

# Understanding adaptation: what can social capital offer assessments of adaptive capacity?

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**Abstract:** The burgeoning interest on social capital within the climate change community signals a positive movement towards a concern for the behavioural elements of adaptive action and capacity. But social capital is a slippery concept. In this paper the case is put forward for a critical engagement with social capital. There is need for an open debate on the dangers and opportunities that social capital presents. This paper discusses the formation, operation and utility of social capital and reviews options for future research agendas focused on communities of place and practice.

## 1. Introduction: Climate Change, Adaptation and Social Capital

As an emergent property of social systems, adaptive capacity to climate change is continually being reshaped through social relationships. Whilst there is a growing interest in economic evaluation of adaptive options (Smit et al, 2000 and Frederick, 1997 for reviews), developed frameworks have limited scope in explaining the pressures that shape adaptive choices (Parry et al, 1999; Berkhout et al, 2002). While opportunities for a more holistic account of adaptation are emerging from ecological economics (Frankhauser et al, 1999), there is scope to draw on new institutional and social capital theory to provide additional purchase on the structural constraints and individual agency that shape adaptive action.

Social adaptations can be reactive, concurrent or anticipatory, spontaneous or planned (Smit et al, 2000; Smithers and Smit, 1997), they can be short-term and tactical or longer-term and strategic (Smit et al, 1996). The importance of socio-economic context is not only in determining access to the resources to undertake adaptation but also in stimulating incidental adaptation to non-climatic stimuli. From the natural disasters literature a number of categorisations exist for adaptations, for example: Burton et al (1993), distinguish between behaviours that: prevent loss, tolerate loss, spread loss socially, temporally or spatially, change use and activity and change location. Carter et al (1994) differentiate between intervention types: infrastructural, legal and legislative, institutional, administrative, organizational, regulatory, financial, research and development, market mechanisms and technological change. Other authors discuss the ordering of adaptation, it may be for example that short-term reactive technological adaptations are followed sequentially by long-term, strategic administrative reforms (e.g., Smit et al, 1996).

A potentially fruitful categorisation of adaptations is between those that reinforce existing organisational or system stability and those that modify institutions to add resilience through flexibility. A growing theoretical literature discusses the principle components of resilient adaptation: some degree of overproduction or excess capacity; overlapping functions; rapid flow of materials, investment and information; responsive decision-making at an appropriate subsidiary level; diversification of

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inputs and of the economic base; alleviation of absolute poverty; learning from past events; mobilising systems to redistribute costs including insurance; and, active experimentation and support for innovation (Wildavsky 1988; Barnett, 2001; Pelling, 2003). But what is it about the internal working of communities and organisations that may determine their choices of adaptive strategy. Partly this will be a function of formal structure and resource distribution, but the authors argue a large part can be attributable to informal social relations and values – to social capital.

It is argued in this paper that social capital offers a lens through which to study the coevolution of social networks and norms in the production of adaptive capacity among collectives (communities, organisations, states and so on). Initial work incorporating a social capital framework (e.g. Pelling, 1998; 2002; Adger, 2003) has produced significant findings for our understanding of adaptation among communities of place. But if the promise of social capital is to be realised the climate change community could do well to learn from the experiences of other communities where social capital has both mushroomed but failed to add collective clarity. As social capital is being brought into studies of climate change it is important for the research community to discuss the limits of this concept and its ambiguities, if we are to hope to build up generalisable knowledge from individual case studies. It is hoped this paper will contribute towards such an endeavour.

The discussion presented necessarily draws from social theory, but applies this to the concerns of the climate change community. The following section outlines three schools of thought within the theory of social capital that lie at the root of the breadth of application that has come to undermine the analytical utility of the concept(s). The extent to which contemporary studies of climate change adaptation have engaged with social capital, and gaps for further work are then examined. In moving the use of social capital forward, questions are asked of the formation, operation and utility of social capital theory for adaptation to climate change. Finally, two interconnected sites for the study of adaptation using social capital – collective action in communities of place and practice – are examined. In conclusion opportunities for further research are set forth.

## **2. Towards a Social Capital Framework**

### *2.1 The Social Capital Debate*

Much of the contestation over the use of social capital stems from epistemological differences in the work of the three principal originators of the concept (Bourdieu, Coleman and Putnam). Bourdieu (1984) used the concept of social capital as part of a theory of social stratification, based on the elaboration of different forms of capital from a realist epistemology. Social capital was introduced to demarcate those social ties that were used by elite groups to reproduce their privileged status. In contrast, Coleman (1990), a rational-choice theorist, introduced social capital as an explanatory variable in an empirical analysis of educational attainment in USA. Where Bourdieu sees social capital as a good consciously maintained by individuals (and whose meaning and power for social division is socially constructed), Coleman conceives of social capital as a largely unintentional outcome of social processes and interaction.

