



Citizens' Advisory Forum

Living with Environmental Change and the Sciencewise
Expert Resource Centre

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Executive Summary

About this research

In July 2010 the Living with Environmental Change (LWEC) partnership commissioned OPM to run a Citizens' Advisory Forum to ensure that the public voice is considered within LWEC's strategic decision making processes around research into environmental change. This piece of deliberative research has been sponsored and supported by the Sciencewise Expert Resource Centre, funded by Department for Business, Innovation and Skills - BIS.

The main objectives of the Citizens' Advisory Forum are:

- To inform the strategic development of LWEC's research by helping to identify research priorities and commenting on strategic aims for the programme
- To identify areas of particular public concern about environmental change, so that the commissioning and communication of research by LWEC, and its partners, can take account of the needs and concerns of society.

The Forum consists of 18 members of the public. Members were recruited from Bristol and the surrounding area, against a range of demographic criteria, to form an inclusive rather than accurately representative sample. Forum members have met on three separate occasions between November 2010 and February 2011. During the three sessions, they have been supported by OPM facilitators and expert researchers to discuss and deliberate on issues of strategic importance to LWEC.

Sessions 1 and 2 were designed to understand where Forum members believe that LWEC should be prioritising research capacity and resources. They were introduced to two distinct areas for research and asked to prioritise specific types of research within these two areas:

- Flood risk management (Session 1)
- Adaptation to climate change (Session 2)

Session 3 had a distinct focus. It was designed to explore Forum members' views on the decision-making and governance arrangements appropriate to the challenges we will face because of climate change. This was a more conceptual question than those addressed in the first two sessions, and so specific scenarios were developed to help the Forum deliberate upon the issues raised. The scenarios looked at governance and decision making in the context of scarce resources, i.e. food and water, and also in the response to the need to reduce carbon emissions arising from transport.

Main findings

By way of context, it is worth noting the majority of members came to the forum sessions with a concern about environmental change and society's contribution to it, although a small minority rejected the idea that climate change should be a driver for behaviour change. Over the course of the sessions, attitudes towards climate change shifted, with a majority of forum members growing more convinced that it was a real problem to which serious attention needed to be paid.

Attitudes to research into environmental change

- Forum members showed support for research as part of the solution to our response to environmental change. Across the three sessions, they emphasised the need for action orientated research, which has a clearly defined purpose and is designed with its application in mind.
- Throughout the three sessions, members emphasised the need for research within the current financial and political climate to be 'value for money'¹. To achieve this, research should aim to produce new information and solutions, which cannot be obtained elsewhere, and have a strong potential for application and use by principle stakeholders. A primary concern within this context was that research produces cost effective solutions, which are more likely to be implemented at this time of budgetary constraint.
- Forum members felt that the overall objectives of environmental research should be preventing disasters caused by climate events and environmental change, and reducing their likelihood where possible. There was a perception that a preventative rather than a reactive approach would be a more cost effective in the long term; a perception that was not strongly countered by expert contributors to the session.
- There was an initial perception amongst Forum members that 'environmental research' involves technical experiments as opposed to qualitative and social research such as case study research, collation of best practice and stakeholder engagement. Forum members were initially more sceptical of the value of social research, but increasingly recognised its value through the deliberations.

Attitudes towards the impact of research into environmental change

- Forum members felt it was crucial for environmental research findings to be properly considered by those who have the power to take decisions that will impact on climate change. Participants felt that there was value in investing in environmental research only if the wider system is committed to using its outputs and has the necessary resources to do so.
- Forum members felt that private sector organisations should be amongst the principle audiences for LWEC's research outputs, for two key purposes, firstly to ensure they understand the extent of the risk from environmental change and secondly to ensure they have the technical solutions to be able to respond.
- Forum members were keen to be reassured that LWEC has sufficiently well developed links with the current government, to enable their research to have real world impact. Ensuring the communication of relevant research outputs to decision makers in government was felt to be critical to making research 'value for money' and a worthwhile investment.
- Local government was also highlighted as a key audience for LWEC, particularly in the sphere of flood risk management. However, Forum members expressed concern that without sufficient resources, local authorities would be constrained in how far they could

¹ When reading this report, it is important to remember the financial and political context in which Forum's deliberations were taking place. Ongoing cuts to public services were the backdrop to the deliberations of Forum members.

implement ideas and solutions identified within research, again risking the extent to which research is seen as a worthwhile investment.

- Forum members felt very strongly that research outputs created by LWEC's partnership should play a role in educating and informing the general public on the extent of the risk of climate change, and the need for behaviour change. Members felt that their own experience within the forum showed the value of data and statistics around future climate change projections and their implications, and were keen to see these disseminated more widely amongst the general public, particularly amongst the 'next generation'. Younger people were framed by many as more receptive to messages around the need for behaviour change.

Attitudes towards governance of our response to climate change

- Forum members explored issues of governance and responsibility in the context of three different challenges related to the impacts of climate change: limitations in water supply; limitations in food supply; the need to reduce carbon emissions.
- Opinions around the extent of individual responsibility varied across the three different challenges. Where the challenge was felt to be familiar to forum members, and in cases where perhaps an issue was already impacting upon personal freedoms (e.g. in the case of carbon emissions, and the fuel excise duty), members were generally less optimistic about the potential for behaviour change, and less enthusiastic to implicate themselves as responsible for bringing about a change. In contrast, where the challenge was not one they had previously considered and was felt to be a long way off from causing tangible impacts, forum members were generally more optimistic about the extent to which individuals could take responsibility for adjusting behaviours accordingly.
- Local organisations were seen to have limited power at present in responding to the challenges of climate change. Indeed, 'big society' thinking appears not to have filtered through to forum members' assessment of where power lies in relation to responding to climate change.
- In contrast, markets and corporate organisations were seen to be too powerful and in need of tighter and more powerful regulation by national and international governance bodies if we are to respond to climate change effectively. In fact there is a scepticism of 'big business' to act in the wider interests of society. Therefore it was felt that big business have a responsibility to respond to climate change challenges, but that they cannot be relied upon to lead the change.
- Generally there was support for interventions led by national government (who are considered the obvious leaders of issues of this magnitude), but interventions should be designed to be mindful of people's demand for personal choice and freedom, and not wholly reliant on punitive measures such as taxation – this was particularly important for maintaining trust that government is not acting out of self-interest.
- Forum members supported international layers of governance around climate change issues, commenting that it makes sense for there to be international-level coordination of issues that cross national borders (e.g. carbon emissions in the biosphere) and international regulation of globally traded commodities (such as food and oil).
- A key conclusion reached through the deliberations was that it will not be sufficient for players in the system to work in isolation, even if they were working to a consistent set of criteria for decision making. It was noted that climate change, its impact and our options

for mitigating or adapting to its effects are so complex that no one layer of decision making can be excluded from, or have sole responsibility for our collective response.

- Forum members advocated a combination of both incentives and more punitive measures to support behaviour change in response to climate change issues. They noted that democratically elected bodies may be reticent to implement punitive measures. Furthermore, it was felt that structural incentives which make behaviour change a more feasible option were important. For example, in order to encourage people to using vehicles which emit high levels of carbon, there is a need to implement structural incentives such as improvements in public transport in addition to solely implementing further taxation and price rises.

Criteria for decision making around access to limited resources

- Forum members believed that in response to limitations in our supply of or our access to resources, the most important criteria for decision making is fairness and equity of supply. This was felt to be particularly important where the resource is critical to human survival – e.g. water.
- There was an acknowledgement of the complexity of the notion of 'fairness' and the many factors which result in greater need amongst certain groups. There was a sense of pessimism around discussions, as it was felt that whatever regulations are applied there will always be an element of inequality and dispute around resource allocation, which may well increase as our supply of resources becomes more limited in the future.

Opportunities for LWEC

The LWEC Directorate is now tasked with ensuring that the learning from this project around public opinion on research into environmental change is implemented into the programme's strategies and sufficiently well communicated to all partners. The programme may wish to consider the following opportunities arising from this piece of research:

Support public engagement at an 'up-stream' level

The Citizens Advisory Forum has shown the potential for members of the public to deliberate on research priorities to support the challenge of environmental change. Where research strategies are still emergent, members of the public have been able to consider how their own concerns around environmental change will translate priorities in terms of research spend and investment. LWEC should be encouraged by the deliberations of the public, and continue to pursue a public engagement agenda that offers a space for public opinions at an up-stream level.

Consider the maturity of an agenda in designing public engagement

LWEC will need to consider how the maturity of a particular agenda can impact upon the way in which it is deliberated upon by members of the public. Our discussions suggested that where an environmental challenge is felt to be remote and distant, and where research participants' own behaviours are not yet implicated (for example, as was the case in discussions around future limitations to food supplies) forum members can consider a broader range of possible solutions and approaches with greater rationality.

Consider LWEC's strategic partnerships with organisations that undertake direct communication with the public

Forum members emphasised the importance of education around climate change and sustainable behaviours and many assumed that LWEC would have some role in

disseminating information and encouraging education around environmental change. Given that LWEC is not in fact a public facing organisation, it may wish to consider its strategic partnerships with public facing organisations to ensure that relevant research outputs are communicated to the public successfully.

Introduction

In July 2010 OPM was commissioned, on behalf of the Living with Environmental Change (LWEC) partnership and the Sciencewise Expert Resource Centre, (funded by Department for Business, Innovation and Skills - BIS), to develop and manage a Citizens' Advisory Forum. The purpose of the Forum is to ensure that public opinion and public concerns are considered in LWEC's strategic decision making processes. At the time of commissioning, it was anticipated that the Forum would have a lifetime of at least one year.

The LWEC Citizens' Advisory Forum (CAF) comprises 18 members of the general public who meet to deliberate on a range of issues pertinent to the work of LWEC. OPM designed and supported the first three meetings, which were held in November 2010, December 2010 and February 2011.

This report set out OPM's approach to designing and managing the Forum and provides a conceptual analysis of the main findings emerging from the deliberations of Forum members to date. Summary descriptive reports on each of the three sessions are provided in the Appendix, together with the agenda for each session, and details of the recruitment process.

An independent evaluation of the Citizens Advisory Forum project will be published in a separate report.

Background

Living with Environmental Change (LWEC) is a ten year partnership which seeks to increase the uptake and impact of research into environmental change. The partnership aims to connect natural, engineering, economic, social, medical, cultural, arts, and humanities researchers and their outputs with policy-makers, business, the public, and other key stakeholders.

