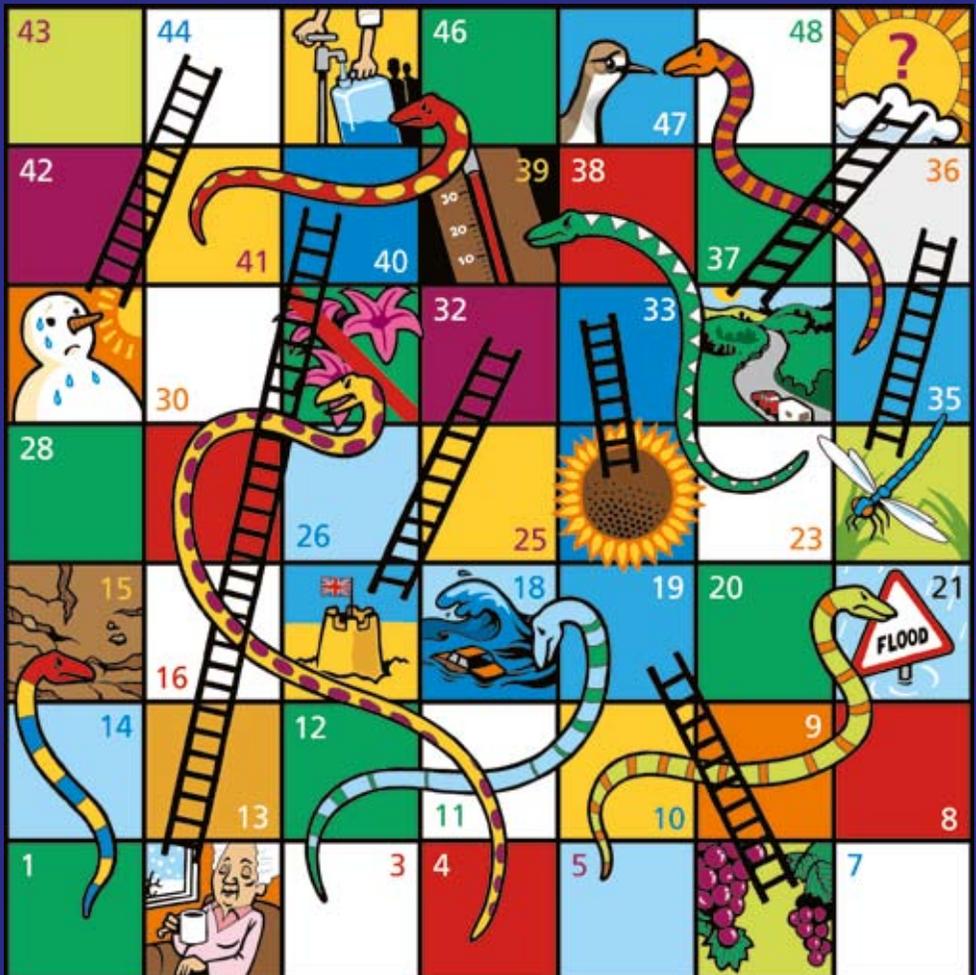




Adapting Institutions to Climate Change

Summary Report



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SUMMARY REPORT

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About the Royal Commission's study on *Adapting Institutions to Climate Change*

This report explores the challenges facing institutions in adapting to climate change by examining existing institutional arrangements for three exemplar areas: freshwater, biodiversity and nature conservation, and coastal zones. By 'institution', the Commission means organisations, practical arrangements for implementing policies, or legal, regulatory and policy frameworks.

The Commission chose this topic because it believes there is an urgent need to understand how UK institutions should adapt to climate change and initiate action to build adaptive capacity. The focus has so far rightly been on how to mitigate climate change through the reduction of greenhouse gas emissions, but the time has come to learn how to adapt at the same time as taking action to mitigate climate change.

During the course of the study over 100 organisations and individuals submitted evidence or provided information on request. The Commission hosted seminars in Reading and Edinburgh to discuss views on the institutional capacity for adaptation to climate change, drawing out synergies, gaps, conflicts and incentives for adaptation. In addition, the Town and Country Planning Association (TCPA) organised a workshop on the Commission's behalf to examine the institutional capacity of the UK's land use planning system in relation to climate change. The TCPA produced a report of the workshop and a more in-depth report on 'Helping to deliver climate change adaptation through the UK planning system.'¹ Reports were also commissioned on legal liabilities for coastal erosion and flooding in the UK due to climate change, the river invertebrate prediction and classification system (RIVPACS) under climate change, and the impact of sea level rise on saline intrusion, groundwater and coastal habitats.

Members of the Commission and its Secretariat made evidence-gathering visits to Wales, Brussels, the Netherlands, Norfolk, Exmoor National Park, the Met Office and the Thames Barrier.

A full text of the Commission's report is published by The Stationery Office (Cm 7843, £26.60) and is available on the Commission's website at: www.rcep.org.uk. The evidence submitted is also available on the website.