Putnam's (1993) first use of social capital was as part of an explanation of differences in institutional performance, governance and economic development in Italy. Later, working on popular civic engagement in the USA, Putnam introduced what has become the most frequently used definition of social capital: 'features of social life – networks, norms and trust – that enable participants to act together more effectively to pursue shared objectives' (1995: 664-65). The definition offers a coherent set of elements which fall inside the definition of social capital, and which have become widely accepted. Just as social capital has rapidly grown to prominence in the social sciences, so it has come to be a highly visible element in a wide range of social policy including economic development, health, education, regeneration, community development and social exclusion and poverty alleviation (Woolcock, 1998). But social capital remains a deceptively simple concept, the closer one gets to it the more slippery it seems to be. This quality has not prevented (and for some may have encouraged) its becoming commonplace in policy discourse (Fine, 2001).

With such diverse roots it is not surprising that the literature on social capital has become amorphous (Johnston and Percy-Smith, 2002). The boundaries of the concept's usefulness need to be made clear if, as Portes (1998) has argued, it is to avoid becoming a cure all robbed of any distinct meaning. Methodological diversity, appropriate in reflecting the context dependent qualities of social capital, has proven a barrier to aggregating upwards in scale and also in accumulating knowledge and building theory across studies (Schuller, Baron and Field, 2000). This should be a critical concern for the climate change community where cross study and dataset comparability are an essential step for building international comparisons as well as showing change through time.

Within individual studies there is a tendency to claim too much for social capital, where surface observations (e.g. of formal groups) are over-extended into analyses of the very nature and inherent capacity for collective action of societies (Mohan and Mohan, 2002). This extending tendency is perhaps most dangerous when social capital is seen uncritically as a social good. Though the possibility for 'perverse social capital' (Rubio, 1997) where collective action undermines social development (e.g. corruption undermining environmental regulation) is being increasingly recognised.

## *2.2 A Theoretical Backbone: Key Metaphors and Concepts in Social Capital*

This section presents two complimentary components of social capital theory: types of interpersonal relationship, and trust and reciprocity. These elements provide the analytical foundations for social capital that need some common understanding if cross study aggregation of adaptation is to be achieved.

### **Bonding, Bridging and Linking Types of Social Capital**

The interpersonal relationships that give form to social capital and are a site and outcome of reciprocity can be categorised in bonding and bridging. Bonding ties are shared between co-identifying individuals typified by ethnic or religious groups. Bridging ties are used to describe social relationships of exchange, often of associations between people with shared interests or goals but contrasting social backgrounds. A sub-category of bridging ties have been termed linking ties, these hold together relationships that transcend group boundaries in a vertical direction, for example between social classes (Putnam, 2000; Woolcock and Naryan, 2000).

The balance between bridging, bonding and linking capital in a social system can help in our understanding of the direction and speed with which adaptations unfold. Strong bonding ties are associated more with survival than development and are often observed in humanitarian responses to natural disaster. Individuals withdraw from maintaining associations with the wider society and turn to close-knit groups. This reduces the exposure of group members to perceived external risks, but also breaks down wider social trust and interaction, slowing the flow of information, building inequality and undermining collective action.

Indicators are needed for comparative assessment of adaptive capacity to natural hazard and climate change. But on the ground it may often be difficult to tell bridging and bonding ties apart. The nature of a social capital can change depending on the use to which it is put and even the position of the observer. Burt (1997) has shown whilst individuals with large social networks will have more social connections, social capital is a reflection of how one is positioned within an organisation's fields of formal and informal interaction.

Societies rich in linking capital benefit from active pathways for facilitating the transfer of goods and information up and down the social hierarchy, but are liable to have difficulties in maintaining social trust and cooperation. In unequal patron-client relationships clients have the opportunity to leverage resources from the hierarchy. But this is at the cost of limited scope to impose sanctions on patrons opening up relationships to exploitation and dependency. The hierarchical relations underpinning linking capital are as useful for top-down social control as they are for delivering social development. For assessments of adaptive potential mapping linking binds will not be sufficient, it is essential to embed these in their social context.

