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Adaptation and Mainstreaming of EU Climate Change Policy: An Actor-Based Perspective

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Adaptation to climate change (in comparison to the mitigation agenda) is a relatively new focus for both research and policy communities. Drawing from ongoing 'actor-based' research being carried out for the ADAM project, this briefing paper reports on the knowledge base being developed through a process of engagement with experts and key stakeholders across a variety of countries, landscape types, sectors, institutions and actors. The concluding discussion then focuses on some of the implications of these early findings for both EU policy and decision-making more generally.

1. The climate change challenge

An increasingly consensual view, promoted through the collaborative efforts of scientists associated with the International Panel on Climate Change (IPCC), is that climate change is happening, and importantly, that human activity is making a discernible contribution to this change (IPCC, 2007). Whilst initial responses concentrated on the mitigation agenda, in particular reducing greenhouse gas (GHG) emissions in an attempt to curb the growth in global temperatures, there is now increasing recognition of the need for nations, communities and individuals to adapt to some level of climate change, even with reductions in emissions (Klein et al., 2007; McEvoy et al., 2006). Indeed, commitment scenarios, which account for anthropogenic greenhouse gas emissions already introduced to the atmosphere, show that a rise in global temperature is unavoidable.

A changing climate is likely to bring both opportunities and challenges – for instance, the European Environment Agency (2006) recently documented the wide-ranging impacts of climate change for Europe. For some (particularly in Northern Europe), the opportunities will result from warmer summers and milder winters, though for others the challenges associated with flooding, droughts, heat extremes and storm events are likely to be much more substantial. Indeed, the impacts of extreme events are already being felt (for instance, the heat wave of 2003 that resulted in tens of thousands of deaths across Europe, and more recently the widespread flooding in many parts of northern England, and devastating monsoon flooding in South Asia, both in the summer of 2007). Increasing scientific consensus suggests that these types of extreme events will become more commonplace in a future, warmer, climate (IPCC, 2007, 2001; EEA, 2006).

This paper presents ongoing research being carried out for the EU-funded ADAM project (ADaptation And Mitigation strategies: supporting European climate policy). Funded by the European Commission and coordinated by the Tyndall Centre for Climate Change Research in the UK, ADAM is an integrated research project running from 2006 to 2009 that will lead to a better understanding of the trade-offs and conflicts that exist between adaptation and mitigation policies. ADAM will support EU policy development in the follow-on stage of the Kyoto Protocol and will inform the emergence of new adaptation strategies for Europe. CEPS is one of 26 participating research institutes in the project (see http://www.adamproject.eu/).

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The urgency for action has been reinforced by the recognition that climate change is not only an environmental issue; but will have very important social and economic implications as well (as illustrated by the high-profile Stern Review, 2006).

2. Adapting to a changing climate

Although human systems have some capacity for self-adjustment, the pace and intensity of climate change is likely to be such that planned adaptation will be needed to reduce the impacts. However, the scale, complexity and global nature of climate change pose significant challenges for our society. "Climate change represents a classic multi-scale global change problem in that it is characterised by infinitely diverse actors, multiple stressors and time scales" (Adger, 2006, p. 273).

The cross-cutting nature of possible adaptation responses adds further complexity to this already complicated mix. Conceptually, a broad definition of adaptation commonly used is the "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (IPCC, 2001). Furthermore, as our understanding of what adaptation actually involves has improved over time, it has been recognised that adaptation can:

1) focus on managing the impacts of the climate-related hazard, reducing exposure to the hazard, or reducing the vulnerability of elements at risk (though in reality responses may sometimes overlap in their categorisation);
2) involve a range of actors throughout society from Governments down to individuals; and
3) manifest itself in many forms (the Stern Review, for instance, highlighted differences according to whether measures were anticipatory or reactive, private or public, autonomous or planned, etc.).

Recent attempts to make the concept operational, and hence more relevant for practitioners, have also found that distinguishing between process (building adaptive capacity) and outcome (the delivery of adaptation measures) can be useful (UK Climate Impacts Programme, cited in Tompkins et al., 2005). This distinction was used in the Stern report and has also proved to be a useful method for framing ADAM research activity.

3. Research scope

Adaptation to climate change (in comparison to mitigation) is a relatively new focus for both research and policy communities. This Policy Brief reports specifically on 'actor-based' research being carried out for sub-tasks of the ADAM packages focusing on adaptation. This involves engaging directly with experts and key stakeholders in order to elicit knowledge and develop understanding on adaptation processes, the building of adaptive capacity, as well as the actual delivery of adaptation measures.

Drawing on relevant theories (such as complex systems, institutional adaptive management, social learning, etc.) such an approach ensures that both process and outcome are considered, as well as enabling interaction with those largely responsible for adaptation in practice (although influenced by multi-level processes, the operationalisation of adaptation is primarily local in scale, with measures needing to be suited to the local situation – accounting for hazard, exposure, vulnerability – in order to be effective). As well as holding important information on adaptation at the scale of implementation, many key actors also act as gatekeepers to valuable anecdotal evidence and unpublished reports. Indeed, the initial engagement experience has shown that although interesting things are being done, in many cases these are not 'badged' as adaptation or disseminated as such.

One of the primary objectives of the research programme is to analyse institutional adaptive management and issues of adaptive capacity, particularly the 'space' that exists between theory and practice. Intended outcomes include a better understanding of the barriers that hinder adaptation activity, whilst also identifying those conditions and processes that enable best practice to occur. Experience to date has shown that an actor-based approach provides a valuable (arguably essential) perspective on both the determinants of adaptive capacity and the mechanisms necessary for delivering adaptation. This viewpoint reinforces the research findings of others, for instance Brooks (2003) who stated that "research focusing on specific adaptation options rarely investigates the processes through which adaptation measures are undertaken'. It is the intention (at least partially) to fill this gap in knowledge.

