

ADAPTATION TO RAPID CLIMATE CHANGE: Institutional resilience in UK rural policy organisations

Interview Report

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Summary

The Rapid Climate Change Project is a one-year ESRC-funded research project to investigate adaptive capacity in the UK to extreme climatic change. The aim of the project is to examine how to understand how organisations and networks in the rural sector might respond to the stresses involved with rapid changing circumstances; for example through a hypothetical sudden climactic cooling in Europe introduced because of a state change in the North Atlantic ocean circulation. The project leader is Dr Mark Pelling, a human geographer with expertise in social adaptation to climate change.

As well as developing a theoretical and methodological framework for assessing the institutional constraints and opportunities that shape adaptive behaviour to rapid climate change in the UK, the project aims to provide a space to think through the implications of different climate change scenarios with local, regional and national stakeholders. The project is not designed to develop any new scientific evidence about the likelihood (or not) of particular rapid climate change scenarios. Nor is it intended to develop a comprehensive assessment of adaptive capacity. Instead, the purpose is to develop a framework that points to issues that should be considered in any such assessment.

The first stage of the project, the construction of an analytical framework, is complete. The framework identifies opportunities to expand the understanding of adaptation by drawing on theories of social learning, social capital and organisational development. The second stage of the project involves work with decision-makers and managers to test and refine the framework through a set of workshops and interviews on rapid climate change and the rural sector.

Following two workshops, a set of 10 interviews and meetings were held at DEFRA (the Department for Environment, Food and Rural Affairs), the Environment Agency, CCW (the Countryside Council for Wales), and the Welsh Assembly Government. The interviews were based on themes uncovered during earlier research during the project. This report draws together the interview responses, in order that respondents can check the interpretations that we place on their remarks. Final research outputs will be available from July 2004.

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Interview Rationale

From the researchers’ point of view, the interviews offer an opportunity to ground-truth the theory that was developed during the first part of the research, establishing whether processes highlighted by theory have much importance in practice. While there was not the same opportunity for reflection and learning on the part of respondents as there was in the earlier workshops, the interviews were designed to provide opportunities for learning about the project themes.

In return for participation in the interviews, a commitment was made by the research team to circulate this report to those interviewed for comment, and to ensure that data arising from the workshop is anonymous. In order that interviewees get the opportunity to review their contribution, all quotes and statements supported by interview material have been given a code of the form (IN), where N is a number indicating that a particular person made that statement.

The expected research outputs which will draw on this research data include this report and various academic papers. The report will be used as a working document within the research project, and will be available to research participants, as well as being placed in the ESRC data archives. There are no plans to publish it any further.

Rural organisations and agencies

Rural governance in the UK is spread across a range of organisations and agencies, with different responsibilities and working at different scales. The picture has become considerably more complicated with the introduction of devolution in Wales and Scotland, and the Whitehall re-organisation of 2001, which established the new Department for Environment, Food and Rural Affairs (DEFRA). Thus it was important to recognise the diversity of organisations that might be considered in an assessment of adaptive capacity across the UK rural sector, while recognising that the point of the research was not to produce such an assessment at this stage.

Selection of organisations to draw interviewees from was simplified by taking rural Wales as a focus, and considering a limited range of organisations and agencies with a relevant responsibility for the effects of rapid climate change. Those bodies included in the interview process, and those relationships between which the research team were aware of before the interviews, are outlined in figure 1 below.

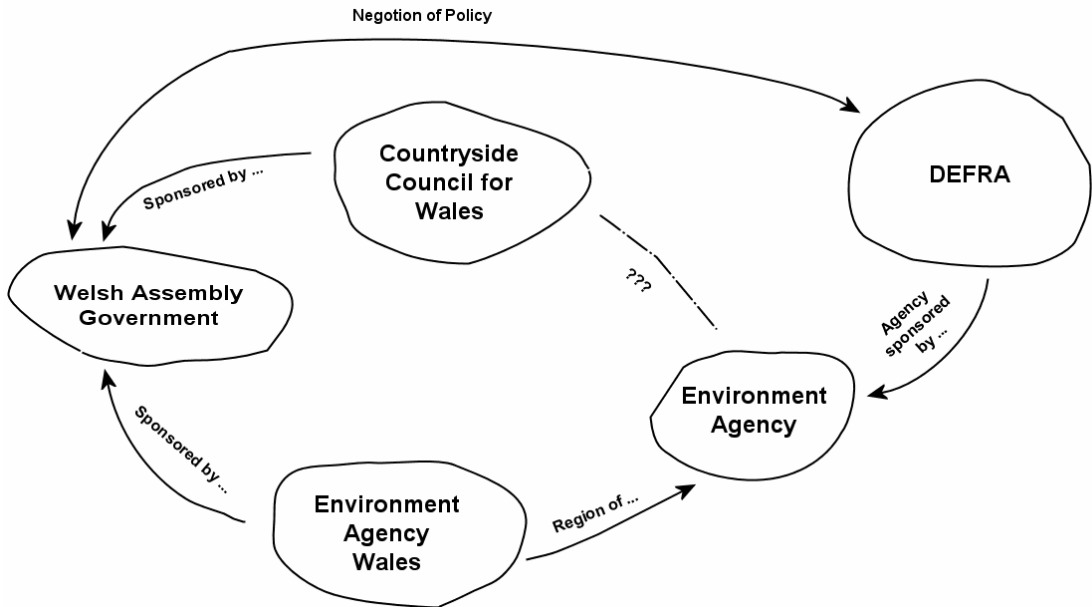


Figure 1 – Some organisations and agencies relevant to the research

The organisations shown in figure 1 are as follows: DEFRA, a UK ministry, holds lead policy responsibility for both climate change and rural issues, to the extent that these issues have not been devolved. Indeed, climate change is perceived to be a key issue within DEFRA's remit:

"Climate change is one of DEFRA's top 5 priorities. Not a top threat, but a top priority. It's tied to sustainable development." (114)

Within DEFRA, contact was made with staff from the Global Atmosphere Division (GAD), the Policy and Corporate Strategy Unit and the Horizon Scanning team. GAD holds responsibility for climate change policy within DEFRA, while the Policy and Corporate Strategy Unit is responsible for DEFRA's risk strategy. Horizon Scanning is a futures unit with a brief to highlight emerging issues of relevance to DEFRA responsibility to the appropriate parts of the organisation:

"I think there's an expectation that we'd pick up a threat that DEFRA hadn't dealt with yet. We want to know what we don't know. That's what Horizon Scanning is about." (12)

The Welsh Assembly Government, is the Welsh civil service, set up to support and enact the policies of the Welsh Assembly which resulted from devolution in Wales. It holds responsibility for a number of policy areas that would be affected by rapid climate change, as well as a wider operational responsibility. Discussions and interviews were held with staff from the Welsh Assembly Government with an interest in rural affairs, climate change and sustainable development.

Since its inception, the Welsh Assembly and the Assembly Government have developed a strong degree of partnership with a range of public bodies operating in Wales, and this would have a part to play in adapting to climate change:

"It would be the Assembly – it might be working with CBI, with the small business federation, with the unions...in the economic area. The Assembly would need to work on health issues...with the national public health service in Wales, with local health boards." (116)

Of particular interest would be the position of the Assembly Sponsored Public Bodies (ASPBs), agencies that bear a responsibility to the Assembly (such as through their remit letters), while maintaining operational independence. Amongst the ASPBs there a range of relevant organisations, including two which were involved in the interviews in this research, the Countryside Council for Wales (CCW), and the Environment Agency Wales. Both hold a responsibility for the rural environment in Wales.

The Environment Agency Wales is an interesting case because it has dual lines of accountability. As well as being an ASPB, it is a region of the Environment Agency, a body which covers both England and Wales. Thus the Environment Agency acts as a bridge between the UK and Welsh polities. The Environment Agency is also in its own right a central stakeholder in rural climate change adaptation, holding responsibility for example for flood management:

"There's huge pressure on the Environment Agency. All these things can have knock-on effects." (15)

A number of other organisations were covered by the research, through the workshops, and through less formal discussions. These include farmers groups (Grasshoppers & the Cadogen Cymru), Welsh Tourist Board, Forestry Commission, and the Welsh Development Agency. There are a number of other relevant bodies that could have been included, such as the NHS, the Countryside Agency, the Food Standards Agency and the farmer's unions, as well as special interest groups

concerning flooding, rural stress and so on. Unfortunately, due to limited time and resources this was not possible within this research project.

Methods

The interviews were run in a conversational mode, using a semi-structured interview schedule with one or two respondents. In addition a series of diagrams based on research themes were used in many of the interviews to help structure conversation and to direct interviewees' attention to particular conceptual relationships. Copies of these diagrams are given in Appendix 1. The diagrams were refined during the interview process, and so have changed in form in some ways since the early interviews. The form and the use of the diagrams were loosely based on systems methodology, which had implications in practice for the way that they were explained to interviewees. In particular, it was emphasised that instances of the diagrams were meant to represent particular ways of looking at a situation, rather than objectively representing the situation itself, and intended to trigger conversation about issues rather than represent a particular respondent's view.

As well as the diagrams, a scenario of rapid climate change (developed earlier in the research) was used during the interviews as a point of reference. However, it played a much less prominent role than during the interviews than the workshops. A summary of the climate cooling scenario (the main point of reference for the interviews) is given in Appendix 2. A series of possible consequences of climate change for rural areas of Wales, developed in the workshops, is presented in Appendix 3.

It is worth emphasising that although these scenarios were developed for this project, they are not the point of it. The research comprised a social science investigation into the response of policy and management systems to climate change. It was designed to further understanding of the social capacity to respond to environmental stress, rather than move forward the physical science of climate change. Therefore although knowledge drawn from the physical sciences was used to establish a hypothetical cooling scenario for use in the project, it is acknowledged that this represents an unlikely series of events within the next 100 years.

Responding to rapid climate change

Climate change in general and rapid climate change in particular are likely to have a range of direct and indirect effects on rural areas of the UK. Rapid climate change, climate cooling for example, makes a particularly interesting study, because it can be seen in terms of changes that exceed current working assumptions of climate trends. In other words, it can be defined in terms of counter-intuitive changes that surpass the expectations of decision-makers about the rate or direction of climate change, or the frequency and scale of catastrophic events that arise as a result.

This section starts by making the case that climate change mitigation alone is an inadequate response to the threat of climate change (and rapid climate change in particular). Therefore an understanding of the opportunities and limitations of adaptation to climate change is required. This is not to suggest that adaptation and mitigation are alternatives. Instead, knowledge of what adaptation is possible helps to make a case for the degree of mitigation necessary and vice-versa.

Rapid climate change in the rural UK

In rural areas of the UK, climate change is an important issue because of the multiple effects it could have:

“There's going to be huge pressures” (I5)

“There’s an issue in terms of climate change, for instance, it’s such a fundamental issue in terms of social and economic activity.” (16)

As at the workshops (see Appendix 3), interviewees were immediately able to sketch out some of the challenges that would result from rapid climate change, such as the cooling suggested within the project scenario:

“So there’s bad news on agriculture...bad news on tourism; that would probably be fairly quick. One filthy summer would be nasty. Transport...there would be bad news in the first bad winter. Same with health, large amounts of influenza and pneumonia would be bad news in the first bad winter. Economic development...That I would have thought would be slow to show up as a stressor, partly because inward investment decisions take a long time to make...and therefore a long time to turn around.” (17)

As well as direct effects, many interviewees pointed to the importance of the indirect effects of climate change.

“People tend to say that “The stressor is climate change”. It will have direct effect on plants and animals. But actually when you think about things like nature conservation, the effects are far more likely to be indirect. For example, if you get southern Britain in drought conditions every summer, there is going to be huge pressures to have more reservoirs and all that infrastructure.” (15)

“We might not have climate change as a top threat. We might have drought. And there’s other issues to do with sustainability, what happens to the rural economy” (114)

Not only physical, but economic or political pressures were seen as likely to arise:

“The worst would be if we were to hear of it from the newspapers.” (12)

“It might be a public clamour that something is going wrong. For example a succession of bad harvests, farmers not having anything to flog. It could be pressure on budgets. Some of our budgets are there until they’re spent. Others are there to meet an open-ended commitment. The latter can put disproportionate pressure on the system. Some are picked up by the treasury, but some are not.” (17)

“Everyone still lives in a world where we get a lot of our food from abroad. We don’t need to be self-sufficient in food. But agriculture is 1-2% of GDP in Wales, not very important. Strip those sheep off the hillsides and let things grow. But actually you read about things like losing lots of rainfall in Central America, the monsoon switching off in Asia and the Mediterranean desertifying and you think...?”(15)

This matches our theoretical position that climate change and other environmental stressors have a robustly social aspect. Their impact on individuals and organisations depends on how they affect on their perceived interests, and this is both socially differentiated and socially constructed, varying between different parties:

“Almost any change brings some benefits and some stresses, particularly when you’re talking about policy. So almost any change can be perceived as a stressor or as an incentive.” (17)

Thus climate change brings a range of challenges, from the need to anticipate and respond to the direct effects, to understanding the likely impact of climate change on

current policy arrangements and the social and economic support systems that underpin the livelihoods and well-being of rural communities and individuals.