The scale of the adaptation challenge

The need to *mitigate* the effects of climate change by reducing our greenhouse gas emissions is well recognised; the UK is committed to reducing its emissions by 80% from 1990 levels by 2050.² However, it is likely that society and governments are underestimating the scale of the challenge of *adapting* to climate change – the International Scientific Congress on Climate Change (March 2009, Copenhagen)³ reported that we are already committed to the worst-case IPCCⁱ emission scenarios trajectories. We will need to adapt to the level of climate change already locked in to the system (as a result of historic greenhouse gas emissions), as well as be prepared to adapt to a greater extent in the future, if we are unable to limit emissions. Climate change will have profound effects on many aspects of our lives in the UK.ⁱⁱ

But what do we mean by adaptation? The IPCC defines adaptation as having three possible objectives: to reduce exposure to the risk of damage; to develop the capacity to cope with unavoidable damages; and to take advantage of new opportunities. Adaptation can be ‘autonomous’ or ‘spontaneous’, in that the response is unplanned and happens unconsciously; ‘planned’, in that adaptation is the result of a deliberate policy decision, (based on an awareness that conditions have or are about to change); or ‘anticipatory’(proactive), in that adaptation takes place before impacts are observed.⁴

In the case of mitigation it is clear that steps must be taken to reduce greenhouse gas emissions on a global scale. In the case of adaptation, actions that we take to improve our capacity to cope with the inevitable challenge of climate change are likely to be local and specific to particular circumstances – there is not a one size fits all solution. Nor is there an adaptation ‘end-point’; the need for adaptation is ongoing. In addition we cannot be certain about the magnitude of climate change we will need to adapt to. For these reasons and more, adaptation is messy and complicated.⁵

It is important to address adaptation to climate change proactively. The Commission has undertaken this study to address the capacity of institutions to adapt to climate change, making reference to three exemplar areas: freshwater, biodiversity and nature conservation, and coastal zones. For this study, institutions are the organi-

i IPCC – Intergovernmental Panel on Climate Change

ii The cover of this report symbolises both the potential benefits (ladders) and problems (snakes) posed by climate change both for the UK’s natural environment and for society as a whole. The image was drawn for the RCEP by Guy Allen.

sations and institutional frameworks which regulate the activities or determine the policies which will be affected by a changing climate – and in particular how they can develop the capacity to deliver adaptation.

The evidence collected by the Commission confirms that complexity and uncertainty are inherent to the challenge of adapting to climate change. These issues include: uncertainty about how quickly and by how much the climate will change; difficult decisions on investment that will have to be made now by governments and society for a problem that will be faced by future generations; and other complex issues of equity, including who will bear the costs and consequences of losses of property, business and community as a result of climate change. This means that this report cannot be a blueprint for adaptation. As adaptation has no definable ‘end-point’, the Commission urges that institutions should move towards planned and anticipatory adaptation, by assessing what climate change will mean for them, and by building adaptive capacity that is responsive and flexible in the face of uncertainty.

The UK climate is already changing

Recent extreme weather events in the UK such as the heatwave in 2003, floods in England in summer 2007, and the snow and ice of winter 2009-2010 in England and Scotland – which exposed gaps in both planning and infrastructure resilience – suggest that UK infrastructure is not sufficiently adapted to current climate extremes, let alone those associated with a changing climate.

What sort of changes to our climate can we expect? Although it is not possible to attribute individual periods of extreme weather to climate change, it is likely that there will be more extreme weather events in the future – be they floods or heatwaves for example. The UK's climate is already changing. In general, average temperatures across England have risen by about 1°C since 1970, and across Scotland and Northern Ireland, average temperatures have risen by about 0.8°C since 1980. Sea surface temperatures have also risen, and the seasonal distribution of rainfall over the UK has changed, with increased levels of winter rainfall. Sea levels around the UK have risen by about 1 mm per year in the 20th century, but the rate for the last two decades has been higher than this.⁶

The updated UK climate change projections (UKCP09) published in 2009 set out the best available local projections for how the UK's climate will change in the future; they are designed to inform policy- and decision-makers about the possible changes in different regions of the UK. In broad terms, the projections suggest there will be warmer, drier summers and warmer, wetter winters throughout the UK by the end of the century. In September 2009 the Met Office's Hadley Centre reported that there was real potential for global average temperatures to warm by as much as 4°C by the end of the century, with a risk of some extreme regional variations.⁷ Such increases in global average temperatures will have profound, even devastating, consequences for different parts of the UK.

The Government and Devolved Administrations have put in place programmes to begin to plan the adaptation response more systematically. The Commission welcomes this but believes that the scale and breadth of the challenge has not been sufficiently widely recognised and articulated.

THE EFFECT OF CLIMATE CHANGE ON THE EXEMPLAR AREAS

The Commission examined the possible consequences of climate change on the three exemplar areas, and the institutional arrangements in place for adaptation (and more generally) for the management of these exemplar areas. Evidence suggests

that climate change will have a profound effect on our natural environment, with consequences for the way we manage natural resources. The demand for water resources, especially in regions such as south-east England which are already stressed, will increase as temperatures rise, with implications for water supply, river quality and freshwater ecosystems. Reduced aquifer levels and freshwater flows coupled with rising sea levels may allow the ingress of salt water upstream in estuaries, affecting freshwater environments and the biodiversity of freshwater ecosystems. Changes in agricultural practices as a result of climate change, coupled with higher mean temperatures, could lead to increased run-off of pesticides and fertilisers leading to increased pollution of watercourses. The increased likelihood of flash flooding (as a result of heavy or prolonged rain showers) on land that may be impermeable to water as a result of drought could exacerbate such a situation.