The LWEC partnership is funded by 20 partners, all of whom either use or produce research on environmental change. These partners include the Research Councils, national, devolved and local government bodies and government agencies.

Knowledge exchange and public engagement are priorities for the LWEC partnership, and help to ensure that sufficient consideration is given to the concerns and priorities of the public when developing the strategic direction for the future of environmental research. The Citizens' Advisory Forum is one of the first major pieces of public engagement undertaken by the LWEC partnership.

This project has been supported and sponsored in part by the Sciencewise Expert Resource Centre (Sciencewise ERC), which is funded by the Department for Business, Innovation and Skills (BIS). The Sciencewise ERC helps policy makers to understand and use public dialogue to inspire, inform and improve policy decisions around science and technology. It consists of a comprehensive online resource of information, advice and guidance together with a wide range of support services aimed at policy makers and all the different stakeholders involved in science and technology policy making, including the public. The Sciencewise- ERC also provides co-funding to Government departments and agencies to develop and commission public dialogue activities.

LWEC's decision to commission the Advisory Forum signals its appetite for a more exploratory 'upstream' dialogue. By engaging early, and involving the public in identifying research priorities, LWEC and its partners will be in a better place to ensure that they do not

overlook issues of vital concern to the public. The Citizens' Advisory Forum is one method to help strengthen the likelihood that research into environmental change will have an impact on policy and practice, by supporting the alignment of research lines of enquiry with key areas of public concern. The involvement of the Sciencewise ERC has helped to ensure that the dialogue has, as far as possible, been carried out in accordance with best principles.

Objectives of the Citizens' Advisory Forum

The main objectives of the Citizens' Advisory Forum are:

- To inform the strategic development of LWEC's research by helping to identify research priorities and commenting on strategic aims for the partnership
- To identify areas of particular public concern about environmental change, so that the commissioning and communication of research by LWEC, and its partners, can take account of the needs and concerns of society.²

To help meet these objectives we needed to take the following into account whilst scoping and designing the dialogue:

1. Those elements of the LWEC programme still open to influence.

The remit of the LWEC programme is broad. Its research interests encompass climate change, changes in ecosystems, species, landscapes and communities and draws upon engineering, natural, humanities, economic and social research. One of the requirements of Sciencewise-ERC funded projects is that there is a 'hook' of some kind to which the findings of dialogue can be attached and over which they can have influence. The LWEC Directorate took responsibility for identifying those areas of research into which public views might still feed.

2. The possibility that the Forum would continue beyond the three sessions that OPM was commissioned to run

We took this into account by agreeing that each session should focus on a different research area. This would enable the Forum's work to contribute to more than one of the LWEC programme's areas of interest. If further discussion of the themes was thought to be necessary, there would be scope for this in future session.

The research areas agreed for the first two sessions were

- a. Flood risk management (session 1)
- b. Adaptation to climate change (session 2)

The objective of the first two sessions was to understand on which types of research, within these two broad categories, the public thinks that LWEC and partners should prioritise their resource and capacity.

There was scope for the third session to drill down further into the findings on the public's criteria for supporting environmental research. However, between the second and third sessions, LWEC decided that the outputs would be of more value to them if the focus moved

² The original tender specified a further objective, which was for the Forum to offer views on different ways of communicating results and outputs to different audiences. During the design phase, however, it was decided that this objective would be better met through a different channel of public engagement.

away from specific research areas and prioritisation to that of an area which potentially might be developed into a research funding call.

In light of this, the third session was instead designed to explore Forum members' views on the decision-making and governance arrangements appropriate to the challenges we will face because of climate change. This was a more conceptual question than those addressed in the first two sessions, and so we developed some specific scenarios to help them consider the issues raised. The scenarios looked at:

- governance and decision making in the context of scarce resources, i.e. food and water
- governance and decision making in response to the need to reduce carbon emissions arising from transport

Although in this final session Forum members were not asked directly for their priorities for future research, it is envisaged that the findings will be used by LWEC members to shape the research agenda around pro-environmental behaviours.

The table on the following page sets out in detail the key lines of enquiry finally agreed for the three sessions of the Forum and the context from which these emerged.

Table 1: Key lines of enquiry explored during Citizens Advisory Forums, Sessions 1-3

	Focus	Rationale for this focus	Key lines of enquiry	Strategic role in LWEC
Session 1 (November)	Research into flood risk management	<ul style="list-style-type: none"> The risk and impact of flooding in the UK is affected by the impacts of climate change, making this a very important topic for LWEC. LWEC currently consulting amongst the academic community on a UK Flood and Coastal Erosion Risk strategy, to encourage collaboration and co-ordination of research providers, funders and users on the topic of flood risk management. 	<ul style="list-style-type: none"> Which types of research into flood risk management do the public believe are most important for LWEC and partners to prioritise? What criteria inform the public's choices about priorities in terms of research spend on flood risk management? 	<ul style="list-style-type: none"> Public response to key questions within consultation, to which LWEC was contributing
Session 2 (December)	Research into adaptation to climate change	<ul style="list-style-type: none"> The LWEC Directorate is considering a more co-ordinated approach to research into adaptation to climate change, and would welcome greater understanding of the public's concerns around adaptation to climate change LWEC is to produce a climate change research strategy in 2011, of which adaptation will be a major part 	<ul style="list-style-type: none"> What is the public's understanding of adaptation to climate change? Which spheres of research into adaptation to climate change do the public believe are most important for LWEC and partners to prioritise? 	<ul style="list-style-type: none"> Public input into strategic direction for large topic area for research – public potentially influencing key areas needing to be addressed
Session 3 (February)	Decision making and governance in response to climate change challenges	<ul style="list-style-type: none"> The Directorate has identified a potential need for new programmes of social research into questions of governance around sustainable behaviours. LWEC and partners are considering this as an area of future funding, and would welcome public input at this early stage of thinking. 	<ul style="list-style-type: none"> Where should we locate responsibility for responding to the challenge of increasingly limited resources due to the impacts of climate change? Where should we locate responsibility for ensuring we respond to need to reduce carbon emissions? What criteria should inform 	<ul style="list-style-type: none"> Upstream engagement, with public opinion on a specific, potential research funding call

			<p>society's access to and usage of limited resources?</p> <ul style="list-style-type: none">• What approaches to behaviour change are most appropriate in ensuring a response to climate change challenges?	
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Recruitment to the Forum

The LWEC Citizens' Advisory Forum comprises 18 members of the public recruited specifically for the purposes of this project.³ A Forum of this size allows for the involvement of a broad cross section of individuals whilst also being small enough for a positive group dynamic to emerge relatively quickly. This was important, given the range and complexity of the issues to be addressed. The Forum size also meant there was time for all members to engage with the topics, ask questions of experts, and discuss and develop their views.

Members were recruited by a professional recruitment agency, according to a recruitment specification designed to ensure that membership of the Forum was inclusive (rather than representative). Quota were set for demographic factors (e.g. age, gender, urban/ rural location, ethnic background, family situation, housing tenure, working status) and environmental attitudes. The recruitment specification and quota for each variable can be found in Appendix C.

All members were recruited from Bristol, and the surrounding areas: this location was chosen because the population is very diverse.

Designing the dialogue

We adopted a collaborative approach to programme design. The agenda and all supporting materials were prepared by OPM, working with the LWEC project lead and the topic experts. Prior to final sign-off, all materials were reviewed by the Sciencewise ERC dialogue and engagement specialist (DES) working with LWEC on this project. All materials used in the Forum have been made available to LWEC and Sciencewise ERC.

The Forum sessions were designed to be deliberative, enabling members to engage with information provided by experts, by the OPM team and by each other, through discussion and the exchange of views. By using a variety of presentational modes, whole- and small-group sessions, and ensuring Forum members had sufficient time to develop and interrogate their own views and those of other members and experts we supported an increasingly rich and varied dialogue over the three sessions. The diagram overleaf provides an overview of the structure of each session.

³ Members were given a total of £150 incentive for their involvement in the three Forum sessions. Incentives were distributed after each of the three sessions.

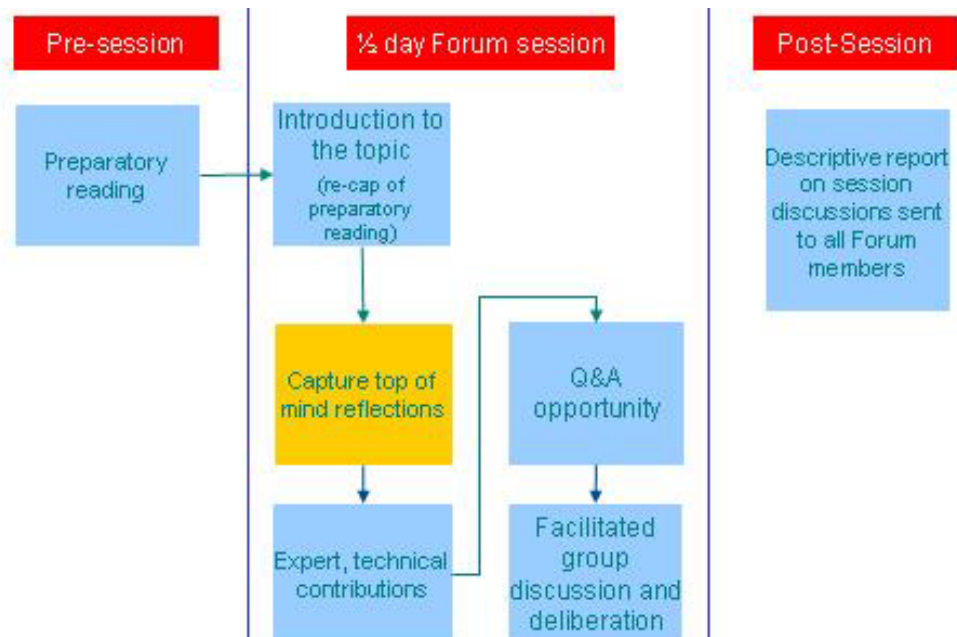


Figure 2. Overview of session structure

In the following sections, we highlight some of the critical factors in the overall programme design.⁴

Expert involvement

Having the right expertise contributing to the programme at the right time was essential. OPM and LWEC worked together to identify the expertise required, and LWEC drew on the resources of their many partners. We looked for experts who had in-depth knowledge of the specific topics being discussed and an interest in and/or experience of public dialogue.

