

Collective learning has been the subject of theoretical development in policy research, as well as within the management literature, because policy is an expression of societal behaviour (ie the social behaviour of nations, local governments, etc), and hence changes in policy can be seen in terms of learning. For example, the advocacy coalition framework of Sabatier and Jenkins-Smith (1999:123-5) includes “policy-oriented leaning” that can only be understood in terms of collective learning. That is, policy-oriented learning is emergent in their theory.

Sabatier and Jenkins-Smith’s (1999) framework proposes three levels of agency: the policy subsystem, the policy coalition, and the individual. A policy subsystem is a reasonably discrete area of public decision-making. Within a policy subsystem, policy is contested by a set of policy advocacy coalitions: alliances of individuals with similar core beliefs, who demonstrate a degree of co-ordinated activity over time (Sabatier & Jenkins-Smith, 1999:138).⁸ Individuals make up the membership of policy coalitions, their alliance built on similar core beliefs, which are held to cut across organisational and even political identities.

Because advocacy coalitions take their identity from core beliefs, they are conservative of them and thus also of the policy positions they advocate as a result. Core beliefs are maintained even in the face of mounting evidence that

⁸ Note that both conditions are necessary, Sabatier and Jenkins-Smith recognise that shared values “the precepts of the belief system of individuals or of collectives” (Jenkins-Smith & Sabatier, 1993: 42) do not guarantee co-ordinated behaviour.

these beliefs lead to unsustainable or counter-productive actions. This can be seen clearly in cases of policy inertia in the face of new scientific evidence. For example, in spite of mounting evidence that climate change is in significant part anthropogenic (Jäger & O'Riordan, 1996), several of the OECD countries have assiduously resisted concerted international effort to reduce greenhouse gas emissions. This could be understood in terms of an effort to continue to maintain industrial output without imposing additional burdens on industry, a core value of the branch modern politics informed by neo-classical economics.

Policy-oriented learning, defined as relatively enduring alterations of thought or behavioural intentions in respect of policy objectives, therefore does not operate within a policy coalition when it comes into conflict with core beliefs. Jenkins-Smith & Sabatier (1993) propose that instead of learning within a coalition or on the part of individuals within them, policy learning in respect of core values takes place through changes in the relative position of different policy coalitions. Changes in policy come about when a dominant policy coalition (that is one which controls the agenda in a policy subsystem) gives way to a previously subsidiary coalition, because of shocks and trends that are exogenous to the policy subsystem. These could be due to changes in the wider political system, in society, or because of environmental stressors such as rapid climate change. Thus policy learning is best understood in terms of collective learning, because it is possible without any learning on the part of any policy coalition or indeed any of that individuals that constitute their membership.

Policy-oriented learning is relevant to social adaptation, if one assumes that policy positions form an important part of the response of a society to challenges such as rapid climate change. Thus social adaptation can be understood in terms of collective learning (at least in terms of policy behaviour), because the policy coalition framework suggests that societal adaptation can take place even in the absence of any adaptive change at the level of individual policymakers. Furthermore, this emphasises the role that changes in power relations have in social adaptation, both in terms of determining and expressing it. A corollary is that adaptive capacity can be seen in terms of the existence of policy alternatives embodied within alternative coalitions.

3.4 Groupthink and collective unconsciousness

The previous section described a view of policy that involves the emergence of collective learning even though no individual learning took place, ascribed to realignment amongst the coalitions that control the policy agenda. The inverse case, where individual learning takes place, has also been described. The literature on groupthink (Janis, 1972; Janis, 1989; Griffin, 1997) for example, analyses failures in collective decision-making where groups have proved less competent than would be expected from the individual abilities of their members. This has occurred, not because individuals failed to learn appropriate responses to the challenges facing the group. Instead, the social environment (that is, the institutional architecture) resulted in the group as a whole failing to surface and act upon the knowledge of individuals.

Janis (1972: 9) defines groupthink as “a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when members’ strivings for unanimity override their motivation to realistically appraise alternative courses of action.” In other words, for Janis, groupthink arises when individuals silence themselves in order to maintain group coherence, because they believe this is more important than pointing out the difficulties they see in a particular collective course of action. Griffin (1997) says that Janis is not trying to establish that all strongly cohesive groups are automatically defective in their decision-making. Instead, he is highlighting that non-learning can emerge from group processes, even where learning has occurred at the individual level.⁹

Goleman (1998) traces a similar process of emergent non-learning, when he suggests that group dynamics exhibit a form of defensiveness analogous to the way that individuals lock experience and awareness away. Goleman (ibid: 193) suggests that “In a group, feelings of cosy unanimity stand at the opposite end of a continuum with anxiety....When a group maintains its cosiness by erecting barriers against information that might upset it, then a collective defence is at work. This process of guarding the group’s self-image is precisely parallel to the ways the personal self skews reality.” Thus he links collective unconsciousness to the discomfort involved in surfacing views or possibilities that are in conflict with the views that frame what is accepted by or acceptable to the group. Enacting such possibilities is not only impossible as social behaviours, but the possibility of doing so becomes undiscussable and hence effectively non-existent (from the collective point of view).

These processes are apparent in the government response to BSE (Bovine Spongiform Encephalopathy), where van Zwanenberg & Millstone (2002:174) show that in the late 1980s MAFF (Ministry for Agriculture, Fisheries and Food) decision making repeatedly displayed a pattern of individual concerns being overturned, ignored or suppressed. It is widely suspected that this was because the national interest was constructed in terms of the financial stability and viability of the agricultural and food processing industry (Caskie & Moss, 1998; Gifford, 2001; Hinchcliffe, 2001; Little, 2001; van Zwanenberg & Millstone, 2002, 2003), a position that had endured since agricultural reforms at the end of the second world war (cf Murdoch & Ward, 1997). As a result, the evidence that BSE that does in fact represent a risk to human health was resisted over a period of a decade (van Zwanenberg & Millstone, 2002: 176-179), and protecting the profitability of livestock farmers won out over a precautionary position in respect of public health.

Groupthink and collective unconsciousness therefore represent cases where adaptive strategies (ban animal proteins in cattle feed, remove infected meat from the human food chain) become suppressed and hence impossible as collective behaviours. Janis (1972; 1989), Goleman (1998) and organisational learning theorists such as Argyris (1992) suggest that group

⁹ In the language of social capital, societies typified by tightly knit groups rich in bonding capital may be more likely to experience policy inertia. Similarly bridging links are essential to the translation of innovations across group boundaries. In tension to this is the security that groups give their members may encourage experimentation.

culture (i.e. informal institutional architecture) has a significant role in causing such maladaptation.¹⁰ The organisational learning literature is interested in achieving the opposite effect, where organisational culture is such that collective ability to learn and adapt exceeds individual capacity. As we discuss in section 4.1, this literature tends to emphasise openness, participation and the formation of a learning culture. This is said in turn to require changes in the enacted values of individuals whose behaviour reveals the nature of the organisational culture (Argyris & Schön, 1996), something which is not considered at all easy.¹¹ It does however emphasise the interplay between the two forms of social learning we have considered, the socialisation of individual learning and the emergence of collective learning from the dynamics of formal and informal relationships within a group setting. We explore this in the next section.

3.5 Social learning and social adaptation

In conclusion, the two senses of social learning that we have examined operate at different levels. While neither determines the other, they are clearly related. We therefore suggest that they are not logical alternatives, but in fact produce the conditions for one another – they form a duality, rather than dualism (Ison & Russell, 2000b). The social environment in which individuals find themselves configures the space of possibility for individual learning. On the other hand, the environment that an organisation provides can be seen in terms of its behaviour, which is shaped in part by the organisational routines open to its members.

Social learning theory illuminates some of the connections between institutions and social adaptation. In terms of socially conditioned learning, institutions provide the context within which individual learning takes place, restricting some learning options and directing attention towards others. On the other hand, institutions themselves can be seen as organisational

¹⁰ In particular, they make a case that the failure of groups to learn rests with the nature of power relationships within organisations. For instance, both Griffin (1997) and Goleman (1998) find evidence that strong leadership can lead to problems of groupthink and collective unconsciousness. Griffin (1997: 240) says that “Leaders climb to the top by being “take-charge” people. Unfortunately, the very force of personality that placed them in authority can have a chilling effect on group candour”. Goleman (1998:1 92) says that “High-power leaders respond well to ingratiating subordinates. In a group with such a leader, the axis of cohesiveness shifts toward the vertical from the horizontal: rather than feeling close to their fellow members, people in the group tend to form a bond of loyalty to the leader”. This emphasises the link between power and silence, the importance of front and back regions, and the need to understand social adaptation in terms of the ongoing dynamics of power relations.

¹¹ If adopting the values that Argyris & Schön (1996) suggest was easy to achieve then they argue that such values would be a standard feature of organisational life due to competitive pressure between organisations. This raises the question of what it is that enables individual values that are destructive at the organisational level to persist. North’s (North, 1990) answer might be along the lines that powerful individuals capture organisational goals through applying their power to the setting of institutions, and that this is inevitable given that bad institutions out-compete no institutions at all. Putnam (1993) makes this point about support for a Mafia being better than isolation in the face of an unsupportive state and other people’s Mafiosi.

behaviours and thus subject to collective learning. Furthermore following Argyris & Schön (1996), institutions provide an explanation of why the behaviour of the individual-as-organisation-member varies from the individual-in-their-own-right, justifying a view of organisational behaviour as emergent and ultimately providing an explanation of the tensions between individual and organisational behaviour.

There is also a connection between social capital and social learning, if the latter is seen in terms of the source of a stream of benefits and disbenefits arising from social interaction. That is, the capacity for social learning can be seen directly in terms of a form of social capital, suggesting that there is a dual link between social capital and social adaptive capacity. The literatures of both emphasise the importance of trust, norms and values worked out through networked relationships, all of which can be constructed in terms of institutions.

The observation that institutions are both the product of and a constraining pressure on individual action has long been recognised in New Institutional theory. The novelty of this project is to advance this observation into the realm of social learning and hence adaptive capacity and action. We suggest that learning should be analysed in systems terms, and that multiple levels of learning and their relationship to one another will give purchase on processes of adaptation and adaptive capacity. These themes are explored further below, drawing on the literature on learning within organisations. The interaction of different forms of adaptation differentiated by scale and order of enactment, and of the networks of social capital and institutional architecture that constrain adaptation will be explored in the empirical part of this project.

4 Learning and change in the organisational literature

Understanding different kinds of learning within organisations, where and how learning processes occur, and how organisations can be managed in order to promote individual and collective learning have been an important part of the management literature for several decades. Argyris & Schön say that in the 1970s when they began to publish on the topic (Argyris & Schön, 1978), “organisational learning was a rare species among ideas, relegated to along with such closely allied notions as “societal”, “public” and “institutional” learning to the popular literature of social change” (Argyris & Schön, 1996: xvii). They argue that by the 1990s, the concept of the learning organisation had begun to receive serious academic attention (ibid: 188), albeit attention that raised a number of challenges for less reflective proponents of organisational learning.

Learning in organisations is considered important in terms of ‘competitive advantage’ (Stewart, 2001:141), as well as part of an effective organisation’s necessary response to rapidly changing external social and economic environments. Organisational learning has been studied and applied not only within commercial organisations, but also government agencies, and non-profit making associations (Flood, 1999: 1). In the sense that learning in organisations is concerned with increasing the capacity to respond to events, it is directly relevant to social adaptation.