Many people live on the UK's coastline and many industries are located on the coast because the nature of their business requires it (for example, ports and some power stations). Changes to the coastline resulting from climate change are likely to have huge socio-economic and environmental impacts. As the climate becomes more unpredictable and extreme weather events more common, storm surges increase the rate of coastal erosion and the coastline retreats inwards. Space for coastal habitats such as saltmarshes will be squeezed and may be lost altogether, so that there is no natural resilience left in the system to absorb storms. In vulnerable areas, tidal inundation may damage coastal dwellings and businesses in vulnerable areas.

Climate change will also have implications for species living in established protected areas, because the geographic range of a particular species is strongly (but not uniquely) defined by its climate envelope.ⁱⁱⁱ As the climate changes, each species' characteristic climate envelope will shift geographically. This means that maintaining the *status quo* for nature conservation and UK biodiversity will be increasingly difficult and ultimately impossible as the climates of protected areas change.

iii The term climate envelope describes the range of climatic conditions within which an organism can survive and reproduce.

The complexity of institutional arrangements

The Commission found that the institutional governance arrangements for each of the exemplar areas are multilayered and complex, involving national governments, local bodies such as district or county councils, and the European Union. They involve democratic bodies with a broad range of responsibilities (for example, local authorities) and specialist agencies (such as the Environment Agency and Scottish Natural Heritage). The private sector and non-governmental organisations also have important roles to play. In many cases there are partnerships in place where a number of organisations come together to deliver shared objectives – a response to the need for co-ordinated and complementary actions in the face of complex organisational responsibilities.

Complexity was particularly evident in the management of the coastal zone, an audit of coastal activity in the east of England by CoastNet found a wide range of stakeholders in possession of five sets of overlapping plans, 14 designations of coastal sites and landscapes, a mix of management bodies, many organisational cultures, unco-ordinated organisational activity at different scales, and overlapping jurisdictions, responsibilities and functions. Besides three central Government departments there were four regional bodies, five statutory agencies, four *ad hoc* groupings, 17 local authorities and five forums which all shared an interest in coastline planning but did not necessarily work together.⁸

POLICIES AND PROGRAMMES FOR CLIMATE CHANGE AT THE NATIONAL AND LOCAL LEVEL

Since the Commission began its study, there has been growing recognition at a global, European and UK level of the need to adapt to climate change. The most fundamental example of action in the UK was the introduction of the Climate Change Act 2008 and the Climate Change (Scotland) Act 2009 (which provide a statutory framework for planning and implementing adaptation, among other things) and creation of the Adaptation Sub-Committee (ASC) of the Committee on Climate Change (CCC), to evaluate the Government's progress in implementing its adaptation programme and to advise the Government on the Climate Change Risk Assessment.^{9,10} The Scottish Act imposes a duty on public bodies to exercise their functions in the way best calculated to deliver on the Scottish Government's adaptation programme.

The Climate Change Act (2008) establishes a power enabling the Secretary of State to require public bodies and statutory undertakers^{iv} to produce reports on the impacts of climate change on them, their policies for adaptation and progress made. The Department for Environment, Food and Rural Affairs (Defra) has proposed that around 90 priority organisations will be asked to report in 2010.

Defra has also developed the cross-Whitehall Adapting to Climate Change (ACC) programme to co-ordinate work on adaptation from all areas of Government and the wider public sector in England and the UK for reserved matters.^v The ACC programme established the Local and Regional Adaptation Partnership (LRAP) Board which acts to bring together representatives from local and regional government with key institutions such as the UK Climate Impacts Programme (UKCIP) and the Environment Agency, and is therefore well placed to facilitate action on climate adaptation. Defra has lead responsibility across Government for adaptation and the Commission welcomes its decision to ask other Government departments to publish adaptation plans in spring 2010, but considers that greater efforts will be required to build the adaptive capacity of all UK institutions. The Scottish Government recently published *Scotland's Climate Change Adaptation Framework*,¹¹ which consists of an overarching national framework for climate change adaptation as well as sector summaries. The overarching framework comprises three 'pillars' which are concerned with building the evidence base, equipping decision-makers with appropriate skills and tools and with integrating adaptation into regulation and public policy.

The Commission also recognises the potentially influential initiatives such as the ten-year Living With Environmental Change programme (LWEC), funded by the research councils, Government departments, Devolved Administrations and delivery agencies, which aims to build on the UK's capacity for analysing the nature and impacts of future climate.

At the local level, local strategic partnerships can choose to report on the progress they have made on preparedness in assessing and addressing the risks and opportunities of a changing climate through national indicator 188 (NI188). This can be adopted as a designated improvement target for inclusion in three-year Local Area

iv Statutory undertakers are bodies with a statutory responsibility for delivering services such as energy and water.

v *Reserved* matters are those areas for which the UK Parliament in Westminster has responsibility. *Devolved* matters are matters on which Parliaments in Scotland, Wales and Northern Ireland have the power to pass laws.