Engaging with experts and other key stakeholders (through interviews, questionnaires and workshops) was originally perceived as a process involving several cycles of learning: starting with a definition of the research questions, planning the stakeholder engagement process, engaging then reflecting on the responses before developing new questions to delve deeper into existing issues or to explore new ones through further rounds of engagement. By interacting with key actors in this way the research team hoped to uncover valuable information on some of the key drivers for change, identifying what supports

effective adaptation decision-making in different institutional settings (as well as what barriers to learning and information sharing exist), and how individuals and organisations interact in ways that either enhance or impede this. This iterative approach, where the output of one engagement informs the focus and questions for the next round, enables the research team to be open to emerging ideas and themes that may not have been obvious at the start, allowing for more genuine learning (and the possibility for surprise and unexpected connections). Through this investigative process, it is intended that knowledge on how to achieve effective action on adaptation to climate change, including how best to facilitate the building of adaptive capacity, will be collated, analysed and disseminated. Of special interest is how organisations move beyond the development of practical guidelines to the 'messy' business of trying to implement them in practice.

The focus on adaptation as a process is also being complemented by an investigation into the delivery of actual measures on the ground, specifically "innovative technologies and institutions designed to reduce or transfer the risk associated with extreme events". Although understanding of adaptation has improved in recent years, we continue to lack evidence of the extent, feasibility and efficiency of different options, and therefore a systematic review and analysis of existing and potential adaptation measures across the EU (and internationally, where this information adds value) is being undertaken. In this instance, innovation is understood as an idea, practice or object that is perceived as new by an individual or organisation, though it is also recognised that traditional management practice in one particular context may translate as an innovative adaptation option when transferred to another setting. The ultimate aim is to design and populate an adaptation catalogue that will act as an inventory of options (including an assessment of potential feasibility and application in different contexts, with associated costs and benefits where such quantitative data are available).

4. The policy context for adaptation

Adaptation will not happen in a policy vacuum; therefore this section lays out some of the contextual background for the actor-based research being carried out, presenting an overview of contemporary EU policy on adaptation.

Protecting the environment was historically seen as conflicting with other policy priorities, particularly economic development, and has only relatively recently been treated as a core competence of the EU. There are signs of a greater emphasis on the environment, alongside economic and social development, as agreed in the Lisbon Strategy in 2000, for instance. Nevertheless, the majority of the EU budget remains focused on sectors such as agriculture and regional development.

There has also been a shift away from a predominantly top-down approach to environmental policy-making as witnessed by the introduction of the 5th Environmental Action Programme (EAP) in 1992. This resulted in a greater focus on less hierarchical modes of governance and an increased emphasis on partnership working. At the same time, there has been an increasing realisation that a sectoral approach is necessary, though there are concerns that the EU has limited control over the most environmentally damaging sectors, e.g. transport, energy production and tourism. However, it is recognised that even where there is no direct EU competence, such as spatial planning, EU policies can still have a significant influence, particularly through mechanisms such as the Structural Funds, Common Agricultural Policy, etc.

The Sixth EAP of the European Community 2002-2012, adopted in July 2002, promotes fuller integration of environmental protection requirements into all Community policies and actions, and provides the environmental component of the Community's strategy for sustainable development. It also identifies four priority areas, one of which is climate change.

The strategy to address climate change is now being taken forward under the European Climate Change Programme (ECCP), and consists of a broad mix of instruments including: command and control mechanisms, market-based instruments, information provision, funding for technology and innovation, voluntary agreements and networking. As can be seen, the original ECCP programme had the primary aim of identifying and developing all the necessary elements of an EU strategy to implement the Kyoto Protocol, and so was predominantly concerned with the mitigation agenda. However, the second phase (ECCP II programme, 2005) gives adaptation a much higher profile, and this in turn has led to the recent Green Paper on Adaptation (European Commission, 2007).

EU adaptation policy

Adaptation is being progressed through the ECCP II under a dedicated 'Impacts and Adaptation' working group. The overall objective was to "define the EU role in adaptation policies so as to integrate adaptation fully into relevant European policy areas, and to identify good, cost-effective practice in the development of adaptation policy, and to foster learning". To meet this challenge the working group

adopted a sectoral approach, holding a series of thematic expert meetings in 2006:

- Impacts on water cycle and water resources management and prediction of extreme events
- Marine resources and coastal zones and tourism
- Human health
- Agriculture and forestry
- Biodiversity
- Regional planning, built environment, public and energy infrastructure, structural funds
- Urban planning and construction
- Development cooperation
- Role of insurance industry
- Building national strategies for adaptation (country reports).

The findings of these meetings were then used to inform and contribute to the development of the Green Paper, the first EC policy document on adaptation. It was officially launched in July 2007, with the main objective being to 'kick-start' a Europe-wide public debate on how best to take the adaptation agenda forward. The paper sets out that Europe's natural environment and nearly all sections of society and the economy, including agriculture, forestry, fisheries, tourism and healthcare are vulnerable to climate change. Coastal zones, low-lying deltas and densely populated river plains could be particularly affected by more frequent extreme events.

Furthermore, it also goes on to outline that given current and future impacts, adapting to climate change is now an indispensable complement to reducing greenhouse gas emissions. Indeed, it is suggested that early action to adapt to climate change could bring clear economic benefits and avoid social disruption by anticipating potential damage and minimising threats to ecosystems, human health, property and infrastructure. The creation of new economic opportunities, such as new markets for innovative products and services, is also highlighted.

The proposed adaptation strategy is framed according to four key 'pillars' of action:

1) Early action to develop adaptation strategies in areas where current knowledge is sufficient;
2) Integrating global adaptation needs into the EU's external relations and building a new alliance with partners around the world;
3) Filling knowledge gaps on adaptation through EU-level research and exchange of information; and
4) Setting up a European advisory group on adaptation to climate change to analyse coordinated strategies and actions.