The bonding/bridging/linking triplet has become a mainstay of social capital. But the apparent clarity it offers to analyses of social relationships needs to be seen against the detail that can be obscured. The language used to describe interpersonal relationships needs refining: not all bonding ties can be described as 'strong' and neither are bridging ties necessarily 'weak'. Moreover, the potential for individuals to change the orientation and complexion of their social ties gives social capital a dynamic and contextual quality through time and in response to external and internal stressors (Leonard and Onyx, 2003).

### **Trust and Reciprocity**

Trust is a long standing theme of sociological research that has been revisited through social capital although antecedents are seldom acknowledged. An exception is Schuller, Baron and Field (2000) who draw on the industrial sociologist Fox (1974). Despite the difficulties of empirical observation, and a lack of pre-existing data on trust (questions on trust have not routinely been incorporated into national census), trust has become a common element in disaggregated national comparisons of social capital. In just such an exercise, Fukuyama (1995, 26) defined trust as:

'the expectation that arises within a community of regular, honest and cooperative behaviour, based on commonly shared norms on the part of other members of that community. Those norms can be about deep 'value' questions like the nature of God or justice, but they also encompass secular norms like professional standards and codes of behaviour'.

Imbedded in this definition is the notion that trust not only exists when it is enacted, but that individuals and societies can command social norms that are more or less conducive to the surfacing of trusting relationships. At the local level, trust has been incorporated in quantitative analysis of social capital. Such studies predominantly employ surrogate measures for trust, for example: Uslaner and Conley (2003), use respondents statements on cultural identity and group membership as proxies for trust to explain variations in cultural assimilation amongst the Chinese community in America. Ethnographic studies of trust in social capital networks are able to provide a closer reading of respondents' understanding and use of trust. Leonard and Onyx (2003: 202) have demonstrated that because most people are at the 'intersection of multiple social categories' the bonding/bridging dichotomy is too simple, so that trust may be formed between pupils in the same school but of different ethnicities. They argue that it is only when these overlapping connections fail that the fractionalisation of communities and organisations into isolated sub-communities takes place. This suggests that adaptive capacity should take note of the extent to which societies are cross cut by apparently politically and economically ambiguous social networks. It may well be that this mess of interactions forms the raw social material that shapes capacity to adapt, learn and cope with change and is more important for long-term adaptive capacity than the more easily observable formal organisations that are currently used to indicate social capital.

Giddens (1990) observes that some people will be recognised as trustworthy because of their role or position in society. Giddens (1990: 83) argues that this form of trust is built on formal credential and reputation but that also:

'in some circumstances, trust in abstract systems does not presuppose any encounters at all with the individuals or groups who are in some way responsible... The nature of modern systems is deeply bound up in with the mechanisms of trust in abstract systems, especially in expert systems'.

The success that e-communities have had in mobilising collective action from the Zapatista and anti-globalization protesters to flash mobbers shows the significance of trust as embodied in abstract systems.

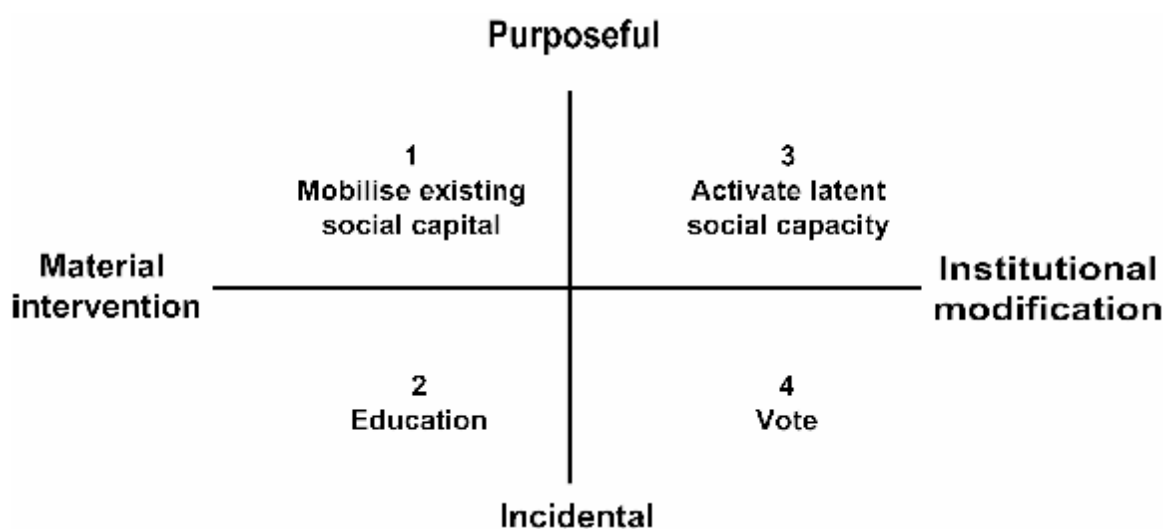
In his most recent writing Putnam (2000) has shifted emphasis from trust to reciprocity. Trust reinforces norms of generalised reciprocity, but reciprocity is a social attribute through which trust is enacted in interpersonal transfers of information or resources. Reciprocity is differentiated into balanced and generalised forms. Balanced reciprocity takes place between two individuals who, perhaps routinely, exchange gifts of a roughly equal value (friends or neighbours exchanging holiday gifts). Generalised reciprocity is less direct, an individual might help another without expecting anything in return but rather in the knowledge that a third party will be predisposed towards extending help knowing the reputation of the first individual for generosity and helpfulness. General reciprocity relies on the propagation of reputation and the threat of its withdrawal as a social sanction against free riding behaviour (Putnam, 1993). Pelling (2005, in press) notes the example of the Russian system of *blat* as just such an informal system of social capital, where participants with a good reputation and a wide array of social contacts are able to circumvent cumbersome formal procedures for accessing goods and information (Rose, 2000). This offers one