Agreements (LAAs). This process-based indicator has been taken up by 35% of all local strategic partnerships, putting it among the top third of indicators in terms of popularity for selection.

The planning regime has a crucial role to play in adapting to climate change. The Government's planning policy on climate change (as set out in the Government's Planning Policy Statement: Planning and Climate Change) requires that "new developments should be planned to minimise future vulnerability in a changing climate", and that when selecting land for development local authorities should take into account "the effect of development on biodiversity and its capacity to adapt to likely changes in the climate."¹²

What are the challenges institutions face when adapting to climate change?

During the study the Commission identified four overlapping challenges which institutions face when adapting to climate change. These are **uncertainty**, **complexity**, **path dependency** and **equity and efficiency**. In confronting these challenges, organisations will need to pay attention to how they **frame** the issue of climate change adaptation, and how they **learn** and **implement** policy responses in the face of these four challenges.

1. UNCERTAINTY

There are four types of **uncertainty** which need to be considered in the context of climate change adaptation:

- uncertainty in input data in climate models;
- uncertainties inherent in the methodologies used to produce climate models;
- uncertainty as to the impacts of climate change and response of natural systems; and
- uncertainty in social and technological systems (e.g. the rate and direction of technological change).

The Commission received evidence to suggest that different institutions have different approaches to managing uncertainty, and that some may tend to fall back on a ‘predict and provide’ approach, which may not be flexible enough to deal with the challenge of adapting to climate change. Even if we were able to fully understand what the climate system will do in the future, it does not necessarily mean we can predict how natural systems will respond.

2. COMPLEXITY

As noted earlier in this Summary Report, adaptation to climate change is a complex problem which is also subject to complex institutional arrangements in all of our exemplars. Although in many instances it is desirable to try to reduce complexity, it is unavoidable due to the pervasive nature of adaptation, the many layers of governance involved, the need for community involvement and public engagement, and the fact that adaptation is often a local issue requiring diverse local responses.

3. PATH DEPENDENCY

Path dependency,^{vi} or an over-reliance on the way things have always been done, may make it difficult to establish new ways of working that could be beneficial in adapting to climate change.¹³ Sometimes, even if there is potential for a particular institutional arrangement (the EU Water Framework Directive, for example) to be applied flexibly to enhance adaptation, it is unclear whether a particular implementation tool (in this case the river invertebrate prediction and classification system, or RIVPACS) is sufficiently flexible to cope with the loss of native species and the arrival of new (alien) species in the UK as a result of a climate change. The Commission received conflicting evidence on this issue.¹⁴

The Commission also found evidence of path dependency arising from the fragmentation of accountability and responsibility across government for different elements of flood risk management, for example. Under the Flood and Water Management Bill, the Environment Agency and the Welsh Ministers are to have a central strategic role, developing a flood and coastal erosion strategy for England and Wales respectively.

The Commission formed the view that adaptation requires flexibility to be built into policy options over longer timescales. The Thames Estuary 2100¹⁵ project takes the long view on increasing risks of flooding in the Thames estuary and is an example of a decision process that has prioritised flexibility to encourage short-term engagement, in the context of a long-term but flexible plan of action. In terms of policy tools for adaptation, the planning system considers change and impacts over 20-30 year periods and has the potential to be flexible enough to build climate change adaptation into development planning. However, the Commission heard concerns that many local authorities place immediate priorities, such as transport and housing, higher on the agenda than climate change. The Commission also heard evidence to support the idea that adaptive capacity should become a routine consideration within, and not additional to, other key policy areas.¹⁶

3. EQUITY AND EFFICIENCY

The Commission received a large body of evidence on the importance of involving stakeholders, particularly local communities, in developing adaptation responses and ensuring that issues of equity (distributional and governance) were taken into

vi Path dependency means that current and future states, actions or decisions depend on the path of previous states, actions or decisions.

consideration. The difficulties of ensuring equitable responses to climate change adaptation arise because the impacts of climate change are not likely to be felt evenly across society – some people are likely to be more vulnerable than others.

As part of its study, the Commission made an evidence-gathering visit to Happisburgh on the Norfolk coast. During this visit the Commission heard that the community felt they did not have sufficient opportunity to take part in framing issues or solutions. They were concerned that questions of equity, including the loss of value of properties that are no longer protected from coastal erosion, remain unaddressed. Similar issues arise when considering resources available to compensate for loss of habitat (as required by the Birds and Habitats Directives) when contrasted with those available to compensate vulnerable human communities.

The effects of climate change are likely to be felt most intensely by future generations. Decisions we make now on climate change may create problems or costs for future generations, and this raises difficult questions about intergenerational equity. Policy decisions are usually based on an analysis of their cost-effectiveness, or cost–benefit analysis (CBA). It can be hard to quantify benefits in the case of adaptation to climate change, due to uncertainties about the nature and extent of future change. The Commission believes that care needs to be exercised in applying CBA in adaptation policy, and other methods (multi-criteria methods and those involving public and stakeholder engagement), are needed as replacements or supplements to CBA.