Although there are many facets of management theory that could be considered relevant to the needs of the Rapid Climate Change project, we shall concentrate on a subset of the literature on learning in organisations, for the following reasons:

- (i) The environments in which we intend to apply the developing framework in the first instance are organisational in nature, and hence work on organisational learning is relevant in its own right, in order to understand adaptive capacity and resilience against external shocks within the research context.
- (ii) The literature on risk management is highly relevant too, however in order to provide a reasonable scope to the project, this has been excluded for the moment.¹² There is a fair amount of cross-over between risk management and the literature reviewed, and where there is a difference in emphasis, we would rather, for the moment, focus on learning, capacity and resilience, rather than risk management which has a greater emphasis on vulnerability.
- (iii) Likewise the literature on scenario planning has been excluded, although this will feed into the methodology review for the project.
- (iv) Some of the more recent literature on organisational learning explicitly explores informal institutional realities within organisations, built on an interpersonal, constructivist epistemology in the same way as that underlying the theory of learning described above, and focussing the organisational literature and on this part of it in particular thus strengthens the theoretical framework developed by our project.

Even after restricting attention to learning in organisations, there is still a large and diverse literature to draw on. Rather than attempt a synthesis or review of which there are many extant examples (e.g. Flood, 1999; di Stefano, 2000, §2; Stewart, 2001; Wang & Ahmed, 2003), we focus on just three lineages of thought – coherent bodies of thought marked by substantial collaboration or engagement between their main proponents – and what they offer in terms of theoretical development for our project. The lineages are summarised below in Table1, along with the major theoretical themes that they offer the RCC framework, and some key references. The theoretical themes are developed in the sections that follow.

The three lineages were selected for their strengths in theory and practice – they are grounded in empirical experience while still valuing the contribution of rigorously formulated theory – and thus fit with this project’s stated aim of developing a theoretical framework that can be used as a basis of practice. They are also all interested in the ‘inner life’ of organisations, constructing their analysis in terms of the experience of individuals and the social groups that emerge from interactions, and thus relate learning and adaptation to both formal and informal institutions. Finally, each lineage comprises a substantial body of work with a broad secondary literature, ensuring both depth and a range of critical perspectives from which to test them.

¹² In particular, the work of Smith (Coles et al, 2001; Smith, 2002) and Weick (1998; 2001).

| Lineage | Summary Description | Important themes | Key References |
|---|--|--|---|
| Argyris & Schön's Organisational Learning | A longstanding and core lineage of thought about organisational learning. It is well critiqued and extensively referenced. | Different kinds of learning – single and double loop. Action strategies and organisational culture. | Argyris (1992); Argyris & Schön (1996, 1978 #420); Schön (1991). |
| Communities of Practice | Developed from theories of situated learning. Central focus on communities of practice, informal groups that permeate organisations. | Learning centred on non-canonical practice. Opens up bridging and bonding capital in terms of identity. Participation/Reification. | Brown & Duguid (1991); Lave & Wenger (1991); Wenger (1999; 2000a; 2000b). |
| Hertfordshire School | Complexity theory as a resource of metaphors for organisational theory and practice | Edge of chaos. Shadow networks. Self-organisation. | Griffin et al (1999); Shaw (1997, 2002 #613); Stacey et al (2000); Stacey (2000; 2001). |

4.1 Argyris & Schön and Organisational Learning

Although Argyris & Schön (1978) were not the first to use the term 'organisational learning' (cf Argyris & Schön, 1996: xvii-xix), their promulgation of the idea over nearly thirty years has proven extremely influential. In their search for a practice-relevant '*appropriate rigour*' (cf Argyris, 1992: 424-442), they consciously (ibid: 30-51) draw on the action research tradition of Lewin (1945) and Dewey (1938). As such, they have consistently worked to bridge the gap between the academic work on organisational learning which they characterise as 'intentionally distant from practice, non-prescriptive and value-neutral', (Argyris & Schön, 1996:188), and the practitioner-oriented literature which they say is usually "prescriptive, practice-oriented, value-committed, sometimes messianic, and largely uncritical" (ibid: xix). In turn, their work is both extensively referenced within the academic literature, as well as recognised for its influence on practitioners (Senge, 1990; Stacey, 2001: 13-14). They do not constitute the mainstream of organisational learning in its entirety, but they are certainly near to the heart of it.

Their concept of learning is influenced by the work of Bateson (2000 [1972]) and of their individual exploration of learning in social contexts (e.g. Argyris, 1957; Schön, 1991). Stacey (2001) has highlighted the influence of Bateson's

cybernetics on their characterisation of learning as the detection and correction of error, which they define as “a mismatch of outcomes to expectations” (Argyris & Schön, 1996: 31-3). However, they take care to distinguish between error (surprising outcomes) and mistakes (undesirable outcomes). Thus for Argyris & Schön, learning can consist correcting the behaviour that led to the outcome (treating the error as a mistake), or alternatively correcting the expectation which judges the outcome erroneous. That is, modifying the goal sought rather than the mechanisms used for reaching a desired goal. A failure to sustain a farming livelihood (a mistake) could give rise to a change in perspective where a more diversified livelihood was possible (an error under the previous worldview). Or a resigned expectation that climate change will destroy a way of life may turn out to be an error when the consequences are less than expected.

Argyris & Schön characterise the difference between learning that corrects behaviour and learning that corrects expectations as single and double loop learning respectively. The former is about efficiency, learning to undertake activities and achieve goals with increased skill. The latter is concerned with changes in the governing values of an organisation, in strategies and assumptions. The difference is that between “...doing things right and doing the right thing...The righter we do the wrong thing, the wronger we become.” (Ackoff & Pourdehnad, 2001: 199).

We suggest that theories of different orders of learning illuminate the qualitatively different kinds of adaptation open to a social system and perhaps outline some of the social qualities that correspond to increased adaptive capacity. In terms of the adaptation of a system, double loop learning can be thought of in terms of shifting assumptions and changes in the values of actors. Thus the ability to shift conceptual boundaries can itself be seen as an adaptive capacity, an aspect of deuterio-learning (cf §2.2). This is a core skill in systems practice (Blackmore & Ison, 1998), where working with the boundaries to attention is considered a way of avoiding the conceptual traps characterised by Vickers (1972). Skilfulness in boundary setting assists in spotting opportunities for reframing a situation, such as the example given above of diversification to achieve a sustainable livelihood instead of failure to achieve a sustainable farming livelihood.

Argyris & Schön (1996) consider double loop learning more difficult than single loop learning, precisely because it requires changes to values. As we discussed above, with respect to policy-oriented learning the link between group values and group identity can lead to collective inhibition of learning. Argyris & Schön point to the importance of individual and collective defensiveness in reducing the opportunities for double loop learning (ibid: 92), and distinguish between strategies that enhance or reduce individual or collective defensiveness. They define defensiveness in terms of embedded values:

“These strategies in turn, reflected deeper and more fundamental norms, strategies, and assumptions, for example:

- Protect yourself unilaterally by avoiding both direct interpersonal confrontations and public discussion of sensitive issues which might expose you to blame.

- Protect others unilaterally by avoiding the testing of assumptions where that testing might evoke negative feelings and by keeping others from exposure to blame.
- Control the situation the task by making up your own mind about the problem and acting on your view. Keep your view private, and avoid the public inquiry which might refute it.”

Argyris & Schön (1996: 68-69).

Argyris and Schön discriminate between different strategies (and the beliefs and values evoked by them) in terms of what they call ‘theories-in-use’, a theme which was picked up by Senge (1990: 174-204) in the form of mental models: “...deeply held internal pictures of how the world works.” Stacey (2001) links theories-in-use and mental models to the schemata of cognitivism (Piaget, 1971; Rumelhart, 1978), which are said to embody the “...rules and categories that order raw experience into coherent meaning” (Goleman, 1998: 75).¹³ As schemata (and theories-in-use) are socially constructed and can be considered to be communally held, there are several links between them and institutions. For example, for Argyris & Schön, theories-in-use are detectable in the consistencies of what people do, and thus are analogous to institutions perceived as the regularities in human affairs across people and over time (Shaffer, 1995). They are also linked to institutions in terms of the embodiment of values (Lowndes, 1996), in the sense that values form the basis of judgements about experience. An observation of Argyris & Schön is that theories-in-use often differ from the values that people claim to enact, which they call ‘espoused theory’. It is claimed that often the person concerned seemed unaware of the discrepancy, and a substantial part of Argyris & Schön’s practice consisted of creating a context in which the differences between espoused theory and theory-in-action could be surfaced. Thus, they distinguish between different kinds of action strategies for evaluating actions and making attributions, Those strategies that do not encourage enquiry and public testing of ideas are called Model I, whereas those that do are called Model II (Argyris & Schön, 1996: 157).

The consequences of Model I strategies, especially when information about a situation is vague, unclear, inconsistent, incongruent or scattered, are the creation of conditions of organisational defensiveness – “undiscussability, self-fulfilling prophecies, self-sealing processes and escalating error” (Argyris, 1992: 30). Model I strategies include unilateral actions to design and

¹³ In this view, learning consists of the revision and extension of schemata as a result of experience. There is a degree of recursivity involved because of the filtering of experience through previous schemata: “schemas and attention interact in an intricate dance. Active attention arouses relevant schemas; schemas in turn guide the force of attention. The vast repertoire of schemas lies dormant in memory, quiescent until activated by attention. Once active, they determine what aspects of the situation attention will track” (Goleman, 1998: 79-80). Thus what can be experienced (and hence learnt) is a function of what has already been learnt. Piaget’s (1971) contribution was to develop a typology of the stages of development that arise as a result during the cognitive development of children.

management the environment, protect the self and others, and to establish control and ownership of tasks (ibid: 94). This is said to result from a theory-in-action that emphasises the definition of firm goals, objective rationality and the suppression of negative feelings.

Model II, on the other hand, rests on values such as valid information, free and informed choice and joint responsibility. However, the action strategies concerned do not merely consist of doing the opposite of Model I:

“Model I emphasises that individuals advocate their purposes and simultaneously control the others and the environment in order to assure that the actor’s purposes are achieved. Model II does not reject the skill or competence to advocate one’s purposes. It does reject the unilateral control that usually accompanies advocacy because the typical purpose of advocacy is to win. Model II couples articulatedness and advocacy with an invitation to others to confront the views and emotions of self and other”

Argyris & Schön (1996: 117).

Argyris & Schön argue that there are different organisational cultures that incentivise Model I and Model II behaviour, which they name O-I and O-II learning systems respectively. In O-I learning systems, “there will be a tendency to minimize conflicts and disagreements by bypassing them and covering up the bypassing” (ibid: 107). O-II learning systems on the other hand are characterised by a spirit of open enquiry, dialogue and minimally defensive interpersonal relationships and group dynamics. In terms of institutions, O-I and O-II can be seen as a claim that different institutional architectures lead to different forms of adaptation, along with a characterisation of the institutional characteristics that allow for radical adaptation. O-I and O-II can also be linked to social capital, because distinguishing characteristic between O-I and the O-II learning systems is the degree to which relationships of trust can be fostered.