Experts were involved in the design, helping to shape the principal themes and issues for deliberation and the supporting materials. This ensured that information was accurate, and that the design and content of each session were complementary.

Experts were also involved in the Forum meetings, giving presentations, engaging in discussion with facilitators, taking part in question and answer sessions and supporting participants' discussions with additional information, but not leading the direction of discussion or any decisions or agreements reached. All experts were briefed in advance of the session in which they were involved and provided with written information about the Citizens' Advisory Forum and what we were asking of them.

The table below gives details of the experts involved in each of the three Forum sessions:

	Content	Expert contributions from...
Session 1	Research into flood risk management	<ul style="list-style-type: none"> • Researchers from the Environment Agency - Andy Moores - Research Expert, Evidence Directorate: Flooding and Communities - Michael Nye - Research Scientist 1, Research

⁴ Full session agenda can be found in Appendix 2.

		Monitoring and Innovation - Communities and Flooding - Owen Tarrant - Research Expert, Flooding and Communities
Session 2	Research into adaptation to climate change	<ul style="list-style-type: none"> • Researchers from the UK Climate Impacts Programme - Gerry Metcalf - Knowledge Transfer Manager, UK Climate Impacts Programme - Roger Street - Technical Director, UK Climate Impacts Programme - Chris West – Director, UK Climate Impacts Programme
Session 3	Decision making and governance in response to climate change challenges	Transport and carbon consultant – Dr Ben Lane

Preparatory reading

To provide Forum members with an initial introduction to the topics and concepts to be discussed in each session, we sent them some preparatory reading. This material was also seen as a way of disperse any anxiety they may have around their ability to contribute. As such, it needed to be succinct and accessible. Feedback from Forum members in the first session suggested that the majority, if not all, read the background reading and found it useful as a starting point for their deliberations.

Understanding ‘the room’

Good deliberative design provides an opportunity early in any event or activity to gauge the range and extent of knowledge, attitudes and expectations in the room. This provides facilitators with insight into three things in particular.

- First, people’s ‘starting points’, which can then be used as an informal baseline against which to assess the impact of different information introduced into the process or different types of activity
- Second, it allows facilitators to identify people who are finding it more difficult to engage with the discussion and ensure that they are not ‘left behind’, either because they feel insufficiently confident or because they feel insufficiently informed to contribute effectively
- Third, it provides facilitators with insight into how participants are working as a *group* rather than a collection of individuals.

We designed three features into the programme to provide us with this early insight.

1. **Introduction to the topic:** this session recapped much of the material included in the preparatory reading. This meant that people who had (for whatever reason) been unable to read the material in detail prior to the session were not disadvantaged in discussions. It might also have helped to emphasise to Forum members that these were issues with which ‘non-experts’ could engage effectively, as this introduction was lead by OPM, rather than by one of the experts.
2. **Reflective discussion:** Forum members had time to reflect on the topics introduced, express any initial concerns or queries and explore in a little more detail any areas in

which they were particularly interested. Reflective discussion, together with the information recap session, provided facilitators with a broad understanding of the social dynamics in the room and an initial sense of the groups' level and range of knowledge

3. **Principles governing discussion:** following an introduction to the Forum and the role of Forum members, participants spent some time defining a set of principles to govern the way the group would work together. These were re-visited at the start of each subsequent session. Agreeing on these principles helps a group to gain a sense of itself as a whole.

Tools to support activities

In addition to straightforward facilitated discussion and the expert involvement mentioned above, we used a number of tools to support different activities. These included:

- Briefing sheets on a range of topics, to provide participants with straightforward information to which they could refer throughout each session
- Ranking exercise: used in session 1 and 2, to help people rank different types of research in order of priority. In both sessions, participants found this exercise difficult, but for different reasons:
 - In session 1, participants found this quite hard, because they felt they lacked the expertise to make decisions about whether one type of research was more valuable than another
 - In session 2, participants found this even harder, this time because they felt that adaptation was too complex, particularly in the face of uncertainty about nature of future changes, in relation to climate change but also food supplies and the economy
- Scenarios: these were designed to help participants with the more abstract discussions about governance and decision-making in session 3 and are discussed in Chapter 4
- Mapping power and influence: this tool helped people to visualise and hence consider the respective influence of markets and regulation on access to resources and to decide what balance was most appropriate (session 3). The findings from this tool are discussed in Chapter 4.

Keeping in touch

To keep Forum members involved with the process and engaged with the issues in the period between Forum sessions, to emphasise the value of their contribution and to provide them with additional information, we kept in touch with them between the three sessions. This was done via email and by post.

After each session we prepared and distributed brief summaries of the session's findings, and also made sure to follow up on any specific questions or requests (via the topic experts) for more information that arose during the session.

Reading this report

The main section of this report takes an analytical approach, identifying the high level findings. The more detailed findings, setting out the specifics of forum members' deliberations are contained within session specific reports in Appendix A.

The report is organised as follows:

- Chapter 1 looks at the overarching themes that emerged during the course of the discussions as a whole and provides a context within which to position the more detailed findings
- Chapter 2 looks at Forum members' attitudes to environmental research, the types of research they favoured and why and the criteria they used to rank different fields of research
- Chapter 3 explores Forum members' views on communicating environmental research and the importance of targeting the right stakeholders, particularly those with power to ensure that findings are acted upon
- In Chapter 4, we look at how Forum members located responsibility for responding to challenges that we will face because of climate change
- Chapter 5 sets out Forum members' reflections on the criteria which we should use in decision making around access to increasingly limited resources
- In the Appendices to this report are:
 - A: Copies of session specific reports, providing greater detail on the deliberations within each session
 - B: Copies of the agendas for each of the three sessions
 - C: The demographic composition of the forum

1. Overarching themes

A number of overarching themes emerged over the course of the three CAF sessions. These provide a backdrop against which the more specific findings should be positioned. There was evidence that attitudes towards climate change shifted, with a majority of Forum members growing more convinced that it was a real problem to which serious attention needed to be paid. Perhaps inevitably, in discussions about research funding, members referred to the wider financial and political context, and ongoing cuts to public services. The role of the corporate sector in contributing to and/or addressing the impact of climate change was a further recurrent theme. Finally, Forum members' attention tended at times to waver between the task of prioritising types of research and identifying changes necessary to policy and practice, which would ensure that research findings were acted upon. In this first chapter, we describe these four themes and also point to later sections in the report where their influence is discussed.

Growing recognition of the seriousness of climate change amongst forum members

The majority of Forum members accepted the validity of the threat of climate change, understanding that it poses a threat to our way of life, as a society, and that there is a need to respond to this threat in some way. Most were concerned about how, as a society, we will change our behaviour sufficiently to be able to mitigate and adapt to the impacts of climate change. The level of concern did vary amongst the group, but overall there was growing recognition of the seriousness of climate change across the three forum sessions. Members' perception of the level of risk posed by climate change appears to have been heightened as a result of being exposed to more information, particularly data supporting future climate projections, through their involvement in the forum.

A few Forum members rejected the idea that environmental change is anthropogenic and hence can be mitigated by changes in human behaviour. These people framed environmental change as a natural phenomenon, which has occurred for centuries. However, it is interesting to note that for some parts of the discussion, particularly within session 3, these participants were willing to suspend this disbelief and engage in discussions around climate change mitigations. For example, in one group discussion, having listened to an expert discuss potential ways to reduce our carbon emissions, a climate change 'rejecter' contributed actively to a group discussion on the merits of different approaches to emissions reduction, including car share schemes and low emissions vehicles. It may be that the engagement with the topic over the course of three sessions impacted upon her fundamental beliefs around climate change. However, she refuted the idea that her opinions had changed and was quick to point out that she still rejected claims about man-made causes of climate change. This could be because she was unwilling to explore such a change in her belief system in front of her fellow Forum members. However, other explanations are possible – for example, she might know about the detrimental impact of transport emissions on air quality and public health and be willing to discuss reductions in these, without feeling that this commits her to a belief in anthropogenic climate change.

The impact of the current political and financial climate on forum members' opinions

Forum discussions took place at a time of great political and financial instability, during which the UK Government was building up to and then beginning to implement a range of radical

austerity measures in terms of public finances. Discussions around the definition of value within the public sector, and the need to ensure the best value for money is derived from public spend, were widespread at the time of the Forum sessions. The real, potential or imagined impact of public spending cuts were debated and covered extensively in the media. Concerns around environmental research being good value for money were prevalent in discussions across sessions 1 and 2, and are set out below, within Section 2.4. Whilst it is, of course, not possible to say whether or not members' concerns about value for money would have been greater or lesser in a more healthy financial climate, some Forum members did refer to this current climate and the importance of using public money wisely and well.

At the same time, the Government was driving forward its localism agenda which is intended to devolve decision-making power to local level. Whilst this policy received far less media attention than did the cuts, it might, none the less, have had some influence on members' views about the appropriate response to climate change. This issue is discussed in Chapter 4, on governance and decision making.

Distrust of the corporate sector's response to climate change

Forum members were very concerned about the contribution of 'big business' to the causes of environmental change and felt that the corporate sector had failed to adapt to the threat of environmental change, thus placing the public at greater direct risk. This emerged as a theme in session 1, when discussing flood risk. Forum members felt that insurers and developers would need to take a more responsible attitude to safeguarding the public against increased flood risk. However, they saw this as unlikely, given what they knew of private sector organisations and their focus on profits above all. Indeed, this theme persisted over the course of the three sessions, with a number of Forum members choosing to lay the blame for failure to respond to climate change at the feet of the corporate sector.

Forum members' focus on the implementation of research outputs

During all three of the sessions Forum members switched frequently between discussions around their priorities in terms of research, and discussions around their priorities in terms of changes to policy and practice. The speed with which members moved between the spheres of research and the spheres of policy and practice underline the basic fact that Forum members see environmental research to be a tool for the development of policy and practice. In other words, Forum members want to see environmental research that is driven by the need for solutions within policy and practice, and policy and practice that is driven by findings of environmental research. Forum members expressed less support for research that would be exploratory in nature, and emphasised the need for research to have a real and tangible effect on policy and practice. This theme is explored further within Chapter 3 below.