Addressing the challenges through framing, implementation and learning

Much of the evidence the Commission received pointed to the need for institutions to ‘build adaptive capacity’, without mentioning the steps that organisations could take to achieve this. The Commission came to the conclusion that framing, learning and implementation are specific components underlying the building of adaptive capacity, with framing at the heart of an effective decision-making (and risk management) process. Together, these components constitute the ‘circles of adaptive capacity’, depicted later in this section.

1. FRAMING

Framing the problem of adapting to climate change is difficult because it can be easy to frame wrongly or incompletely – for example, one might be more likely to think in limited terms of ‘flood defence’ rather than more broadly about ‘flood risk management’. Because adaptation is hard to frame, it is hard to define ‘successful’ adaptation metrics for measuring progress or outcome. The Commission identified five key elements in framing the adaptation problem. These are:

- The role of climate in relation to the **key missions** of an institution

The Commission observed adaptation tends to have varying priority within an institution, and this is due in part to the key missions of the institution, or whether adaptation is recognised as a primary or significant part of its mission. For example, the economic regulation of water services is required to have regard to sustainable development but it has tended to give priority to consumer interests and to the sustainability of water utilities.

- The role of other relevant actors in **partnerships**

In framing adaptation, organisations need to think about the roles that other actors play – working in partnership will be essential if the transfer of risk from one place to another is to be managed.

- **Competition** with other goals

There may be cases where competition with other goals will hamper adaptation. The Commission heard evidence of projects such as the proposal to create flood plain woodland in the Laver catchment to help manage flood risk in Ripon. The project

did not proceed in the end because financial incentives proved insufficient – greater financial return could be achieved by using the land in ways other than as flood plain woodland.

- The tendency for **short-termism** in decision making

Many organisations and individuals within them tend to focus on short-term decisions and outcomes. This may be in conflict with what is required for building long-term adaptive capacity.

- The existence of **different values** and **interests**

Different values and interests can lead to very different ways of framing a problem. For instance, the protected areas of tomorrow for nature conservation will look very different from the protected areas of today. Society will have to make difficult decisions about how we manage these protected areas. These decisions are likely to be shaped by personal values and interests, and a willingness, or otherwise, to accept change.

2. IMPLEMENTATION

Implementation involves making the decision to take action and then doing it. Issues to bear in mind include:

- **Up-scaling** local and small-scale initiatives

The Commission received very encouraging evidence of adaptation actions being taken at small or local scales. However, the Commission is of the view that in order to capitalise on such projects they need to be scaled up to larger projects and/or adequately resourced to continue in the longer term. It was often unclear how this up-scaling would be achieved.

- **Enabling mechanisms** for adaptation goals

The Commission observed that one of the main constraints on adaptation is the absence of enabling mechanisms. For example, the planning system has limited scope to promote new schemes or to enable adaptation of the existing built environment, although it can encourage particular forms of development through development planning.

- **Engaging** public support

Evidence the Commission reviewed showed that although many people are aware that climate change exists and could be a problem, they are not likely to take action in the near future to do anything about it unless they feel imminently threatened by the consequences. Clearly, public engagement in areas such as coastal erosion, flood protection and nature conservation is very important. This is because (in part) a decision-making process which is perceived to be open and fair by those potentially affected can go a long way to enhancing tolerance, and even acceptance, of outcomes. Further, the input of local knowledge and understanding can contribute to the problem of taking decisions under conditions of uncertainty and complexity.

- **Co-ordination** between actors

Co-ordination is crucial for building adaptive capacity. On a visit to the Netherlands, the Commission learned that the Dutch management of flood risk is based on a system with different levels of governance from the state through to local and municipal areas, with a range of actors (stakeholders) sharing responsibility for ensuring that the flood defences worked properly. Similar examples of good practice exist in the UK (e.g. the Thames Estuary 2100 project) but they are far from universal.

- **Resources** – people, skills and finance

Effective adaptation will require the right number of people with the right skills and training, and sufficient financial resources. The Commission received evidence to suggest that more engineers and a greater capacity in the planning system were required to deal with the challenge of adapting to climate change.¹⁷

- **Distribution** of costs

The burdens of climate change will be unevenly distributed, with people living in flood or coastal zones likely to feel the brunt of climate change. The provision of flood and coastal defences (a discretionary power rather than a duty) is determined by cost–benefit analysis, and Treasury rules do allow for consideration of social wellbeing. The Commission noted with interest the fact that the Environment Agency is planning to introduce a new policy statement on the provision of flood and coastal defences, and that the Defra Pathfinders initiative has recently allocated funds to local communities to explore ways of adapting to coastal change.¹⁸

3. LEARNING

The Commission believes that organisational learning is essential if the challenges of framing and implementation are to be effective and manageable. The key elements of successful learning include:

- The **generation and sharing** of information

The Commission found evidence of an over-reliance on the information that the UKCP09 projections provide – the Commission is concerned that this information needs to be used appropriately, recognising the inherent uncertainties in the projections. The Commission saw positive evidence of networked organisations sharing information on climate change – for example, through local government associations and the Local and Regional Adaptation Partnership (LRAP) Board.