It is worth noting that Argyris & Schön assert that most organisations contain O-I learning systems (Argyris & Schön, 1996: 111), and that O-II learning systems are unlikely to actually be found in practice. Instead they focus on the practice that is necessary in order to move towards the O-II, seen as an ideal state. Thus Argyris & Schön (1996: 117) are clear that they are normatively seeking to spread the governing values of Model II - “...valid information, free and informed choice, and internal commitment”. However, this raises some interesting questions. If these values are inherently superior, then why are they so rare? Does defensiveness have social value? For instance, Goleman (1998) who traced a similar link between persistent and pathological error¹⁴, socially constructed unconsciousness (see section 3.4 above) and defensive behaviour is much more ambiguous about the role of defensiveness, pointing out that the game of not surfacing uncomfortable

¹⁴ “There is an almost gravitational pull toward putting out of mind unpleasant facts. And our collective ability to face painful facts is no greater than our personal one. We tune out, we turn away, we avoid. Finally we forget, and forget we have forgotten. A lacuna hides the harsh truth.” (Goleman, 1998: 244.)

truths has its place in social life too. He says, “Somewhere between the two poles – living a life of vital lies and speaking simple truths – there lies a skilful mean, a path to sanity and survival” (ibid:251). This suggests that some aspects of Model I can be valuable for their contribution to organisational life and continuity – the question is one of balance rather than choosing between two mutually exclusive alternatives.¹⁵

Argyris & Schön’s ideas are certainly not immune to criticism, especially from a social constructivist perspective. Nonetheless, they quite consciously hold in tension opposing ideas such as a pre-eminence for individuals as learners and the possibility of organisations that learn in their own right. Even the realist flavour of their cognitivist model of learning is textured by their understanding of how learning arises through social interaction (see Schön, 1987, 1991; Schön, 1995, for a description of how professional learning arises which has many similarities to Lave & Wenger’s, 1991 situated learning). Their analysis of the importance of unconscious action and the way that it is promulgated and institutionalised offers a doorway to understanding informal institutions, as well as the value systems that cause tacit action to become pathological. However, they still treat the tacit as something very much to be managed and controlled, in contrast to the other two lineages examined below.

4.2 Communities of Practice

The term Communities of Practice has its origins in the work of Lave & Wenger on situated learning (cf Lave & Wenger, 1991, cited in Ison et al, 2000). Their approach arose from ethnographic research, observing how newcomers integrated with existing communities of practice, which they define as the self-organising groups whose shared identity arises from their mutual engagement in a common practice. In this sense, their work has similar origins to the work of Schön (1987; 1991) on reflective practitioners, because of the latter’s interest in how professional competence arises

However, while Schön was interested in how practice is taught, Lave and Wenger approached the practice from the point of view of how it is learned, and developed a perspective that is specifically social (Brown & Duguid, 1991). It rejects cognitivist explanations of learning, holding that

“...learning is located in the process of co-participation, not in the heads of individuals. Researchers in this emerging tradition ask what kinds of social engagements provide the proper context for learning to take place. Learning is a way of being in the social world, not a way of coming to know about it,”

Ison et al (2000: 41).

Wenger developed the idea of a community of practice (CoP) through further ethnographic work (Wenger, 1999), building a rich analytical conceptual framework that unpacks the relationships between learning, practice and

¹⁵ The viability of different action strategies and the skilfulness and propriety in different situations of Model I and Model II strategies will be investigated during the empirical phase of the project.

social identity in organisational life. For Wenger (1999: 47), practice means "...doing, but not just doing in and of itself. It is doing in a historical and social context that gives structure and meaning to what we do." CoP organise themselves around practice, defining themselves in terms of joint enterprise, shared repertoire, and mutual engagement (ibid, §3). Joint enterprise means that members of the community in effect negotiate a mutual set of goals that are present through the ways that they hold one another accountable. Shared repertoire means the community has a set of resources (whether these are symbols, activities or whatever), which give common points of reference and the opportunity for the negotiation of new meaning. Mutual engagement means that members of the community do things together which have a meaning for them, which they negotiate amongst themselves – a form of social capital.

Because practice takes time to develop, and requires sufficient mutual engagement to transform the identities of their constituent members, they can be thought of in terms of shared histories of learning (ibid: 86). That mutual engagement within a CoP produce shared meaning amongst the members of the CoP is not a particularly new idea. This is evidenced by Kanter's (1977) quotation of Adam Smith "But the understanding of the greater part of men are necessarily formed by their ordinary employments." However, learning is so intrinsic to CoP that Wenger (2000b: 4) suggests that they may represent the "natural social structure for the ownership of knowledge."

For Wenger, learning in a COP arises through participation and reification, which are conceived as the dual modes through which meaning is socially negotiated. Participation refers to "...the process of taking part and also to the relations with others that reflect this process. It suggests both action and connection" (Wenger, 2000a: 55). Participation is thus an active social process, referring to the mutual engagement of actors in social communities, and the recognition of the self in the other. Reification is the process by which "...we project our meanings into the world, and then we perceive them as existing in the world, as having a reality of their own" (ibid: 58). Thus reification can refer to the social construction of intangible concepts as well as the meanings that members of a community of practice see embedded in physical objects.

The two modes of mutual engagement operate together, and as they develop reification can lead to participation and vice-versa. This understanding has been used as the basis of simple learning systems, in the sense of an heuristic device to interrogate views of learning processes, within research on learning and communication in sustainable development (High, 2002, §4). This offers a simple tool to unravel different kinds of learning with respect to adaptive capacity, along different dimensions from the single/double loop learning discussed in the previous section, an application piloted by High (ibid, §4.3 & §4.4), but not developed into a full methodological application. Because Wenger theorises that the relationships between different COP operates through the same dimensions of reification and participation (Wenger, 1999:), an extension of this tool could be used to track the way that learning within one COP triggers learning elsewhere, something which High

(2002, §5) demonstrated to be of utility when considering both inter- and intra-organisational learning processes.

The CoP perspective differs from much of the work on organisational learning already discussed above in two important respects. Firstly, CoP offers a more positive interpretation of the interplay of the contrasting interests of individuals and collectives within organisations or regimes. A persisting theme across Argyris' work, (Argyris, 1957, for example), is the fundamental conflict between being in a group and being an individual (Stacey, 2000: 187). Whereas, for Wenger, the individual's experiences are made meaningful in the group context, he argues that "for each case in which an individual's creativity is squelched by a conformist community, there is another case in which a social activity is a source of insight" (Wenger, 1999: 147).

Secondly, there is the strong relationship between CoP and non-canonical practice (Brown & Duguid, 1991). That is the practices through which CoP in organisational settings arise are the actual (rather than the organisationally espoused) 'ways that things work'. Thus CoP are not necessarily reified (Wenger, 1999: 152), and are often not recognised by the organisations which they permeate. Brown & Duguid (1991: 110-111) put it this way: CoPs are "more fluid and interpenetrative than bounded, often crossing the restrictive boundaries of the organization to incorporate people from outside".

Constellations of communities of practice, which comprise networks of relationships between different CoP (cf Wenger, 1999: part II), therefore represent an alternative view of the social architecture of organisations, focussing on the relationships experienced as meaningful by people rather than the formal, canonical relationships sanctioned by the management. Brown & Duguid argue that recognising the existence of CoP is essential:

"Rejection of a canonical, predetermined view and the construction through narrative of an alternative view... involve, at heart, the complex intuitive process of bringing the communicative, community schema into harmony with the environment by reformulating both. The potential of such innovation is, however, lost to an organization that remains blind to noncanonical practice" (Brown & Duguid, 1991: 114).

However, that is not to say that if canonical organisational structures are not the whole story, then the solution is to extend management activity to the control of CoP. Instead, CoP are held to have a life of their own, arising in response to the challenges produced by the operation of the canonical organisation. Thus they respond to canonical management initiative rather than being the subject of it, as Senge (1990: 58) puts it: "the harder you push, the harder the system pushes back." So while Wenger says that legitimising the work of CoP can be important for driving innovation within an organisation, (Wenger, 2000b: 8), he also says that "A knowledge strategy based on communities of practice is not a plan to be designed and implemented. It is more akin to a social movement that gains momentum as a new idea spreads, changing people's expectations and sense of possibilities" (ibid: 18). Aimed at a management audience, he adds that:

"The knowledge strategy I have just described may come both as a relief and as a worry. On the one hand, it may be a relief that you

don't have to "manage" knowledge yourself. Communities of practice will do it for you. And because it is their knowledge, they are best qualified for the task and they will even do it gladly, given the right circumstances and support. On the other hand, this news may come as a worry because you do have to deal with communities that have a life of their own. You cannot regiment them easily. But if you really believe that your organisation has to run on knowledge and learning, then the regimenting idea was not a good one anyway. If you are really going to dance, don't look for a puppet. Would you not rather delight in the responsive unpredictability of a skilful partner?" Wenger (2000b: 19).

The link between CoP, informal networks and non-canonical activity in organisational settings is an important link between this body of theory and the concerns of the Rapid Climate Change Project. Another such link is between CoP and social capital, something which Lesser & Prusak (2000) have discussed. Although their discussion is quite brief and based on an instrumental, top-down reading of both social capital and CoP, it shows that there is scope for further exploration of the links to be done. This could be approached by clearly mapping opportunities or barriers for synthesis between CoP and social capital. For example, one could consider the role that bridging, bonding and linking social capital play in the operation of CoPs, constellations of CoP and canonical hierarchies. Wenger constructs CoP in terms of shared identity, and thus CoP map well to groups characterised by bonding capital, whereas the discontinuities in larger social configurations which lead Wenger to treat them as constellations (Wenger, 2000b: 126-128) might be better understood in terms of bridging capital.

Understanding the relationships between the concepts within these two theoretical traditions could start to illuminate a range of questions. When and how do loose networks become transformed into tight-knit communities? In what circumstances do different sets of social relations give rise to or inhibit adaptive capacity? How do power relations play out in these relations? And does this affect the flow of knowledge, ideas and adaptive opportunity?.

Finally, a promising line of enquiry is exploring the links between Wenger's work and new institutional literature; between institutions and CoPs. It is not immediately clear how the two theoretical areas map onto one another, because the language used is quite different. Wenger, for example, tends to use 'institution' to refer to the canonical organisational context in which CoPs operate in contrast to CoPs themselves.

However, at the very least, CoPs offer a perspective on how informal institutions arise and develop, and their relationship to formal institutional structures. The CoP perspective leads to a quite different interpretation of the relationships between actors, institutions and organisational processes than would be offered from a canonical perspective. For instance, an important consequence of reification within CoPs is that the institutions arising within the canonical organisation are locally interpreted within CoPs, and given meaning in relation to the ongoing practice of the community. Further exploration could focus on comparing Wenger's discussion of the negotiation of meaning in practice centred on mutual engagement, joint enterprise and shared repertoire

with the New Institutional literature's views on institutional dynamics and learning, in order to provide further illumination of the relationship between learning and institutions, and hence of adaptive capacity.

4.3 The Hertfordshire School

The 'Hertfordshire School' refers to the body of academics and management consultants with a common interest in the implications of understanding organisations in terms of theories of complexity, self-organisation and emergence (Stacey et al, 2000), based in the Complexity and Management Centre at the University of Hertfordshire. They see a deep connection between their collective project and questions that have exercised Western thinkers for millennia:

“Are we to understand change in our world only as the unfolding, or revelation, of forms that are there in some way? Or, are we also to understand change as a process that brings into being new forms that have never existed before? Put slightly differently the question becomes whether our future is knowable or whether it is in a process of perpetual construction and, therefore, unknowable. ”

Stacey et al (2000: 183)

In terms of adaptive capacity, the latter view challenges the idea that adaptive capacity consists of a store of potential responses and instead consists of a constantly evolving capacity to respond in novel ways.

To understand these issues, the Hertfordshire School draw on complexity science, an emerging tradition finding application across a range of traditional disciplines (cf Capra, 2002). In the social sciences, it has been used as a source of insight in economics (Anderson et al, 1988), globalisation (Urry, 2003), development studies (Rihani, 2001) and political science (Jervis, 1997). This is not to say that complexity theory should be approached as a coherent body of work. Stacey et al (2000: 86) argue that “there is as yet no single science of complexity but, rather, a number of different strands comprising what might be called the complexity sciences.” Rather than draw literally on applications of complexity theory developed in the physical sciences, they treat complexity science as a source of analogy or metaphor, aware that, “...it is easy to take concepts from complexity thinking in the natural sciences, apply them indiscriminately, either directly or by analogy, and present quite unjustifiable management prescriptions” (ibid: 19). It is perhaps for this reason that they seek to ground the insights they receive from complexity theory in their own experience as management practitioners as well as in other traditions of thought.