explanation for the observation that networks of social capital can be a resource for individual adaptation whilst simultaneously undermining collective adaptation.

#### 4. Social Capital as a Lens for Examining Adaptive Capacity to Climate Change

The use of social capital in climate change policy is dominated by the mobilisation of social capital for building material adaptations. But, a fuller use of social capital demands a wider and deeper engagement with social life. Figure 1 presents a simple mapping of adaptive capacity to climate change as seen through social capital. Adaptive capacity is broken down along two continuous axes. The vertical axis distinguishes between interventions that are purposeful – directed specifically at climate change, and incidental – interventions directed at background stresses but which have an impact on vulnerability to climate change for example by affecting socio-economic status. The horizontal axis distinguishes between material interventions – where social capital is mobilised as a resource to mitigate risk; and institutional modifications – interventions that aim to change the balance of decision-making power that ultimately constrain access to resources for future adaptation and development.

**Figure 1: Mapping adaptive capacity through social capital**



The bisection of the axes in Figure 1 creates four realms of social action. 1: Where social capital is used to generate material interventions directed at reducing vulnerability to climate change; for example, using collective action to raise the level of river embankments. 2: Where social capital is used to generate material interventions that respond to background stress; for example, investing in children’s education to enhance their human and social capital to increase familial resiliency to future socio-economic risk. 3: Where social capital is used to generate institutional modifications that respond to climate change stress; for example, an individual building their social capital with the aim that this may generate enhanced access to resources for future material interventions. 4: Where social capital is used to generate institutional modification that responds to background stress; for example, by taking part in broad procedures and processes of collective decision-making with the aim of

participating in change, such as voting in local or national elections. These four realms are not mutually exclusive, so that two or more can be undertaken by the same action; nor are the realms independent, so that action in one realm can impact on actions in other realms.