2. Attitudes to environmental research

As noted in the Introduction, in the first two sessions we focussed on specific research areas (flood risk management and adaptation to climate change) and Forum members' deliberated on what research should be prioritised within these broad areas. Throughout the discussions, members recognised that public monies needed to be spent on environmental research and were supportive of continuing investment in this field.

In this chapter, we look at the broad themes that characterised the dynamics of the discussion and impacted on Forum members' discussion of what research should be prioritised. (For more detail on the specific comments made within each session around flood risk management and adaptation, please refer to the session reports found in Appendix A)

Initially, participants understood environmental research as primarily a matter for natural scientists; however, this view developed through discussion, and they later saw the value in social science research to support behaviour change and systems improvement (e.g., in adaptation of homes to climate change and around wasting less of finite resources) Participants felt too that that uncertainty about the security of predictions about the extent and impact of climate change (and the future more generally) made decisions about what research to fund problematic. This is perhaps a more general issue, relating to research in general and not to just environmental research and linked to insufficient public awareness of the role played by uncertainty in the sciences. Finally, in their discussions of which research to prioritise, Forum members saw more value in research that would generate new information, new and cost effective solutions and focused on the prevention rather than recovery.

What counts as environmental research?

Initially, Forum members appeared to have a narrow definition of the range of activities that constitute environmental research, for which an organisation such as LWEC should be responsible. For example, having read the preparatory reading and heard the initial presentation from OPM outlining the types of research conducted into flood risk management, Forum members expressed surprise at the range of research included. When asked for their opinion on the types of research they wished to see LWEC prioritise, they focused initially on technical research, involving the natural sciences. In session 1, on research to support flood risk management, many Forum members dismissed the need for research in order to improve flood recovery and flood response. While they acknowledged it was important to improve these things, they felt that this could be achieved without any spend on research, just improved communication and practice share:

'What more do we need to know, beyond what we can learn from looking at how emergency services have coped with emergencies in the past?'

These comments highlight the perception amongst the public that 'environmental research' involves technical experiments as opposed to qualitative and social research such as case study research, collation of best practice and stakeholder engagement. This also links the Forum's emphasis, discussed below, on making sure that research resources are rigorously targeted at developing 'new' information, rather than surfacing information that is already known but not widely communicated.

Decisions in the face of uncertainty

Forum members were consistently concerned about the role of uncertainty in environmental research. They saw the extent of uncertainty within the future of climate change as a factor which could limit the value of investment and spend in this area and made decision-making and prioritisation difficult. Forum members concern around uncertainty did vary according to the topic being discussed, and was also impacted upon by explanations provided by experts. Below we have set out the impact of uncertainty as a limiting factor to environmental change, throughout the three forum sessions:

- in the first session, some members argued that there was little value in putting large amounts of resource into forecasting flood risk and the impact of climate change on flood risk *'when they can't predict what the weather will be like tomorrow'*. Having first-hand experience of inaccurate weather forecasts, they saw limited value in investing in research to predict flooding incidents, and particularly in investing in models to understand the impact of climate change on the likelihood of flooding.
- the value of the deliberative approach and, in particular, of the effective involvement of experts, was evident in the way that participants' views on this issue developed. Experts helped Forum members to see how risk is managed and made explicit within flood forecasting models, and also how to understand the difference between weather and climate, and the different types of calculations that are made to predict long term climate change versus short term weather conditions. As a result, Forum members began to give greater priority to research into flood risk modelling. However, it did not alter their view that the value of research into environmental change overall is hampered by the extent of uncertainty within climate systems and with regards to the future overall.
- indeed, the role and impact of uncertainty in relation to predictions about the future was explored again in the second session, in the context of research into adaptation to climate change. Again, Forum members highlighted the extent of uncertainty surrounding future scenarios - in general, and not just in relation to climate change – and suggested that this was a factor that could limit the value of research into adaptation.

'I suppose, for me, it's about understanding what scenarios they are using to plan... Will we be using land in the same way? Will we be able to import as much food? We may not have access to and use of fossil fuels. We will probably be in a very different world in many ways.'

- Within the second session, some Forum members fed back that they found the exercise of ranking types of research into adaptation too challenging to undertake. They cited the level of uncertainty around future scenarios as the reason for their reluctance to take a firm decision around future spend on adaptation. They felt that it was too challenging to identify where to prioritise research given the level of uncertainty around what the future would look like.

The role and value of social research

Many Forum members were initially sceptical about the role and value of social research in responding to the challenges of environmental changes. For example, in session 1, when asked to rank the different types of research into flood risk management, many de-prioritised social research aimed at better understanding the response of individuals and communities to flood risk situations. Members noted initially how challenging it would be to encourage a different response amongst communities who are at risk of flooding:

'I know from working with the scouting movement, trying to get people to step up, it's always hard.'

This response was not immediately challenged by the experts within the session, who provided relatively little information on the impact of behaviour change work in relation to flooding. Therefore, Forum members' first response was that resources should be directed at adapting the natural environment to reduce flood risk, rather adapting the response of individuals and communities.

However, over the course of the two sessions on environmental research, participants' support for social research grew:

- as with the discussion of uncertainty, expert contribution to the process was instrumental in helping participants to think through these issues. Experts within session 2 were more focused on communicating the importance of understanding human motivations in order to achieve pro-environmental behaviour change. The experts from the UK Climate Impacts Programme (UKCIP) emphasised on a number of occasions the importance of social science in encouraging take-up of technical solutions to adaptation. Experts underlined that as a society, we have already many of the technical solutions to be able to adapt to climate change. The challenge now is to ensure that these are implemented. This argument seemed to impact upon Forum members' views and, in the second session on research into adaptation, they prioritised social research to understand behaviour change in response to climate change⁵.
- for example within session 2 there was strong support for social research to understand what factors would motivate landowners and also homeowners to implement adaptation solutions to their property. There was a suspicion that people would be motivated by financial incentives (particularly so for landowners who manage their land for profits, in comparison to homeowners who would resist the upheaval entailed) but also a curiosity to know more about motivating factors beyond the financial:

'Couldn't we pay people to grow new crops, like apricots. That already happens in the EU.'

- some Forum members made useful analogies to the sphere of public health, to encourage others to understand the potential for behaviour change. The example cited below of a successful intervention by public authorities encouraged Forum members to see the potential for research spend to better understand public motivations and decision making processes.

'If you can get people to stop smoking, you can get them to not pave over their garden. Surely.'

- another example of public information and public messaging that has had positive impact upon healthy behaviours was offered within session 3; that of the '5-a-day' government campaign to encourage people to eat five portions of fruit and/or vegetables a day. The popularity of the campaign was remarked upon by many within the discussion.

As a result of the input of experts and forum members in setting out the potential gains to be made from behavior change, and thanks to Forum members' increasing familiarity with the

⁵ This shift around the perceived value of social research may also be in part driven by the specific focus of session 2, on adaptation to climate change. Session 2 posited the idea that some degree of climate change is inevitable, and therefore the emphasis must be on responding to change.

idea of social science as a legitimate element of LWEC's undertakings, support for this type of research grew across the course of the first two sessions. Indeed, by the end of session 2, some members were proposing detailed social research by region, to allow policies to take into account the variation in cultures, attitudes and behaviours across different communities.

'We need to look at local areas, everyone is different, so you should know that they're going to react different ways in different areas.'

It is interesting to note that social science aimed at eliciting behaviour change requires considerable demystification and explanation in order to be considered as a legitimate spend. It could be assumed that social science is more easily accessible by members of the public, since it does not rely on understanding of physical sciences. However, it may in fact be that the reverse is true, and this type of research appears counter-intuitive to members of the public who assume that their behaviour is less open to influence than research may suggest.

Prioritising research spend

During the first two forum sessions, Forum members were asked to comment on the value of different types of research within two fields; flood risk management (session 1) and adaptation to climate change (session 2). They were asked to indicate which types of research they felt were priorities within these two fields. Participants used a number of criteria in their discussions and in their decisions on the priorities for research spend and investment. These are presented below in order of apparent importance to the Forum, starting with the most important.

We should note that we have identified these criteria in the course of our analysis of the discussions. They were neither referred to explicitly as criteria during the course of discussions and have not been tested with Forum members. It would perhaps be valuable to return to this issue in future Forum sessions to understand which of these are paramount, and which criteria are most consistently applied by the public when evaluating different spheres of environmental research.

- Potential to prevent disasters

Forum members were keen to prioritise research that could contribute to the safeguarding of people and communities from the physical threat of extreme weather events and climate change.

During the initial session on research into flood risk management, Forum members' discussions centred heavily on a preference for research that would 'prevent' flooding, or reduce the risk of it occurring. This led them to favour research into the improvement of flood defences and flood risk systems, so as to limit the potential impact of flooding, in terms of physical damage, emotional distress and financial cost. Whilst some Forum members saw flooding as inevitable, others argued that with increased knowledge and understanding of flood risk patterns and defence systems we should be capable of reducing the frequency and extent of flooding. Amongst these individuals there was a persistent perception that research should be used to 'prevent' flooding, rather than to respond to its impact, to ensure that communities are protected as far as possible from the effects of flooding. Some members also believed that prioritising research to prevent and reduce flood risk would be a cost effective strategy. Having heard information around the cost of flood recovery (which surprised many Forum members), they remarked that investment in flood prevention would surely be less resource intensive than paying for the clean-up operation.

'It's better to stop the flood happening in the first place, and then you don't have to shell out for the cost of the impact.'

It is important to note that forum members were not provided with detailed information on the cost of flood prevention, which may have affected this initial assessment of cost effectiveness.

Forum members felt too that research into flood risk management should aim to support communities in areas at most at risk of flooding. Although there was, as noted above, more limited support for research into developing flood response and recovery systems, where Forum members did prioritise this type of research, they noted that it should aim to protect the most vulnerable members of communities, i.e. the elderly and the young.

The same preference for research to support the prevention of natural disasters played out in session 2. Some Forum members expressed a preference for research into adaptation of land use as opposed to the adaptation of infrastructure or buildings. They felt that there was a greater risk attached to not 'getting this right', arguing that if land is used inappropriately it can lead to 'disaster' situations where people's lives are put at risk (e.g. from extreme weather events), or forcibly and significantly altered (e.g. through a mass evacuation and relocation of people). They saw research strategies to prevent such situations as a priority.