Most recently, the Green Paper has been subject to a web-based public consultation (running from July until the end of November 2007), complemented by four regional stakeholder workshops (in Finland, Portugal, UK and Hungary). The results of this public consultation exercise will help shape the further work of the European Commission – notably an official White Paper on adaptation due at the end of 2008.

5. Learning examples

The analysis currently being conducted in the ADAM project is predominantly place-based, reflecting an understanding that the risks associated with climate change will be context specific, influenced by the type and severity of hazard, and the vulnerability and exposure of the different elements at risk. Hence, most adaptation activity will be implemented at the local scale – "practical initiatives that improve societal adaptive capacity, thereby reducing vulnerability, are commonly expected to be evident at the community scale" (Smit & Wandel, 2006, p283).

This is also reflected in comments made in the Stern Review (2006), which acknowledged that "effective adaptation measures are highly dependent on specific, geographical and climate risk factors, as well as institutional, political and financial constraints". Detailed analysis of selected case studies, or what have been termed 'learning examples', therefore forms a core component of the research.

Adopting a sectoral/issue-led approach, the learning examples have been chosen to ensure representation of a range of different characteristics and circumstances, including differences in geographical location and vulnerability, levels of awareness and perception of risk, institutional presence, decision-making cultures, and the roles and motivations of public bodies and private interests (as well as relationships between them). The resulting learning examples are:

- Tourism (with a focus on the Guadiana region of Spain and Portugal)
- Health/heat stress
- Urban planning and design (looking at London, Manchester and Berlin)
- Insurance and investment banking
- Water scarcity (Guadiana and southeast England)
- Flooding (particularly the Tisza Basin in Hungary)
- Desertification (inner Mongolia)

One of the principal aims of the learning examples is to better understand how successful adaptation is managed by different organisations and within different institutional settings. It is important to distinguish between organisations (stakeholders or actors) and institutions (the system of rules which influence actor behaviour and determine the character of their practices). Institutions can be said to enable or constrain behaviour, operate at multiple scales and have a certain level of permanence (Bakker, 1999), and can also be either formal or informal. Formal institutions are created explicitly, though informal institutions can also arise as a process of social self-organisation and through social order reflecting culture, habits and customs (Scott, 1995).

It was envisaged at the outset that the latter category (informal) would need to be an important consideration, recognising that the degree of shock caused by an extreme event can be 'positively correlated with the degree of informal arrangements set up to mitigate it' (SIRCH, undated). Institutions are also being investigated according to a number of perspectives (as outlined in Pelling & High, 2005): structural (social, economic and political), agency-centred (examining the importance of power and access to power between different actors) and adaptive capacity (particularly the role of learning as embedded in social relationships).

6. Some preliminary reflections

Consultation with key stakeholders[1] and experts has proved to be extremely valuable in uncovering anecdotal evidence and grey (sometimes unpublished) material, as well as knowledge and information not officially 'badged' as adaptation. A comprehensive analysis of this engagement process, and the lessons learned, will be made available in the final report due in April 2009; however at this stage of the research process, it is possible to highlight some preliminary insights and interesting points of note (giving the reader at least a 'flavour' of the interactions that have taken place).

Analysis of the interactions that have taken place has been framed according to a set of common, and sometimes overlapping, themes which have been identified that cut across all the initial interviews. Specific comments from those interviewed are emphasised in italics font in the text. The themes have been categorised as:

1) Mainstream acceptance of the reality of human-induced climate change
2) Process versus outcome
3) A need for improved understanding of climate-related risks and how to respond
4) Uncertainty and the decision-making process;
5) Gap between theory and practice
6) Learning to adapt
7) Making space for learning
8) Knowledge transfer
9) Overcoming barriers to change
10) Getting 'buy-in'
11) More effective use of existing mechanisms.

Mainstream acceptance of the reality of human-induced climate change

It has been clear from the interviews to date that, on the whole, the climate change issue is no longer questioned as it was in the past.[2] Across all sectors, there is a common acknowledgement that climate change is happening and that we need to be preparing for future change. Indeed, in the words of one interviewee, "*the world is changing fast and I no longer have to deal with sceptics as I have done in the past*", whilst others have noted how "*rapidly the climate change issue has risen in profile over the past couple of years*" and that there has been a "*rapid sea change in attitude following recent climate-related events, such as the heat wave in 2003*". The influence of recent weather events are also said to have shaped people's views, with increasing acknowledgement that even current-day extreme weather needs to be planned for (e.g. the impact of Hurricane Katrina was mentioned as a pivotal moment). That said, how sectors, institutions and individuals perceive the risks associated with climate change ultimately influences their type of response. For example, the insurance industry already has considerable experience in managing risks, and this has resulted in a proactive approach to dealing with climate change, to the extent that the sector is now seen as one of the main 'agents' of change, with considerable power to influence adaptation activity.

Highlighting this, the Association of British Insurers (in its role as an umbrella group for the insurance

[1] The research programme was specifically designed to ensure that engagement with stakeholders played a key role in the learning process. Initial scoping activity, concentrating on relevant policy analysis and the identification of key actors, is now being followed up by more detailed enquiries, with the intention to elicit knowledge through a series of interviews, questionnaires and stakeholder workshops.

[2] The authors recognise that this statement may be influenced by the type of actors interviewed to date and their geographical location. That said, this finding heightens the importance of awareness raising.

sector) has negotiated with the UK Government and committed to continue the provision of flood insurance, on the condition that investment is made to ensure adequate climate proofing of planned developments (becoming headline news in October 2007[3]). A second example is the Greater London Authority. London is seen as potentially at risk from all the major climate-related hazards and is therefore pro-active in developing an adaptation policy (due for launch mid-2008). The Greater London Authority also recognises that climate risks are likely to affect most aspects of business, as well as being an environmental issue.