**Figure 2: The expanding worldview of adaptive theory**

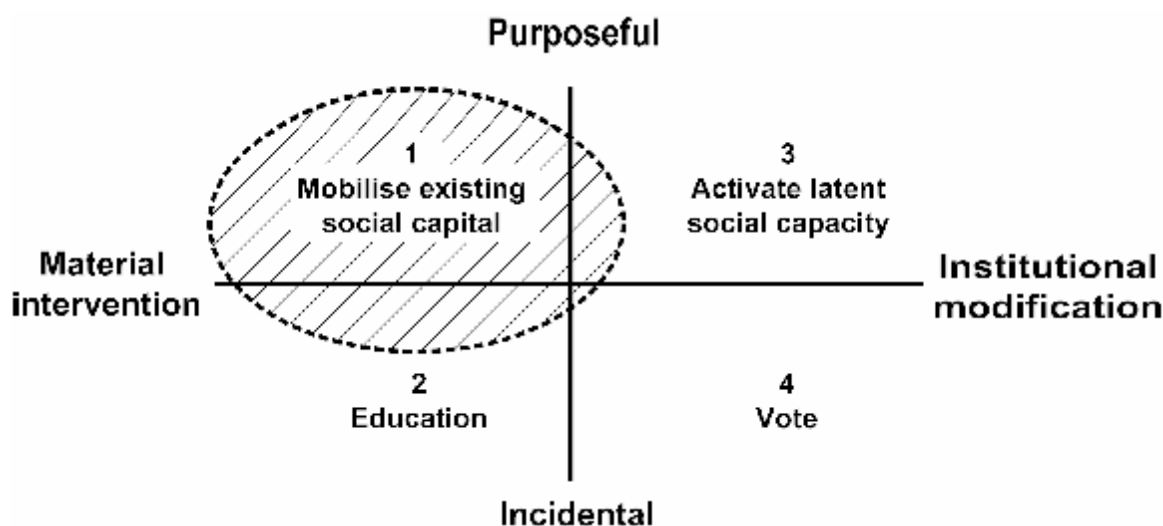


Figure 2 maps the contours of current research on adaptive capacity that incorporates a social capital perspective onto Figure 1. The largest amount of work is associated with the first realm of purposeful, material intervention. This makes good sense, it is the realm of most visible activity using existing analytical categories of adaptive behaviour. But the broader social capital lens shows just how partial this view is – particularly for a problem area concerned with the influence of contemporary action on future levels of adaptive capacity.

The field is moving rapidly, but there remains much opportunity for research and policy development across these realms and in their interactions. This figure compliments the observation made earlier in this paper that social capital studies are in danger of focussing overly on the outcomes of social capital – formal organisations.

### **3. Three Questions for Social Capital**

If social capital is to make a more serious contribution to climate change research then a number of ambiguities in the literature need to be confronted. These are elements of the way social capital is conceptualised that may also be addressed through climate change research. Perhaps most important is that research on adaptation under climate change uses an agreed core of theory to allow comparative research and give more weight to findings. This is critically important if the institutional and social elements of adaptive capacity are to be rigorously examined with the potential for radical changes in the orientation of adaptation policy. This section examines three unresolved (and too often unvoiced) debates in social capital theory, which point to a research agenda for the building of a coherent institutional theory of adaptation to climate change.

### *3.1 The Formation of Social Capital*

The possibility that policy interventions can construct positive social capital is a fundamental assumption of many policy makers. But the evidence in support of this claim remains clouded. Both supporters and objectors agree that the creation and destruction of social capital is marked by virtuous and vicious circles with trust, norms and networks of civil engagement being built up with use and lost with disuse. At one extreme, Putnam (1993) argues that social capital accrues through history, and its qualities and quantity for any one society are dependent upon the historical development path taken. This is a view supported by empirical studies of civil society and collective action which observe that voluntary cooperation is more likely in communities with inherited stocks of social capital (McIlwaine, 1998). The opposing view holds that social capital can be fostered through external interventions that change the social rules and incentives in society and that can result in a wakening of latent social capital. The latter view suggests that individuals and societies can hold social capital in potentia, which, in the right social conditions or faced by a particular development challenge of shock, could be brought forward and used for collective advancement (Fukuyama, 2001). The functioning of social capital in communities faced with climate change shock and stress could be a means of exploring potential implications of this fundamental policy dilemma.

There has been little success in searches for general rules regarding the distribution of different types of social capital according to social variables. It has been suggested that urban communities tend to have strong bridging but weaker bonding capital, whereas rural communities more typically have strong bridging but weaker bonding capital. Similar differences are reported from gender analysis with women being associated with bonding and men with bridging or linking capital (Woolcock, 2002). But generalization is difficult and perhaps the most common rule of social capital is that its character is dependent not only on history but also on social context. The implications of this are that the search for anything other than indirect indicators of social capital for disaggregated studies is unlikely to be fruitful. A combination of local qualitative studies linked to larger scale quantitative summaries may be a more appropriate tool for comparative studies of adaptive capacity.

### *3.2 The Operation of Social Capital*

A distinction needs to be made between social capital (informal networked relationships built on norms of trust and reciprocity) and formally constituted relationships that compose organisations or are part of an organisational structure. Organisations may often be an outcome of and seedbed for social capital, and trust or reciprocity between colleagues can enable formal relationships to function well. But the two levels of relationship – the formalised and the informal - need to be kept analytically distinct if research is to accurately unpack the mechanisms that lead to social capital contributing to or constraining adaptive capacity.