In session 2, many Forum members ranked research into adaptation of natural resources as a lower priority. They felt that it was less important to invest in adapting natural resources, such as flora and fauna, than it was to safeguard human life. Encouraged to think about the ways in which natural resources support human life, Forum members acknowledged that some natural resources (e.g. water) were essential to human life and would need to be protected via adaptive measures. However, beyond water, many members stated that the value of the natural world upon human society can often be intangible and therefore is not the greatest priority for research⁶. It should be noted that there was little information provided by experts within their presentation to counter this assumption. Detail on the ways in which biodiversity supports human life may have encouraged forum members to prioritise this type of research differently.

- Potential to produce new information and new solutions

Forum members were aware of the resource constraints within the sphere of environmental research, and of the threat of particular constraints in the current context. With this in mind, they were keen that as far as possible, policy and decision makers made full use of existing knowledge and resources, including research conducted within other countries.

For example, in session 1, Forum members engaged in a critical debate with one of the experts around the value of continued investment into flood risk modelling. While Forum members acknowledged that understanding flood risk was an important element in risk reduction, they questioned whether future spend would produce only diminishing returns. They wanted to understand from the expert whether existing models are a sufficiently good basis on which to make necessary decisions. Forum members asked:

'At what point will the models be good enough?'

⁶ It should be noted that some forum members underlined the need for biodiversity, and expressed more support for research into the adaptation of natural resources. Indeed, one member suggested the need for greater public engagement specifically on this issue in order to encourage people to understand the real trade-offs being made if we fail to protect species from the effects of climate change.

They were keen to know that research resources were being spent where there were most gains to make in terms of flood risk management. In response, the expert identified areas where further spend had the potential to improve our long term planning and short term flood risk systems, thus convincing members of the value of this research. This discussion underlines very clearly Forum members' insistence that research should produce new and valuable insights and, where possible, existing information (such as models) should be used in preference to 'research for the sake of research'.

A further example of this insistence arose within session 2. When questioned about the need for research into adapting our emergency services to respond to new climate challenges such as heat waves, forum members pointed out that other countries would have research findings on this particular challenge. They felt that making full use of research conducted internationally would help to ensure that research budgets were spent on projects that would lead to new information and new solutions. These comments signal Forum members' belief in the importance of the coordinated sharing of research outputs, to ensure the most effective use of research spend and investment.

- Potential to produce cost effective solutions

Again, with a view to the current restraints within public finances, forum members were keen to emphasise the need to prioritise research that will inform and help to shape cost effective solutions to the threats of climate change.

For example, within the discussion around research into flood risk management, forum members were keen to prioritise research into flood defences, since they saw a direct link between flood defences and safeguarding communities. However, they were also made aware, by experts, of the cost of building flood defences such as flood walls and dams. In response they felt that research needed to focus on new, more innovative and cost effective flood defence solutions, such as permeable paving materials to support surface water drainage.

Some members also underlined the need for research into the effective maintenance and updating of flood defences, to ensure that local authorities who have already invested large amounts of money into flood defences are supported to get the best value for money from their assets.

Similarly, within session 2, forum members highlighted the importance of research into the adaptation of key pieces of national infrastructure on which we depend as a society, e.g. communication and energy networks. When informed by experts that many solutions to the adaptation of the national infrastructure are highly cost intensive, forum members responded by emphasising the need for cost effective adaptation solutions. Members feared that in the current financial climate, and with limitations on public budgets, there would be limited scope for the implementation of costly solutions. They underlined the risk that, if cost effective solutions are not pursued, money spent on research in this field will be wasted by producing solutions that are unfeasible at present.

3. Impact and application of environmental research

Throughout the first two sessions, Forum members underlined the importance of ensuring that environmental research findings are properly considered by those who have the power to take decisions that will impact on climate change. Participants felt that there was value in investing in environmental research only if the wider system is committed to using its outputs and has the necessary resources to do so. The specific audiences they identified included the private sector, central and local government and the public.

In this chapter, we look at the issues discussed and reflected upon by Forum members and their views on how LWEC's research should be managed in order to have real application and impact on different stakeholder groups.

Application of research in the private sector

Forum members felt that private sector organisations should be amongst the principle audiences for LWEC's research outputs, for two key purposes, firstly to ensure they understand the extent of the risk from environmental change and secondly to ensure they have the technical solutions to be able to respond.

Educating the private sector

Before they could (or would) implement proposed solutions for adaptation, participants felt that private sector organisations would need support to better understand the need for change. Forum members highlighted the private sector focus on maximising shareholder profit and argued that private businesses would need to understand the impact that failure to adapt could have on their long term profitability. They felt that private sector audiences needed well communicated research outputs, providing clear data on the extent of future climate change and the extent of the risk.

For example, within the context of research into flood risk management, Forum members noted that information about the relative flood risk in different areas that is provided by in-depth analysis and modelling is only of value if developers are committed to using it, and planning new developments accordingly. Forum members felt that at present, developers are happy to build on land at risk of flooding and indeed they pointed out a number of local examples of where this had occurred around Bristol. While forum members did acknowledge a shortage of land for new homes within the UK as a driving factor behind developers' choices, they none the less felt that a longer-term more sustainable approach needed to be taken by the sector. They argued that private developers needed to be educated about the future risk of flooding, before they were likely to commit to sustainable development on flood plains in the future.

Private sector access to technical solutions

Having heard the experts discuss some of the research into adaptation to climate change, Forum members underlined the need for large corporations responsible for parts of our national infrastructure to have access to this type of information. They felt that business –

and in particular businesses managing essential infrastructure - needed to be told about the solutions developed by LWEC and partners, to ensure that they are aware of how to adapt to climate change within their sphere.

As noted earlier in the report, Forum members thought that research should focus not just on solutions, but also on cost effective solutions. They felt this was particularly important to encouraging take up of adaptation to climate change amongst the private sector. The sector's responsibility towards shareholders and maximising profit meant, participants felt, that they were likely to reject costly adaptation solutions which might impact on the cost of products and services. In line with this, it was noted, for example, that research conducted into solutions for the adaptation of homes and buildings to climate change must focus on producing cost effective measures:

'It's got to be something that can be done cheaply. The cost of new houses is already too high for most people.'

In the opinion of Forum members the uptake of adaptation solutions amongst the construction industry was particularly important in light of the fact that individual homeowners were unlikely to implement any adaptation to climate change for themselves, Forum members felt that the 'retro fitting' of adaptation solutions to houses is unlikely to be popular amongst home-owners:

'I can't see many people wanting to go through the hassle of it. Particularly older people.'

In turn therefore there is a greater importance placed on construction companies to build in the adaption to climate change, to build it into the construction of all new homes. Forum members emphasised that, if companies are expected to implement new techniques in constructing homes for the future which are resilient to the threat of climate change, then technical information and solutions should be available to them. However, not everyone agreed on the need for public research spend to provide these:

- many of the Forum members argued that the private sector should help to fund this kind of environmental research. As well as the construction industry, it was felt that energy, transport and communication companies should all be taking some responsibility for research into environmental change and their response to it. A similar argument was made with respect to transport within session 3. Vehicle manufacturers were said to have responsibility for undertaking research and development into low carbon vehicles.

'If there is any money to be made in this, then the private sector should be funding it.'

- this was an argument given as to why certain types of research should not be priorities for LWEC as a public body. However, in response to these comments from the Forum, experts pointed out that many private companies are already committing large amount of resource and investment into research and development of low carbon, sustainable and climate change resilient solutions. This was welcomed by Forum members.
- for other members, though, distrust of the private sector affected the extent to which they could accept big business's involvement in environmental research. Private sectors' perceived emphasis on profit making meant that forum members were wary of trusting their long term involvement in research and development into sustainable solutions. What if solutions are considered to be too expensive by the private sector? Will these solutions be buried? These individuals went on to argue that it was the responsibility of the appointed public bodies to ensure the appropriate research was undertaken, and where certain solutions and challenges are not being dealt with by private sector research there is a role for the government to play in supporting and stimulating the research agenda.

These comments link to findings discussed in Chapter 4 about the location of responsibility and governance within our response to climate change challenges.

Application of research in government policy and local practice

Developing strong links with national policy makers

Forum members highlighted the importance of national policy development drawing on solid research findings. In one group discussion in session 2, they asked about the extent to which LWEC fed research into the coalition Government's policy making processes. They wanted reassurance that the Research Councils had sufficiently strong links with Ministers and Special Advisors to be able to influence their thinking effectively. Perhaps because they had limited understanding of how policy is made and how evidence is used in policy making, they also had few suggestions about how the links between LWEC and the Research Councils might be improved. More detail on how research is fed through to decision makers at a national level may have allayed some of the Forum members' concerns on this issue.

Supporting a change in practice amongst local authorities

Forum members also highlighted the importance of ensuring that research outputs are sufficiently well communicated to local authorities, particularly given their role in controlling planning and development. These comments were driven by Forum members' beliefs that:

- local authorities are not currently heeding information about flood risk properly and are failing to plan on a long term basis with a flood risk strategy in mind. In response to these comments, Environment Agency experts highlighted the amount of work that is done at the local authority level to implement national data on flood risk into a local strategy. However, it is interesting to note that this did not marry with the perception of Forum members.
- local authorities may lack the necessary resources to be able to respond to the changes proposed by research findings. Members acknowledged that it is not just information and a disposition to act that is required, but the necessary resources. For example, they recognised that coastal erosion can cause severe localized problems and there are areas where the level of risk is known and acknowledged but little is done to respond to the risk. They argued that local authorities needed dedicated resources from central government to enable them to respond better to the outputs of research in this field.