Mitigating climate change

In the public consciousness, and in many policy contexts, responding to the challenge of climate change seems largely tied to the idea of mitigation. That is by reducing the amount of greenhouse gas in the atmosphere by reducing their emissions, or by increasing the rate they are absorbed from the air. Achieving meaningful mitigation is both a political and a scientific challenge:

“We do have a Royal Commission report saying we need to go for a 60% reduction by 2050, but no one actually knows whether that’s possible or what the impacts are, even if we get it down to double historical levels. In a sense, it’s an arbitrary target, just trying to get it down to something. That’s something aim for numerically, but we don’t know what that means in terms of impact...We might reach the targets and still be stuck.” (16)

Indeed, effective mitigation depends on global co-operation, as with other cross-jurisdictional environmental issues

“That’s the problem we face with pollution. You can deal with local pollution. But when you talk about air pollution, a lot of the pollution produced in Britain goes to Scandinavia and a lot the pollution in Britain comes from the continent. These bigger issues, even for the UK government... it’s too big.” (15)

The fate of the Kyoto treaty, the most comprehensive effort yet in this regard, is troubling because even just this initial step towards bringing green house gas emissions to safer levels may be reduced to an ineffective token:

“We can’t even get the major emitters to sign up to Kyoto, which is a pretty small step to reaching 60% cuts. People are saying we have higher priorities for economic growth and social welfare, and what they are on the whole saying is that they don’t believe the effect.” (16)

Thus it is not clear that present mitigation efforts will be sufficient to significantly address the hazards arising from climate change, especially given the hysteresis of the Earth’s climate system. Adding in the possibility of non-linear rapid climate change that exceeds the current working assumptions scientists and policymakers in terms of rate of change and impact, and mitigation alone seems a risky strategy. We suggest that an understanding of how social and natural systems might respond to climate change is required as well. This will reveal threats and opportunities that can inform decision-making, not least of which is the urgency with which mitigative action need to be pursued.

Adapting to climate change

Because it seems likely that current mitigation efforts may be inadequate on their own, there is an increasing awareness in policy and research circles that the ability of social and natural systems to adapt to climate change is important. We define adaptation as changes in the state of a system that enable other aspects of the system to be conserved or increased. A farmer changing livelihood strategy in order to keep their business viable, or the species mix within an ecosystem changing and thus maintaining the provision of particular environmental goods under changing climatic conditions, for example.

Adaptation is a policy issue, because an advance idea of the envelope of possible adaptations of to a potential stressor is necessary in order to limit damage done and

to capitalise on opportunities that arise. Questions about the future adaptation of social and natural systems have implications for present decision-makers, because they change the weightings given to different policy and investment options in the present:

“There’s an issue there with all emergencies with how they start. They start with a coping mechanism within existing structures, and then they grow to a point where thresholds are broken and people need to put into place or invoke emergency plans, which in some cases exist, but not always, and they will be kicked off.” (I6)

“The first key to adaptation would be to say, well we need to rethink the system. That would work it’s way all the way through everyone’s work programmes. (I5)

There are different types of adaptation, and one can distinguish between reactive and proactive adaptation, for example. Reactive adaptation refers to responding to events as they arise. This type of adaptation depends on existing characteristics of the system of concern. In a natural system, one might consider the extent to which species can migrate to cooler latitudes or altitudes. In a social system, one could look at the existing arrangements to assist those affected by the consequences of climate change:

“One important stressor is storm damage – if it is severe enough, it triggers emergency funding to the local authorities affected. That might get funding from the UK contingency reserve” (I15)

“Clearly the department would start a flurry of more detailed research, and findings would need to get around the department.” (I14)

Proactive adaptation, on the other hand is based upon anticipating the course of events, and responding in advance. This might consist of infrastructure measures, such as higher sea walls, or emergency planning of some kind. Recent policy events have given impetus to discovering opportunities for proactive adaptation:

“It’s an area currently being thought about in terms of things like terrorist incidence. What structures are in place, how flexible and robust are they? If things fail, what are the backups?” (I6)

“What foot and mouth disease has put more emphasis on is trying to think outside the box. Is the worst case scenario the worst? Can you have an organisational culture which is agile enough to respond to the worst?” (I2)

Another distinction about adaptation can be made between specific and generic adaptation. That is adaptation can be considered in terms of responses to particular risks, as well as in terms of more generic adaptations, which apply different stressors. In order to explore the tensions between generic and specific adaptation, the focus of the research was not about particular adaptive strategies *per se*. However, we do have an interest in the thinking that underpins decision-making, and the tension between generic and specific adaptive strategies in practice. The interaction between different potential stressors and the range of adaptations that might arise in response can be understood in terms of the adaptive capacity of different systems.

Assessing adaptive capacity

Adaptive capacity refers to the characteristics of a system that enable it to adapt to a range of interacting stressors. For example, in the rural UK, adaptations to severe storm damage depend on the capacity of species to repopulate areas of land and the capacity of economics systems to deal with storm damage through insurance and compensation. Adaptive capacity often does not consist of a set of independent factors, but instead arises from the interaction between system components. This section examines adaptive capacity from the perspective of rural decision-makers. It begins by looking at adaptive capacity in terms of the risks and uncertainties inherent in making decisions about possible future climates. Taken together with an examination of the resources that can be brought to bear on issues of adaptation, this leads to an interest in institutional modification as a strategy for adaptation or for changing adaptive capacity. This in turn suggests that understanding the nature of institutions and organisations is a critical aspect of assessing adaptive capacity

Managing risk and uncertainty

There are a range of policy tools for dealing with potential future hazards in terms of risk. Risk here refers to a known or estimated likelihood of a potential event, multiplied by its known or estimated impact. Risk management tools are designed to assess, prioritise and respond to the awareness of potential risks. Given a reasonable assessment of risk, rational policymaking can proceed through the familiar tools of cost-benefit analysis:

“Looking at your scenario, the issue is gearing up the point where we can cope with 10 years notice. That means getting certain measures in place...Get ready to take the worst case scenario and be ready to deal with it as it unfolds.” (I1)

“Where it would start to have an impact is it would start to affect cost-benefit assessments.” (I2)

Where the risk of something taking place is not known, further research may be necessary to enable an uncertain risk to be dealt with by decision-makers:

“We narrow down uncertainty by commissioning research.” (I2)

“Sometimes no action is needed, and something just needs monitoring, but then we need to make sure that someone’s actually monitoring it.” (I4)

“There’d have to be a greater emphasis on monitoring mechanisms.” (I1)

However rapid climate change is an exemplar of a whole class of possible but unlikely events, which are difficult for decision-makers to deal with because of the uncertainties involved:

“We’re trying to get prepared for these low probability/high impact events. That’s one of the things we’re trying to do. So we can say we know these things are unlikely, but it could happen.” (I4)

“At what point do you have enough evidence to trigger a response plan? You can develop a risk management approach when you have a reasonable amount of certainty about the driver, but you don’t know it’s impacts, but when you have an uncertain driver as well, people think, “Oh, well, can I actually cope with this.”” (I6)

An example is the risk of Bovine Spongiform Encephalopathy leaping the species barrier into sheep:

“An example of that is BSE in sheep. There’s a theoretical risk, but it hasn’t been proven. We need to be saying that it’s a theoretical risk, recognising it, but not scaremongering.” (I2)

The difficulty is that even where a risk assessment is possible, there may be a significant difference between perceived risk and actual risk. Furthermore, sometimes all that is known (or suspected) is that an event is possible but there is no way to actually assess the risk because the knowledge is not readily available to inform decisions. Further research itself takes resources, and not every theoretical possible event can be thoroughly investigated:

Uncertainties cause quite a lot of difficulty in knowing when thresholds are going to be triggered, and so there tends to be a sort of business as usual type of approach, because if you’re going to do some additional planning or organisation, that needs some resource. (I6)

“So you have to build a case as to why you have to do it, and if the case is based on a lot of uncertainty, you have some difficulty in actually getting the resource.” (I6)

The need to balance uncertain future events against the concrete needs of the present therefore makes uncertainty a difficult issue in decision-making:

“There’s a feeling that we can’t manage if we’ve got such uncertainties.” (I6)

Even if you do consider them, it’s still very difficult to resource contingencies and resilience to them.” (I2)

“The issue is one where people say to what extent can we just cope as we go along, and at what point do we reach a threshold where we say within the range of uncertainties we cross the threshold and we have to start saying we’re going to do X, Y and Z.” (I6)

“I’m not sure there’s been much subtlety in separating out managing uncertainty and risk management. UKCIP put together a report on risk, and uncertainty was taken to be one of the barriers. But in a sense I’m not to sure how it was managed in that framework. It was merely taken as one of the areas that because of the uncertainty, it was difficult to get people to engage, and they weren’t willing to commit themselves to much thinking and resource while the uncertainties exist, rather than saying “This a spectrum of uncertainties, how to we risk manage across that spectrum.” (I6)

Nevertheless, there was still recognition amongst interviews that uncertain risks are an established feature of rural management and policymaking, and the question is how to deal with them:

“Everyone knows that things don’t go according to plan.” (I1)

“We’re still faced with trying to respond to the unknown. It’s a bit like September the 11th, where something a scale different to what you were used to suddenly comes along. When those things come along, they are so overwhelming that you won’t be ready for them.” (I2)

“The big issue with uncertainty is how to present it to colleagues as they make big decisions. How do you explain that?” (I2)

A conceptual tool to deal with uncertainty that has arisen within the debate on sustainability is the precautionary principle. This suggests that where the precise risks are not known about the consequences of a particular course of action, a conservative strategy is best. In terms of climate change, this was used to argue for mitigative action at a time when the scientific consensus on the anthropogenic drivers of climate change was not as strong as today, for example. The difficulty is that this can be used to argue the case from opposing points of view (as per Bjørn Lomborg's argument that spending money on climate mitigation put at risk direct spending on human development), and is in any case of less utility when challenging business-as-usual, where the options are not clear:

"You could provoke the precautionary principle and say well these things have to change, but the question then is what do we change to? Because in a sense it's easy to use the precautionary principle when you're at a decision point, asking whether to do option A, option B, or option C." (I6)

Furthermore both risk management and the precautionary principle fall down in respect of unknown hazards, or those which have been disregarded by the policy system. Horizon scanning, a strategy for dealing with exactly this state of affairs, has arisen through the post-FMD (foot and mouth disease) interest in resilience in rural policy. This is essentially futures research, and entails a continuous effort to spot important trends in a given context, to uncover their significance to policy and to bring them to the attention of the appropriate policymakers:

"We do a broad baseline scan. We look at all the future trends that people are discussing and then we analyse them ourselves to look at trends. We assess them to see how they affect DEFRA. When something is going to have a big impact on DEFRA, we start to study it." (I13)

"If horizon scanning is running well, then we'll be picking up trends and maybe commissioning some research ourselves." (I2)

"It becomes an interest to horizon scanning because we get an e-mail or an article and then we have an impact score – timescale, likelihood, impact on DEFRA – you get an overall score. Something like rapid climate change becomes an horizon scanning issue because even though it's of low probability, it's very high impact." (13)

It was anticipated that horizon scanning would be an important avenue for the 'discovery' of rapid climate change by the UK policy system, and therefore an important component of adaptive capacity with respect to rapid climate change:

"If Rapid Climate Change happens the idea would be that we've already spotted it, let the policymakers know in advance, and given them ownership of it." (I13)

"The threat of climate change is not having an impact on the top threats at them moment. Not the top 10. But if you're at the top of the organisation, you need to have confidence that if things change you'll get some early warning. These risks and threats need to be able to escalate quite rapidly. So whilst it may not be a top threat at the moment, things like horizon scanning are there to keep an eye on it." (I2)

However, that is not to say that horizon scanning is a panacea for uncertainty. Even working well in its own terms, there is still the challenge of embedding the findings of horizon scanning in other parts of the policy system. The challenge in this case is developing and supporting the practices which allow individuals to influence the course of public policy and decision-making in the face of competing claims on the attention of policymakers.