Because of difficulties in identifying and measuring social capital it is tempting to use formal organisations as a proxy indicator. Most commonly, civil society organisations are used to indicate social capital. Whilst this may be an accessible entry point to studies of social capital, without other contextualising data it can lead to an incomplete and potentially inaccurate picture of social capital. It says little about who is excluded from and who potentially controls or resists such surface level expressions of social capital, nor does it unearth the tensions of compatibilities between the formal



and informal. Some elements of social capital derive their very strength from making external observation difficult. The tension between invisibility as a condition for social capital, and the opportunities that could be gained from surfacing and up-scaling adaptive innovations coming from or made within networks using social capital offers fertile ground for investigations of social capital in adaptation.

Examining the place of social capital in adapting to future climate change directs work towards the informal relationships that cross-cut and may eventually become part of bureaucratic organisations. The tension between the innovation associated with informal interaction and the order and transparency gained from bureaucratic organisation suggests that the balance of influence held by these two circuits of social interaction might point towards another indicator of adaptive capacity.

Because social capital is held in networked relationships and reproduced through norms of trust and reciprocity it is most commonly interpreted from the sociological literature as a public good or asset (Dasgupta, 2003). But this over-simplifies the dynamics of social capital and is perhaps a product of the difficulties of generating policy friendly data from individual level studies (Durlauf, 2002). At a theoretical level it is argued that because social capital is a relational good, it cannot be commanded by an individual acting alone. However, individuals can enter into or leave relationships that change their entitlements to social goods as their use of social capital changes. Entering or leaving particular social relationships and networks will vary in difficulty for each individual, but individuals can legitimately be seen as having the agency to potentially form their own portfolios of social capital and not be constrained absolutely by the social structures in which they are situated.

In an assessment of the social base of adaptive capacity, Adger (2003) uses bonding and networking to distinguish between the public and private faces of social capital and acknowledges that these two realms are likely to deliver conflicts in interest. Work on collective action has examined the motivation of individuals in joining groups and the role of groups in controlling individual behaviour (Ostrom, 2000). This work could be usefully extended by contrasting private and public gains and losses from particular types of social capital. Whilst it would be in the public interest and long-term individual advantage to build collective social organisations, it is not always advantageous for individuals to contribute toward this process. Similarly, research on participatory development is replete with examples of collective action providing disproportionate individual benefit above the collective good (for example: Desai, 1995).

The relationships and roles of individuals in organisations and communities cross-cut one another. At times individuals will find themselves in relationships that are defined by formal and informal roles that come into conflict (for example in corruption). At times informal rules and networks might come to dominate the bureaucratic system (as in institutionalised corruption or nepotism). Elsewhere the formal and informal can reinforce each other (using contacts and employment agencies to identify job opportunities). As climate change unfolds and new stressors are felt what constellations of overlapping relationships will be best placed for equitable adaptation? Will climate change adaptation be a force that leads to the collapse or reinforcement of entrenched roles and the marginalisation of the vulnerable? Rayner and Malone (2001) argue that the diversity of interpersonal ties that constitute social

life are a fundamental resource that can facilitate capacity for individual and collective change when faced by climate change or other external pressures.

### *3.3 The Utility of Social Capital*

The utility of social capital as offering a lens that can point towards social change has been questioned. The argument is that through acknowledging the particularity of place or context, social capital diverts analysis from larger, structural concerns, for example of class subordination (Keane, 1998). But this overlooks the potential of social capital as a tool that can help in unpacking the power dynamics that unfold between social actors in the (re)constructing of social inequality and risk.

In social capital power is relational rather than structural. By drawing analytical attention to the relationships between actors, social capital connects with Foucaudian arguments of power as relational; held and felt in interactions between individuals rather than emanating from actors (Fox, 2000). Social capital opens opportunities for exploring power as enacted through relational and networked space. To do this work on social capital that privileges the national-scale analysis of socio-political systems where quantitative assessment of (usually indirect) indicator variables of social engagement with political process, such as the number of registered non-governmental organisations, newspaper readership or voting propensity, needs to be backed up by micro- and cross-scale analysis of the anthropology of social capital. Situated analyses of social capital force a rejection of linear causation and recognise the complexity of social systems. In doing so there are echoes of Giddens' theory of structuration and of Actor-Network theory, that have sought to overcome the tensions between actor, system and structure.

Bonding capital in particular can be used to further social control and exclusion, and to distort adaptation (Putzel, 1997; Pelling, 1998). Highly visible examples are youth gangs and business cartels or lobby groups, but this can also work out through old boys networks, institutionalised racism or sexism. The uneven and overlapping distributions of perverse and positive social capital in society contribute to uneven geographies of adaptive capacity. Responding to this, indicators of adaptive capacity will have to grapple with the inevitable subjectivity of their assessments of the positive/perverse influence of social capital in creating opportunities or constraints on equitable and efficient adaptation to future threats. More broadly, this underlines the importance of accounting for the quality as well as the quantity of social capital ties in assessments of adaptive capacity (Szreter, 1998).