On the other side of the coin, more traditional (or conservative) sectors "*tend to favour a cautious approach to adopting new policies as a result of needing to preserve their long-established reputation*". In this latter case, climate change is "*seen as one risk amongst many*", emphasising the need to take multiple stressors (not just climate change) into account.

Process versus outcome

Whilst there has been widespread acceptance of the climate change problem, much of the focus remains on mitigation (particularly at the local level). This is partially a result of adaptation being such a new agenda (for both researchers and policy-makers) and mitigation being easier to get "*to grips with*" (adaptation having a more 'diffuse' problem structure), but it was also suggested (by several interviewees) that the mitigation agenda is also thought of as 'sexier' – "*no-one has yet promoted the virtues of adaptation – the sustainability and mitigation agendas are considered much sexier*". Others took an alternative position, suggesting that adaptation may have more 'positive' aspects and actually reinforce other policy agendas, hence "*making adaptation responses easier to sell*".

The embryonic nature of adaptation is cited as a cause of why process has dominated the initial round of discussions rather than practical outcomes. Indeed, evidence of practical adaptation measures was limited in this initial engagement process, though it was suggested that this might be "*because the adaptation agenda is so new*" and "*due to the newness of agenda there is an obvious need to build up knowledge and ensure responses are evidence-based*".

The fact that the initial round of interviews concentrated on establishing links with key gatekeepers to information and contacts, rather than those directly responsible for implementation, may also have been a factor in much of the early detail being more focused on adaptation processes. However, other recently completed research projects aimed at identifying adaptation in practice have also found that processes are more easily identified than actual outcomes, with some authors again concluding that it may be a result of adaptation being a policy very much in its infancy (Tompkins et al., 2005).

That said, interviewees have documented several examples of practical measures, including a limited analysis of costs and benefits. These include the impacts of climate change on historic buildings,[4] options for making golf courses more sustainable (different species of grass, water resource management, etc.) and the use of green roofs. Interestingly, this final option was not originally introduced to combat climate change even although it can be regarded as an innovative adaptation option for the urban environment – green roofs not only retain rainfall hence helping to slow surface run-off rate but can also cool the microclimate, absorb dust and pollution, and contribute to urban biodiversity. Taking Stuttgart as an example, the introduction of green roofs in the 1980s was as much to do with "*environmental concerns of the time, such as acid rain*" as well as being attributed to the German psyche i.e. "*if you take from nature you have to give something back*". The high take-up of green roofs in Stuttgart can substantially be attributed to the comprehensive local policy regime which includes a combination of development control, subsidies and permeability taxes (an innovative portfolio of instruments with the potential for replicability elsewhere).

A need for improved understanding of climate-related risks and how to respond

Many of those interviewed stressed that access to information was extremely important for their organisation to adapt. This related to a) assessment of risk and b) information on potential adaptation options. In the first case, authoritative guidance on risk assessment tools and methodologies was considered highly beneficial. The emphasis on authoritative guidance not only relates to a lack of access to scientific guidance but in some cases stems from the fact that there was a feeling of "*information overload*", "*contradictory evidence facing decision-makers*" or "*conflicting advice from a variety of sources acting as a major barrier to changes in practice*". It was also noted by several of those interviewed that effective guidance needs to be tailored to user needs, i.e. in a suitable format for policy-makers and practitioners.

[3] http://news.bbc.co.uk/1/hi/uk/7036904.stm

[4] http://www.ucl.ac.uk/sustainableheritage/historic_futures.htm

In the second case, concern was expressed about accessing data that could be used to assess, or compare between, different adaptation options – this is problematic because of the context-specific nature of much adaptation activity, and the difficulty of assessing costs and benefits of alternative options – "*our current lack of knowledge of costs and benefits is a potential barrier to implementation*" and "*the economic dimension of adaptation is extremely important as the viability of both public and private investment will ultimately be influenced by costs and benefits*".

A specific criticism related to 'improving understanding' was directed at those designing and developing the built environment, with comments that long-term performance monitoring of new technologies was lacking and in some instances initiatives are going ahead without sufficient knowledge in place. One of the examples given was the operating effectiveness of a high-profile 'best practice' housing development. Although promoted as low carbon, "*the PV cells that have been installed only capture 15% of the sun's energy, re-radiating the remaining 85% into the house itself*". This has resulted in the over-heating of the internal space, and a subsequent need for mechanical internal cooling (with implications for mitigation).

Several interviewees also wanted to make it clear that adaptation is not something new – societies have been adapting to changing weather, and other environmental variables, for many centuries. Hence, it is important to note that "*traditional practice in one situation (coping with dry weather for example) may be labelled adaptation when applied in a different country or context*". Another example given was that of flood management, which although considered a traditional practice, is increasingly having to take account of climate change. In one interviewee's experience, "*there is a blurring of the boundaries – for instance, adaptation is to be a major component of the forthcoming UK water strategy*". There was also a suggestion that we need to think about risk in another way – "*we should see this as not so much about climate change but about change management*". Elsewhere, it was commented that it could equally be about "*management change*".

Uncertainty and the decision-making process

One of the key issues facing stakeholders is that of decision-making under conditions of uncertainty. Precise predictions of the future aren't possible, and therefore grappling with adaptation to climate change requires decision-makers to work out ways to make sense of a dynamic and uncertain system that is influenced by many variables. This is needed to allow them to have the confidence to make resource commitments for the future.