As an intellectual tradition, complexity theory has many things in common with the longer established systems movement, including cross-disciplinary application, an holistic (rather than reductionist) orientation, and a focus on emergent phenomena. Therefore some, such as Capra (2002, 1996 #887), see complexity as merely the latest development in systems theory. This is something the Hertfordshire academics resist. For them, complexity offers an alternative, tackling a perceived failure of systems theory to address human freedom and the origins of novelty (Stacey, 2000: 56-84).

The Hertfordshire School analyse the distinction between their approach and applications of systems theory in management (and in fact the whole gamut of management theory) in terms of teleology. Stacey et al (2000, §2) explain that they are interested in teleology, because the question of purpose cannot be excluded from considerations of human affairs, and claim that even in the natural sciences where teleology is considered unnecessary, it has simply gone underground; where it cannot be subject to any serious scrutiny. This they say is important, because various teleological theories are uncritically imported from natural science contexts when complexity is used in order to understand how organisations change. Stacey et al (2000) argue for a transformative teleology that does not assume a known future state, but instead sees the future as something under perpetual construction, arising from the unfolding of the present moment (ibid, §3). They contrast it with a formative teleology that assumes emergent phenomena are already implicit in systems, ready to emerge under the right conditions.

Under a transformative teleology, Stacey et al (2000) argue, one sees a paradox – both transformation and continuity arising from the micro interactions between entities. They give the example of an argument between man and wife:

“...a husband says quietly to his wife, “I was thinking of going to the football match”, and she shrieks, “You are so selfish. You don’t love me or the children.” He guiltily replies, “But I haven’t been out for three weeks,” and she replies, “I have been stuck here with the children for days.” From there on the exchange might develop into a contrite reconciliation or a full-blown row. Notice how the movement of the communication transforms what the husband may have thought of as a tentative enquiry into something quite different – an act of extreme selfishness. As these two continue they cannot know how their interaction will develop. When he makes his comment he cannot know what it will lead to this time around, and nor can she; but at the same time, both recognize the pattern as they engage in it. It has happened before but each time it happens the pattern takes an unpredictable form. Note too how each statement takes meaning from the subsequent response and even changes meaning in the light of even later responses”

Stacey et al (2000: 33-34).

The example describes a particular pattern of dynamics that hold great significance for the Hertfordshire academics, and for complexity theorists more generally. It is described by Griffin et al (1999: 302), as the edge of chaos; one of three broad kinds of dynamics, and lying at the boundary between “stability, regularity and predictability”, and “randomness, utter chaos and tremendous instability”. The edge of chaos concerns a “paradoxical dynamics of bounded instability”. Thus novelty emerges, but in a form that is at least potentially positive, and with a sense of continuity in relation to earlier forms. In human affairs this translates as:

“For us, organization is a process of joint action in which patterns in that action are both repeated to preserve continuity and stability and at the

same time opened up to create the possibility of transformation, the truly novel” (Stacey et al, 2000: 83).

For the Hertfordshire School, this dynamic emerges socially from the ongoing self-organising, micro-interactions between actors. Power relations still exist, but they are no longer constructed in top-down terms (perhaps with a corresponding idea of resistance) from the point of view of a manager who directs activities within an organisation, forcing compliance where necessary. Instead, power arises between humans in their relationships, and is a characteristic of all relationships. Shaw (2002: 72-74) speaks of “power figurations”, which “...evoke the sense of patterning emerging through the dynamic mutual constraining-enabling of one another in our shifting webs of relating”. She links this once more with the edge of chaos, noting that power figurations simultaneously perpetuate and transform our agency, before finishing,

“...What is more, although we may be developing political intentions, consciously making bids to influence the course of events, shifts in power figurations occur spontaneously and unpredictably beyond the control of any one party or group, as is the nature of all self-organising processes” (Shaw, 2002: 73-74).

Within social groups, the Hertfordshire School make an explicit link between power as constraining-enabling and the edge of chaos. So, Griffin et al (1999: 304-305) have argued that the actions of those who hold power in relation to others during the emergence of a community of practice (they use the example of a therapy group) can do much to affect the subsequent dynamics. They say that the “distant, persecuting employment of power”, to control peoples’ behaviour leads to chaos and disintegration, whereas “gratification and indulgence”, the abdication of influence and leadership, leads to stuck routines of behaviour, where individuals are not challenged to innovate. It is the skilful application of power by its members that leads a group to the edge of chaos and the conditions where change and growth as well as continuity are possibilities. It is interesting to note that Griffin et al (1999: 305) characterise such group dynamics in terms of trust and liking. Hence there is a link between a self-organising social network operating at the edge of chaos, a community with high social capital arising from the form of trust marked by mutual emotional commitment, and Wenger’s communities of practice founded in mutual engagement and the building of a common identity.¹⁶

In organisational contexts, the Hertfordshire School locate self-organising networks and innovation in the non-canonical organisational structures that permeate organisations. They refer to these as the ‘shadow system’ (Stacey, 1996; Shaw, 1997), a term which has connotations of shadow-versus-legitimate (Stacey, 2000: 376-386; Stacey, 2001: 167-168). This is not to say that shadow networks exist separately from canonical organisational networks. Instead, shadow systems are a “complex web of interactions in

¹⁶ We are suggesting liking and co-identification are essentially the same – I like you is pretty close to I am like you in more than just a sense of wordplay.

which social, covert political and psycho-dynamic systems coexist in tension with the legitimate system.” (Shaw, 1997: 235). However, an analysis of learning and change in organisations that ignores the shadow system would be considered an inadequate one by the Hertfordshire School, given that the shadow system can be identified as where ‘things get done anyway’. In other words focussing attention solely on the formal systems of an organisation hides the details of ordinary, everyday life in organizations (Stacey, 2000). This argument adds weight to the view being formulated within the theoretical framework for this project that informal institutions and their relationship to formal institutions, organisational forms and formally defined roles are a critical part of understanding the pathways through which adaptive behaviour unfolds.

The implications of the work of the Hertfordshire School for practice within organisations are profound. The Hertfordshire school takes a fundamentally different approach from institutional theorists such as North (2001), who while recognising that informal institutions are important, nevertheless prefers to focus on formal institutions because these are subject to top-down control, making them more visible and amenable to public policy than shadow systems and informal institutional rules. In contrast Shaw (2002) suggests that engagement from within the shadow system offers a viable alternative to ignoring, merely tolerating or attempting to bring shadows within the sphere of formal management and control. In this respect, the Hertfordshire School seem to share a congruent analysis of organisational life with the CoP tradition, but in our judgement have developed a much richer and more coherent practice as a consequence.

Shaw (1997; 2002), for example, says that the question is not so much one of how to go about changing organisations, but how to participate in the way that things change over time. This involves “conceptual ability brought to bear on the large-scale combined with individual skills of communication exercised at the small scale.” (Shaw, 2002: 172). It requires a leap of faith and a shift in assumptions in organisational practice to a way of being where trust is invested in the abilities of individuals and groups within interpenetrating formal and informal organisational structures to make sense of the changing situations within in which they find themselves, and to create and develop new organisational behaviours¹⁷. As Stacey puts it:

“Mainstream prescriptions on these matters are directed at “you”...But who is this “you”?...From the perspective I am suggesting, organizational knowledge is an evolutionary process of communicative interaction in which “you” is every member of an organization as they go about their everyday, responsive, relational lives. This by no means excludes the powerful, the expert, the leader, the manager, or anyone else. This perspective by no means denies the enormous power that some have and the little power that others have. Instead, one understands these enormous power differences as arising in the communicative interaction in “local” situations between the more and

¹⁷ We shall take questions about the interplay between formal and informal action and the limits to both to the empirical part of our research.

less powerful and seeks to understand their part in the knowledge creating process.”

Stacey (2001: 234)

Thus the Hertfordshire School offers an understanding of adaptation as an unfolding movement into the future, taking place within a flexible, shadow system. Institutions can be read as the regularities in social life, but they are not fixed for all time and are not designed objects. At the edge of chaos they are continually reconstructed in the moment through the ongoing, local interaction of organisational actors. We suggest that this perspective does describe a way of working with adaptation and adaptive capacity, but not from an external top-down position. Instead adaptive capacity unfolds from the quality of relationships in the living present, and this suggests that policymakers and researchers alike should pay attention to the quality of the relationships they enter into while analysing situations.

It is harder to see the links between the Hertfordshire School and social capital. However, if we consider social capital to be an emergent property of formal and informal networks, then the Hertfordshire perspective raises the question of the extent to which such social capital (and other emergent phenomena at the social level) are resistant to direction on the part of powerful individuals and elites. North's position in contrast is that the agency of the powerful is the primary driver of institutional and organisational forms (see A1 below). A compromise position that a key capacity for the exercise of power in relationships is the ability to work with and manipulate non-canonical institutions bears further examination. In any case, if shadow systems represent alternative sites and vehicles for power to influence adaptive behaviour within organisations and regimes, then the consequences for policy and practice with respect to rapid climate change could well be quite profound.

5 Conclusions: Learning, informal institutions and adaptation to rapid climate change

In conclusion, we can point to several areas in which the literature on organisational and social learning enriches our understanding of adaptation. First, a systems view of learning reveals adaptation as a process which is analogous to learning, and which can be discussed in the same terms as learning, provided that one accepts the legitimacy of viewpoints that recognise the agency of social systems¹⁸. Examination of the literature on social learning reveals connections between collective and individual learning and problematises the idea that collective learning derives straightforwardly from individual learning. This suggests that an analysis of adaptation or adaptive capacity needs to address nested levels of adaptation, and to address the way that processes at different scales (and different types of scale) emerge from or shape one another.

¹⁸ The link between collective agency and the agency of actants in Actor-Network Theory (Law, 1992; Fox, 2000)..

Secondly, although the relationship between institutions and adaptation can be interpreted in terms of the institutional structuring of individual learning, a consideration of collective learning suggests way that institutions arise out of adaptation. This is if institutions are interpreted as inter- or intra-organisational behaviours, in the sense that organisations exist in order to co-ordinate individual behaviour, then changes in institutions can be understood in terms of our definition of learning, and hence as adaptation. Our interpretation of institutions in terms of regularities arising at the edge of chaos provides a particularly dynamic view of institutions. This view is made richer by considering how existing institutions might be said to determine how institutions are produced in a process reminiscent of deuterio-learning. Whether institutional change arises as a result of individual agency or through the production and perpetuation of institutional forms in the relational space that exists between individual actors bears further examination. Comparison and synthesis between the underlying theories of power within the different theoretical lineages we draw on is therefore a key challenge in constructing a coherent framework for the project.

Thirdly, although we have deliberately selected theory that relates to the informal side of organisations, the theory we have reviewed supports our view that informal institutions are important. We have found a spectrum of opinion on the significance of informal institutions for learning (and in our terms adaptation). Argyris & Schön see informal institutions as inherently conservative and a source of resistance to learning, to be overcome by formal policy and action, but in quite a different form – their practice consisted of creating conditions for dialogue to redirect individual values towards more constructive ways of cooperative behaviour. In contrast, Wenger and the Hertfordshire School see non-canonical communities of practice and the shadow system as the essential drivers of organisational evolution and responsiveness to change.

Building on the position that non-canonical forms are important, the argument supported in this paper is that learning and adaptation are enhanced because informal institutions encompass a degree of flexibility and alignment with individual interests that allows a degree of co-ordinated individual behaviour in the face of uncertainty and change. Examination of the conditions where this occurs is therefore central to the project. For example, each of the three lineages of social learning in organisations reviewed in this paper emphasise that the conditions in which collective and individual learning achieve a degree of alignment can be characterised in terms of trust, an important theme in the social capital literature. Seeing trust as an expression of human feeling, rather than an abstract theoretical variable is an important part of the practice side of the lineages we have examined. Thus it can be understood as an emotional commitment to the well being of another and the expectation that they will reciprocate, marked by mutual engagement, co-identification and a commitment to surfacing and dealing with differences rather than suppressing them.