Impact upon behaviours amongst the public

As noted above in Chapter 2, throughout the course of the first two sessions, Forum members became increasingly supportive of the potential to change the behaviours of the public with regard to the environment and climate change and the value of social research to support behaviour change. They thought that data itself – for example, projections of future climate change and its impact - could play a principle role in convincing people of the threat of climate change, and the need for us all to change our behaviour. In the third and final session, some Forum members commented that their involvement in the Forum and their exposure in session 2 to information about future climate change projections had had just this impact on their own perceptions of the urgency of climate change, and the importance of

adjusting behaviour accordingly. Forum members discussed the following points in relation to the use of research in effective educational tools for the general public:

- targeting the next generation was felt to be a priority. Many Forum members, particularly older individuals and those who are parents felt that outputs from research into environmental change should be targeted at younger people. Older members assumed that younger people's behaviours are less ingrained and hence research findings are more likely to have a real impact upon them than on older individuals. (In some cases, this perception was also driven by the individual believing that these issues 'can wait' and that there is a lack of evidence to show any urgency in tackling issues within their generation.)
- in response to these discussions, forum facilitators questioned the group on how far education of the young would bring about behaviour change, given that young people generally have more limited power to change the status quo than adults. For example, a child may well understand the need for sustainable eating habits but they are not generally responsible for a household's shopping or cooking and so will have limited opportunity to put their understanding and knowledge into practice. In response, Forum members acknowledged that education and information should in fact be targeted across age groups
- Forum members also reflected on the specific vehicle and format for research outputs to be used in educating the wider population and seeking to influence behaviour change. One member cited the 'Five a Day' government campaign encouraging the consumption of five portions of fruit and vegetables a day as evidence of the efficacy of succinct, short messages. A number of participants also remarked on the popularity of the recent Channel 4 season on sustainable fishing practices and its effectiveness at highlighting an important environmental issue. Participants felt that documentaries or 'edutainment' were a good way to educate the public on the issues, and that, in addition to working with central government, research bodies should be working with the media to produce accurate, reliable and engaging information to support behaviour change:

'People will tend to watch things on television and then talk about them with friends, so in that way you can get a real movement going.'

- Members reflected that private sector providers should not be given the responsibility of informing or educating the general public on issues of environmental change particularly where their business is implicated in people's behaviours and choices. For example, water companies are well placed to provide consumers with information about how to consume water in a more sustainable fashion:

'They don't really have any interest in helping people become aware of how much they are using.'

Therefore it was felt that this duty falls on publically appointed bodies.

4. Governance of our response to the impacts of climate change

In the final and third forum session LWEC wanted to explore public perceptions of how governance and responsibility for behaviour change should operate in future scenarios where the negative effects of climate change are being felt (e.g. where people have increasingly limited access to resources such as water, food and carbon based fuels). The key questions that were asked were:

- At what level should governance and responsibility for behaviour change sit, ranging from individuals to international decision making bodies?
- Upon what principles should decisions be made about how people access increasingly scarce resources?
- What approaches are most effective in encouraging sustainable behaviours and pro-environmental behaviour change?

Members of the forum discussed these questions in relation to three potential future challenges: 1) reduced availability and access to a wide range of food; 2) reduced availability and access to water; and 3) the need to reduce carbon dioxide emissions from transport to help mitigate climate change.

This section presents a more detailed overview of the findings as compared with sessions 1 and 2. This is largely because it generated comparatively more qualitative data on a broad ranging topic. Participants were able to engage in the debate more quickly as they had direct and lived experience that they could bring to bear, and felt less inhibited by the need to get a strong grounding in 'technical information' provided by experts. They were also more likely to bring in their own political viewpoints to frame their opinions and more likely to reflect on their own personal circumstances, decision-making processes and lifestyles to explore the feasibility of future options for encouraging sustainable behaviours.

The remainder of this section is divided into three parts:

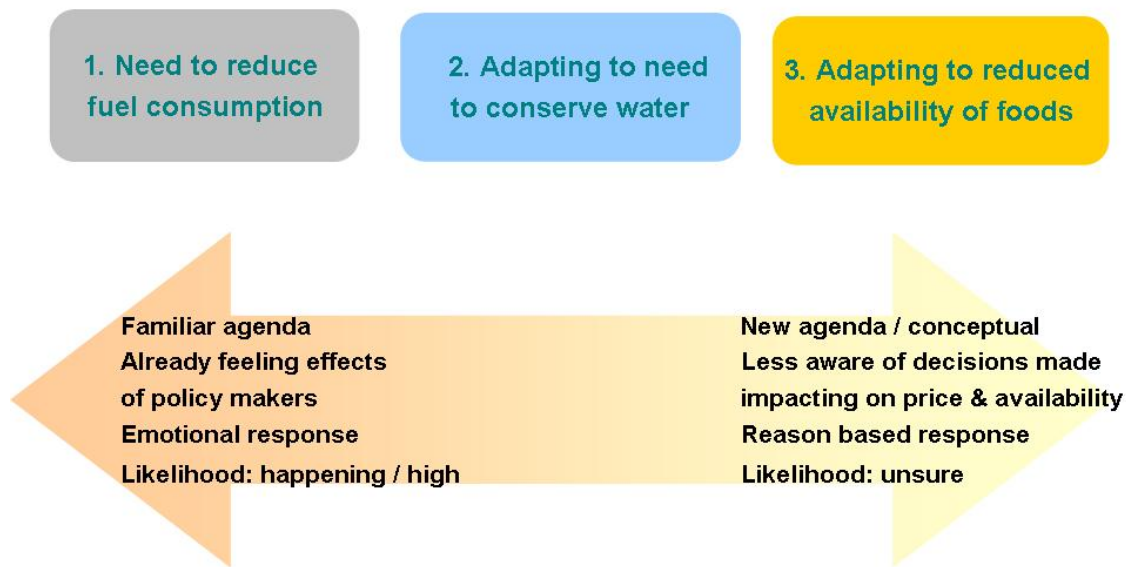
- Assessing the role of individuals in relation to climate change challenges
- Assessing the role of other 'players' and levels of decision-making in relation to climate change
- Ensuring players act together in response to climate change – this explores key findings about the relationships between players, how power should be balanced between different players and how they must be viewed as a whole system that needs to work in coordination.

The role of the individual

Some challenges associated with climate change were perceived as more familiar, more prevalent in popular debate and relevant to everyday life than other potential challenges. Participants felt they were fully aware of the pressure on individuals to reduce their carbon emissions and noted they were already subject to (largely unpopular) levers of influence aimed at achieving this, such as fuel excise duty and congestion charges. Most forum members also had some awareness of drives to conserve water and means to make people more aware of how much water they are consuming, such as water meters, but nonetheless expressed surprise at the extent of the current shortages in the UK. However prior to the

session, forum members had given comparatively less consideration to a potential reduction in food supplies associated with climate change, and were coming to this agenda with relatively 'fresh eyes'. These differences seemed to have an important bearing on participants' emotional response to the topics, how far they viewed behaviour change as achievable, and the extent to which they agreed they had a role as individuals to make sustainable and pro-environmental choices. This is summarised in the figure below.

Figure 2: Mapping climate change challenges



The role of the individual in reducing carbon emissions from transport

This was an issue which elicited an emotional response from participants. Views ranged from strong defensiveness about current patterns of personal fuel consumption and a belief that individuals can only play a limited role in reducing carbon emissions, through to openness to individual behaviour change as an important way to mitigate a very real environmental threat. Those members who were more defensive about their current levels of fuel consumption and more closed to the idea of personal responsibility felt that

- in practical terms individuals were relatively powerless as compared with other bigger 'players' in the system. This was linked to a perception that it is impossible for individuals to make positive choices while other decision-makers, such as government and private transport companies, fail to offer a viable alternative in the form of an affordable, reliable and convenient public transport system. They argued that individuals cannot easily opt out from activities which at present necessitate the use of a car, and individuals cannot easily influence local and national transport infrastructures.
- in ideological terms individuals have a right to autonomy and freedom over their own behaviours, such as choosing when and how often they wish to use their car, go on

holiday, transport their children to school, etc – this was strongly linked to participants' existing political outlook regarding the relationship between the individual and the state.

- there is still some uncertainty around the pace and scale of climate change – therefore it is very difficult to know what a proportionate response looks like at this stage.

Those who were more in favour of individuals having a strong sense of personal responsibility for acting in a sustainable and environmentally conscious manner emphasised

- their appreciation of people's ability to adapt their behaviours to a changing world. One older member of the forum noted how patterns in car use had changed dramatically over the course of his life time, from a time when car use was limited because car ownership was unaffordable for most working people to a position now where it is a 'rite of passage' expectation for most teenagers. It would not be impossible for this to change once again.
- their faith in people to 'act responsibly' if they are fully informed about why they need to change their behaviours, what the benefits of making 'positive choices' are and what the consequences are of not acting responsibly (such as a negative impact on future generations). They felt that people had the capacity to behave in more environmentally responsible ways, much in the way that they increasingly adhere to socially responsible behaviours like not drinking and driving. It was noted that people are more likely to 'do the right thing' if they feel they are not acting alone, and if they feel they are being actively supported and enabled to make positive choices by other players in the system (such as government and private businesses). It is also important that they trust these supporting players to be acting responsibly and not in a mercenary or self-interested way. The role of public education, information provision and an informed public debate was cited here as an important means to emphasise personal responsibility and stimulate responsible behaviours.

Members' views tended not to shift in response to hearing new evidence and the arguments of others within the time made available for this debate. This suggests that there is a greater potential for deep seated views to be held on a politicised and familiar topics of debate that receives frequent attention in the media. It also suggests that forum members were less willing to identify the individual as being a key decision-maker responsible for behaviour change in cases where they have been subjected to seemingly unavoidable and punitive measures (such as high fuel prices) without feeling like they have been engaged in full debate on the rationale behind that measure and other options that could also achieve the desired behaviour change.

The role of the individual in adapting to the need to conserve water

Participants were generally more supportive of the need for individuals to take responsibility for changing their behaviours to use water responsibly, and less defensive than they were about fuel consumption. This was linked to the recognition that *'you need water like you need air'* and therefore a collective response to ensure fair access for all was considered a 'must do'. Furthermore changes such as installing a water meter and paying for what you use were seen to be relatively unobtrusive to one's way of life – consequently there were some within the group who recommended water meters should become standard in the future. There were also concerns amongst the group about the impact of metering on large families on low-incomes, but it is interesting to note an emphasis amongst the group on individual responsibility for responding to limitations in supply.

It is also worth noting that none of the participants had recent experience of individual choice being taken away from them (e.g. through a hose-pipe ban) or 'heavy handed' imposition of

measures designed to reduce their water consumption. Furthermore, not everyone within the group paid the bills for water consumption within their home, meaning that they were new to considerations of price and consumption levels.

As with carbon emissions, forum members called for an increased level of information for the public to support them to understand the rationale for using water responsibly and to motivate them to change their behaviours. Forum members were surprised to read and hear the extent of the current water shortage in the UK as detailed in the information provided to them at the beginning of the group discussion. This points to a potential lack of education around the issue of water as a limited resource. Members noted that they would welcome meaningful guidelines on what is 'normal' and what is 'atypical' in terms of water usage. This links to the point made in relation to carbon emissions about people not wanting to act alone and wanting to be able to benchmark their behaviours against the efforts of others.