- Use of **information and knowledge** (for example, UKCP09 projections)

Learning organisations must ensure that new information and knowledge are fed into the learning process. But the Commission saw evidence that the translation of information and knowledge is problematic for some institutions, resulting in adaptation being accorded neither the necessary scope or urgency required.

- **Strategic memory and social learning**

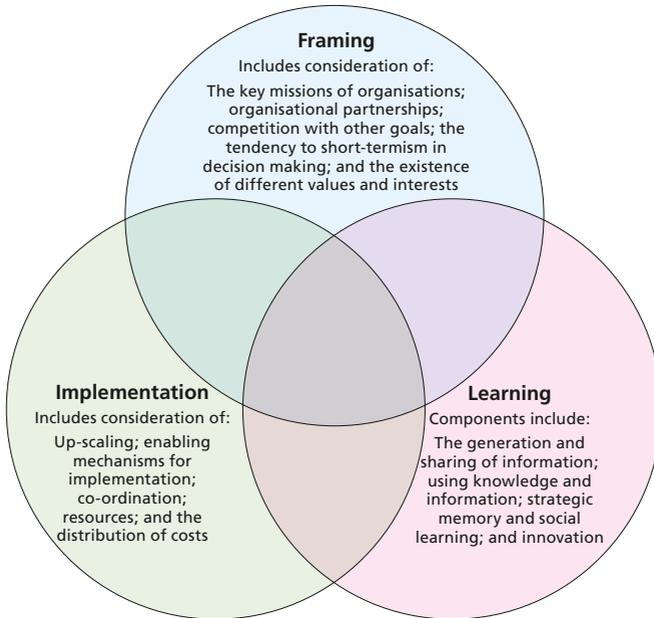
The Commission saw evidence of the importance of institutional memory, sharing practice and facilitating social learning at the Thames Estuary 2100 project and in the work of trade bodies and organisations such as Water UK and the Water Research Centre.

- **Innovative** approaches

Finally, and in order to ensure that path dependency is not limiting the opportunities to adapt, the Commission noted the importance of encouraging experimentation in adaptation, leading to increased adaptive capacity. It is likely that ‘business as usual’ and maintaining the *status quo* will become increasingly impossible in the face of climate change, and organisations will have to be increasingly innovative.

THE CIRCLES OF ADAPTIVE CAPACITY

In summary, institutions addressing adaptation face four challenges – uncertainty, complexity, path dependency, and equity and efficiency, and in order to build their adaptive capacity, institutions will also need to consider how to frame the issue of adaptation, how to implement and how to learn. These components are multi-faceted and inter-linked, as illustrated below:



TEN QUESTIONS ON ADAPTATION

Although we have stated that there is no blueprint for adaptation and that adaptation responses will be specific to local circumstances, the Commission recognises that in some cases organisations will not have begun to think about what adaptation means for them. In order to help these organisations begin to think about framing the problem and implementing actions, we suggest ten pertinent adaptation questions:

1. Have you identified the possible range of impacts of climate change on the activities and responsibilities of your institution or business, and their timescales?
2. Do you understand the nature of, and the limitations in, the climate projections in UKCP09?
3. Do you understand that adaptation to climate change is an open-ended process, not a single action that will solve your problems or reduce your risks?
4. Have you framed the questions and issues to be addressed adequately, so as to avoid tackling the wrong problem, or making matters worse? Do you understand how the risks posed by climate change interact with, and might change, the other risks your organisation has to respond to?
5. Have you identified options for adaptation, and devised flexible plans and strategies that can deal with uncertainty?
6. Are you embedding consideration of adaptation into your core business? Is there the right accountability for actions at the most senior levels of your organisation?
7. Are the objectives and aims of your institution fit for purpose in a changing world? Are you aware of the powers and duties affecting your institution?
8. Who are the significant other stakeholders (including members of the public) with whom you need to interact to deliver adaptation? Are there barriers (perceived or real) that might make collaboration difficult? How do you plan to negotiate these barriers?
9. Do you have mechanisms in place to listen and respond to alternative views on the ways of dealing with climate change, new ways of thinking, and ways of evaluating the success of past actions in relation to climate change?
10. Do your organisation's planning and investment cycles allow for new insights and information about climate change to be taken into account?

Conclusions and recommendations

The process of developing adaptive capacity is complicated and will require difficult choices to be made by governments and society. The Commission has learned that adaptation is complicated and is likely to be messy¹⁹ – much of what will happen cannot be predicted. Rather than try to offer specific solutions to the problems organisations will face, the Commission has set out a framework of key components which it believes must be considered in order to help organisations to build resilience to climate change and hence adaptive capacity. It is the Commission’s view that adaptation must be embedded in all aspects of institutional design and operation – with this in mind the Commission recommends use of an ‘adaptation test’ which could be integrated into decision-making frameworks. Although the Commission chose to focus its investigations on three exemplar areas, the lessons that have been learned extend more broadly. Reflecting this, the Commission has outlined a series of recommendations, which between them serve again to highlight the complexity of the issue of adaptation.