Fourthly, consideration of shadow networks challenges the idea of control. It is interesting to note that Argyris & Schön (1996), who are most wary of engaging with shadow networks, are most closely associated with a

managerial perspective. Both Wenger (2000b), and the Hertfordshire school (Stacey et al, 2000) are critical of the idea that informal networks can be managed, and that attempts to do so are necessarily helpful. Instead they advocate working with shadow networks, respecting their locally produced 'way of doings things' and seeking to engage with them where possible. This suggests a contingent, exploratory approach to organisational change and social adaptation: "An exploratory process [in organisational practice with regard to learning and knowledge] oriented to practice is necessary because the formal structure of the organisation may not be a good point of departure. In fact, it is precisely where the formal organization leaves some white spaces – as any structure inevitably does – that the greatest potential [for adaptation] often exists" (Wenger, 2000b: 9).

In some cases this might imply taking a hands-off or at least non-controlling approach to the informal, a metaphor of allowing rather than controlling that any wildlife gardener would be familiar with. It certainly requires a deeper appreciation of the local production of organisational behaviour, and the degree to which organisational insiders are involved in creating and maintaining the institutions that actually co-ordinate activities. This is not to imply that an oppressive culture tied to shadow networks of power is any less undesirable or counter-productive than an oppressive management. Power will be enacted, given substance through routineised behaviour and reproduced or challenged in relationships within the formal and informal realms. At present, however, equating informal networks of the shadow system with negative influences such as corruption or denying their existence misses an opportunity to work with the informal to build adaptive capacity and foster adaptation

References

- Ackoff, R. & Pourdehnad, J. (2001). **On misdirected systems** in **Systems Research and Behavioral Science** (18): pp. 199-205.
- Anderson, P.W., Arrow, K.J. & Pines, D., Eds. (1988). **The economy as an evolving complex system**. Redwood City, CA, Addison-Wesley.
- Argyris, C. (1957). **Personality and organisation: the conflict between system and the individual**. New York, Harper and Row.
- Argyris, C. (1992). **On organizational learning**. Cambridge, Massachusetts, Blackwell Business.
- Argyris, C. & Schön, D. (1978). **Organizational Learning: A theory of action perspective**. Reading, Massachusetts, Addison-Wesley Publishing Company.
- Argyris, C. & Schön, D. (1996). **Organisational learning II - Theory, learning and practice**. Reading, Massachusetts, Addison-Wesley Publishing Company, Inc.
- Armson, R. & Ison, R.L. (2000). **T306 Block 1 - Juggling with complexity: Searching for system**. Milton Keynes, Open University Press.
- Ashby, W.R. (1956). **An introduction to cybernetics**. London, Chapman & Hall.
- Bateson, G. (2000). **Steps to an ecology of mind**. London, The University of Chicago Press, Ltd.

- Bennett, J. (2001). **The relationship between team and organisational learning** in *International Journal of Health Care Quality Assurance* 14(1): pp. 14-20.
- Blackburn, J. & Holland, J., Eds. (1998). **Who changes? Institutionalizing participation in development**. London, Intermediate Technology Group.
- Blackmore, C. & Ison, R. (1998). **Boundaries for thinking and action** in Thomas, A., Chataway, J. & Wuyts, M., Eds. **Finding out fast**. London, Sage, pp. 41-66.
- Blackmore, C., Ison, R.L. & Chapman, J. (2000). **T306 Block 4 - Managing sustainable development: learning with other stakeholders**. Milton Keynes, Open University Press.
- Broad, C.D. (1923). **The mind and its place in nature**. London, Kegan Paul, Trench and Trubner.
- Brown, J.S. & Duguid, P. (1991). **Organizational learning and communities of practice: Towards a unified view of working, leaning and innovation** in *Organization Science* 2(1): pp. 40-57.
- Burton, I., Kates, R.W. & White, G.F. (1993). **The environment as hazard**. London, Guildford Press.
- Capra, F. (1996). **The web of life**. New York, Anchor/Double Day.
- Capra, F. (2002). **The hidden connections**. London, HarperCollins.
- Caskie, P. & Moss, J.E. (1998). **The beginning of the end or the end the beginning for the BSE crisis?** in *Food policy* 23(3/4): pp. 231-240.
- Checkland, P. (1985). **From optimizing to learning : A development of systems thinking for the 1990s** in *Journal of the Operational Research Society* 36(9): pp. 757-767.
- Checkland, P. (1999). **Soft systems methodology: a 30-year retrospective** in Checkland, P., Ed. **Systems thinking, systems practice**. Chichester, John Wiley & Sons.
- Checkland, P. (1999). **Systems thinking, systems practice**. Chichester, John Wiley & Sons.
- Checkland, P. (2000). **Soft systems methodology: a 30-year retrospective** in *Systems Research and Behavioral Science* (17): pp. S11-S58.
- Checkland, P., Clarke, S. & Poulter, J. (1996). **The use of soft systems methodology for developing HISS and IM&T strategies in NHS Trusts** in *Healthcare computing*: pp. 223 - 233.
- Checkland, P. & Scholes, J. (1990). **Soft systems methodology in action**. Chichester, Wiley.
- Choleris, E. & Kavaliers, M. (1999). **Social learning in animals: Sex differences and neurobiological analysis** in *Pharmacology, Biochemistry and Behaviour* 64(4): pp. 767-776.
- Coles, E., Smith, D. & Tombs, S., Eds. (2001). **Risk Management and Society: Advances in Natural and Technological Hazards Research**, Kluwer.
- Cooke, B., Ed. (2002). **Participation: The new tyranny?** London, Zed Books.
- de Vibe, M., Havland, I. & Young, J. (2002). **Bridging research and policy: An annotated bibliography**. Working paper, No. 174, Overseas Development Institute, London.
- Dewey, J. (1938). **Logic: The theory of inquiry**. New York, Holt, Rhinehart and Winston.

- DfID (2003). **Promoting institutional and organisational development.** DfID Issues, No. 1861925352, Department for International Development, London.
- di Stefano, A. (2000) **Beyond the rhetoric: A grounded perspective on learning company and learning community relationships** Ph.D., Open University, Milton Keynes.
- Elwyn, G., Greenhalgh, T. & Macfarlane, F. (2001). **Groups: A guide to small group work in healthcare, management, education and research.** Abingdon, Oxon, Radcliffe Medical Press.
- Espejo, R. & Harnden, R., Eds. (1989). **The viable system model.** Chichester, John Wiley & Sons.
- Fernandez-Gimenez, M.E. (1999). **Reconsidering the Role of Absentee Herd Owners: A View from Mongolia** in *Human Ecology* 27(1): pp. 1-27.
- Flood, R.L. (1999). **Rethinking the fifth discipline - Learning within the unknowable.** London, Routledge.
- Fox, S. (2000). **Communities of practice, Foucault and Actor-Network Theory** in *Journal of management studies* 37(6): pp. 853-867.
- Fritz, J. & Kotrschal, K. (1999). **Social learning in common ravens, *corvus corax*** in *Animal Behaviour* 47: pp. 785-793.
- Giddens, A. (1984). **The construction of society: Outline of the theory of structuration.** Berkeley, CA, University of California Press.
- Gifford, C. (2001). **Deregulation and BSE** in Tombs, S., Ed. **Risk Management and Society: Advances in Natural and Technological Hazards Research.** Kluwer, pp. 207-226.
- Goleman, D. (1998). **Vital lies, simple truths.** London, Bloomsbury Publishing.
- Griffin, D., Shaw, P. & Stacey, R. (1999). **Knowing and acting in conditions of uncertainty: A complexity perspective** in *Systemic practice and action research* 12(3): pp. 295-309.
- Griffin, E. (1991). **Social learning theory of Albert Bandura** in Griffin, E., Ed. **A first look at communication theory.** McGraw-Hill, pp. 367-376.
- Griffin, E. (1997). **Groupthink of Irving Janis** in Griffin, E., Ed. **A first look at communication theory.** McGraw-Hill, pp. 235-246.
- Gross, R. (1996). **Psychology - The science of mind and behaviour.** London, Hodder and Stoughton Educational.
- Hall, P.A. & Taylor, R.C.R. (1996). **Political science and the three New Institutionalisms** in *Political Studies* 44: pp. 936-957.
- Hay, C. (2002). **Political analysis: A critical introduction.** Basingstoke, Palgrave.
- Hay, C. & Wincott, D. (1998). **Structure, agency and historical institutionalism** in *Political Studies* 46(5): pp. 951-957.
- Henderson, S. (1997). **Black swan's don't fly double loops: The limits of the learning organization** in *The Learning Organization* 4(3): pp. 99-105.
- Heylighen, F. (1989). **Self-organization, emergence and the architecture of complexity.** Proceedings of the 1st European Conference on Systems Science, Paris, AFCET.
- High, C. (1998). **Education from the receiving end - reflections on a learning history.** Australia and New Zealand Fourth Annual Systems Conference, UWS-Hawkesbury, Sydney, October 1998.

High, C. (2002) **Opening spaces for learning: A systems approach to sustainable development** PhD thesis, Centre for Complexity and Change, Open University, Milton Keynes.

Hinchcliffe, S. (2001). **Indeterminacy in-decisions – science, policy and politics in the BSE (Bovine Spongiform Encephalopathy) crisis** in *Transactions of the Institute of British Geographers* 26(2): pp. 182-204.

Hulsen, P. (1998). **Back to basics: A theory of the emergence of institutional facts** in *Law and philosophy* 17(3): pp. 271-299.

Huppert, W. (1996). **Participation and service orientation**. ZOPP marries PRA? Participatory learning and action - a challenge for our services and institutions, Eschborn, November 1996, Deutsche Gesellschaft für Technische Zusammenarbeit.

Hutchins, E. (1996). **Organizing work by adaptation** in Cohen, M. D. & Sproull, L. S., Eds. **Organizational Learning**. London, Sage Publications Ltd, pp. 20-57.

IDS (1996). **The power of participation: PRA and policy**. Policy Briefing, No. 7, Institute for Development Studies, Brighton.

Ison, R.L. (1990). **Teaching threatens sustainable agriculture** in *Gatekeeper series SA21*: pg. 18.

Ison, R.L. (1994). **Designing learning systems: how can systems approaches be applied in the training of research workers and development actors?** Systems-oriented research in agriculture and rural development, Montpellier, France, November 1994, CIRAD-SAR.

Ison, R.L. (2000). **Systems approaches to managing sustainable development: Experiences from developing supported open-learning**. IFSR Conference, Santiago, 2000.

Ison, R.L., High, C., Blackmore, C. & Cerf, M. (2000). **Theoretical Frameworks for Learning-Based Approaches to Change in Industrialised-Country Agricultures** in Cerf, M., Gibbon, D., et al, Eds. **Cow up a tree - Knowing and learning for change in agriculture: Case studies from industrialised countries**. Paris, INRA.

Ison, R.L. & Russell, D.B. (2000a). **Agricultural extension and rural development: Breaking out of traditions**. <http://www.loc.gov/catdir/samples/cam032/98051725.pdf>, Accessed.

Ison, R.L. & Russell, D.B., Eds. (2000b). **Agricultural extension and rural development: Breaking out of traditions**. Cambridge, Cambridge University Press.

Jäger, J. & O'Riordan, T. (1996). **The history of climate change science and politics** in O'Riordan, T. & Jäger, J., Eds. **Politics of climate change: A European perspective**. London, Routledge, pp. 1-31.

Janis, I. (1972). **Victims of groupthink**. Boston, Houghton Mifflin.