Resources and adaptive capacity

Alongside weighing risks and uncertainty, or even having knowledge about the need to make decisions about adaptation, an important factor in adaptive capacity is that many adaptations require resources. Where these need to be committed in advance of events, or where there is not a clear-cut argument that *this* money is required to respond to *that* event, there may be difficulties in negotiating budgets in the face of other calls on public attention and the public purse:

“There’s a difficult conversation to be had around that, trying to explain what you get for your extra £10 million.” (I2)

“I’m not resourced to handle climate change properly.” (I1)

“There is a problem of resource. Policy development takes a lot of resources to do properly. For instance, if you have an organisation that is learning about policy development, it’s probably not doing it very efficiently in the first place, so there’s a bit of problem there, but actually the amount of resource available to do that, probably isn’t sufficient anyway.” (I6)

“You need to be able to pull a project group together, with the resource to actually do it.” (I6)

A further constraint is that there is significant inertia within policy systems, and this would affect how quickly resource allocations changed:

“It wouldn’t make a big difference in the next twelve months if it were to happen now. We have current commitments and some of those hold into the future too. So it would be business as usual.” (I2)

“Most of the expenditure in most of the budget lines is actually committed, and you can’t chop and change it from year to year. There’s actually a very small margin for manoeuvre.” (I7)

That is not to say that those resources are not available or would not become available in the face of evidence about rapid climate change. In the context of the Welsh Assembly, for example:

“There would be more scope for project management. On any big project, there’s a certain amount of slippage, and the total of that amount is bigger than the discretionary slice. So for a short time, you could cover the pressure, but that can’t last.” (I15)

“Over a decade, the pressure would feed into UK debates. The money the Assembly has is basically formulaic, derived from consequentials of UK government funding decisions. Over a decade, our finances are almost entirely derived from deals being made by our counterparts in Whitehall departments.” (I15)

Furthermore, it is not apposite to limit policy attention to financial resources, when rural governance includes the scope for other individuals and organisations to take on some of the load that would arise from rapid climate change:

“For the environmental NGOs, they would be immensely happy to address the question of what should be done. They might have a role to play in working out the tactics in working that out through the political system.” (17)

This implies that relationships and the opportunities for co-ordination across organisational boundaries are important resources too, albeit harder to work into budgets than pounds and pence.

Institutional constraints and institutional modification

Alongside physical assets and financial resources, another major factor determining the aspects of adaptive capacity that lie within the gift of decision-makers to shape is the interaction between potential adaptations and existing social structures. In other words, taking or designing adaptive actions can be sustained by or in conflict with existing institutions – ways of doing things, which have their own logic, history and cost to be reformed or dismantled. An example of this is the impact of climate change on the way that nature conservation has traditionally been approached in the UK:

“There is a kind of perception and it is certainly there in a lot of the regulatory models that we somehow regulate an environment that is unchanging, we are not terribly good at looking at internal variability in a system, the natural variability of hydrology or climate or whatever.....” (13).

“An awful lot would have to change under climate change. Take nature conservation. The whole policy is all based on a stable climate. The assumptions behind the political structure and the legislation which gives CCW the powers to protect natural features...The whole basis is that we have to protect things where they are now. We’re not interested in letting them move. Our remit is to keep them where they are now, like pieces in a museum. Under your scenario, that’s a non-starter.” (111)

A second example is the contradiction between the pressures on global food production that climate change would bring, and the current post-productivist slant to rural policy:

“Everyone thinks...warmer temperatures right, lets crank up the agriculture, and I don’t think people really....the whole system is moving towards making people less reliant on agriculture.” (15)

“In practice, politicians don’t traditionally have a long-term perspective. The political aspect is part of the system, although maybe not always helping. It might be causing some inertia. So civil servants need to ensure that ministers are alive to the issues.” (12)

Thus an important type of proactive adaptation is institutional modification, reducing conflict between adaptive possibilities and existing social realities, and creating enhanced opportunities for adaptive actions to arise as needed. The impetus for this can arise from without the policy system as well as within, and a major focus of this project has been the scope for individual or collective agency in taking such adaptive action. We found a number of examples of skilful, intentional activity which can be described in these terms, for example:

“My feeling, which I expressed at the DEFRA meeting, is that we need to start bringing Rapid Climate Change into contingency planning, but as you know the evidence that the scientists are giving us is that it’s still very unlikely in the near future.” (11)

“In a sense, we’re doing that (institutional modification) through our seminars, but we are also working in the Welsh Assembly and the Environment Agency, and everybody else. We’re trying to get the Welsh Assembly to lead on a Welsh climate change communications strategy. It’s not a priority for them, but we are trying to lobby for that.” (15)

“The role of the actor as a member of an institutional organisation would depend on the position they were in, the amount of influence they have, the remit they have been given...whether they actually had any authority within an organisation to suggest to anyone that they should do anything different, and ... one should not neglect this... their personality.” (17)

In the next section, we look at some of the ways that institutions can be understood, and of their relationship to the individual and organisational actors whose activities they influence.

Institutions, actors and organisations

The central claim arising from the theoretical review within the project was that the social structures of rural organisations matter to adaptation:

“The social context changes over time, so that shapes how adaptation changes.” (16)

Therefore attention was paid during the interviews to the institutions – the ‘rules of the game’ – that rural stakeholders experienced as significant in shaping learning, communication and adaptation in the UK polity. This section considers some of the details of institutions as revealed through the interviews. In particular attention is paid to the ‘the players of the game’ the individuals and organisations whose actions shape and are shaped by different institutions.

Institutions

Institutions shape social existence and are everywhere. We have taken a very wide definition of institutions in this project, which covers a range of socially constructed contracts and ways of doing things. These include formal and informal institutions, and may therefore be visible to different degrees. Institutions include rules, procedures and routines, as well as roles and responsibilities. Shared ideas can also be a form of institution, and these include standardised ways of seeing and recording experience, such as reporting procedures and standard categories. Also relevant is another form of shared idea – a communally goal. Thus shared aims and objectives can also act as institutions. The table below collates remarks from the interviews that exemplify our understanding of these different kinds of institutions.

Type of institution	Examples
Rules	<p><i>“All our projects are open bid. They’re peer reviewed and have a steering group.” (I12)</i></p> <p><i>“A recent example is that we now have guidance on how to run a meeting and guidance on how to manage.” (I5)</i></p> <p><i>“And then there’re things you’re not allowed to talk about. You can’t go to someone and say “Oh this project has found this out”, before it has reported. And there are official secrets – there’s certain things you just can’t...you just don’t talk about. Nothing serious, justlike results of projects that haven’t reported back yet. It’s not official.” (I12)</i></p>
Procedures & Routines	<p><i>“We have monthly reporting and lunch time seminars and I’d set up meetings with other projects when they were doing something interesting.” (I12)</i></p> <p><i>“So that gives you a feel for how important procedures are. Whereas a lot of people would have been far more flexible and almost in their heads they would have thought through the procedures they would need. They might well have come to similar conclusions, but they wouldn’t have sat down and written it on paper first and told people this is how to do it.” (I5)</i></p> <p><i>“Our organisation, because of its history and culture, is obsessed with setting up systems. To try and institutionalise things as much as possible.” (I5)</i></p>
Roles & responsibilities	<p><i>“The remit of the actor would ultimately come from the minister, or if it was a matter of the smooth running of the organisation, from the permanent secretary and the executive board. Those two things tend to overlap.” (I15)</i></p>
Records & categories	<p><i>“Top threats are the really big issues that need to be addressed by the board at the top level. Climate change or let’s say drought or something like that certainly has to get on there at some stage.” (I4)</i></p> <p><i>“Then we invite people to that workshop. People we think need to see the output, need to see the result. That’s very formal.” (I4)</i></p> <p><i>“Everything has to be recorded and minuted. We have a meeting with people, and we take notes.” (I4)</i></p> <p><i>“In terms of what Horizon Scanning can do formally, it’s mainly to inform people of what we’ve found and what we believe. Each of our projects has a formal reporting process. They have to give a report by a certain date, hold a workshop by a certain date, give a seminar by a certain date.” (I4)</i></p>
Aims & objectives	<p><i>“We weren’t the first to do horizon scanning. In terms of DEFRA, it was stakeholder workshops and meetings. Everyone got together and said what do we mean by horizon scanning. What are we hoping to achieve. They set the targets and objectives and that’s how it was formally decided. Informally, we look at other departments and we see them</i></p>

Type of institution	Examples
	<p><i>and we see how they're doing things.” (I12)</i></p> <p><i>“We have to report our progress monthly. Targets and milestones, and we have a chart we have to fill in which says what our targets and milestones are...Whether we're on target, whether we're slipping.” (I4)</i></p> <p><i>“They come together to make corporate decisions. They're supposed to share these top threats and priorities. They're supposed to make some common decisions about how we work together to mitigate climate change, for example.” (I14)</i></p>

Table 1: Examples of different kinds of institutions

Although these examples have been separated out for the purpose of demonstrating the range of phenomena that could be seen as institutions, in practice the categories overlap. For example, an institution could be considered both a rule and an institution to do with the way that experience is recorded and understood:

“The transparency rules – we have to put certain things on the web. What's been done and what's being done.” (I4)

This is an important point. Because institutions are socially constructed, they can not only be seen as a blend of different pure types, they can also be seen as different from different viewpoints. For example:

“So you'd be talking about a totally different approach. You already have the beginnings of that in agri-environment schemes. But again, they only tinker around the edges. You can look at agri-environment schemes from two perspectives. They're either a way of giving farmers money without annoying the WTO, or you can say they are trying to improve the environment. What they don't do is provide those little islands of animals and plants which give any levels of flexibility or adaptive capacity to respond...” (I5)

Thus institutions have a *negotiated* quality. They are not fixed in stone, but can be renegotiated as circumstances change, as different individual and organisational actors become involved and as the existing actors readjust their internal priorities:

“There's a big review coming up, so things aren't quite business-as-usual.” (I1)

“It is set in their contract that they have to do a workshop and that it needs to have these outputs, but there is nothing in it that says you have to do it in this way. But if one of us were to say to someone, look we think you ought to do it this way, then they're not going to say no. They might come back and say that they've had a better idea.” (I12)

“DEFRA is new. It comes from different cultures. We have a MAFF culture, a department of the Environment culture, and they still exist. There's no unified culture as such.” (I14)

“The spending review would be a critical time. We' need to present information to the treasury. If they were not wanting to spend it on something, we have to be able to say – If you don't fund us, then these are the risks in terms of reputation and cost etc., and that would take into account climate change.” (I14)

The negotiated nature of institutions can lend itself to a different approach regulating behaviour:

“As I say that is nothing to do with my day job but I think if we want to be more sophisticated about the ways we respond to the challenges of sustainable development we have to look for more sophisticated mechanisms than simple regulation.” (I3)

Institutions and individuals

The ability of individuals to renegotiate institutions is of particular interest within the theoretical framework of the project, because of this leads opens opportunities for institutional modification. As with any activity, negotiation has its costs, financial and otherwise and considering how institutions do or might change necessitates an analysis of the power figurations that conserve or act against particular institutions. Within our framework, we do not suggest that power is some substance or quantity that can be hoarded, transferred or spent. Instead it is a quality of relationships, expressing a potential for one party to influence the behaviour of another through that relationship. Power relations can be given expression in many different ways, but in an organisational context, the direction of resources is an important one:

“Clearly they hold the purse strings. Once they’ve been given some money. So as they decide priorities, clearly money should flow in that direction.” (I2)

“Politics is difficult. I have certainly tried to foster close relations with DEFRA, DOE, DETR whatever it happens to be but you are dealing with a culture that is fairly rigid there – they pay the bills, we do what they say.” (I3)

“I’m in a difficult position. We’re a small team in a big organisation, and we have a bigger problem to deal with than most.” (I9)

“UKCIP was well-resourced by DEFRA, and very clearly managed by them.” (I1)

“If the management board are concerned with climate change, then one of the things they might instigate is more research, or redirect resources – priorities going in different directions. That feeds back into what they might evaluate.” (I14)

Institutions can both constrain and enable. As a constraint, they check individual and collective behaviour, making certain options impracticable, unattainable or relatively more costly:

“One of the biggest holdbacks with horizon scanning has been this whole set of rules about how you commission projects. You have to have an advert. It goes to peer review, and gets approved. It needs to be out for a certain length of time. After the deadline, the proposals go for peer review. Then you have a panel meeting and you let everyone know. We hope to have cut it down to two months. It has taken as long as six months in the past from an advert going out to a project starting.” (I12)

“Data protection is an issue. People have to register themselves, or we can’t keep their details. If they don’t, we can’t keep their contacts.” (I4)

“If I approach people in the agricultural field, they’ll say, “Yes, but the EU says this...” They’ve got management systems for now, not for later.” (I5)

For individuals, this can create a tension between their personal and/or professional agenda and an impersonal system. This is particularly difficult when it feels as though the institutions originate elsewhere, and the costs of renegotiation them are exorbitant. The resulting situation can feel very frustrating:

“The tension is between CCW’s desire to do things in a standardised way, and individuals feeling that “I know what I’m doing...Why do I keep getting this...” (I11)

“In the day job there is a day job. I have objectives to do. What I do outside of that is my affair so corporately the culture is quite thick – quite hierarchical, which is frustrating because if we are moving from managing simplicity in regulated sources through to managing complexity – environmental systems – one of the first tenets is devolution of decision making and yet we are going diametrically the opposite way so I find it frustrating intellectually certainly personally.” (I3)

“A simple example is a volunteer who wanted to come and work with us. They were between jobs or something. So I said fine! Then I thought I better check with personnel. They said there’s all these health and safety issues that CCW would be responsible for. They had a pro-forma for it and then we found that this person needed to have all the right health and safety equipment – high boots and... It got away from being a simple agreement, something which would have been acceptable in most places to ...” (I11)

“That was the contracting rules which slow everything down, and for me personally, that was a pain. There’s all this correspondence that goes backwards and forwards and I have to file it and sort it, and make sure that everyone knows what’s going on. There’s all those meetings and that just generates paperwork.” (I12)