Whilst producing aggregate measures of social capital is proving difficult, social capital can offer a valuable entry point into understanding the operation of scaled decision-making in organisations and communities. As Adger (2001) has noted, the most appropriate governance regime adaptations will combine action at multiple scales from the individual up. The role for public policy is to create the most favourable socio-economic environment and institutional arrangements to allow climate change adaptation to take place. Because social capital draws attention to the operation of power and flow of resources and information in relationships it is possible to follow networks that cross boundaries of administrative and political scale. Social capital directs research towards the interaction of formal administrative and organisational structures and conventions for information transfer and decision-

making authority, with more informal and personal networks of influence and learning.

## **5. Towards an agenda of adaptation research informed by social capital**

This section reviews two sites for the application of social capital in studies of adaptation and adaptive capacity: communities of place and communities of practice. Both types of community cross-cut one another, but each has a particular legacy of research on which to build and for clarity is dealt with separately here. Future research that can move towards a synthesis of approaches would make a valuable contribution towards realising multi-scalar and cross-sector analysis of adaptation and adaptive capacity.

### *5.1: Social Capital as a Tool for Understanding Adaptive Behaviour in Communities of Place.*

There has already been some useful development in this application of social capital within the climate change community. Literature on adaptation of communities of place to climate change that explicitly uses social capital has focussed on the pressures that lead to changes in the quality and quantity of formal and informal networks, and so to the building up or breaking down of entitlements to external resources or capacity to mobilise internal community resources for adaptation. The interplay between structural-political forces and local social capital has produced some useful comparative work. Adger (1999; 2000) shows that the modernisation and liberalisation process in Vietnam has led to increased inequality in local capacities to mitigate sea-flooding. But that these same processes have opened the political space needed for the rekindling of traditional street associations that in their turn are a source of informal resources and coping capacity. An example of latent capital becoming active, and of the resilience of informal networks of social capital faced with long-lived repressive political structures.

In a comparison of three Caribbean political-economies, Pelling (2003) examines the challenges to social capital formation and maintenance in regimes undergoing transition towards democracy from military authoritarianism (the Dominican Republic and Guyana) and contrasts this to a crisis in maintaining social capital within a rapidly modernising, democratic state (Barbados). These contextual analyses highlight the perverse and positive faces of social capital. The interplay and tensions between the individual and collective use and benefits of social capital reveal the role of power in shaping inequalities in command over social capital that shape the distribution of adaptations to present flooding and shape adaptive capacity. These studies also use a historical perspective that pulls out the dynamic and static elements of local social capital as individuals and communities reinvent local institutions of governance within the broader system of a coevolving socioenvironment.

Work to date has demonstrated the relevance of social capital to shaping adaptive capacity. Its further understanding and use in policy points towards two distinct but related research agendas. First there is a need for a deeper and more ethnographically informed engagement with the place of social capital in individual and communal development – to move out of the first realm of social action in Figure 1. This is a need in the wider literature on social capital as the preceding sections of this paper

have shown, but for social capital to be used with confidence in informing policy for building adaptation to climate change it is important that the depth and breadth of social capital's influence is accounted for. Secondly, social capital has already begun to form part of aggregated collective or national level assessments of adaptive capacity, or vulnerability to disaster (e.g. UNDP, 2004). But there is a danger here that indicators for social capital will be understood to convey more precision than they can. We are a long way from generating indicators that can bring out the informal side of social capital, and the qualitative variation of different kinds of social relationship that each collective and individual possess. Developing generalisable indicators of social capital to move from context specific case studies to meaningful aggregate analysis remains an important challenge.

### *5.2 Social Capital as a Tool for Understanding Adaptive Behaviour in Communities of Practice.*

Examining the role of social capital in the adaptation of communities of practice draws on the social learning literature. The possibility that social capital could play a role in explaining business competitiveness and sustainability was first studied in the mid 1990s (Adler and Kwon, 2002). Amongst a range of attributes ascribed to social capital a number are of direct relevance to adaptive capacity within organisations more generally. Melé (2003) interprets social capital as a public good that can reduce transactions costs and facilitate the exchange of resources and information between individuals and management units enhancing innovation and capacity to learn. In the organisational literature the informal ties and relationships that make up social capital networks within communities of practice have been dubbed 'shadow systems' by Shaw (1997). She critiques the dominant construction of shadow systems as a source of resistance to legitimate efforts at making changes (foot dragging or corruption) – and argues for their recognition as a source as innovation and an alternative to canonical social organisation.