Janis, I. (1989). **Groupthink: The problems of conformity** in Morgan, G., Ed. **Creative organization theory**. Beverley Hills, Sage Publications, pp. 224-228.

Jarvis, P., Holford, J. & Griffin, C., Eds. (1998). **The theory and practice of learning**. London, Kogan Page Limited.

Jenkins-Smith, H.C. & Sabatier, P.A. (1993). **The study of public policy processes** in Sabatier, P. A. & Jenkins-Smith, H. C., Eds. **Policy change and learning: An advocacy coalition approach**. Boulder, Westview Press, pp. 1-37.

- Jervis, R. (1997). **System effects: Complexity in political and social life**. Princeton, Princeton University Press.
- Joiner, R. (1989). **Mechanisms of cognitive change in peer interaction: A critical review**. Critical review, No. 60, Centre for Information Technology in Education, Open University, Milton Keynes.
- Kameda, T. & Nakanishi, D. (2003). **Does social/cultural learning increase human adaptability? - Roger's question revisited** in **Evolution and human behaviour** 24(4): pp. 242-260.
- Kanter, R.M. (1977). **Men and women of the corporation**. New York, Basic Books.
- Kersten, S. (1995) **In search of dialogue: Vegetation management in western NSW, Australia** Ph.D. thesis, Crop Sciences, Faculty of Agriculture, University of Sydney, Sydney.
- Kiser, L.L. & Ostrom, E. (1982). **The three worlds of action: A metatheoretical synthesis of institutional approaches** in Ostrom, E., Ed. **Strategies of political enquiry**. London, Sage, pp. 179-222.
- Korten, D.C. (1980). **Community organizations and rural development: A learning process approach** in **Public administration review** (September/October 1980): pp. 480 - 511.
- Lave, J. & Wenger, E. (1991). **Situated learning: Legitimate peripheral participation**. Cambridge, Cambridge University Press.
- Law, J. (1992). **Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity** in **Systems Practice** 5(4): pp. 379-393.
- Lesser, E. (2000). **Communities of practice, social capital and organizational knowledge** in Lesser, E. L., Fontaine, M. A. & Slusher, J. A., Eds. **Knowledge and Communities**. Oxford, Butterworth Heinemann, pp. 123-150.
- Lewin, K. & Grabbe, P. (1945). **Conduct, knowledge, and acceptance of new values** in **The Journal of Social Issues** 1(3).
- Little, G. (2001). **BSE and the regulation of risk** in **Modern law review** 64(5): pp. 730-756.
- Lowndes, V. (1996). **Varieties of New Institutionalism: A critical appraisal** in **Public Administration** 74: pp. 181-197.
- Macadam, R., Van Asch, R., Hedley, B., Pitt, E. & Carroll, P. (1995). **A case study in development planning using a systems learning approach: Generating a master plan for the livestock sector in Nepal** in **Agricultural Systems** 49: pp. 299 - 323.
- March, C., Smyth, I. & Mukhopadhyay, M. (1999). **A guide to gender-analysis frameworks**. Oxford, Oxfam.
- Maturana, H. & Varela, F. (1992). **The tree of knowledge - The biological roots of human understanding**. Boston, Shambala.
- Mithen, S. (1998). **The prehistory of the mind - A search for the origins of art, religion and science**. London, Phoenix.
- Murdoch, J. & Ward, N. (1997). **Governmentality and territoriality: The statistical manufacture of Britain's 'national farm'** in **Political Geography** 16(4): pp. 307-324.
- Nelson, R.R. & Nelson, K. (2002). **Technology, institutions and innovation systems** in **Research Policy** 31: pp. 256-272.

Nelson, R.R. & Sampat, B.N. (2001). **Making sense of institutions as a factor shaping economic performance** in *Journal of Economic Behaviour and Organization* 44: pp. 31-54.

Ni Laoire, C. (1997) **Migration, power and identity: Lifepath formation among Irish rural youth** PhD thesis, Department of Geography, University of Liverpool.

North, D.C. (1990). **Institutions, institutional change and economic performance**. Cambridge, Cambridge University of Press.

North, D.C. (2001). **Needed: A theory of change** in Meir, G. M. & Steigler, J. E., Eds. **Frontiers of development economics: The future in perspective**. Oxford, Oxford University Press, pg. 491.

Nutley, S., Davies, H. & Walter, I. (2002). **Learning from the diffusion of innovations**. Conceptual synthesis, No. 1, Research Unit for Research Utilisation, St Andrews.

Ostrom, E. (1999). **Institutional Rational Choice** in Sabatier, P. A., Ed. **Theories of the policy process**. Boulder, Westview Press, pp. 35-72.

Pelling, M. (1998). **Participation, social capital and vulnerability to urban flooding in Guyana** in *Journal of International Development* 10(4): pp. 469-486.

Piaget, J. (1971). **The construction of reality in the child**. New York, Basic Books.

Powell, W.W. & DiMaggio, P.J., Eds. (1991). **The new institutionalism in organizational analysis**. Chicago, University of Chicago Press.

Pred, A. & Watts, M. (1992). **Reworking modernity: Capitalism and symbolic discontent**. New Jersey, Princeton University Press.

Pretty, J., Guijt, I., Thompson, J. & Scoones, I. (1995). **A trainer's guide for participatory learning and action**. London, IIED.

Richmond, N. (2003). **Personal Communication**. 4 November 2003.

Rihani, S. (2001). **Complex systems theory and development practice: Understanding non-linear realities**. London, Zed Books.

Rizzello, S. & Turvani, M. (2002). **Subjective diversity and social learning: A cognitive perspective for understanding institutional behaviour in Constitutional Political Economy** 13: pp. 197-210.

Röseberg, M. (1996) **Participatory methodologies of research and survey in third world development** M.Sc. Agricultural Extension, Agricultural extension and rural development department, University of Reading, Reading.

Rumelhart, D. (1978). **Schemata: The building blocks of cognition** Centre for Human Information Processing, University of California at San Diego.

Sabatier, P.A., Ed. (1999). **Theories of the policy process**. Theoretical lenses on public policy. Boulder, Colorado, Westview Press.

Sabatier, P.A. & Jenkins-Smith, H.C., Eds. (1993). **Policy change and learning: An advocacy coalition approach**. Boulder, Westview Press.

Sabatier, P.A. & Jenkins-Smith, H.C. (1999). **The advocacy coalition framework: An assessment** in Sabatier, P. A., Ed. **Theories of the policy process**. Boulder, Colorado, Westview Press, pp. 117-166.

Salner, M. (1986). **Adult cognitive and epistemological development in systems education** in *Systems Research* 3(4): pp. 225 - 232.

Schön, D. (1987). **Educating the reflective practitioner**. London, Jossey-Bass Limited.

- Schön, D. (1991). **The reflective practitioner**. Aldershot, Ashgate Publishing Limited.
- Schön, D. (1995). **Knowing-in-action: The new scholarship requires a new epistemology** in *Change* (November/December 1995): pp. 27-34.
- Scoones, I. & Thompson, J., Eds. (1994). **Beyond Farmer First**. London, Intermediate Technology Publications Ltd.
- Senge, P. (1990). **The fifth discipline - The art and practice of the learning organization**. London, Century Business.
- Shaffer, J.D. (1995). **Institutions, behaviour and economic performance; Comments on institutional analysis**. Staff Paper, No. 95-52, Michigan State University.
- Shaw, P. (1997). **Intervening in the shadow systems of organizations: Consulting from a complexity perspective** in *Journal of Organizational Change* 10(3): pp. 235-250.
- Shaw, P. (2002). **Changing conversations in organizations: A complexity approach to change**. London, Routledge.
- Smith, D. (2002). **Making accidents happen in the imagination: the development of crisis simulations in organisations**. Working Paper, No. 3, Centre for Risk and Crisis Management, Liverpool.
- Stacey, R. (1996). **Complexity and creativity in organisations**. San Francisco, CA., Berrett-Koehler.
- Stacey, R.D. (2000). **Strategic Management and organisational dynamics: The challenge of complexity**. London, Prentice Hall.
- Stacey, R.D. (2001). **Complex responsive processes in organizations: Learning and knowledge creation**. London, Routledge.
- Stacey, R.D., Griffin, D. & Shaw, P. (2000). **Complexity and management: Fad or radical challenge to systems thinking**. London, Routledge.
- Stewart, D. (2001). **Reinterpreting the learning organisation** in *The Learning Organization* 8(4): pp. 141-152.
- Sutton, R. (1999). **The policy process: An overview**. Working paper, No. 118, Overseas Development Institute, London.
- Urry, J. (2003). **Global complexity**. Cambridge, Polity Press.
- van Zwanenberg, P. & Millstone, E. (2002). **'Mad cow disease' 1980s-2000: how reassurances undermined precaution** in Harremoës, P., Gee, D., et al, Eds. **The precautionary principle in the 20th century: Late lessons from early warnings**. London, Earthscan, pp. 170-184.
- van Zwanenberg, P. & Millstone, E. (2003). **BSE: A paradigm of policy failure** in *Political Quarterly*: pp. 27-37.
- Vandenberg, P. (2002). **North's institutionalism and the prospect of combining theoretical approaches** in *Cambridge Journal of Economics* 26(2): pp. 217-235.
- Vickers, G. (1972). **Freedom in a rocking boat: Changing values in an unstable society**. London, Penguin Books.
- von Foerster, H. (1984). **Observing Systems**. Seaside, CA, Intersystems Publications.
- von Glasersfeld (1998). **Distinguishing the observer: An attempt at interpreting Maturana**. <http://www.oikos.org/vonobserv.htm>, Accessed: October 2003.
- Vromen, J.J. (1995). **Economic evolution: An enquiry into the foundations of new institutional economics**. London, Routledge.

- Wang, C.L. & Ahmed, P.K. (2003). **Organisational learning: A critical review** in **The Learning Organization** 10(1): pp. 8-17.
- Weick, K.E. (1998). **Enacted sensemaking in crisis situations** in **Journal of management studies** 25(4): pp. 305-317.
- Weick, K.E. & Sutcliffe, K.M. (2001). **Managing the unexpected: Assuring high performance in an age of complexity**. San Francisco, Jossey-Bass.
- Wenger, E. (1999). **Communities of practice - Learning, meaning and identity**. Cambridge, Cambridge University Press.
- Wenger, E. (2000a). **Communities of practice and social learning systems** in **Organization** 7(2): pp. 225-246.
- Wenger, E. (2000b). **Communities of practice: The key to knowledge strategy** in Lesser, E. L., Fontaine, M. A. & Slusher, J. A., Eds. **Knowledge and Communities**. Oxford, Butterworth Heinemann, pp. 3-20.
- Williamson, O.E. (1986). **Economic organization: firms, markets and policy control**. Brighton, Wheatsheaf.
- Williamson, O.E. (2000). **The new institutional economics: Taking stock, looking ahead** in **Journal of Economic Literature** 38(3): pp. 595-613.
- Wisner, B., Blaikie, P., Cannon, T. & Davis, I. (2003). **At Risk: Natural hazards, people's vulnerability and disasters**. London, Routledge.

Appendix 1 – Theoretical background

In developing our theoretical perspective through this working paper, we build on our existing theoretical position. While we do not intend to defend any of this here in detail, we outline aspects of it in order to give an insight into what we assume, as well as what we propose. This appendix covers institutions, systems theory and power.

A1 New Institutionalism

A1.1 North and NIE

The study of institutions, of the social factors that shape individual and collective behaviour, has enjoyed resurgence across the social sciences in recent decades. From sociology (Powell & DiMaggio, 1991), to political science (Hay, 2002: 10-11), to economics (Williamson, 2000), ‘new institutionalisms’ have appeared which focus on non-atomistic accounts of social processes (Lowndes, 1996). They are new in the sense that they have arisen in reaction to individualist and materialist forms of social science and hark back to “old” institutionalisms in their respective fields.