As such, it has been important to identify examples where progress has been made despite the inherent uncertainty in climatic and socio-economic projections of the future. In these examples, uncertainty is not seen as an insurmountable barrier. For instance, "*companies that have a lot to lose financially tend to see the implications of the climate change risk straight away, whilst some companies find the uncertainty in the scientific climate information hard to deal with, and some do not trust it. However they are willing to make decisions based on all sorts of assumptions about the future, such as population projections, that seem just as uncertain*". Another respondent thought that competition between companies would change perspectives "*as those slowest to adapt would begin to see that change could be profitable, or even that inaction in the face of climate change could hurt the company's bottom-line*". In this respect, public and private companies were noted to respond very differently due to the nature of the work they do – "*public companies focus on levels of service and safety, whereas private companies tend to be more concerned about profit*".

Uncertainty can relate to insufficient knowledge, difficulty of measurement, or lack of understanding (until it becomes more obvious). Some respondents expressed concerns that the technical officers who are tasked with implementing adaptation on an operational level often do not have the knowledge/experience or institutional support required to do the job effectively (and that ultimately adaptation was probably a wider brief than a single person could deal with). Further discussions surrounding organisational support highlighted issues such as 'climate proofing' operations and 'mainstreaming' adaptation. Although it was agreed that this would be a valuable endeavour, there was much less clarity about how this could be done in practice.

Gap between theory and practice

Whilst those interviewed often had a good grasp of climate risks, and the need for adaptation, many were struggling to move into the option assessment, decision-making and implementation stages. This can be put down to a number of reasons, the predominant one being that there is a perceived gap, or disconnection, between theory and practice – "*there are useful adaptation case studies and guidelines in existence but there is a gap between these reports/papers and implementation on the ground*", "*the existence of guidelines is not enough*", and "*how do we move from awareness to action*?".

It is relatively easy to understand why a complicated and cross-cutting issue such as adaptation to climate change is problematic for decision-makers, and difficult to respond to on an operational level, especially when there are limited resources, knowledge and skills currently available. That said, examples of good practice do exist although they are often poorly documented, or even not labelled as adaptation (a further concern was that there has been limited evaluation of existing guidance on adaptation, and even how it is being used).

On a final note, one interviewee introduced a caveat noting that the use of spatial analogues needs to be treated with caution. The example given was the basing of UK building design on current conditions in the South of France – "*temperature is not the only variable that needs to be considered, as the geometry of the sun is also important as it affects solar shading and how buildings will be impacted*".

In response to this perceived gap, the research focus for the ADAM project has concentrated to a large extent on the 'space' between theory and practice – on the one hand being based on the latest scientific understanding, on the other identifying what is 'good' adaptation according to stakeholder perspectives, whilst attempting to understand the in-between process stage i.e. the main determinants for building adaptive capacity, and the conditions needed to support adaptation learning processes.

Learning to adapt

A common thread that weaves throughout all the interviews is the importance of 'learning to adapt', and ultimately to better understand how learning occurs in different organisations (seen as a crucial component of the adaptation process). Indeed, there is a lot we can learn from other contexts, sectors and systems on how to do this well (knowledge already exists in relation to the conditions that best support effective learning, e.g. a comfortable space, lack of urgency, etc.). When experienced by stakeholders, there is greater acknowledgement of the benefits that the approach brings to many aspects of their work.

In positive terms, collaboration can enhance a process of mutual learning on behalf of all those involved (for example, local flood risk management groups in Scotland involve a wide range of stakeholders, including organisations such as insurance companies), whilst on a more negative note, there are concerns that in many instances "*policy makers are unaware of what is actually happening at the coal-face, a result of liaising predominantly with other policy makers*".

In similar terms, another stakeholder response noted that operational people often grasped the relevance of adaptation very quickly and could see not only how a changing climate would affect their work but also potential solutions. This type of 'bottom-up' resource is invaluable and can act as a complement to top-down adaptation strategies. It can also be a useful way of explaining to people higher up in the organisation what possible adaptation measures might actually 'look like' at an operational level.

It should be noted that the assumption that by experiencing something you automatically learn from it may not always be the case. Concern was expressed by several interviewees that although awareness raising was important, short-term memories can be a complicating issue, with people often reverting back to their previous behaviour over time having not learnt the lessons of weather-related events. The 'hydro-illogical cycle' was given as an example by one interviewee, whilst another questioned whether "*the lessons from events such as 2003 have been quickly unlearnt*".

Early messages from the engagement process appear to indicate a need to actively create spaces for people to learn from events and experience, or at least give active support to existing knowledge networks.

Making space for learning

Several discussions reflected on translating awareness into action. The LCLIP initiative (UKCIP) was highlighted as a specific example of making space for learning and reflection, with the potential for effecting changes in management and organisational behaviour. The 'Local Climates Impacts Profile' is a process which produces a database/briefing on the impacts of previous weather events on a local area, in this case specifically council buildings and services (Oxford, UK). It is based on the compilation of local weather-related media stories over the last 10 years into a (fairly sophisticated) database and is used to prompt further investigation into the knock-on effects of these events on council property and activities. The investigative process involved contacting different departments in the Council and asking them to consider the weather-related media cuttings (and reflect on the implications for their own work). People commented that this was the first time they had taken time to stand back and do this, and it inevitably had the effect of raising their awareness of the issue. For example, stories about a heat wave causing the roads to melt could be further investigated by contacting the roads/transport department and reminding them of the event and asking for further information and recollections about what happened on that particular day. More detailed information about different weather

variables and their spill-over effects could then be collected, including what was happening in other council departments at that time - were there school closures, health-related problems, or even a change in the use of leisure facilities, i.e. the combined impact on council buildings and services?

Quantification of the financial costs for the council (using data that was easy to identify and access, for instance the cost of road repairs and insurance payouts) was seen as particularly valuable. Although based on a crude calculation for unanticipated weather-related payments (and obviously an under-estimate), information in this format was seen to be influential when dealing with decision-makers (in this case the Council's Senior Executives) and the mainstreaming of climate change considerations into council activities and services. The LCLIP tool was therefore a useful approach to widen the perspective of key decision-makers to include consideration of the consequences of weather events (not climate change specifically) and to give some rough guidance as to the financial costs that are associated with the events.