The recommendations are grouped into five areas:

1. The policy framework
2. Specific institutional arrangements
3. Resources to build capacity
4. Equity
5. Public engagement

Some of the Commission’s recommendations are directed to the Adaptation Sub-Committee (ASC) of the Committee on Climate Change. If the ASC considers that it does not possess the statutory authority to carry out a particular task identified by the Commission, or does not consider itself the appropriate body to do so, we recommend another body with adequate resources and expertise be charged with fulfilling these functions.

1. THE POLICY FRAMEWORK

Institutions are already vulnerable to current weather. The future climate will be different, more variable with more extreme episodes, therefore institutions need to examine their current and future policies and programmes to assess them from a climate resilience perspective. New policies, which may have implications over long

timescales, should not exacerbate existing vulnerabilities to extreme weather; organisations should be aware of the limitations of cost–benefit analysis when performing investment appraisal. In light of this the Commission recommends:

- An ‘adaptation test’ appropriate to the circumstances should be integrated into public and private decision making. The objective of this test should be to reduce exposure to the risk of damage through climate change; to develop the capacity to cope with unavoidable damages; and to encourage organisations to take advantage of new opportunities.
- When performing investment appraisal, new flexibilities in the supplementary guidance to the Treasury Green Book should be fully used by public sector bodies, particularly for infrastructure investment.
- A range of alternative discount rates (including zero) should be used in appraising investments with very long-term impacts.

Efforts to build adaptive capacity depend on appropriate enabling policy frameworks being in place at the local and national level. The Climate Change (Scotland) Act and the legislation for the Greater London Authority already impose a positive duty on public bodies to address climate change adaptation. The Commission recommends:

- The Climate Change Act 2008 should be amended to impose an adaptation duty on public bodies of the kind included in the Scottish Climate Change Act or the Greater London Authority Act.
- The Adaptation Sub-Committee should be responsible for ensuring that appropriate and transparent systems of accountability are in place for monitoring compliance with a general adaptation duty imposed on public bodies.

Under the Climate Change Act 2008 the Government can direct priority reporting authorities to prepare climate risk assessments and action plans. There are bodies which satisfy Defra’s criteria as priority reporting authorities but do not meet the definition of a reporting authority for the purpose of the Climate Change Act. With these points in mind the Commission recommends:

- The Government should regularly review, and if necessary update, the definition of a reporting authority in the Climate Change Act 2008, in order to ensure that reporting obligations can be imposed on all bodies identified as meeting the Defra criteria for selection as priority reporting authorities.

Some bodies meet Defra's criteria for priority reporting authorities and do constitute reporting authorities within the meaning of the Climate Change Act 2008 but will not (initially at least) be required to report under the terms of the Act – for example, local authorities, which may have chosen to report on adaptation in accordance with NI188, and will have had to create indicators to help them define what successful adaptation looks like. The Commission recommends:

- The Adaptation Sub-Committee should evaluate and ensure the adequacy of the arrangements which apply to bodies which meet Defra's criteria for priority reporting bodies but are excluded from Defra's initial list of those required to report.

2. SPECIFIC INSTITUTIONAL ARRANGEMENTS

The Local and Regional Adaptation Partnership (LRAP) Board facilitates at the regional and local level a robust approach to identifying and managing the risks and opportunities of unavoidable climate change in a co-ordinated and consultative way, and is currently funded to 2011. The Commission recommends:

- Defra should extend LRAP beyond 2011 to take full advantage of collaborative working across national and regional organisations.

2.1 The land use planning system

The Commission received evidence to suggest that the planning system will be crucial in delivering successful adaptation. We recommend:

- Local authorities should ensure planning departments are adequately resourced and organised to enable their responsibilities in relation to adaptation to be met.
- The Adaptation Sub-Committee should scrutinise planning policy guidance to assess and advise on the recognition within spatial planning of the importance of adapting to climate change. The Sub-Committee should also scrutinise the activities of the Infrastructure Planning Commission in the context of adaptation to climate change.

2.2 Lessons from the exemplars

Some shortcomings in existing policy frameworks were identified which illustrate broader challenges which must be addressed. Firstly, it is essential that adaptation is embedded in the key missions or duties of organisations. Secondly, flexible policy frameworks will enhance the ability of organisations to respond to the challenge of climate change adaptation – the rigid application of some directives may hinder

efforts to adapt, and it may be necessary to question long-established or taken-for-granted concepts. Thirdly, the Commission has learned that a cross-sectoral approach to policy making and implementation will be necessary to build climate resilience. We recommend:

- Organisations, including those subject to statutory duties, review and where necessary revise their mission and objectives from an adaptation perspective. For priority reporting authorities, the Adaptation Sub-Committee should scrutinise these reviews, and where necessary recommend revisions, to their mission and objectives.
- In implementing EU directives, including those on conservation, governments should utilise the flexibility inherent in the directives in order to facilitate adaptation.
- Environmental regulators should ensure that the assumptions underpinning water management models are updated so that they remain appropriate for the maintenance of water resources and quality in a changing climate.
- The Government's Adapting to Climate Change Programme should ensure there is a framework for collaboration on a cross-sectoral approach to the development of the National Risk Assessment^{vii} and subsequent Action Plans for adaptation to climate change.