In economics for example, institutions were “...a central concern to Adam Smith and his great classical followers” (Nelson & Sampat, 2001: 31-32) and at the heart of the empirically-oriented institutional economics which dominated the field in the first half of the 20th century (Vandenberg, 2002). This was superseded by neoclassical economics after the Second World War, only to see a resurgence of interest in institutions in the 1980s, in response to a growing dissatisfaction with the failure of the models underlying neoclassical economic theory (ibid). The field that has emerged in economics shares incompleteness and a pluralism of approach (Williamson, 2000) with the new institutionalisms in many other fields.

As we are interested in the intersection of institutions, organisations and adaptation, we take as our starting point the new institutional economics (NIE) of North (1990), for whom these are core concepts. This is reasonable given his location within new institutional economics literature (a starting point for the project) and the widespread recognition of his work, with multiple citations both within and without economics (Hall & Taylor, 1996; Hay & Wincott, 1998; Williamson, 2000; Hay, 2002; Vandenberg, 2002; DfID, 2003). North’s work is considered significant because it provides a bridge between new institutional economics and a revival of the so-called ‘old’ institutional economics (Vandenberg, 2002). The former seeks to extend neoclassical methods to explain the origin and operation of institutions in terms of individual decision-making, while the latter draws on sociology, politics and law to understand the way that political and social structures affect economic processes (Lowndes, 1996).

North himself traces the movement of his thought from a focus on institutions (as determinants of economic performance) grounded in efficiency to an understanding that institutions arise primarily through negotiations governed by power relationships (North, 1990). He sees the shaping of institutions by the powerful as the explanation for the long-term persistence of institutional

regimes that are not socially optimal: “Institutions are not necessarily or even usually created to be socially efficient; rather they or at least the formal rules, are created to serve the interests of those with the bargaining power to devise new rules” (ibid:16).

A1.2 Defining institutions

North defines institutions as the “humanly devised constraints that shape human interaction” (North, 1990: 3). They are said to control access to and distribution of resources, and decrease uncertainty and compensate for bounded rationality. Thus they cut down transaction costs, and enable modelling of other actor’s decision strategies (Kiser & Ostrom, 1982). Under North’s definition an institution is the result of purposeful negotiation, essentially external in origin although they can be internalised. This is a more focussed way of understanding institutions than broader sociological definitions such as that of Rizzello & Turvani (2002), who see them as ‘structures’ emerging from the subjective process of generation of knowledge within a social context, or Shaffer’s (1995) version - regularities in human behaviour across individuals and over time.

For North, institutions are rules, conventions and codes of behaviour, which are sometimes proven in the breach and punished. Thus institutions include not only the expectation of how individuals and groups should behave, but also how they will be penalised. The inclusion of enforcement in the analysis of institutions is an important part of North’s thinking (North, 1990: 54-60), and opens some space between institutions (or at least formal and some informal institutions) and outcomes in terms of expected and actual behaviour, while still explaining how the individual is incentivised to act in accordance with institutions. He uses the variable cost of enforcement, for example, to explain why strongly institutionalised states (with security of property rights and third-party enforcement) perform well economically compared to stateless societies (or by extension, weak states).

It is therefore easy to read North’s concept of institutions as external and coercive in the way that Hulsen (1998: 298) defines them. On the other hand from North’s point of view, the case where institutions are not externally enforced (i.e. where an individual acts in a particular way because they want to in the absence of external enforcement) can be understood as the internalisation of enforcement, or through the utility function. But we explicitly retain the idea of institutions as enablers of action as well as constraints – the social technologies of Nelson & Nelson (2002).

Under North’s definition of institutions, the ‘rules of the game’ in a given context can be formal, informal or a mixture of both. In other words, as well as the formally constituted institutions in a society which constrain or enable particular activities, there are a host of socially constructed informal traditions, practices and norms which are every bit as much the ‘rules of the game’ (North, 1990) as any laws, regulations or contractual obligations. The existence and importance of these informal institutions is well established within the institutional literature (North, 1990, § 5; Lowndes, 1996: 183; Fernandez-Gimenez, 1999; Ostrom, 1999), but there is considerable uncertainty and variety of opinion on how they come into existence, how they

change and on the nature of the relationship between formal and informal institutions (Williamson, 2000; North, 2001).

North states that most institutions are informal and sees the relationship between formal rules, informal institutions and enforcement regimes as key variables governing social and economic trajectories (North, 1990). However, while he recognises informal institutions, he also recognises that cultural changes that lead to changes in taste in individuals lie in part outside of the scope of his analysis. For example, North says he has no explanation for the success of the movement which abolished the slave trade (North, 1990: 85), which does not at least include changes in ideas.

North has therefore been accused of lacking an explanation of how informal institutions arise (Williamson, 2000: 596) or change (Lowndes, 1996: 187-8). This is perhaps because of his focus on institutions as negotiated, whereas Williamson (2000: 597) suggests that informal institutions have mainly spontaneous origins. Perhaps because of this, North tends to treat culturally derived institutions as relatively permanent, changing only slowly if at all. Thus, Lowndes (1996: 188) says North treats culture as an exogenous variable, which is fair when considering his past position. A critique of North's position is that holding cultural factors as relatively invariant elides relatively fast processes of institutional formation that are nonetheless informal, such as the formation of group identity – microculture if you like. Nonetheless, Vandenberg suggests that North's work marks the beginning of a reconciliation between neoclassical economics and the '...socialised actions of modern sociology' (Vandenberg, 2002).

Perhaps in compensation for his uncertainty of how to fully integrate informal institutions into his framework, North (2001) focuses on formal institutions as a locus of opportunity for change and reform. Others such as Ostrom (1999) take a similar line, or go even further, presenting informal institutions as a source of inertia and corruption (Lowndes, 1996: 188-9). We on the other hand intend to explore how strategic action can arise in respect of informal institutions. This may well require a substantial reconceptualisation of what strategic action is or should be, and where it may be applied. This is something that the management literature has increasingly engaged with over the last 30 years, and is a major reason for our interest in management theory on learning and change.

A1.3 Organisations

North defines organisations as 'players of the game' (North, 1990: 4). He sees them as structure which guides human action, but conceptually different to institutions, especially inasmuch as they are goal-seeking, "groups of individuals bound by some common purpose to achieve objectives" (ibid: 4), and capable of strategy. Thus organisations are described as actors, capable of making and enacting decisions. North's definition includes formally constituted organisations such as firms, cooperatives and government departments as well as social bodies such as churches, clubs and athletic associations.

But as with his explanation of institutions, North emphasises the designing action of individuals in creating organisations with respect to “maximising wealth, income or other objectives defined by the opportunities afforded by the institutional structure of society” (ibid: 73). Thus there are common forms of organising collective behaviour in society, such as extended and nuclear families or groups of friends, that it would be harder to see as organisations in North’s terms. We nevertheless take a broader view of organisations, including any form of collective organisation that can be understood as purposeful and co-ordinated, even if the purpose under examination has nothing to do with the existence or continued existence of the group.

Another aspect of organisations and institutions where we would prefer to cast a wider net than North does is understanding how the process of organising collective behaviour is subject to institutions. North is generally more concerned with understanding how the behaviour of organisations as actors is subject to institutions (see North, 1990, §9, for example). While this is important, we are also interested in how the behaviour of organisations arises from the institutions that members of the organisations are subject to as a result of their membership.

The institutionalisation of organisations has been dealt with elsewhere in the new institutional literature. Vromen (1995), for instance, says that firms should not be treated as unitary agents and constructs the behaviour of firms as emergent from individual behaviour. Williamson (1986) understands the existence and operations of companies in terms of contracts, the focus of his research interest with new institutional economics. So while wider societal institutions will clearly govern both the behaviour of organisations and of individuals and affect the adaptive capacity of both to respond to climate change, we are also interested in how the relationship between adaptation at the level of the organisation and of the individual is mediated by institutional forms that are internal to the organisation. That is, we suggest that important parts of the institutional frameworks governing adaptive capacity at the organisational level will be locally constructed, or at least comprise locally nuanced forms of institutions derived from a wider context.

A1.4 Further notes on North’s NIE

There are some points worth noting in passing here. The first is that institutions, in North’s analysis are reified. That is they are treated as if they have a separate existence from the particular instances in which they exist. Thus changing an institution (or a set of institutions) as it applies to one context, changes it in a corresponding way in different contexts. Challenging the norm of the rule of law in a specific case might be undesirable because of the general knock-on effects, for example.

Secondly, North considers power important. Institutions (at least formal ones) are renegotiated when individuals with the power to do so find it less costly to change institutions than to live with them. The corollary here is that institutions do not carry a fixed price tag. For individuals or organisations, the strength of their bargaining position affects the cost of changing or seeking to maintain particular institutional framework, and thus governs whether they

apply their resources to institutional modification or not (in the context of the other uses to which those resources could be put).

Thirdly, the sum set of institutions extant in a particular society or other social context do not all apply to every situation, as seen through North's eyes. Thus the rules and norms concerned with buying a house (to use his example) are not the same as those for buying a horse, although there will be several wider institutions which apply in both cases. This raises an interesting question. To what extent is the selection of institutional relevance in itself institutionalised. For example, a black market transaction explicitly rejects the formal institutions which govern legal trade (such as taxation, consumer rights law etc.), but the set of norms and expectations which enables that can themselves be seen as institutions. A much more dynamic image is evoked – almost an ecology of institutions – in contrast to the neat, rational image of a coherent institutional framework.

Interpreting the effect of rapid climate change (and other environmental stressors) on institutional frameworks in North's terms, the main effect would be to change relative prices and hence change the incentives for actors to create or modify institutions (ibid: 84-86). Relative prices are said to change because of "changes in the ratio of factor prices, changes in the cost of information, and changes in technology", with environmental impacts contributing to shifts in factor prices. There may be secondary effects through the development of technologies in response to climate change which then alter the incentives to change institutions. There may also be effects arising through cultural change (in response to climate change – arguably the high visibility the issue has enjoyed in the media over many years might have some kind of cultural impact), resulting in a shift in tastes. Although North says such cultural changes are not well understood (ibid: 86), we are interested in such processes and consider that theories of social learning may help to unravel how such changes come about.

A2 Systems theory

We also draw on soft systems methodology (Checkland, 1985; Checkland & Scholes, 1990; Checkland, 1999 [1981], 2000), a branch of systems theory which has been applied to 'messy', intractable problem situations in contexts ranging from information management in the NHS (Checkland et al, 1996), to agricultural development in developing countries (Macadam et al, 1995), to learning and communication in sustainable development (High, 2002). Soft systems methodology is a branch of systems theory, an intellectual tradition spanning the last century, with its roots in traditional disciplines such as mathematics, sociology, philosophy, economics, physiology (Ison, 1994) and especially biology (Capra, 1996: 26-30).

In the soft systems¹⁹ tradition, a system is an epistemic device, a way of looking at the world, rather than a representation of part of it. A well-constructed system draws attention to relationships and emergence, and can

¹⁹ Checkland coined this phrase to distinguish his approach from hard systems methodologies, which treat systems as real objects to be designed, controlled or manipulated.

be used (whether consciously or not) to organise enquiry into complex phenomena. (High, 2002). Thus we do not treat systems as tangible, observer-independent descriptions of an external reality, but instead as conceptual structures. That is, we consider them models rather than material properties of the world 'out there' (Checkland, 2000). The shape and form of a system therefore arises from the distinctions made by an observer. Each observer will bring their own life experiences, professional training, research or policy priorities, material interests, political and cultural ideology, and personal values to describing a system/set of systems relevant to the situation they are thinking about. This will influence the features that the system(s) they derive takes – a farmer, a politician, a grassroots activist will all distinguish different relationships within the same situation and discern different systems operating around and through them.