The LCLIP process has therefore acted as a stimulus for raising the climate change issue, instigating further investigation, and prompting council officials to consider as far as possible the full implications of impacts and adaptation. The creation of 'space' to reflect in this way, and alter decision-making accordingly, can be considered an innovative mechanism for changing management practice.

Peer-to-peer learning through networks, well facilitated meetings, training events, etc. was seen by some as a good way to share practical information about experiences, overcoming barriers and detailing best practice (as well as providing required support). Meeting people who are in the same situation and grappling with the same constraints can provide a much-needed and motivating sense of 'we're not alone', as well as benefiting actors through a process of shared experience. This type of support can be very important for those responsible for adaptation as they are often charged with something seen as very new and complex. Peer-peer meetings are also considered particularly useful as often good practice is not written up. One respondent proposed that this may be because the "*people running them are 'practitioners' who have a preference for action over reflection and reporting*". By meeting peers face to face this information is able to be captured in a more immediate way.

Knowledge transfer

Across all the interviews, access to the latest scientific knowledge and best practice, and ensuring responses are evidence-based, was seen as one of the key issues facing adaptation (the forthcoming ADAM adaptation catalogue was seen as a potentially valuable addition to the knowledge base by those interviewed). For the urban environment, end-users cited solutions-orientated research such as the Building Knowledge for a Changing Climate (BKCC), and its follow-up initiative Sustaining Knowledge for a Changing Climate (SKCC),[5] as particularly "*useful for those involved in urban planning and design*" by "*linking science, policy and stakeholders and in providing practical tools for robust decision-making*". New ways of working, with greater connection between academic/policy-making/wider stakeholder communities, was also considered a step in the right direction in order to improve the quality of adaptation decision-making.

Many experts also identified suitable knowledge transfer platforms and networking forums (targeted to specific end-users) as critical to building adaptive capacity and 'learning to adapt'. Several existing examples of best practice were highlighted in discussions. These included the UK Climate Impacts Programme web portal which hosts a range of impacts and adaptation information, data, methodologies and tools;[6] regional climate change partnerships – for the example of London this is seen as an "*effective mechanism for the perspectives of different stakeholders to be represented, with the steering group considered a partnership and a useful forum for learning*"; and training such as that provided by organisations such as Urban Design London, including "*access to training, learning laboratories, peer-peer learning, master-classes and e-learning on design-related issues*". Indeed, it was felt that further advanced-level training for professionals can ensure that the climate change information/guidance is put to most effective use.

Finally, embedding staff in new learning environments was suggested as potential best practice. Examples discussed include Knowledge Transfer Partnerships (a staff member of the Chartered Institute of Building Services Engineers is currently seconded to UKCIP and will exploit the knowledge gained to encourage adaptation thinking in her home organisation) and the activity of the Carbon Trust whose members spend time working with different levels of local authority staff (though in this example the focus is on mitigation). Adapting existing information approaches in other sectors was

[5] http://www.k4cc.org/

[6] http://www.ukcip.org.uk/

also recommended e.g. the 'NHS Direct' resource that provides basic medical information for the public in the UK through both a phone line and an online Internet site.

Getting 'buy in'

The level at which adaptation is addressed within organisations in certain sectors can influence the extent to which internal adaptation activity is either supported or hindered (it was felt that when there is buy-in from those with decision-making power in key parts of the organisation, then the adaptation process can gain valuable momentum and support). One respondent spoke of the "*shift in business thinking from viewing climate change as an environmental risk, and thus marginal, to a corporate risk, making it central to the business with a similar importance to geopolitical or health and safety risks*". Other respondents also spoke of how climate change risk is becoming central to the thinking of many organisations even being part of the organisation's emergency-planning process.

Alternatively, failure to get 'buy-in' can also result at the level of individuals. One interviewee's comments highlight this issue. They spoke of having to use 'stealth' tactics to introduce thinking about adaptation in their organisation as an immediate manager felt they had enough to deal with by already having to cope with the mitigation agenda. Without this internal support at a strategic decision-making level, the effectiveness of the adaptation process is inevitably restricted within an organisation. Part of this reluctance may relate to insufficient knowledge, or even reassurance that there are useful steps that can be taken now on adaptation in any organisation. As such, some stakeholders noted that it is worth identifying some "*low hanging fruit that could demonstrate relatively easy, low-cost wins for approaching adaptation*". Demonstrating successes through easy wins was thought to make it easier to generate interest in the 'harder wins'. Knowledge of possible organisational hooks and levers was also considered invaluable in progressing the adaptation agenda.

The LCLIP approach mentioned previously is a good example of stimulating more 'joined up' thinking. The pilot in Oxfordshire County Council had some success in getting buy in at the executive level as it gave clear messages about the impact of recent events, and enabled a process of reflection by those with decision-making power in the authority in terms of their preparedness for future events.

Other interviewees highlighted external factors, such as greater awareness of climate change amongst the general public, as making it easier to introduce the adaptation agenda. In particular, media coverage of events such as local flooding in the UK in the summer of 2007, the devastation caused by Hurricane Katrina and the publication of the Stern Review, were all cited as influential in shifting thinking to some degree.

Overcoming barriers to change

Several barriers to change have already been touched upon. These include: differing perceptions of risk influencing organisational response, perceived inadequacy of information on which to base risk management decisions, decision-making under conditions of uncertainty and the need for more widespread knowledge transfer, to name but a few.

Whilst the barriers question will be more fully analysed and discussed in a subsequent final report, several other examples can be highlighted at this stage. These include the vexed question of responsibility, with much adaptation activity having spillover effects, resulting in both winners and losers (in terms of sectors, organisations, and individuals). Indeed, who pays and who benefits "*may make the business case for adaptation harder to sell*".