“One of the issues with FMD was that the local authority network was chopped off. They had responsibilities, but they were excluded. They became very angry at one point because they were not being included.” (I6)

However, institutions also enable. In particular, they create the conditions for co-ordinated behaviour:

“We have fortnightly review meetings within the team, were we all say what the key things are we’re doing, the highlights and the lowlights if we’ve had any.” (I13)

“We are now working to include climate change in formal procedures. Once we’ve done the initial awareness raising, that’s what we’re about. This is an early stage, but we’re thinking about an audit of our impacts and climate change’s impact on CCW and say how do we improve our adaptive capacity.” (I11)

“Foot and mouth disease is a good example. To a certain extent, we said, “Right, we’ve got to do certain things.” But our first reaction was “Right, we need procedures.” The first job was to get somebody to start writing before you could act. They were told, “We want

procedures tomorrow,” because it was urgent. But we had to have procedures.” (15)

“Because one of the things about a regulatory organisation is that if you make a quarter of an inch of difference the difference sticks, in an NGO if you make seven and a half miles of noise a fraction of a millimetre might stick in the system. In an organisation of this nature progress will be slow but progress is progress. So I guess I rationalise it in this way.” (110)

“There is a DEFRA management board. The management board get together to discuss what the department are doing. There’s also the next level down, the directors. They all get together.” (14)

Institutions and organisations

Within our project, we have tried to maintain a careful distinction between the terms institution and organisation. Where institutions refer to the way that social learning is ordered, organisations are one result – a collective social form able to act coherently. The core point is that a body of individuals are reified as a unit that is able to act. The overlapping nature of organisations and organisation is important in unpicking potential adaptive action:

“The organisation is very externally oriented, particularly when it comes to climate change. We are very keen to be an actor.” (11)

“We did some work within the organisation on climate change. Even personnel go involved. Even CIS – the computing service, because they had to sort out web pages on it.” (19)

It would be the Assembly – it might be working with CBI, with the small business federation, with the unions...in the economic area. The Assembly would need to work on health issues...with the national public health service in Wales, with local health boards. (116)

“But if climate change does happen...external forces will suddenly push agriculture. But it’s not really in our ability to respond to that because the whole thing’s built around European and UK policy.” (15)

When speaking of organisations within our framework, the key variables are from whose point of view has an organisation been identified, and with respect to which activities. Thus as well as the formally constituted organisations we referred to in the interview rationale (see figure 1), one can talk of the informal organisations or organisational forms that arise through informal institutions, and in particular formal organisations can be analysed in terms of their components, which may be formal or informal:

“Now that level of human dialogue is really valuable, as we know, but the real organisation is about a more hierarchical approach with delivery at the edges and thinking in the middle – or at the top rather.” (13)

“In many respects, the department is in a state of flux, because the emphasis is on a smaller policy core with delivery pushed out to regional partners.” (12)

“I don’t know whether the grapevine has a personality as such. I suspect it doesn’t. It’s more like a set of overlapping committees that don’t actually report to higher committees.” (17)

The Assembly would need to base its case for change on reasonable evidence, and that's where it works with networking. Networking with the likes of the Environment Agency and CCW, in order to say "This is a current situation", and be able to make predictions in terms of what is likely to happen. (I16)

Between them institutions and organisations provide the beginnings of a toolbox to understand adaptive capacity. Some important themes that were explored in this respect were the interlocking nature of institutions and organisations, and their dynamic aspect. The next section unpacks processes of change from a social perspective, focusing on the learning and communication and their role in fostering adaptation and adaptive capacity.

Adaptation, communication and learning

Defining learning as changes in the capacity to act arising through experience, it becomes a lens to understand how institutions and organisations evolve and interact, because the actions of organisations as well as individuals can be discussed in terms of learning. Considering communication and learning gives a dynamic feel to the analysis of adaptive capacity, bringing into view the processes through which new adaptive possibilities arise. For example, bearing in mind the aspects of adaptive capacity discussed above, both learning and communication are highlighted. Thus in terms of managing risk and uncertainty, learning is required to quantify uncertainty in terms of risk, while communication figured in making unknown hazards visible through mechanisms such as horizon scanning. The role of communication is clear in terms of negotiating resource use and institutional frameworks, while learning can describe the exploratory nature of such negotiation – the 'learning' of policy and management systems as they seek to adapt to changing circumstances.

Thus learning and communication were a constant theme throughout the interviews, and their relationship to adaptive capacity with respect to rapid climate change were described in many different ways. For example:

"There's not that much awareness of rapid climate in the UK, particularly for the man in the street." (I1)

"The skills that are required are in a sense, building the evidence base, building the models. Those are the semi-technical side. But the other side of that are...influencing, communication, risk management, perception, all that sort of thing. How we actually influence, that's the issue." (I6)

"The last thing they want to do is find out just two days before a major catastrophe." (I4)

"Agility for me means things like getting information up the line quickly. Things like ramping up resources when needed. Can we go from business as usual to FMD-mode very quickly." (I2)

"You might want to try to then pick out some leading people who've taken on that message and then use them as leaders of that community to energise them into how you're going to adapt." (I6)

This section covers some of the findings of the research about learning and communication in the contexts we researched. We conclude with a contention that much of the scope for effective learning and communications in public spaces is tacit. The section therefore concludes by suggesting that the unmanaged spaces that permeate public life are an important site of adaptive capacity for the rural UK.

Learning

Learning can be considered as a process which generates a capacity to act effectively in the future, based on the experiences of the past and present. Creating an atmosphere where learning is promoted is part of adaptive capacity, and can translate important experiences into enhanced capacity to deal with future threats:

“FMD is probably as good an example as you can get. There was a certain amount of “Well, I’ll just go and get on with in it. We’ll talk about it later.” But it was formalised. We did learn from the informal choices we made, but that’s not always the case.” (I5)

“There clearly has been a lot of learning. Enquiries etc. and people presenting information back to us. It’s had a big impact on how we organise ourselves. It’s created new areas of work and funding to tackle gaps. ... The lessons are quite general and cross-cutting: How do you get bad news up the line quite quickly? How do you ramp up resources quickly?...That can now happen very quickly. Not only are there plans to show us how to do that, but we have practice simulations. (I2)

“Ministers and senior officials do get a summary of the headlines and newspaper articles on a daily basis, everything where DEFRA is mentioned, or where there is a strong food, farming or environmental interest. So the news is filtered and brought to official’s notice. There’s an ad-hoc system for ministers to be aware of headlines. They also have their own headlines. It’s probably very self serving. We want to see where and why we’re in the headlines. Partly to keep an eye on our reputations. “ (I14)

Opportunities for learning arise throughout organisational life, and can be fostered:

“We have informal lunchtime sessions, and people ask questions about it. The questions will be more informal. People are sitting there eating lunch and asking questions. It’s informal in that respect.” (I4)

On the other hand, not all learning is positive, and there was a warning about uncritically accepting the lessons of experience, without continuing to probe their relevance to new situations:

“I think one issue that is quite difficult is learning from experience. One has to be very careful that the experience you had is relevant to the problem that you now have. We often come up against the situation where people who’ve had long experience say “Oh yeah, we tried that, and it didn’t work. That’s it.” It cuts off the options and one has to very careful that one is saying that was the experience, but was the context and the problem the same?” (I6)

Communication

Communication was seen as a necessary skill for individuals and organisations in a risk environment:

“The risk environment would change quite radically as rapid climate change took over, so that average manager in DEFRA would need to be quite articulate in terms of talking about some of those issues.” (I14)

In particular, good communication skills are a necessity for institutional modification, something that a number of interviewees demonstrated skill in and awareness of:

“Scientist can come up with a particular rationale, and the political process is that they have to look at a wider range of things, and you know that there will tend to be some kind of compromise because that’s the way things will work. So for the scientists, the issue is how smack in the eye is it, so that the politicians will go with that advice, rather than go for some kind of middle course.” (I6)

“That is why I write so much. If it is out there in the white literature then it is in the public domain. A peer review paper has more weight than my opinion. Particularly when I bring in co-authors who happen to be lawyers. (I3)

“You might want to try to then pick out some leading people who’ve taken on that message and then use them as leaders of that community to energise them into how you’re going to adapt. It’s better to deal with people who’re half converted or part converted, rather than start with a total blank sheet.” (I6)

“We’ve got a database, so people send e-mails saying “This has happened”, “This reports...go to this website to see what this report says”. That’s quite an important way for Horizon Scanning to feed back to the policymakers, through workshops and presentations...and to the public through the web.” (I12)

“I’m publishing papers in my own name, not using work time whatever to get the learning from that, put it in the right literature so I can go to the policy people in the organisation to say LEARN, you don’t have to trawl through grey literature, unpublished sources here is all the right literature put together – APPLY IT, DO IT please.” (I3)

It is also important for public relations, building public support for policy, and public awareness of issues as they surface:

“There was an interesting dynamic of the decision making process, which is to what extent are you centrist and make decisions very quickly, and to what extent do you make it a consultative process. There’s an obvious tension there between consultation and speed.” (I6)

“There were corporate things to do to do with being influential and showing effective commitment.” (I1)

That is not to say that dealing with the public has its costs, and there is a difficult balancing act between transparency and the ability of line staff to undertake their work without too much interruption:

“We’ve done a briefing on the film, because there’ll be a lot of PQ’s (public queries) to handle.” (I9)

“In terms of the general public what is happening corporately is walls are being built so I think we are going in the wrong direction. You know if you are re-engineering an organisation where your front line, your regional and area staff are delivery merchants then you want to stop then ‘wasting time’ in dialogue with the punters. You want them to be doing stuff, not talking about stuff. ” (I3)

Communication requires skills such as knowing who to communicate with, and how to find them...

"It was explained to me right when I started out. You can search for someone by division, or even by a random subject. I found out that works, simply by trying it." (I13)

"Yes, the situation at the moment is that the frequent callers to the agency are the people with specific fisheries interests, water quality and so on who know who they want to talk to, pick up the phone and talk to then." (I10)

"You can e-mail the head of a division, and they'll tell you who should deal with it." (I13)

"In terms of what I have done personally well I network a lot and by definition everyone who is not in the Environment Agency is in the public and when people aren't doing their day jobs they are in the public so it is a question of how you define who the public is." (I10)

"I wouldn't send out an e-mail to all Fast Streamers saying we're doing a workshop, do you want to come along. But I might choose two or three who I know would be interested in it." (I13)

...and also how to go communicate effectively, designing acts of communication which are appropriate to the task:

"We want to create tools that people can use. We don't want to create tools that are boring or that scare people, or just another report on their desk. We want something that people engage with." (I4)

"You can send a summary, or you can send the report and a note saying read page such and such. It's relevant to you. They don't just read reports if it's like this thick. They need some bullet points to say why it's relevant to them. Then you try and arrange a meeting following up. Then there's some incentive to read it. They're not going to want to come along not having read it." (I4)

Communication is not a neutral act, and there are many conventions that apply to the way that communication is carried out in different relationships and contexts:

"I might say to someone higher up in DEFRA – you need to be aware of this. Usually I talk to other members of the HS team first." (I12)

"Sometimes we send people guidance. Some people find that very useful. Others are resentful. So there are a lot of people who don't need to be told what to do." (I5)

Knowledge culture

Because the appropriate combination of learning and communication strategies available to actors is determined in the cultural characteristics of the organisational setting in which they operate, it makes sense to speak of the knowledge culture of an organisational setting. That is the characteristics of an organisation or other social body that make particular forms of learning and communication possible or not. The sense of a pervasive way of being that both influences the individual and that results from the collective actions of individuals came through clearly in one interview:

"So to what percentage am I attributable I don't know to what extent is culture changing around me and these ideas becoming more and more I don't know I can't measure that but in my own head I'm pretty well convinced that I have banged on at certain people for long enough that we have got an understanding." (I3)

The reward for a strong knowledge culture is the greater opportunities for an organisation to capitalise on the skilful learning and communication of its members.