Wenger (1999) offers an empirically informed framework for assessing communities of practice. For Wenger, these are the loci of association that form around what people do. Multiple, 'constellations' of communities of practice share many features with Shaw's shadow systems: both are composed of networks built from interpersonal relationships that have not been formalised within the bureaucratic organisational framework. Wenger (2000) offers a typology for communities of practice based around three elements: engagement (what and how much individuals do together), imagination (the strength of a shared mental image of the bounds and qualities of the network) and alignment (the extent to which individuals act within the rules of the network). Networks are held together by their members shared identity, norms of mutuality and codes of communication. There are similarities here between Bourdieu's use of cultural capital, and Wenger's shared imagination and codes of communication. But Wenger, adds a dialectical and coevolving quality to the relationship between networked communities of practice and the wider world of potential-members. Communities of practice (Bourdieu's social capital) evolve as the community takes on new ideas and aims in response to new membership, but this stimulates changes in the codes of communication and imagination of membership (Bourdieu's cultural capital), which in turn changes what networks (social capital) do and how things are done.

Lesser and Prusak (2000) argue that social capital within organizations is linked with an organization's ability to manage its knowledge resources, and that communities of practice are the primary vehicle for building social capital within organizations. They build on a framework proposed by Nahapiet and Ghoshal (1997) that presents social capital as having three dimensions: structural (the network), relational (shared norms that form codes of communication and enable trust) and cognitive (common identity of the network). Empirical work by Tsai and Ghoshal (1998) found that social interaction within the network breeds reputations of trust, and that trustworthiness was associated with more exchanges of resources. This in turn was found to contribute to innovation; a potential candidate as an indicator for adaptive capacity. Similarly, Bouty (2000) found that capacity for legitimate information exchange between firms leading to innovation was built on mutuality and trust between research scientists working for different companies. Here scientists had to balance the short-term gain from exploiting information gained through informal interactions against the longer-term benefits accruing from upholding a reputation for trustworthiness. The potential for social capital inside organisations to be used for personal gain has also been discussed in the context of career mobility (Seibert et al, 2001), and the pay of senior executives (Belliveau et al, 1996). Adaptive capacity is seen as an outcome of the tension between actor and organisation, and of short- over long-term gain as enacted through the informal networks and norms of social capital.

## **6. Conclusion**

What are the prospects for social capital to contribute to our understanding of the behavioural aspects of adaptation and adaptive capacity? This paper argues that social capital can offer a perspective to begin opening the black box of interpersonal and informal relationships that shape adaptive capacity and the final enactment of adaptation to climate change. It offers the opportunity for such analyses to be situated in the wider, scaled processes of social life and in a context of multiple-risks. The focus of existing studies in adaptation on purposive material modifications is appropriate but ultimately partial. For future research to be most useful for policy-makers work needs to exploit the full breadth and depth of social capital's reach. At the same time, for individual studies to contribute to knowledge as a whole there is need for a debate within the climate change community on the extent to which common theoretical ground is achievable. The global impact of climate change makes this goal all the more important.

There are suggestions that the multi-layered and many faceted social ties of everyday social interaction may be a community's best resource in maintaining a capacity to change collective direction. If this is so there are radical implications for development policy under climate change. If this analysis were born out in empirical studies it would at least demand some rethinking of the relative weight placed on social and economic development in contemporary policy for sustainability and security in the context of climate change.

For a rigorous argument to be made for social capital in building and facilitating adaptation and adaptive capacity the questions of its formation, operation and utility need addressing. Each question points to future research agendas fleshed out in part by the examples of communities of place and practice presented above. A useful first

step in opening debate on social capital is to make more transparent the ambiguities and limits of social capital that have plagued research and undermined policy in parallel policy areas. It is hoped that this paper has made some contribution to this end.

An honest and critical appraisal of social capital is essential if we are not to compromise the opportunity it affords us to enhance our understanding of informal social relationships, trust and reciprocity that gives meaning and shape to collective and individual action inside communities of place and practice. Without this work there is a danger that social capital will be taken uncritically into the rapidly growing range of research and evolving policy discourse on the social aspects of adaptation to climate change. This will both miss the opportunity of using social capital to open the door for deeper anthropological studies of adaptive behaviour and undermine the credibility social capital as an analytical category and tool.

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