3. RESOURCES TO BUILD CAPACITY

Building adaptive capacity will require knowledgeable individuals and leaders who can think about what adaptation means for their organisation, and the culture of a learning organisation that will help to deliver effective adaptation. Investment in training and professional learning about adaptation must be factored into everyday work – the UK Climate Projections 2009 (UKCP09) are an important resource for such learning. Some organisations will rely on external contracted expertise to help them to understand how UKCP09 should be applied to their business. In the longer term the Living With Environmental Change (LWEC) research programme could be an important source of new insights that could contribute to our adaptive capacity,

vii The Climate Change Act commits the UK Government to carry out an assessment of the risks to the UK of climate change every five years. The first cycle is required to report to Parliament by end of January 2010. See: <http://www.defra.gov.uk/environment/climate/adaptation/assess-risk.htm>

especially if there are effective knowledge transfer mechanisms in place. It is the Commission's view that adaptation should be seen as a core element of an organisation's primary activities. In light of these points the Commission recommends:

- Organisations (both public and private) should ensure that responsibility for building adaptive capacity and putting in place arrangements to develop and utilise the competencies necessary for climate change adaptation is assigned at Management Board or Director level.
- Governments should ensure that the UK capability to produce and interpret climate change projections is maintained and enhanced.
- Governments and the UK Climate Impacts Programme (UKCIP) should work with professional institutions (for example, those bodies representing planners and engineers) to create continuing professional development that increases understanding of the need for adaptation.
- Governments and relevant bodies should build climate change adaptation into existing personal and corporate accreditation schemes to help ensure climate projection information is being interpreted and used appropriately.
- The Living With Environmental Change partners should develop an extensive and proactive knowledge transfer programme to ensure that new information on climate change adaptation is shared widely and effectively.
- Government departments should ensure at the next (and future) comprehensive spending reviews sufficient resources are committed to building adaptive capacity, and that recognition of the need for adaptation is reflected in the frameworks for setting and prioritising departmental objectives.

4. EQUITY

The costs of climate change will be unevenly distributed (socially, temporally and geographically). Difficult decisions will have to be taken regarding (for instance) allocation of national public resources to protect against flood and coastal erosion. Even allowing local funding to maintain or improve protection is not straightforward, since this could have consequences for communities downstream or along the coast.

For communities that are not fully protected, there will be questions about whether the losses caused by flooding and coastal erosion should lie where they fall, especially if those losses are uninsurable. Although public compensation for properties damaged or lost to flooding and coastal erosion might seem an intuitively attractive response, it is far from straightforward. For example, the resources devoted to compensation may not be available for investment elsewhere; and large-scale community disruption would not be captured by compensation for property damage. Moreover, compensation (or not) implies a particular understanding of distributive justice (or simply fairness), when as a society we take very different approaches to distributive justice, depending on the circumstances. The challenge posed by climate change gives society the opportunity to consider afresh the most equitable approaches and the Commission recognises the need for open public and political debate on this issue. The Commission recommends:

- The Adaptation Sub-Committee should explore the range of options available to address issues such as the loss of community, business and employment, and the disruption to health, educational and social services, which may be a direct or indirect consequence of climate change.
- Governments should initiate and sustain an informed political and public debate on the distribution of the costs of the impacts of climate change and of adaptation. This should cover the consequences of flooding and coastal erosion, the impact on communities and questions of compensation, and of the costs of maintaining or improving defences. Governments should make policy decisions on the basis of this informed political and public debate.

5. PUBLIC ENGAGEMENT

Climate change will have intensely local outcomes, and will have major impacts on the way in which individuals interact with their environment.²⁰ Decisions taken in the short to medium term on adaptation will have environmental, social and economic impacts (positive and negative) on future generations. It is the Commission's view that decisions around issues such as water resource management, coastal protection and new housing provision, should be embedded in an understanding of the uncertainties and risks posed by climate change, as a routine part of public discussion and decision making. The Commission also believes there should be enhanced public access to and debate around the UK climate change projections, to increase understanding about what climate change means for individuals, institutions and communities, as an important part of the framing and learning process. We recommend:

- Defra, environmental regulators and local authorities, and the equivalent for the Devolved Administrations, should pay urgent attention to the presentation of national and regional narratives or stories which describe what climate change will mean for institutions, communities and individuals, and the relevant adaptation priorities.

It is not possible to predict precisely how the impacts of climate change will be felt by society – institutions will therefore need to be sensitive to the acceptable levels of risk posed to different groups within society and the appropriate distribution of the costs and benefits of climate change. The Commission recommends:

- Public authorities should make greater use of discussion-based public engagement much earlier in decision processes, to help frame the issues relevant to adaptation and to gather public concerns and views to inform decision making, as opposed to limited passive consultation on draft actions.

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The Royal Commission on Environmental Pollution is an independent body, appointed by the Queen and funded by the Government, which publishes in-depth reports on what it identifies as the crucial environmental issues facing the UK and the world. The Royal Commission's full report on *Adapting Institutions to Climate Change* is available from The Stationery Office (Cm 7843, ISBN 9780101784320). Alternatively the full report and this summary are available on the Royal Commission's website (www.rcep.org.uk).

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