“One of our concerns is that if we had FMD tomorrow, we would handle it quite well in comparison to last time, because there are lots of people who have experience of it. But the stage we want to get to is that even if those people weren’t around, the people who were in post would still need to react quickly and well enough.” (I2)

An important aspect revealed by looking at learning and communication in terms of knowledge culture is that the informal and the tacit are just as important for knowledge, even from the organisation’s perspective, as formal and explicit channels. For example, in the case of learning, formal learning was in some cases identified with training, and it was clear that this was just one aspect of learning from the individual viewpoint:

“There are two types of learning – training and on the job learning.” (I5)

“There is a formal training programme, but there’s also a lot you learn as you go along.” (I4)

“Training tends very much to be related to people’s competencies...to give presentations, to speak Welsh. It’s often related to tools you need to do the job. It doesn’t link to what people do, in terms of their topic area.” (I11)

Thus, throughout the interviews there was a range of evidence referring to informal channels of learning and communication, and the way these were rooted in both the formal and informal activities of respondent’s organisational experience. Some examples include:

“We might get their proposals, either formally or informally, and they’ll say what do you think.” (I4)

“So yeah formally, in the formal email, telephone whatever you play the game but you still carry out the learning stuff. If I see the head of conservation who I know very well and for many years I’ll say ‘Have you seen this paper’ ‘No I haven’t actually’ ‘Oh I’ve got a few on the line have you got a minute...’ ‘I’ve got this one on common law’ you know ‘I’ve got this one on economics’ yeah OK lets talk about that that’s really interesting blah blah.” (I3)

“In my experience, there are plenty of opportunities to look ahead, for that sort of informal reflection, just chatting over coffee. Or our group meetings will often have presentations. It’s fairly informal, there’s no requirement to do it from high. It’s just something we do. I suspect that in certain groups, there’s less of that. But I couldn’t really say.” (I5)

“He might get me to do something for him. So he might want to know who else is looking at rapid climate change, so I’d put together a 1 page thing just looking at it, give it to him and he’d have a look at it, so I suppose that’s quite informal.” (I4)

Adaptive capacity and less managed spaces

Because of the importance of social relationships in building, maintaining and operating adaptive capacity, a key research question for the project is how different social spaces enable or constrain learning and communication. In particular, the

research team were interested in gathering evidence about the relative importance of formal and informal spaces, and the interactions between them. It is suspected that the ability to respond to uncertainty, to negotiate and reassign resources and to undertake institutional modification lie at the boundary between the formal and informal, within less managed spaces where there is enough order to act effectively, but enough space to change quickly.

In other words our research suggests that opportunities for learning and communication arise from the intermixing of informal networks with the formal structures of social life. In much of the academic literature, this space is treated as either too complex to engage with or a source of corruption and inefficiency. However, a range of evidence within management studies and the literature on social capital is emerging that such spaces are not only potentially beneficial, but also form a crucial part of any effective organisation.

While less managed spaces are almost by definition hidden and perhaps legitimately resistant to analysis, understanding how they give rise to learning and communication is important. Their role in providing opportunities for adaptation may suggest ways that their operation can be strengthened (or mitigated against where dysfunctional), although this may not be straightforward. Studying these 'shadow systems', in conjunction with the formal organisational structures they lie alongside, therefore offers an opportunity to better understand adaptive capacity and the potential of the UK rural sector to successfully adapt to rapid climate change and other extreme circumstances.

Adaptation and the shadow system

A shadow system refers to the system of tacit and informal relationships that permeate organisational life. This section makes the claim that such systems are an opportunity for organisational effectiveness, and hence an important source of adaptive capacity. The role of formal management and the skills of individuals in engaging with the shadow systems in the rural UK are considered, concluding with an argument that it is the interactions of shadow systems with canonical organisational structures that make them valuable from the point of view of adaptive capacity. This suggests in turn that a reworking of institutional analysis, one that is able to encompass both the formal and informal structures of public life is required for a trustworthy understanding of adaptive capacity to uncertain hazards such as rapid climate change.

Shadow system as an opportunity for effectiveness

There instances where interviewees were unable to make a connection between their role as an organisational agent and their capacity to act within the shadow system:

"You put me in a difficult position when you ask me to comment on my own status as an actor within this organisation, because a civil servant has but one public persona, that of the representative of his minister." (I15)

"In terms of what we feed back to DEFRA, it's all done through formal routes." (I4)

However, most interviewees could identify with the claim that the informal shadow spaces exist, and that the informal is an essential part of organisational life:

"There's a dichotomy in organisations that we all recognise. On one hand there's the formal process, and on the other what really happens. It's something people live with." (I1)

“The way I think is that the day job is largely defined by the delivery of regulation and the influencing stuff happens through the informal routes by and large.” (I3)

“Some people do clearly defined jobs in a defined way, but others are much more policy oriented.” (I1)

The benefit to the organisation of the shadow system arises through a degree of alignment between their members’ formal roles and their informal skills and capacities. Thus the personal capacities of individuals to wield influence and to work with knowledge become part of the organisation’s capacity to act:

“There’s a certain amount of personal feeling of being useful, rather than useless. But there’s also a certain amount of organisational benefit, picking up on things where the Assembly could come unstuck.” (I6)

“I think it’s fair to say that most of the adaptive capacity that we have at present is not institutionalised. It’s down to individuals own adaptive capacity. I suppose have said that there’s myself and one or two others, and that’s our job. But for most people, it’s never been on their agenda as a specific work issue, so they’re not doing it through a specific procedure if you like.” (I5)

“I know that statements I have made and discussions I’ve had with very senior people have later turned out in more or less verbatim in strategy documents.” (I3)

While individual initiative cannot be legislated for, it can be positively incentivised, opening up a major resource for the organisation:

“If I could see a big gap between HS and what I could see in a particular department, then the first step would be to try and arrange a meeting, and that’s quite easy to do within DEFRA. You can invite them to informal lunch time seminars, to lunch, and sit down with them.” (I4)

“If I was unhappy about something, then I’m sure I could go to someone else in the department, or even someone outside this department. Someone more senior, and say “Look I’m just not happy about that.” (I12)

“The organisation three years ago had a tokenistic approach to the social, but now has social policy. This is moving more and more mainstream, and arguably there is sort of a change in political direction anyway, but an individual mover and shaker who I happen to talk to quite a lot has been singularly effective in raising that as a policy.” (I3)

“If there’s a particular issue I’m interested in, I’ve gone and looked it up myself. No-one has told me to. I’ve done this before and written a two page brief and passed it on, or e-mailed it to people.” (I4)

Conversely, this allows individuals to enact their values through the operation of the formal organisation:

“If I wasn’t happy with something...say a project was due to report back, and I could see that it wasn’t going to engage the policymakers at all, then I’d like to think that I’d be able to say to them: Look I don’t think we’re getting the right output here.” (I4)

“That it depends who you ask these questions to. There are those who work hard to get the job done. There are other who have moved between different organisations and have some weird idea to try and change the world and migrate around the place to try and do that.” (I3)

“I do the day job and then I do the work at home kind of thing. This does not give me as much free time with the family as I would like hence my being out there influencing as much as I can as a way that can feedback into this organisation.” (I3)

“Through my own personal connections, yes. Obviously because I do so much extracurricular work anyway I’m active in topics and areas of interest that aren’t my day job.” (I3)

“So yes, I’m keeping doors open, but that is a personal mission and I don’t expect that will be a particularly common occurrence throughout the organisation.” (I3)

“My private action has feedback into the organisation” (I3)

As a consequence of the alignment of public and private interests, the organisation becomes better able to ‘learn’ about it’s environment with a benefit in terms of adaptive capacity:

“I could tell my superior that I had a very strong worry that something was going to happen. I could tell him. I could go and say I had read this report, and I’ve checked out the sources and it looks like something is going to happen, and we have to have a stance on this. If I did that, then the relevant people would be informed and I would be involved in putting together the government stance or our opinions on that.” (I4)

Managing and the shadow system

While there is a need in public life for the transparency and rigour of formal organisational structures and procedures, to reduce corruption and nepotism for example, formality is not the whole picture. There is a fine balance to be maintained between formal rigour and informal flexibility, because with too rigid an organisational culture it is possible for an organisation to fail to benefit from informal spaces by creating a conflict between personal relationships and organisational expectations:

“It is a personal view this, I think we are losing an important part of our relationship with people. People relate to the environment in a very personal way and so if they want to do something about it or query it or get involved with it the personal relationship with the regulator is vital.” (I3)

“Sometimes we build procedures where there’s no need for it, or we build procedures that have no logic. They seem built for the purpose of the procedure rather than the use we put it to.” (I5)

“And then we get back in our boxes and I don’t communicate with him because he is not part of my section.” (I3)

“I’ve come to the conclusion you can’t move regulatory organisation rapidly at all simply because they are connected with so many lines of command outside that you can’t disrupt very quickly.” (I3)

“There’s a tension between the formal reporting required by the organisation, and the sort of policy work that I do.” (I8)

“Management tends to perceive that as rocking the boat so I have kind of given up.” (I3)

This suggests that an important area for working with adaptive capacity, given the importance of shadow systems for learning and communication, is positioning the role of formal management with respect to the informal. This is not straightforward, because the informal is almost by definition resistant to management effort. But while it is not necessarily manageable, there is still scope for management activity with respect to shadow systems.

The simplest strategy is perhaps to recognise the role of the informal and to accept a degree of imprecision, allowing individuals the flexibility to work around the systems where required:

“Oh yes...If you think about it simplistically, you’ve got people at the coal-face as it were, they’re interested in their specialist topic – climate change or whatever. They have to follow certain procedures to get things through contracts or personnel or grants or whatever. And those guys out there, in personnel or wherever are trying or enforce the system, because they’re trying to cover their backs. We’re trying to...to get around that. There’s a certain amount of that.” (I5)

“Our organisation is very demanding in it’s formal processes, and we just have to all take that with a pinch of salt, or you wouldn’t survive.” (I1)

This is not always straightforward, and may require a rethinking of formal procedures:

“How do I demonstrate that by going to this meeting rather than that one that a particular outcome came about? It’s all about influencing, but only sometimes can you point to a report or a policy document and show that they’ve used your wording.” (I8)

Thus a more positive strategy with respect to the shadow system might be to find ways to report on it and to incentivise individuals to use their skills in creating and maintaining informal relationships for the corporate good:

“In practice there’s certainly some differences. When DEFRA was created, people were coming with their own personal agendas and representing their own business. So there’s been a body of work to get them to act together as a team. So as new challenges come along, they can come to a common agreement.” (I14)

“Corporately it would take a change of mindset and the release of the percentage of days for informal networking, and a recognition that people have expertise. So it is moving against the flow of current corporate change. So that would have to be right at the top level.” (I10)

Above all, it is a matter of making sure that the individual skills are available in the first place. This creates a demand for individuals with competencies relevant to the shadow system:

“Because of the way that policies are going to have to be decided, we’re going to have to make sure that we’ve got the right people in the room, particularly delivery agents. That is a bit of a shift for DEFRA.” (I14)

Skilled actors in informal spaces

Interviewees produced a range of examples of the capacity for skilled informal interaction required by individuals within organisational settings:

“Some people are better at selling things than others. I have colleagues who could sell Saharan timeshares to alligators to let others get on with draining the swamps.” (I7)

“A new employee in the team would already be up to speed on a lot of things. They’d need to find out who the key players in the organisation are, so I’d send them out to find that out to start with.” (I1)

“So DEFRA is going to have to change and the policymakers we’re going to need in the future are not only going to have to be able to talk to ministers etc., but also build partnerships with delivery agents.” (I14)

“Learning the ways that the organisation works is the only way you are ever going to be able to influence it at all because if you try to influence it from a different discourse or dialogue you just bounce off it...” (I3)

“I write books as well and ask people to tell me what is wrong about them - this is a way of roping people in. I treat publications as a way to integrate views with some clarity and common sense.” (I3)

Starting from the view that people are skilled social actors, there is still the question of where these skills come from and how they become relevant to the ‘day job’ (I3):

“Like when I started this job, I wasn’t networked, because people don’t know you. It’s only over time that you may or may not provide a useful contribution, and you establish a useful credibility.” (I6)

Prior experience is an important resource:

“We are moving towards shorter terms. More project management. I think that means looking for different things in senior civil servants. The idea of having experience out in the regions is seen as desirable for involvement in a major programme.” (I2)

“Some of the projects I’ve been on, I’ve had contacts from my degree course.” (I4)

And from the individual’s point of view, the pay-off is effectiveness and satisfaction in carrying out their formal tasks:

“But I feel that most people are aware of a dual approach. (formal and informal) Anyone who’s successful in the agency would have to be. Otherwise they wouldn’t get through the management hierarchy – they wouldn’t be selected.” (I9)

“There’s a certain amount of personal feeling of being useful, rather than useless.” (I6)

While we have tried to avoid the impression in our discussion of informal spaces that the shadow system is an unquestionable public good, it should be explicitly said there are potential difficulties arising from the shadow system for individuals and organisations. While shadow systems can be a source of personal effectiveness and satisfaction, they can also be a source of exclusion:

“I’m sure you’re right that shadow networks are not always a problem. In literature on social capital, there is the obverse assumption that by and large, all social capital is good. One has to remind oneself that occasionally it is negative. The old-boy network that excludes people, for example.” (17)

“You can have people who’re not really all that involved...You can miss out a lot if you choose not to be involved.” (14)

“I guess if you’re quite shy then you might find it difficult.” (14)

A more subtle tension is between the experience of working in a freer environment, and the rigours of the ongoing formal operations of an organisation:

“I think that during FMD, many people found themselves sucked in and found it relatively difficult to come back into the organisation.” (12)

“The organisation is re-organising itself as a kind of ‘set targets, deliver’, you know a fairly linear type of organisation and particularly having been away on secondment and finding this when I came back I have had to learn an awful lot just to survive things like new forms.” (13)

Formal and informal interactions

In conclusion, it was clear from the research that the formal and the informal are bound up together. Effective action in either sphere can be supported by skilled work in the other:

“In terms of playing the corporate game, it is about knowing to put the right, copy the right people on emails, don’t jump levels over and above bosses, all the basic hierarchical things that is the way it works formally. The way it works informally – having been around the organisation for a million years and knowing all the other people that have been in the organisation a million years you know that is what water coolers and coffee machines are for.” (13)

“To get the management board to do something, you need to develop relationships, so they’ll be receptive.” (12)

Thus as well as using informal activities to support formal roles, formal activities can be a resource for action in the shadow system:

“When all else fails, there’s the corporate directory.” (12)

“I have contact lists – Fast Streamers, Science Directorate.” (113)

“We keep all our e-mails, so I can look back and see who I dealt with, and what their responses were.” (14)

“The Assembly would certainly need to establish a different cut in terms of the people. It may actually need to look at a project management approach, which is being used more and more, but it is not the normal culture of how things work.” (116)

“Now the policymakers are going to have to be able to maintain that partnership. Those people may not be the people we have at the moment. That’s a challenge. We’re defining some of the roles and skills we’re looking for at the moment.” (12)

The challenge of course is as individuals and organisational actors to create opportunities for a healthy shadow system to support a strong canonical organisation:

“I think the Assembly is fairly young in terms of developing these aspects. We still need a great deal of effort to get staff to think about this, rather than the implementation of policy, which has tended to be the main focus.” (I16)

“It’s a cross between formal and informal, because you got the meetings and groups very formal. But informally, we do communicate. We might say – This has been brought to our attention. It’s probably not on our radar, but it might be on yours. What do you think?” (I4)

We suggest that doing this requires an understanding of organisational realities that are not trapped by the dichotomy of formal and informal, but instead emphasises the interactions between them. Within the project, we have begun to explore this through the lens of institutions, and the social structures from which they arise and which they shape.