Forum members initially suggested that the water companies should be more proactive in informing users about the need to conserve water resources and providing guidelines for usage. However, this suggestion was then contracted as Forum members reflected on the fact that private water companies were not best placed to encourage this kind of behaviour change.

The role of the individual in adapting to the reduced availability of foods

Forum members also approached this topic of debate in a less emotional and more analytical way, as compared to the later debate on reducing carbon emissions. This may have been because people had not considered this issue in depth before, and therefore brought fewer pre-conceived views about the topic to the discussion. Food is still perceived as a relatively cheap and plentiful commodity (unlike petrol) therefore some participants viewed the prospect of limited foods supplies as a longer-term possibility rather than an immediate risk. Therefore they were able to explore changes to individual behaviours without a sense that this would threaten their current lifestyle in the near future.

Although many members of the forum thought that supermarkets were, and would continue to be, the most powerful decision-makers in regard to food supply and consumption, they were also comparatively open to the prospect of individuals becoming more responsible for making pro-environmental choices in response to reduced food supply in the future. For example, they advocated

- individuals changing their behaviour to be much less wasteful of food – they felt statistics on how much food is wasted by the average household was unacceptable and that people needed to move away from a 'convenience culture' to be more respectful of food as a valuable resource. There was some degree of nostalgia for measures like rationing and the recent fashion for 'growing your own' which reinforce the value of food.
- individuals being educated (principally by government and public bodies rather than by the private sector) to be more environmentally conscious and informed consumers. One member cited the success of the 'Five a day' campaign as evidence that individuals can be supported to change their behaviours if provided with simple and effective messaging and information over time.

Nevertheless, it was also noted that there are likely to be barriers and limitations to individual consumers being the main drivers of behaviour change in regard to food consumption. For example, environmentally conscious consumer choices are often only available to more affluent consumers and it was thought this trend is likely to continue in the future. It was also noted food consumption is culturally driven (much more so than water) and individuals are

likely to reject pro-environmental choices if this is in direct conflict with how people wish to enjoy food, express their identity through food and share food with others in social situations.

The role of other 'players'

Beyond the role of the individual, members of the forum explored where governance and decision-making power should lie at a number of other levels, in the context of future climate change. These levels included:

Local organisations (including councils)
Markets, and corporate organisations
National government and regulators
International governing bodies

Forum members were provided with summary information on the current decision-making powers and levers of influence currently available to these players in relation to food, water and transport consumption patterns and behaviours. They were asked to make recommendations on where decision-making powers and influence should lie in the future context of climate change (i.e. scenarios where climate change has presented serious challenges around resource allocation and requires us to behave in more sustainable ways). They also considered the overarching principles and criteria that should be used to inform the decision-making processes of these players.

A table presenting an outline of the findings on perceptions of where decision-making power should lie in future climate change scenarios can be found in Appendix A. The high-level findings that can be drawn from this are that

- local organisations are seen to have limited power at present and in the future – ‘big society’ thinking appears not to have filtered through to forum members’ assessment of where power lies in relation to responding to climate change
- markets and corporate organisations are seen to be too powerful and in need of tighter and more powerful regulation by national and international governance bodies – this links to the Forum’s wider scepticism of ‘big business’ to act in the wider interests of society. Further it was felt that ‘big business’ could not be trusted to provide the level of information and education required to create behaviour change amongst the general public, and this responsibility falls rather to public bodies
- generally there is support for interventions led by national government (who are considered the obvious leaders of issues of this magnitude), but interventions should be designed to be mindful of people’s demand for personal choice and freedom, and not wholly reliant on punitive measures such as taxation – this is particularly important for maintaining trust that government is not acting out of self-interest
- it makes sense for there to be international-level coordination of responses to aspects of climate change that cross national borders (e.g. carbon emissions in the biosphere) and international regulation of globally traded commodities (such as food and oil).

Ensuring players act together to implement effective responses to climate change

A key conclusion reached through the deliberations was that it will not be sufficient for players in the system to work in isolation, even if they were working to a consistent set of criteria for decision making. It was noted that climate change, its impact and our options for mitigating or adapting to its effects are so complex that no one layer of decision making can be excluded from, or have sole responsibility for our collective response. The following quote illustrates the inter-connectedness between different layers that was identified by members of the forum:

'Even decisions which seem individual – like driving your car in a certain way to be green or whatever need some sort of push. You'd need national government to raise awareness and advise people to do this and educate people about how to do this.'

Indeed, awareness raising and education initiatives reaching out to individuals and led by national government (about why and how to behave sustainably, and how to influence other decision making processes such as transport planning) was raised again and again as a key example of where different levels of influence and decision-making need to connect up. Forum members also called for more state interventions which incentivise and help individuals to make positive choices (i.e. structural rather than direct incentives, such as providing an affordable, convenient and reliable public transport system). They highlighted that a more sophisticated relationship between the state and the individual in supporting behaviour change may be needed. In support of this, members noted how the traditional levers of influence such as price increases as a means to curb our use of carbon emitting vehicles have not worked in changing behaviour thus far.

Members of the forum also recognised that people respond emotionally rather than rationally when making decisions about how far they should change their behaviour to adapt to or mitigate against climate change. As such people naturally look to others to assess whether their own behaviours sit within or outside 'social norms', and hold strong beliefs about who should provide leadership and set examples in modelling positive behaviours. This point is illustrated by the following quote:

'Educate the businesses because if they won't change then we won't.'

The majority of members agreed that as a society we need to have a continued debate about the relationships between different levels of decision-making and influence, and a continued review of the balance of power across them. This point was raised as part of their conversations around the need to reduce the power of profit-driven markets and private companies over limited resources and access to 'essentials' such as food (e.g. through stronger state intervention and regulation).

Carrots vs. sticks in promoting a systemic approach to behaviour change: what type of interventions will promote reductions in CO2 emissions?

Forum members were introduced to a range of possible interventions which may work to reduce CO2 emissions from transport, and asked to reflect on which types of interventions are likely to be most effective, including whether the focus be on incentives or penalties, on carrots or sticks?

Given the sensitivity around people's access to cars and personal transport, many participants reflected that it may be more politically viable for governments to offer incentives rather than restrictions. Democratically elected organisations may fear losing their mandate by penalising those

who fail to reduce their carbon emissions. Also, participants underlined that penalties in terms of price rises are not always effective.

'We have seen the lack of impact of price rises on things like cigarettes and fuel already, they don't work on their own'.

However, participants noted that there would need to be a combination of both incentives and penalties.

Where penalties are used transparently, and *'as long as there's a clear argument and reason as to why we're doing it'* they are felt to have a far greater potential to positively influence behaviours. Forum members' emphasis here links to the broader call for greater levels of information and education for the public on the impetus to address challenges of climate change.

Participants highlighted that at present, it is felt to be too difficult for individuals to make a positive decisions to reduce their carbon emissions from transport. A range of factors including the state of public transport, and the nature of capitalist society which deems time as money, continue to favour use of the car. Therefore government should not focus on penalising car use, or incentivising behaviour change, but on changing infrastructures so as to make behaviour change more feasible for individuals. For example, there needs to be greater investment in transport, and a change in attitudes amongst employers who will be able to offer flexibilities (e.g. in terms of remote working) that make employees less reliant on personal car use.

5. Criteria for decision making around access to limited resources

Members of the forum felt that the following criteria were important for making decisions about managing access to limited resources and encouraging sustainable behaviours in future climate change scenarios. These are presented below in order of apparent importance to the Forum, starting with the most important.

- Providing a baseline amount of critical resources

All individuals should have access to a baseline amount of critical resources such as food and water – these are essential resources for living and not just resources impacting on lifestyle. Therefore in an extreme scenario where rationing was necessary, it was recommended that everyone should have access to an equal quantity of food.

'You can even go a few days without food, but you need water like you need air. It's critical.'

- Aiming for equity and fairness

Although access to carbon based transport was not considered an essential resource in the same way as food and water, participants still felt that principles such as equity and fairness should guide potential resource management schemes such as individual carbon allowances (although questions were raised about the viability of imposing such a scheme). This was because carbon based transport is perceived as 'essential' by many to 'secondary means of living' such as engaging in paid employment.

- Flexibility to accommodate greater needs

While equal access to limited resources is the underpinning principle, within this there should be some flexibility for greater allowances according to need. This should only be so when there is a clear cut case, e.g. disabled people living in rural areas may need a greater carbon allowance because alternative means of travel may be closed to them. Some also suggested that businesses should be given a more flexible carbon allowance to support economic growth, while being expected to adapt working practices to reduce carbon emissions as much as possible. More controversially some noted that larger families may need more water and so should have access to affordable water provision, although some felt that having a large family was a personal choice with consequences attached to it and did not deserve special allowances.

- Protecting personal choice and control

Personal choice and control should be protected as far as possible – e.g. if you are subject to a personal carbon allowance, you should be able to spend your allowance how you wish. Although it was felt people should be encouraged to limit non-essential and recreational travel to reduce carbon emissions before reducing work-related travel. However, at this point in the discussion a number of forum members noted that achieving fairness is almost impossible, since almost everyone could be said to have 'special circumstances' in one way or another. One individual made a parallel to the complexities of the benefit system, which does not easily or accurately respond to the needs and circumstances of different people.

'Everyone will have their own reason why they need to use a car more, and it will be a case of whoever shouts the loudest.'

- Rewarding pro-environmental behaviours

There was also some support within one of the group discussions for the idea that individuals who choose pro-environmental behaviours should be rewarded by having a greater allowance to limited resources and should be liberated from some of the restrictions / regulations. However it is interesting to note that this emerged as a possibility within the Forum's discussion around responding to limited food resources, a discussion in which we have already acknowledged (see Chapter 4 and Figure 1) that members were more open to discussions about new ways to approach the challenge.