Systems theory suggests that when systems are compared critical differences between systems can often be described in terms of the system boundary (a criterion for judging which actors, roles and activities are treated as inside or outside of the system), and the system purpose. Different systems traditions understand the system purpose in different ways. Hard systems theories, for example, treat the purpose of a system as the goal to which the system's behaviour is directed. For a soft systems theorist, the purpose of a system is the end that makes sense of system activities, and is intimately related to the worldview of the observer distinguishing the system (Armson & Ison, 2000). Thus, for a farmer, their farm could be understood as a system supporting their livelihood, or a system to get into debt or a system to hold onto a traditional identity. All of these might apply, but by describing each and then studying the nature of the different systems thus identified, important features of the complex reality of a farmer's relationship to their land can be revealed, compared and discussed.

Seeing systems in this way has its roots in a socially constructivist and intersubjective epistemology. It is an essential part of a theoretical and methodological base which has developed in a so-called 'second-order' mode of systems thinking (cf Ison & Russell, 2000b; High, 2002, §7), grounded in a synthesis between soft systems methodology (Checkland, 1999, 2000) and second order cybernetics (Maturana & Varela, 1992; von Glasersfeld, 1998). The 'second order view of systems offers a perspective that moves away from debates about whether something (learning, adaptation, power or whatever) has an external existence, to begin understanding how viewpoints and power arise in relation to one another. From a constructivist point of view, everything is ultimately a product of the person or people who experience it, and depending on the flavour of constructivism either there is no *accessible* external reality against which to match concepts, or the concept of any external reality is itself ultimately spurious. The question is not whether a particular object can be treated as real or not, but what the consequences are of behaving as though something is real during a particular conversation or act of boundary designation.

Exploration of the differences between viewpoints can reveal chains of interpretation, observer's judgements of other observer's observations. Although this sounds complicated, operation within such a *'calculus of*

observers' (von Foerster, 1984) is a normal human ability, what Mithen terms as higher order intentionality (cf Mithen, 1998). That is, social cognition operates in terms of models of the meaning of other people's models. Mithen claims that most soap opera deals in third order intentionality, for example in East Enders, where Alfie Moon's Nana bases her advice to him on her understanding of what Alfie is feeling that Kat Slater feels for him (Richmond, 2003). Mithen claims that most people can cope with making sense of up to seven orders of intentionality.

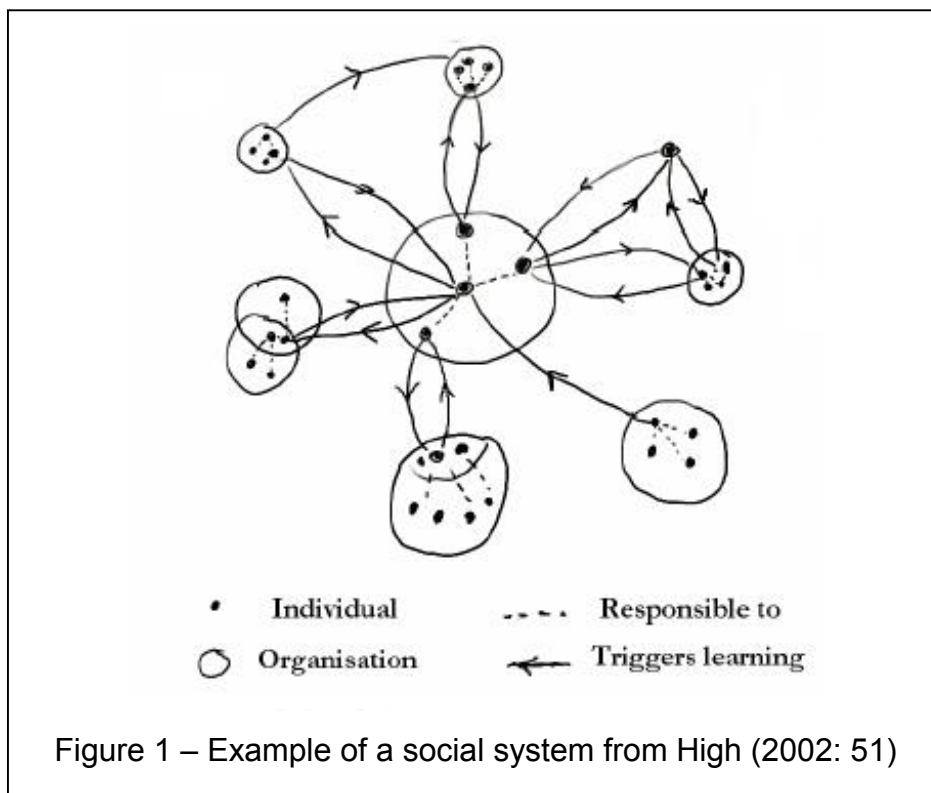
The calculus of observers is a theoretical tool that recognises and capitalises on this natural capacity. As a basic step, one's own relationship as an observer to a particular viewpoint is explicitly declared. Naming observers and their relationships to one's own observation opens up differences in viewpoint for discussion, and is considered one way of being responsible for one's relationships with other stakeholders during research (Ison & Russell, 2000b). As such, it operates at the level of epistemic cognition (Salner, 1986), requiring awareness of the legitimacy of differences in viewpoint, but without giving way to relativism. Observers of systems and their adaptation, for example, are free to make judgements about their own relation to other viewpoints, without being forced into adopting or de-legitimising them.

A consequence for practice is that systematically comparing observer's viewpoints and using them to question individual experience has proven a valuable tool for sparking dialogue and reflection (Checkland, 2000). It may also help to direct attention to the fact that viewpoints do differ and investigate why this is so in any given case. While Checkland warns that surfacing power issues is never anything but a political act (Checkland, 1999: A20), and thus worthy of careful consideration, the method could uncover stakeholders' assumptions about their ability to wield power, authority or legitimacy relative to other actors. It is argued that by surfacing the consequences of different viewpoints, a space is opened for individual and cultural change. Critically, this cannot be specified in advance, it is the subject of negotiation and social construction rather than design.

Considering social adaptation in terms of viewpoint and the calculus of observers highlights the choices involved in naming a system boundary and purpose, which in turn relies on the underlying perspective from which it is analysed. Although speaking of adaptation relative to an observer's perspective makes for a messy analysis it allows flexibility and contextuality. For example, where adaptation is not possible, or at too high a cost, under once choice of system (adaptation with respect to business as usual – capital intensive agriculture for example), more desirable options may be uncovered by considering alternative system boundaries (eg adaptation of a diversified rural livelihoods system). As Schön (1991) would have it the challenge is to encourage modes of thought and practice that enable movement in the “...swampy lowland where situations are confusing messes incapable of technical solution” (ibid: 42).

Drawing on systems theory, there are two possible approaches to understanding the complex overlapping of scales and groupings in social networks, one analytical and one methodological. The analytical solution is to construct a layered model of a social system, corresponding to a social

structure such as a network, with different (relational) scales represented by different logical levels. Figure 1 is an example of such a model, constructed to represent the different learning processes in operation in an international multi-organisation research project (High, 2002, §4.2.1). The individual nodes in the diagram represent individual people, while the larger sets represent the organisations participating in the project. Two types of process are considered, the triggering of learning, e.g. the learning of a research organisation triggers learning in one of the other organisations, or for an individual within the co-ordinating organisation, and lines of responsibility (w.r.t. the project) within organisations, for example the relationship between a fieldworkers and the person in the organisation responsible for reporting research results to the centre



The model in figure 1 is idealised rather than representative, exemplifying the types of learning process observed within the project. Although each of the peripheral organisations is based more or less on an actual research partner, only six “partners” are actually shown, and individuals with less than secondary involvement in intra-project learning, and all non-researcher stakeholders have been elided. However, a qualitative model of this kind could be refined to an arbitrary degree of correspondence to the ‘facts’ known about a situation. Furthermore, systems traditions such as Viable Systems (Espejo & Harnden, 1989) and Systems Dynamics (Senge, 1990), suggest other ways of producing layered models which focus on emergent properties resulting from scale and hierarchy, both more oriented to modelling or representing social processes rather than just social units.

Alternatively, the social theory underlying Soft System Methodology (Checkland, 1999 [1981]:264-285) suggests that once social construction, different viewpoints and the sheer contingency and complexity of social relationships is taken into account, "...no once and for all substantive account of social reality is possible because there *is* no social reality to put alongside what appear to be the well-tested physical regularities of the universe" (ibid: 285). Instead, "social reality is the ever-changing outcome of the social processes in which human beings, the product of their genetic inheritance and previous experiences, continually negotiate and re-negotiate with others their perceptions and interpretations of the world outside themselves" (ibid: 283-284). The conclusion to be drawn from this is that any attempt to represent social reality in terms of a model is so inherently limited as to guarantee failure and/or irrelevance, especially when applied to unpicking actual problem situations.

Instead, Checkland effectively advocates relegating systems analysis to the subsidiary position of supporting change processes of learning and change, rather than leading them. Systems are simple, formal models constructed so as to be relevant to dialogue and debate, rather than direct analytical representations of 'reality'. This forces methodological rather than simply analytical action, because it involves the presentation of models or the questions raised by models to stakeholders, and engagement with them to address issues. Thus instead of addressing the complexity of social situations head-on, the soft systems approach is to participatively draw stakeholders into engagement with one another (paying attention to the systems practitioner's role as a stakeholder too). Different scales are addressed by drawing attention to them, and allowing their significance to be established through the ongoing conversations of involved research stakeholders, rather than solely through the intellectual manipulation of allegedly dispassionate researchers.

Participative approaches are not without their pitfalls in practice, and there is a broad literature that critiques and methodologises it (Pretty et al, 1995; Huppert, 1996; IDS, 1996; Röseberg, 1996; Blackburn & Holland, 1998; Cooke, 2002). The topic is addressed in some applications of soft systems methodology through dialogue and the careful expression of invitations rather than an attitude of intervention (High, 2002, §6.2.3). Dialogue is emphasised as a mode of interaction, because it opens a space for questioning dominant public discourses and exploring various options for defining and resolving problems (Kersten, 1995: 176), and is distinguished from debate in terms of the environment in which it takes place, the way that people are able to express themselves, and the intentions of the participants. The politics of invitation and intervention rest on creating conditions in which stakeholders experience invitations to participate as genuine invitations (rather than demands) through active listening, the building of relationships and critical reflection (High, 2002: §6.2.3).

A3 Power

More broadly, the approach developed in this project fits with the post-structural movement in the social sciences as it has been applied to the re-

thinking of human-nature relationships (Demeritt, 2001; Harraway, 1992) and environmental risk (Hannigan, 1995). The post-structural view is centrally concerned with power and builds on Foucault's (1977) position that power is not something that actors hold or wield – as in the models of sovereign power held by nation states – but rather a potential for force that exists in myriad social relationships and the use of which is normalised through and contingent on social context. As Castree & Braun (1998: 19) present it in discussing the social representation of nature:

‘power is diffuse – it operates unannounced in myriad social practices, including those we take as “merely” discursive. Indeed it is precisely because we mistake our ordering of appearances for the world itself, unaware of how our knowledges reflect their social context, that power relations become naturalized in our representation of nature’.

Individuals have the power to reconfigure and re-define the systemic social networks in which they are embedded. The degree to which individual agency is constrained by structural forces continues to be debated. There are extreme positions on both sides. Hay (1998; 2002) has argued that the division is in any case moot, reflecting an ontological division, with no empirical way to distinguish between the two positions. Perhaps a moderate view is most useful, discounting neither set (individual and structural) of pressures. Power can usefully be seen as being relational within systems, but social institutions (formal and informal rules) play a great role in sanctioning and legitimising the use of power between individuals and so outcomes in terms of adaptive policy and practice.