The complexity of roles and responsibilities is further enhanced when considering public and private actors, whose motivations and time scales differ. Strategically, the role of public intervention is considered very important, as "*the market can be less effective when having to deal with longer-term risks*". It was argued by one interviewee that "*ownership and liability need to be more clearly defined if a comprehensive response is going to occur*", and that ultimately, "*a better understanding of different actors and their roles can facilitate a more effective response*". This is reinforced by evidence from a real-world example with the "*definition of roles and responsibilities being a key component of the national heat wave plan in England*".

A further barrier relates to behaviour i.e. the tendency of the majority of people and organisations to wait until after they are affected by an extreme event before being stimulated into action. This is clearly shown by the heat wave of 2003, when many countries reacted after the event (only the city of Lisbon had an operational heat wave plan in place prior to 2003).

In addition, one respondent talked about the problem of having a 'silo' mentality in their organisation i.e. "*different parts of their organisation were disconnected and certainly not used to working together*". There was a recognition that coming together to address an issue such as adaptation to climate change would potentially have win-win

effects for other areas of work as a result of closer collaboration between the different sections. That said, some sectors may not experience full and honest collaboration because "*it was not the normal way of behaving*", with openness of information and competitive advantage being two chief concerns.

In more practical terms, entrenched and outdated practice in many fields was highlighted as a barrier. For example, "*many UK buildings are still being designed and built to standards that are based on the climate of the 1970s, with little consideration of possible future conditions*". These types of 'path dependencies' or technological 'lock-ins' present a considerable challenge to the introduction of innovative adaptation options.

Practitioners also called on policy-makers to ensure that longer-term planning horizons were put in place. In many instances, there is not automatic hostility to public intervention, but rather a desire that there is a 'level playing field' for all, with a strategic framework allowing business to plan ahead and ensure "*adequate skills and products are available to support the adaptation agenda*". Several of those interviewed also stressed that the role of 'champions' should not be underestimated in overcoming barriers to change.

The usefulness of meeting up and sharing ideas and reflecting on best practice and how to break down barriers was cited as potentially beneficial. These connections could either be within the same organisation (e.g. different units or departments), between different organisations in the same sector (e.g. local government climate change officers), or different organisations regionally (e.g. regional climate change partnerships). Learning to share perspectives and deal with the inevitable contradictions between different people, organisations or sectors was considered a valuable response. On a final note, it was stressed that many well-functioning networks already exist for sharing information, and that these could also be used for sharing climate risk and adaptation information.

More effective use of existing mechanisms

In the case of the UK, interviewee comments highlighted the considerable potential for using pricing mechanisms to influence change, opportunities which are not currently being exploited to any great extent, and that more innovative use of incentives may be a useful tool to help support the introduction and take-up of adaptation measures. Some considered this a major failing – "*we have a lot to learn from other countries, in particular the potential use of rebates and incentives as a mechanism to help promote increased implementation of adaptation measures*". Examples given included: Australia (water efficiency measures), California (energy efficiency measures) and Germany (permeability taxes).

Due to the focus of the initial interviews, the most commonly discussed regulation was that of building legislation. It was felt, even by practitioners, that the regulatory environment might need to be strengthened if general practice is to be improved, particularly as "*building standards and regulations tend to be treated as maximums rather than as minimums by developers and designers*". In terms of voluntary agreements, an associated mechanism for raising building standards in the UK is the 'Code for Sustainable Homes'. Although criticised from certain quarters for its voluntary nature and being seen as too limited, others consider it a scheme that will progressively increase standards – "*the Code for Sustainable Homes has provided an important step in the process of creating more sustainable housing stock*". It is argued that the gradual introduction allows the building industry to make preparations for the new standards rather than force an 'abrupt change'.

7. Implications for policy

Up front, it needs to be noted that there are two distinct responses for adapting to climate change that are available to policy-makers. Not only is it necessary to have a strategy that focuses on adaptation specifically, but mainstreaming climate change considerations across all policy areas will be equally important (recognising that EU policy and actions can have significant influence on the adaptive capacity and vulnerability of many different sectors and communities both within the EU and further afield).

An EU adaptation strategy

The complexity and uncertainty associated with the impacts of climate change have implications for the development of any strategic adaptation strategy. Hence, whilst there are obvious benefits to having a high-level policy 'vision' which acts as an overarching framework for integrated and coordinated action at the EU level over a long time period, it is clear that a 'one-size-fits-all' approach to adaptation is not appropriate. Preferably, any strategy would act to stimulate pro-active adaptation responses, whilst retaining the flexibility and robustness necessary for enabling the development, testing and implementation of measures at the 'local' scale.

In some areas the work of the European Commission is likely to have a supranational focus, and lead

elements of adaptation policy. In this regard, a crucial role of supranational influence is likely to be in areas of adaptation that require collaborative action (e.g. cross-border river basins or in dealing with cross-sectoral issues). In others it may influence the way that member states implement adaptation policy (perhaps even requiring that all member states develop national strategies). Finally, there will be areas where neither the Commission nor member states have a lead role but where the promotion of 'enabling' conditions could potentially be of great value to local adaptation activity (even whilst much adaptation is private, public intervention can help shape responses – a result of having different time horizons and motivations). A key role of the Commission will therefore be to ensure the integration of policies operating at different spatial scales and that efforts are coordinated in an effective manner. Promisingly, the EU Green Paper has begun this process by arguing for a multi-level approach to the governance of adaptation, with specific roles at the European, national, regional and local levels.