The Institutional architecture of adaptation

The theoretical aspect of our project suggests that understanding organisations and the institutions that shape them is a key part of understanding and developing adaptive capacity. However, considering the importance of the shadow system it seems reasonable to extend this analysis beyond the canonical forms of organisation that are visible in public life, and look at those forms which tie them together. Within the project, we draw on theories of social and organisational learning and of social capital to do so.

In this section we unpack institutional architectures (systems of interlocking institutions) in terms of two common social patterns of organisation: communities and networks. These can be characterised in terms of different types of relationships, co-identification and exchange, which although differ in many of their qualities, but are both founded in trust. Finally we make an argument for a systemic analysis of institutional architectures that explores that interlocking of communities and networks. The social structures so revealed comprise a useful addition to the analytical toolbox for adaptive capacity, and a starting point for working with the formal and informal relationships that underpin the capacity of the rural sector to respond effectively to stressors such as climate change.

Communities

We define communities as groups of people who are perceived in terms of a shared identity. This includes communities of place and culture, but also communities of practice, whose identity is derived from shared activities. Within the workplace, such communities can be found through expressions of similarity:

“I think of community as the other horizon scanning people, even with other departments.” (I12)

“For me personally, in terms of my career and what I hope to do after this job, then Fast Streamers are very much a community.” (I13)

“Crudely, anyone at the same grade. You’d feel more comfortable with people at the same level, even in a different policy area.” (I14)

“I’m sure that many of them come wearing different hats, but if you’re a member of the management board, you are classically a

managing director. But actually we want you to leave that behind.” (I14)

“If I get together with people from Greening....They’d be a slightly different community, but even then they’d be a community.” (I11)

Shared identity is expressed in similar interests and shared values:

“So I am not interested primarily in a community that want people to play by the rules I am interested in people who for want of a better word – although it is a shitty old phrase ‘want to make a better world’” (I3)

“We have a sense of other’s work across those people with roughly the same agenda. They might have different focuses, but we’re all trying to go in the same direction.” (I2)

“There’s no rivalry. I’ve never had any problems with that here. DEFRA’s all working together.” (I12)

“There is some understanding that we’re all going in the same direction and some feeling how you fit into that, through business plans and work plans.” (I2)

“For me personally, Fast Streamers are a community. In terms of where I fit in with DEFRA. Fast Stream are very much ...We’ve all got the same goals, the same achievements.” (I13)

“In other words if someone really cares about social factors and sustainability and they have sort out a job in an organisation that can do something I will feel sort of attracted to spend time with them. . In terms of my community is people who are looking to make the step changes.” (I3)

Because of the centrality of shared values and identities to communities, the important institutions are likely to include shared understandings of what the community is and what membership entails. These tend to have a taken for granted quality, and it can be threatening to question them. Thus community bonds tend to be quite tight, equating to bonding social capital. The negative side of this is that they can be exclusionary, and non-membership of such communities can give rise to ill feeling between insiders and outsiders.

“One of the issues with Fast Trackers is they might not be very popular with the rest of the department. They’re seen as a favoured crew.” (I14)

Community boundaries do not necessarily reproduce those of the formal organisational contexts in which they occur:

“Horizon scanning is huge. There’s lots of different divisions within DEFRA and it sits across DEFRA. Although I’m with the Science Directorate, we work across all the other divisions.” (I12)

Thus communities tend to arise through mutual engagement rather than management fiat, and are very much of the shadow system. But although they have their own rhythm of development it is possible to give them space to grow by making time for individuals to interact:

“There was a Fast Stream meeting when I first got here and there were all the DEFRA Fast Streamers. We all exchanged cards.” (I13)

“You have to do training courses together, and I think everyone gets involved at some stage or other at least in their first year.” (I13)

“If I go to an external horizon scanning workshop, I’m not there to improve DEFRA’s horizon scanning, but I might pick something up. I might incorporate it into what I’m doing. That’s how you shape your priorities and definitions. They change as you meet other people who have other priorities and definitions.” (I12)

From the individual’s perspective, communities can be a significant resource, opening up opportunities for action through links with others with similar interests:

“There are other trouble-makers out there that I tend to gravitate towards. My community is people often dressed as very establishment but who are basically in the organisation for their own agenda.” (I3)

“There’s someone doing a job I’m actually interested in. I met them at social events. So I now know I’ll keep an eye on...I know when he’s going to leave at about the same time as I will, so I can...That’s very informal. There’ll also be the formal e-mail that will come around from Human Resources that will say this job has come up. But because I know it’s coming up that morning, I will already have written the application form.” (I13)

“It’s difficult to find many people in the policy development side, so you do develop a sort of interdependency to make things happen at all. So people come to rely on certain others in the organisation to actually sort of help.” (I6)

Similarly, communities are a natural unit for adaptive action, as shared interests and similar worldviews make negotiating and endorsing plans and reactions quicker and easier.

“In terms of communities, we’d probably want to try to pick out particular groups of people in sectors who are most likely to be affected. Transport or agriculture for example.” (I6)

“For example, there’s a group of farmers in mid-Wales who are looking at how they can make agriculture more sustainable, looking at how to deal with flood control, with soil quality. That’s like a self-motivated group of 10 farmers, acting as a community because they see particular environmental threats. You’d have to look at groups like that to get that core of adaptation.” (I6)

“There’s a climate change community. I will be going to the MONARCH steering group meeting. It’s basically the conservation/environmental community that’s interested in climate change. So when I go there, I’m among like-minded people. There’s no question that climate change is an issue and its going to affect everything.” (I11)

Thus communities give an organisational unit of analysis in accord with individuals’ own perceived interests. As with any form of organisation, they have different facets and there can be disagreement even within their membership over their shared identity and boundaries. Also membership is not necessarily mutually exclusive, and communities overlap, giving a dense texture to social architecture. Because shared interest is assumed and may be beyond challenge, they can also close down

opportunities for change. Therefore it is also worth investigating a more open social form, the network.

Networks

Networks arise in social life across boundaries of difference. Thus unlike communities, common interest is not assumed, but instead is negotiated. As with communities, interviewees were able to point to example of networks with significance for their professional lives:

“We do a lot of work in networks.” (I4)

“There’s a lot of networking. We try and make external people aware of the programme. We get 10-15 people per day signing up to our website.” (I4)

“The network aspect would be working with people say in CCW’s area offices, who come at things from a different perspective, and their realities are very different.” (I11)

“All Assembly Members have their own networks, which interface with professions, with voluntary groups, with academia, whatever. They’re also part of social groupings which are way beyond my comprehension. So immensely complex things would be going on in the background.” (I15)

“Consultants and people involved in industry that aren’t really doing horizon scanning. That’s who I think networks would be. The people you meet at workshops. They have a different perspective on things.” (I12)

Although networks do not create and maintain a shared amongst their members, they do have their own identity, arising through the regularities in their qualities, history and trajectories:

“Foot and Mouth Disease was a sort of example, where there came a cross-Assembly approach. People from health promotion, tourism, economic development, local authority liaison, who formed a large team. The interesting point is where did that project start?” (I16)

“Generally there is a tendency to try and using existing networks, rather than bring new people together. You’re basically saying “What is there already? Who can we talk to?”” (I6)

Without a taken for granted basis in common interest, networks perhaps less likely to give rise to organisational forms than communities, with any co-ordinated action being more transitory. :

“I think the grapevine lacks any hierarchic nesting. It has communications, it has articulations, but no mind. It lacks intention.” (I7)

“The trouble is that everyone is part of everyone else’s environment. So for the ASPBs, they would know that the Assembly govt is going to be under strain, and our budgets are under strain. They would want to be part of working out a solution, less someone else should work out a solution that involved them being cut, because they were perceived to be at the margin of what is essential. So all the chief execs of all the ASPBs would be being ostentatiously helpful and helping to mobilise thinking resources in the hope that they would be

a bit more able to live with the solutions. Local government likewise.” (I15)

Networks are also less dense than communities, and this may be their weakness:

“So the networks need to be robust enough to deal with these situations.” (I2)

However they are a site of bridging social capital, linking together organisations and communities. The encounter with different values and worldviews that occurs through networks makes engagement in networks a significant opportunity for learning:

“I was at an Environment Agency workshop on horizon scanning when they picked out some trends to say OK this is the method. So we can take away their idea of how to do it, and they get feedback from us.” (I12)

“I met someone from the Art College at a seminar that was nothing to do with Horizon Scanning. We had a chat about our project, and stuff like that”. (I12)

“Yes, there’s a network. If you can identify where to implement different policies...you can identify certain people, you can see who has done this and been quite successful at it. You build a little network of people to go to. A little expert group in a sense. It’s important to learn from people, rather than start off from a blank sheet all the time.” (I6)

Thus networks provide opportunities to build and operate adaptive capacity:

“The Assembly would need to base its case for change on reasonable evidence, and that’s where it works with networking. Networking with the likes of the Environment Agency and CCW, in order to say “This is a current situation”, and be able to make predictions in terms of what is likely to happen.” (I16)

“There were several different groups involved in starting horizon scanning. There is a horizon subgroup of the main DEFRA change programme. There were also outsiders involved, from the workshops and so on, who were coming up with the initial ideas. Many of them are still on the steering groups.” (I12)

It may be that operating as an individual in a network requires a different skill-set to working within a community:

“I think I am a bit of an outlier. But there are other people who think laterally and link up disciplines.” (I3)

With their basis in relationships between individuals, there is a danger that forcing networks into existence will result in a paper exercise or a locus of discontent. However, there is much that can be done from a management perspective to foster networks

“But when you’re dealing in a cross-Assembly issue, which this would be, then you have to try to pull the people together in some sort of project group. The difficulty is making sure that that happens more than in name. You can get people along to meetings, but it requires issues to be sorted, actions to be taken, so that it permeates out in to additional action, with all the resource that requires.” (I16)

“We keep databases of all the people we’ve had contacts with. Anyone starting horizon scanning would have the database. All the groups, all the projects we’ve done.” (I12)

“There are a lot of other people across government, not just DEFRA, who do Horizon Scanning as well. We’re trying to get links across the different departments etc.” (I12)

“All of our projects have steering groups with external people and DEFRA people and most of those people were involved with horizon scanning from the start.” (I12)

However, there is also an opportunistic quality to networks and opportunities to create and maintain networks arise wherever relationships can be established across difference:

“We (UKCIP) were opportunistic, working with regional and sectoral structures, wherever there was an opening.” (I9)

“Every time you go to workshops, you swop cards and then look at each others’ websites. You go to their things and they come to yours.” (I4)

“We have monthly reporting and lunch time seminars and I’d set up meetings with other projects when they were doing something interesting.” (I4)

“It’s on the training days that I get to know people from other departments.” (I13)

Trust

What both networks and communities have in common is that they are founded in relationships of trust. Within a community, trust arises from shared interest:

“You tend to know certain people, certain groups, and they establish a track record of whether they can deliver or not, because you are clearly trying to find the one’s who are most effective, rather than spend a lot of time saying you want this to start from grassroots sort of thing.” (I6)

In a network, trust is required in order to negotiate a mutual interest, and arises through ongoing engagement:

“One of our teams started working with the College of Art. Now we’re going to take that one step forward and start working with them ourselves on other projects.” (I12)

“It’s a bit of horse-trading there with different groups. Co-operation is rewarded with future co-operation.” (I6)

Trust can be invested in individuals and expressed in personal relationships:

“It’s a question of individual credibility and track record that becomes established.” (I6)

However, it can also arise through institutions, arising from the social contracts embedded in formal organisational forms:

“There needs to be some clear understanding that the corporate interest is more important than their personal area of demand.” (I2)

“I was very impressed by the first UKCIP stakeholder meeting.” (I19)

“A lot of the public trust that the Agency does engender...is simply because the local officers know the local people and the local issues. So actually I fear that what we are doing is losing the connection. I think the call centre is going to make us become a big impersonal monster.” (I10)

Trust is important in adaptive capacity, because it enables social action and decreases the amount of effort involved in maintaining communities and networks. That is not to say that creating and maintaining trust does not have costs of its own:

“We need to engage policymakers around issues, they need to have ownership.” (I4)

“If you pull that lever and nothing happens, then you lose all credibility for what it is that you’re doing. It makes it clear that you don’t understand what you’re doing and people will therefore take no notice of you. So there’s a credibility issue here in actually making things work.” (I6)

Systemic analysis

While networks and communities are interesting in their own right when considering adaptive capacity, it is in combination that we suggest they prove a powerful tool for understanding adaptive capacity – providing purchase on the informal institutions and relationships of the shadow system, as well as the more visible formal organisational forms.

Communities provide a powerful focus of social energy and resilience, but without the linking function provided by networks they risk becoming isolated from the broad pool of human experiences and learning in which tomorrow’s solutions to emerging issues might be found. Networks on the other are perhaps too diffuse, failing to provide an adequate basis for organised action, except in circumstances where the need to do so overrides the transaction costs involved in negotiating across different interests.

This suggests to us that institutional architectures should be analysed in terms of the articulation between communities and networks, and between the formal and the informal aspects of social life. Changes in adaptive capacity and opportunities for adaptive action are more likely to be picked up through such a lens than if only part of the social fabric is visible. A systemic analysis of adaptive capacity should therefore ask questions about different kinds of institutions and relationships, seeking points of common ground as a starting point.

As a concept, trust offers one locus of intersection between communities of network, and its importance within both types of social structure points to its central role in organisation and intentional action for adaptive capacity. A more subtle unifying principle is the understanding that networks and communities are not fixed categories, but that institutions and sets of social relationships change over time and between different viewpoints. Grasping this requires a flexibility of understanding and a willingness to appreciate different viewpoints - a capacity we found already present within many of our interviewees. Given the space for reflection, they were able to group and regroup the objects of their attention, revealing different aspects in doing so:

“One thing that’s interesting. Talking to different people who do horizon scanning. Other govt. departments, research groups etc. Everyone has their methods and timescales, but everyone is very aware of who else is doing it.” (I12)

“In terms of horizon scanning, there are a few people who are interested in horizon scanning and might come across it in their division, but it’s not, so sort of a network, but not really.” (I12)

“You could do it at a different level and say CCW is effectively a community and that the network is with others like the Environment Agency and landowners or other stakeholders like that.” (I11)

Conclusion

In this report, we have attempted to demonstrate some of the sense we made from the conversations and interviews we have held over the course of our project. Our main line of argument runs as follows:

- Rapid climate change is significant as an exemplar of low risk but high uncertainty, high impact events which affect the rural sector from time to time.
- As well as mitigation, adaptation is a necessary part of responding to climate change.
- Because rapid climate change is considered low risk, and because of the uncertainties involved, it is difficult to address through traditional risk management tools, although horizon scanning may help to bring it ‘onto the radar’ of decision-makers in good time to respond to it through risk management.
- Nonetheless, a broader understanding of the institutions and organisations that underpin adaptive capacity and the processes of learning and communication on which adaptive action depend may prove fruitful in identifying and addressing the weaknesses and supporting and exploiting the strengths of the rural sector’s adaptive capacity.
- Learning and communication have formal aspects, but the shadow system of informal institutions which interweaves formal organisational forms is a key resource, and in particular, a site of learning and communication processes.
- Analysing the shadow system can be fruitfully undertaken through an analysis of the communities and networks that rural actors find meaningful in their personal and professional roles.

It is our ambition that the systemic mode of analysis enabled by this perspective could help highlight opportunities for improvement in adaptive capacity. This would go some way to responding to the following expression of need:

“So we are already moving in a direction which will improve our adaptive capacity, but if you said rapid climate change was going to happen in 10 years time, there would have to be a dramatic change of direction.” (I5)

However, the responsibility for coping with rapid climate change ultimately rests with rural actors themselves. In conclusion, we suggest that the yardstick of measures relating to adaptive capacity is whether they free up social energy and enable learning and communication which serves both communal and individual ends. This synergy does not always seem possible, but the environments in which it is more possible deserve more study. Such research would seek to understand how situations such as that below arise, and the appropriate management and individual stances to bring them to fruition:

“Sometimes I’ve ... come across something that’s not really horizon scanning, and written a note to someone for their comments and you can carry it forward.” (112)

Further Research

This report represents an important phase of the research: an opportunity for those invited to the workshop to reflect on the knowledge that emerged through analysis of the interview data and for the project team to formulate appropriate means for interpreting the information gathered. We invite comment in terms of both the accuracy of the portrayal and the conclusions we draw from it, which we will use to redraft the report as the most balanced representation of these issues we can achieve. This therefore represents a significant part of the data that the research is designed to collect, alongside output from the workshops which have already been reported on. This will feed into academic publications, presentations to researchers and policymakers and new research proposals. Just as important though are the relationships that have arisen through the research processes, and we welcome opportunities to develop further collaboration between members of the research team and participants in this research on rural and climate change issues.

Additional material and resources

There is a range of additional material available relevant to climate change and the rural sector in Wales. Most can be found on the National Assembly for Wales (www.wales.gov.uk) or DEFRA (www.defra.gov.uk) websites.

This includes:

- Farrar, J. & Vaze, P. (2000). **Wales: Changing climate, challenging choices - A scoping study of climate change impacts in Wales**. Commissioned Report, National Assembly for Wales, Cardiff.
- GNAW (2001). **Climate change Wales: Learning to live differently**. Report, The National Assembly for Wales, Cardiff.
- GNAW (2001). **Farming for the future: A new direction for farming in Wales**. Report, Government of the National Assembly for Wales, Cardiff.
- Hopkins, A., Topp, K. & McGehan, M.B. (2003). **Influence of climate change on the sustainability of grassland systems**. DEFRA Project, No. CC0359 Institute of Grassland and Environmental Research, Okehampton
- Hulme et al (2002). **Climate Change Scenarios for the United Kingdom. The UKCIP02 Scientific Report**. Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK.
- National Trust (2001). **Valuing our environment: The economic impact of the environment in Wales**. Study report, National Trust, Cardiff.
- MAFF (2000). **Climate change and agriculture in the United Kingdom** Ministry for Agriculture, Fisheries and Food, London.
- DEFRA (2001). **National appraisal of assets at risk from flooding and coastal erosion, including the potential impact of climate change**. Final Report, Department for Environment, Food and Rural Affairs, London.
- Willows, R.J. & Connell, R.K. (2003). **Climate Adaptation: Risk uncertainty and decision-making**. UKCIP Technical Report, UKCIP, London.

Relevant work with a more international perspective includes:

IPCC (2001). **Climate change 2001: Impacts, adaptation, and vulnerability.**
Cambridge, Cambridge University Press.

Abildtrup, J. & Gylling, M. (2001). **Climate change and regulation of agricultural land use: A literature survey on adaptation options and policy measures.**
Literature Review, Danish Institute of Agricultural and Fisheries Economics, Farm Management and Production Systems Division, Denmark.