In addition to its integrating role, it is clear from the preliminary ADAM findings that there are further important challenges that policy at the EU level should seek to address in a systematic manner. These are reflected on earlier in the paper, but there are several key issues worthy of mention here. The first of these relates to the promotion of an improved understanding of climate-related risks and responses. This can be in relation to more general education and awareness-raising, but also by setting (and supporting) a research agenda dedicated to the development of a climate change evidence-base that is informed by the latest multi-disciplinary scientific research. Providing guidance on tools and methodologies for assessing risk, or even offering advice regarding decision-making under uncertainty and the need to build in adequate climate 'headroom' to all relevant economic and social activities will all be useful activities.

As stressed throughout this briefing document, the transfer of knowledge to end-users in a suitable format is a particularly important component of the adaptation process. Being adequately informed is considered by stakeholders as critical to the building of adaptive capacity, with the highlighting of existing best practice and examples of successful adaptation a valuable awareness-raising function in this regard. It is therefore recommended by the authors that the establishment/support of suitable knowledge transfer platforms should be actively encouraged (for instance, a portal for the dissemination of European level information).

As a final point, it is becoming increasingly evident that research, policy and stakeholder communities need to develop closer links and working relationships in order to better inform the risk assessment and adaptation processes. This places emphasis on new forms of collaborative activity between research, policy and wider stakeholder communities, with exchanges of knowledge and expertise taking place in an iterative manner. Indeed, promoting 'spaces' for interaction between different organisations and actors can help to enhance processes of 'learning to adapt' across the EU.

Mainstreaming

In addition to the emergence of adaptation policy frameworks and the integration across spatial scales, there is increasing recognition that integration also needs to occur horizontally, i.e. across different sectors. This requires the consideration of adaptation through existing institutional mechanisms, a process known as 'mainstreaming'. The concept was first put forward and explored at the World Summit on Sustainable Development (Johannesburg, 2002), and in early usage is most commonly associated with the integration of climate change considerations into development assistance. More recently it has been applied to wider policy contexts, i.e. strategies for adaptation being embedded within existing sectoral policies and institutional frameworks.

This emphasis on existing policies, rather than relying on the design and implementation of independent adaptation policies, results from the cross-cutting nature of adaptation to climate change. As such, it is argued that the EU needs to first get 'its own house in order' and make sure that existing policies are sufficiently climate-resilient. This will be especially important for policies related to those vulnerable sectors where the EU has significant competencies like agriculture, fisheries, water, biodiversity, health and transport and energy networks, but other sectors and themes will also need to be considered (for instance, the urban environment, where most people live and work).

In the case of adaptation, analysing the interactions between different policies is a valuable exercise due to its crosscutting nature, particularly highlighting cross-sectoral impacts and the implications for sustainable development. As a practical example, the promotion of urban greenspace not only benefits adaptation by providing valuable cooling and infiltration functions, but it can also contribute to socially-oriented agendas such as health and quality of life (as promoted by the Sustainable Communities Programme in the UK for example) or economic activity such as urban tourism, and in some instances can even reinforce other environmental agendas e.g. reducing energy use by providing shade for buildings. These 'win-win' situations provide important opportunities for delivering adaptation,

even if not directly motivated for this purpose. Alternatively, there may be policy barriers as illustrated by the potential conflict between different mitigation and adaptation measures. A better understanding of opportunities and barriers will undoubtedly assist more effective decision-making and the informed development of an overarching strategic framework at the EU level, though the linking of top-down strategy with bottom-up processes (such as social learning as outlined in this paper) will be a considerable challenge.

The Adaptation Green Paper does begin to address the mainstreaming issue to some degree, highlighting that "certain sectors are largely integrated at EU level through the single market and common policies and it makes sense to integrate adaptation goals directly into them". It also discusses the need to "integrate adaptation when implementing and modifying existing and forthcoming legislation and policies", and that "when preparing their programmes for Community support, Member States should integrate adaptation activities". The Green Paper also argues that adaptation needs to be integrated into the EU's external policies, especially those oriented to more vulnerable developing countries through, for example, support for actions within the UNFCCC, such as National Adaptation Programmes of Action (NAPA).

This final point is extremely important. It is clear that adaptation will require solidarity among EU member states in order to ensure that the poorer and more disadvantaged regions are able to take the necessary measures. As a starting point, the EU needs to consider those areas where current funding and budgets strongly determines the shape of the sector, notably agriculture, but it will also needs to consider wider development initiatives, such as structural funds/regional development funds, etc. It is here in particular that policy alternatives to reduce Europe's vulnerability to climate change will have a crucial influence.

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Annex. Organisations Interviewed

1) Acclimatise, UK
2) Watkins Gray International LLP, UK
3) Town and Country Planning Association, UK
4) Urban Design London, UK
5) London Climate Change Partnership (LCCP), UK
6) Department for International Development, UK
7) Golf Environment Europe
8) UKCIP
9) Oxford Brookes University, UK
10) Association of British Insurers, UK
11) BP Pension Fund, UK
12) City of London, UK
13) SE Climate Change Partnership, UK
14) CABE Space, UK
15) Environment Agency, UK
16) Green Building Council, UK
17) London Fire and Emergency Planning Authority, UK
18) London School of Hygiene and Tropical Medicine, UK
19) Health Protection Agency, UK
20) Greater London Authority, UK
21) Environment Agency, UK
22) Defra, UK
23) Oxford City Council, UK
24) Stuttgart Municipality, Germany
25) International Green Roof Association
26) Mission Risques Naturels; CEA Natural Hazards Working Group, France
27) Institute for Meteorology and Water Management, Poland
28) Polish Academy of Science
29) Potsdam-Institut für Klimafolgenforschung, Germany
30) Agricultural University of Poznan, Poland
31) University of Prague, Czech Republic
32) University of Economics in Prague, Czech Republic
33) Agricultural University of Poznan, Poland
34) Centre for Sustainable Heritage, University College London
35) Mersey Community Forest, Warrington, UK
36) Centre for Urban & Regional Ecology, University of Manchester
37) Department of Geography, University of Manchester

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