Appendix 1 – Diagrams used during the interviews

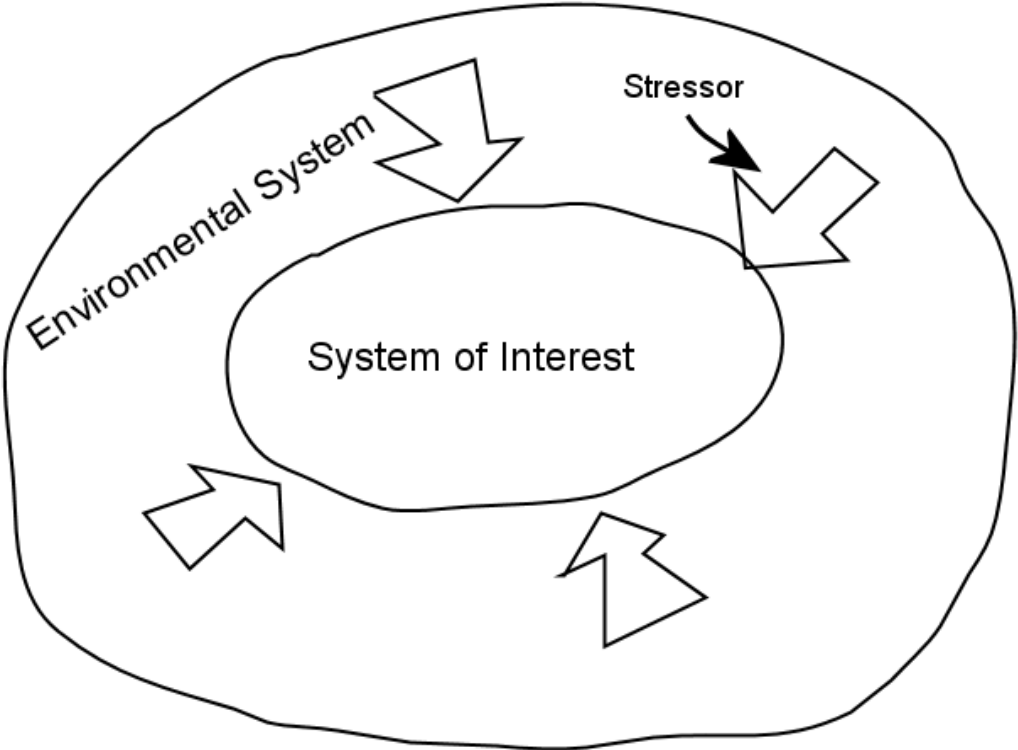


Figure 1 – A system under stress

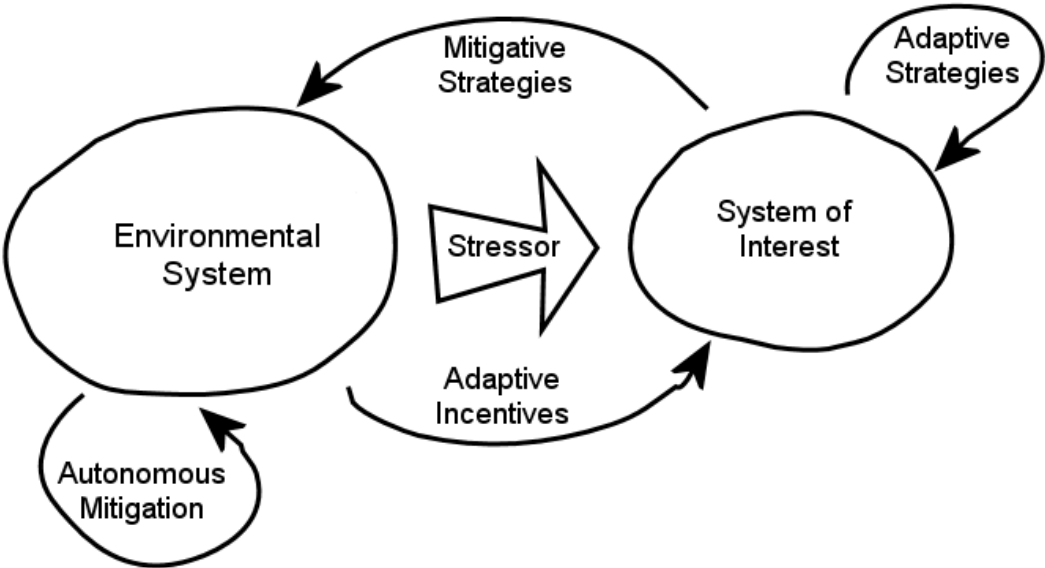


Figure 2 – Mitigation and adaptation

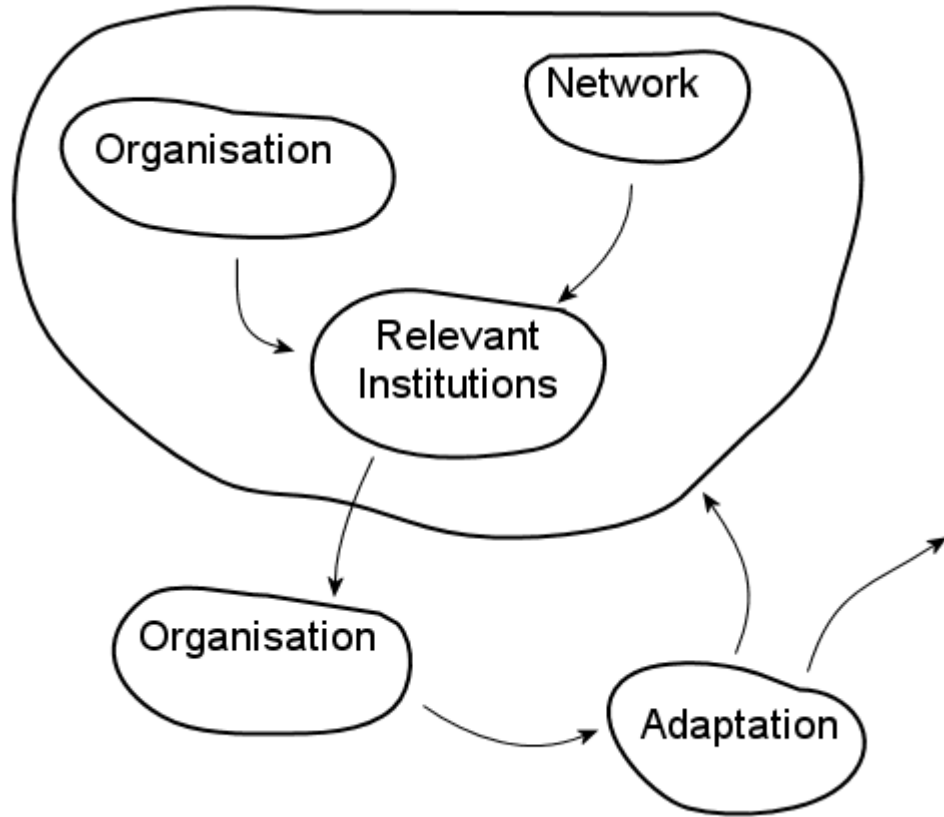


Figure 3 – The social architecture of adaptation

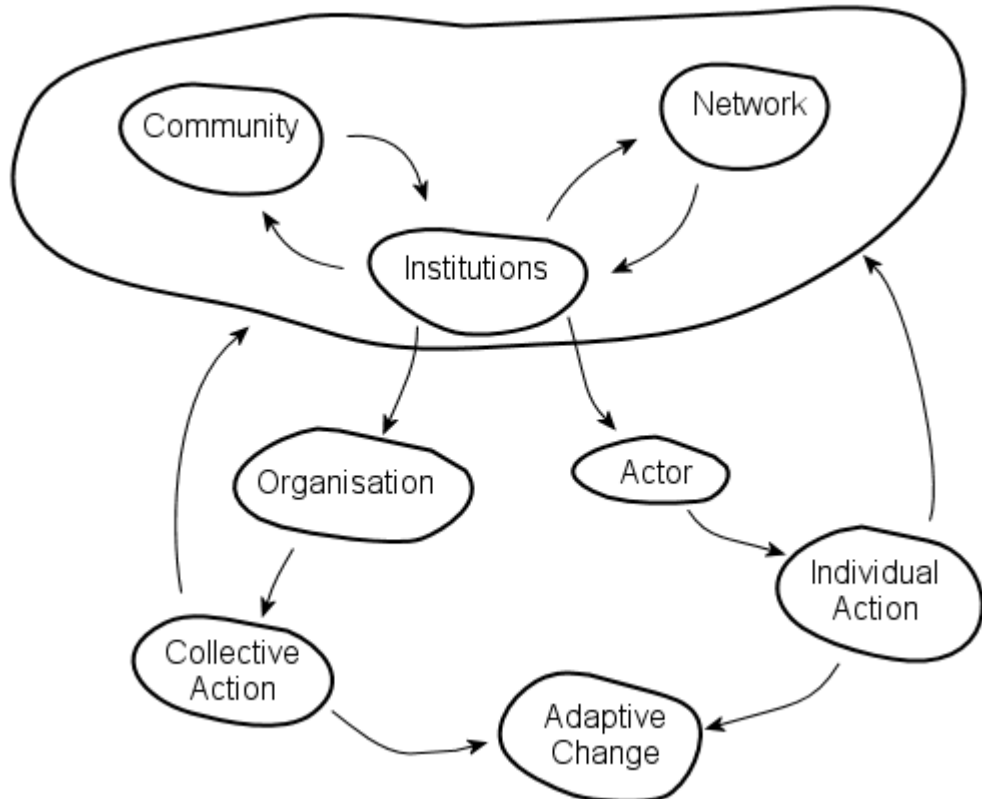


Figure 4 – Individual and collective adaptation

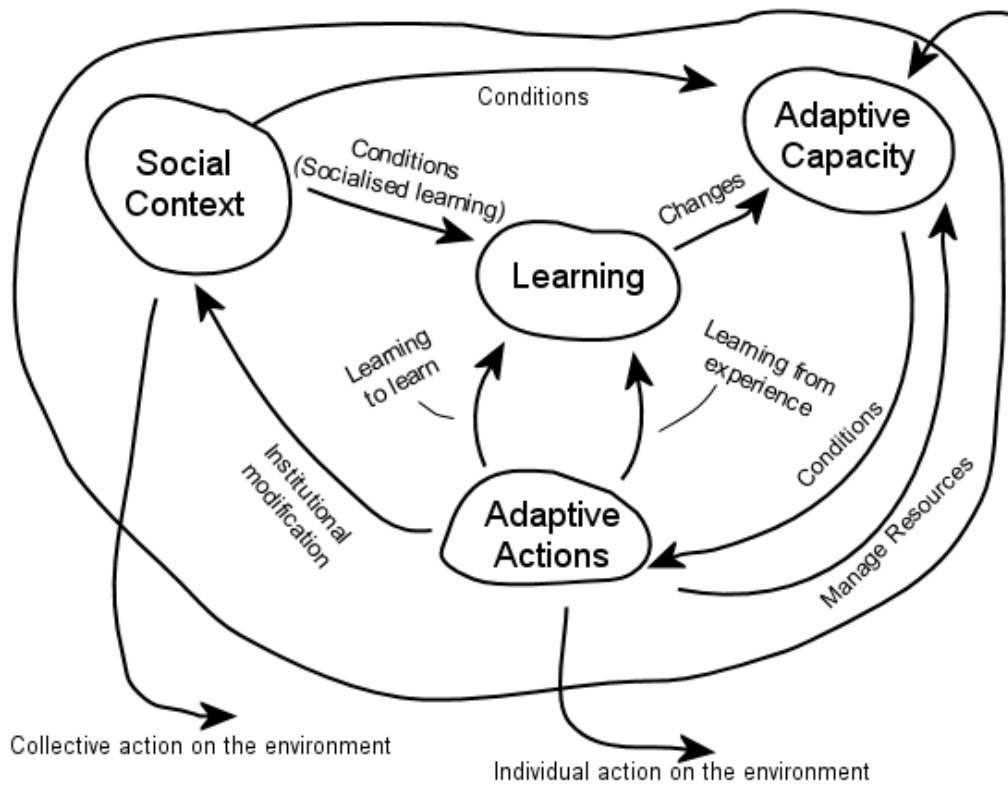


Figure 5 – Learning and adaptation in a social context

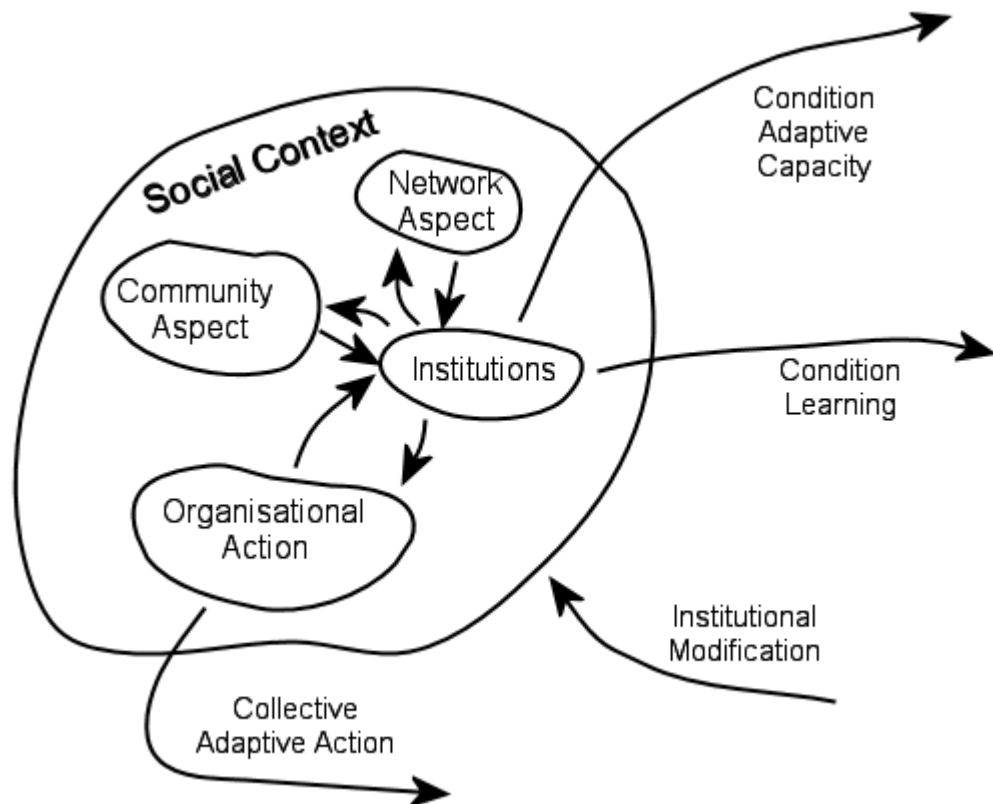


Figure 6 – Unpacking the social context

Appendix 2 – Climate cooling scenario

In order to think through some of the implications of profound environmental stresses for rural areas of the UK, the project team developed a pair of future climate scenarios for rural Wales, based on (i) a mainstream expectation of climate warming over the next century, and (ii) an extreme version of rapid climate cooling. The scenarios, and in particular the climate cooling scenario, were used in the interviews as a point of reference, where required to test responses from interviewees.

The main features of the climate cooling scenario are:

- Mean temperatures initially rise around 2°C, following the upward trend of the mainstream warming scenario.
- Changes in the North Atlantic circulation are induced by the effects of global warming.
- The surface currents that bring a 'heat subsidy' from the tropics to the Atlantic seaboard of Europe is diverted away.
- Within ten years of certain data indicating that this has happened, average temperatures fall 4°C from present-day values.
- Cooling is concentrated in the winter months, with severe winters much more frequent.
- Spring flooding increases.
- Global weather patterns shift, with a drying of the tropics, including reduction of the monsoon.

Appendix 3 – Possible effects of climate change scenarios in rural Wales

Possible implications of warming and cooling scenarios for the Welsh rural sector
(From the Cardiff Workshop)

Climate Warming Scenario	Climate Cooling Scenario
<u>Climactic effects</u> Increased rainfall and flooding over winter Higher temperatures overall Drier, hotter summers Similar to S France (Atlantic Coast) or North Spain	Increased flooding in spring due to snow melt Lower aggregate temperature Cooler Significantly colder winters 1 in 7 winters 'extreme' Similar to N Scotland or S Norway
<u>Rural development</u> Diversification opportunities Increased rural population	New opportunities for secondary employment Rural de-population Transport disrupted Less access to services during winter
<u>Health</u> Increased respiratory disease in (wet) winter New diseases Heat stress Pollution effects?	Increased respiratory disease in (cold) winter
<u>Agriculture</u> Soil loss due to flooding New pests and diseases (overwintering possible) Late summer grazing reduced – may be compensated by increased grass production overall More difficult to use the land effectively Crop diversification possible, especially on the coasts. But soil quality mitigates against this	Soil loss due to flooding Reduction in stock or capital spending on winter housing. Loss of winter growing season – less grazing implies less protein production
<u>Forestry</u> Timber productivity up while quality down Use of trees for water management?	Timber productivity down while quality up Pressure on forestry management More forestry on marginal rural land?
<u>Biodiversity</u> Links between habitats are important for biodiversity as climate changes, because wildlife corridors allow species to migrate to more	Links between habitats important for biodiversity as climate changes More active management of species migration needed than under

favourable areas as conditions change. Loss of sphagnum moss Pollution effects?	warming scenario Eco-restoration possible?
<u>Tourism</u> Generally beneficial in terms of volume No extended winter season Fares well in comparison to competitor destinations Storm and flood damage to facilities Loss of 'Green Wales' image	Tourist volume decreased overall Possibility of development of winter sports trade Seaside market in decline
<u>Other industries</u> Less trouble with water supplies than in England	Shellfish production crashes (temperature sensitive) Possible loss of 'footloose' industries

There are a number of similarities between the two scenarios. In general terms, both point to a combination of long-term stresses and short-term shocks during a transition to a new climatic state. Both also demonstrate strong seasonal variation in their effects on tourism and agriculture. Furthermore, the workshop suggested that under both scenarios, there would be increased erosion, negative health effects and challenges in conserving biodiversity, as well as new opportunities for rural livelihood diversification.

The differences between the scenarios can be seen in terms of the direction of several trends (eg timber quality vs. production, tourist volume and shifts in the urban/rural population ratio). Warming is more gradual, with a longer lead in time, and offers much less variation in mean temperature than cooling (which encapsulates further warming first). The effect of cooling on the agricultural industry is more likely to be negative, whereas warming may increase opportunities. Finally, there are some scenario-specific effects, such as the loss of shellfish fisheries under cooling.