6. Conclusions and recommendations

Conclusions

Forum members' attitudes to research into environmental change

- Forum members showed support for research as part of the solution to our response to environmental change. Across the three sessions, they emphasised the need for action orientated research, which has a clearly defined purpose and is designed with its application in mind. Forum members also emphasised the responsibility of research bodies for communicating outputs and solutions to relevant stakeholders.
- Forum members commented upon the complexity of the environmental challenges which we face as a society, which they identified as being brought about by a range of interlinked factors. They were also struck by the extent of uncertainty about future scenarios. With this in mind, Forum members noted how challenging a process it is to prioritise research spend in discrete areas. In most cases, this did not mean that the participants disengaged from the process, but that they expressed the need for more information and expertise to be able to set priorities more accurately.
- Throughout the three sessions, members emphasised the need for research within the current financial and political climate to be 'value for money'. To be considered value for money, research should aim to produce new information and solutions, which cannot be obtained elsewhere, and have a strong potential for application and use by principle stakeholders. A primary concern within this context was that research produces cost effective solutions, which are more likely to be implemented at this time of budgetary constraint.
- Forum members felt that the overall objectives of research in this field should be preventing disasters caused by climate events and environmental change, and reducing their likelihood where possible. They did support research with other areas too (e.g., flood response and recovery) but the majority were concerned about the devastating impacts of climate and environment change and keen to see research used to prevent and reduce this risk for communities. There was a perception that this would be a more cost effective approach, a perception that was not strongly countered by expert contributors to the session.

Forum members' attitudes to research into flood risk management

- Forum members expressed a strong preference for research into reducing the risk of flooding in areas where people live, so as to reduce the risk of physical, financial and emotional impacts upon communities. Research that produced accurate flood models and risk analyses and helped avoid development on flood risk areas, and research that improved our flood defences were seen as best suited to the purpose of flood prevention.
- Forum members who saw flooding as inevitable were more inclined to support a greater level of effort on flood recovery and response systems. However, these individuals distinguished between 'learning from past disasters' to improve flood recovery and 'proper' research.

- Forum members were initially sceptical of the value of social research in helping to reduce the potential impacts of flooding, believing that there is limited scope to understand and influence the complex behaviours of individuals. However, this perception was affected by expert information provided throughout the sessions and also challenged by some individuals who cited campaigns such as those targeting smoking cessation, which they felt had influenced behaviour change successfully. Support for research in this sphere grew in line with members' increasingly familiarity with the concept of supported behaviour change and increasingly familiarity with examples of its benefits.

Forum members' attitudes to research into adaptation to climate change

- Forum members were challenged by priority setting exercises around research into adaptation, in part because of the level of uncertainty around future scenarios of climate change, as well as wider social and economic change. They also acknowledged that adaptation was a new angle on the issue of climate change, and one which they had barely considered before, meaning that they felt as though they had less expertise with which to rank research types.
- Consistent with their previous considerations around research into flood risk management, Forum members were keen to prioritise research that could produce information and solutions to reduce the risk of disasters affecting communities within the UK. It was felt that research into the adaptation of land use, and vital resources (e.g. water) was key. With regard to research into the adaptation of land use, the rationale was that if future development is planned with a consideration of the future risk of extreme climate events, this could reduce the potential for human disasters.
- In contrast, many forum members ranked research into adaptation of other natural resources, e.g. flora and fauna as less important. Although there was a recognition of the importance of biodiversity from some members, and indeed from the experts within the session, it was felt by others to not be critical enough for the survival of our society to be prioritised in terms of research spend and investment.

Forum members' attitudes to governance and decision making in response to challenges posed by climate change

- In a scenario where we as a society face the challenge of increasingly limited resources, e.g. limited food and water supplies, Forum members underlined the need to limit the control of market forces. Forum members were nervous about the prospect of leaving the responsibility for the distribution of potentially limited resources in the hands of the private sector and market forces. It was said to be unacceptable to limit society's access to a resource as critical as food simply on the basis of ability to pay.
- Forum members underlined too that profit making organisations were unlikely to encourage new, sustainable behaviours in the face of resource limitations. Members felt as though the private sector's emphasis on profit making is at odds with the need to encourage people to consume more sustainably and less wastefully. As such, Forum members felt the need for state intervention to control for the impacts of climate change, particularly where they threaten resources which are necessary for human survival.
- Conversely, where a potentially limited resource is overly controlled by state regulation, this may bring problems of its own. In the case of water, Forum members felt that government subsidising of water meant that the resource was overly cheap and therefore

not valued enough by consumers, leading again to waste and a failure to adopt sustainable practices. Forum members were nervous about overly draconian forms of state interventions which limit access to vital resources, and sceptical that they would even be possible to administer and manage, but supportive of state interventions which incentivise and help individuals to make positive choices.

- The types of interventions called for by Forum members are those which make behaviour change more of a feasible option. These might be called structural incentives, rather than direct incentives. Forum members emphasised that punitive measures may be politically unwise and counter-productive in some cases, and that so far price increase as a penalty has not been able to curb our use of carbon emitting vehicles. Although the Forum members acknowledged a role for punitive measures, it was felt that overall there is a need for combined systems of incentives and punishments, and more creative solutions.
- Forum members strongly emphasised the need for overall equity and fairness in the distribution of or access to resources which may become increasingly limited. However, there was an acknowledgement of the need to make special allowances for genuine cases of greater need, followed by an acknowledgement of the challenges of making such a system workable in practice.
- Throughout all discussions about decision making on climate challenges, Forum members felt that a key priority for the movement around environmental change was increasing the amount of education and information for the general public. And Forum members implicated LWEC and partners in this task. It was felt that greater engagement with the outputs of environmental research would support the wider public to understand the imperative to act in this area and to make positive and informed decisions about their behaviours. It was underlined that this task should not be left to private sector, and that public bodies have a responsibility to play in creating informed consumers, and informed future consumers amongst the younger generations.

Recommendations

- **Continue to prioritise public engagement**

The Citizens' Advisory Forum has underlined what is already known about the potential benefits for researchers and scientists of engaging more closely and creatively with the public, which can help to generate new perspectives on the issues and challenges we face. As a partner-programme, LWEC can play a role in continuing to encourage public engagement as a priority within the environmental change research and policy community. Indeed, it can support individual researchers and scientists to see public engagement on issues of environmental change as an important and valuable part of their role.

- **Support public engagement at an 'up-stream' level**

The CAF has shown the potential for members of the public to deliberate on research priorities to support the challenge of environmental change. Members were able to contribute to conversations on both current and emergent research strategies. Where research strategies are still emergent, members of the public are able to consider how their own concerns around environmental change will translate priorities in terms of research spend and investment. LWEC should be encouraged by the deliberations of the public, and continue to pursue a public engagement agenda that offers a space for public opinions at an up-stream level.

It is important, however, not to assume that 'up-stream' engagement is sufficient: engaging with the public at this more strategic level is not a replacement for working with them to

implement solutions or discuss the options that research findings might generate. We would encourage LWEC to work with its partners to identify opportunities for effective public dialogue up and down stream. For example, having consulted with the Citizens' forum at a relatively early stage in the development of the research agenda around adaptation, there is now scope to pursue specific lines of enquiry elements in greater detail. For example, understanding motivating factors to encourage public uptake of adaptation solutions would be an area of interest for Forum members.

- **Consider the maturity of an agenda in designing public engagement**

LWEC will need to consider how the maturity of a particular agenda can impact upon the way in which it is deliberated upon by members of the public. Our discussions suggested that where an environmental challenge is felt to be remote and distant, and where research participants' own behaviours are not yet implicated (for example, as was the case in discussions around future limitations to food supplies) forum members can consider a broader range of possible solutions and approaches with greater rationality. This has advantages for exploratory public engagement, which aims to gather a wide range of innovative approaches to an issue, but may not produce reliable indicators of future behaviour patterns.

- **Consider LWEC's strategic partnerships with organisations that undertake direct communication with the public**

A number of Forum members emphasised the value to them personally of their involvement with the CAF. They noted the impact that data and statistics on the impacts of environmental change had had on their perceptions of risk, and their understanding of the need to respond with new behaviours.

In line with this, Forum members emphasised the importance of education around climate change and sustainable behaviours and assumed that LWEC would have some role in disseminating information and encouraging education around environmental change. Considering that LWEC is not in fact a public facing organisation, it may wish to consider its strategic partnerships with public facing organisations to ensure that relevant research outputs are communicated to the public successfully. Forum members wished to see greater access to information and education amongst the general public around all of the topics discussed, and many felt it was particularly important for the younger generation to be the targets for increased education around environmental change. LWEC may wish to consider how far it is able to respond to this call for increased education amongst the general public at large.

Appendix A: Session reports

Session 1: Research into flood risk management

Introduction

The first session of the Living with Environmental Change citizens' forum focused on the topic of flooding and research that is done to minimise its risk and impact. The day consisted of presentations from OPM, LWEC and expert speakers from the Environment Agency, together with group discussions exercises.

Participants were asked to discuss how important they perceived different types of research around flooding to be. The key findings from the discussion are being fed back to LWEC, to help them develop their strategy for flooding research. In the next session (on Saturday 27th November) we'll return briefly to the discussion on flooding research, in order to define a list of factors that drive priorities and decisions around this topic.

Forum's concerns around flood risk

- Generally, the forum participants were interested and engaged in the topic of flooding. They listened to an initial presentation on the causes and impact of flooding in the UK, during which a number of forum people asked questions to further their own understanding. They expressed interest in:
 - Extreme weather conditions causing flooding: *'What is the difference between a tidal surge and a high tide?'*
 - Potential changes to levels of flood risk in the UK: *'Do you get new flood plains in the UK, or do they remain static?'*
 - The quality of UK flood defences and preparations for flood recovery: *'Are other countries better prepared than we are?'*

Focus on financial aspects of flood risk and flood impact

- After the initial presentation, the participants were asked for their general reflections on what they had heard. Amongst the group, there was a lot of surprise at the cost of flood recovery and the impact on the economy. Participants also voiced concern that planners and insurers can often worsen the risk and impact of flooding. They laid some blame on developers for building on flood plain areas, and insurers for then failing to offer adequate protection to those who live in at risk areas. *'You hear of people being left high and dry by the insurance companies'*. Several participants referred to local examples of building on flood plains, e.g. in areas such as Portishead. While participants understood why it was happening (e.g. *'there's no where left to build'*), there was a sense that this needs better management by local authorities and planners, and better collaboration between researchers and policy makers in order to facilitate this.

Forum's responses to research into flood risk management

Opinions on the importance of flooding research

- The forum then moved on to a presentation on the different types of research related to the topic of flooding, and subsequent discussion. Most participants noted that before being involved in the forum they knew very little about the different types of research that

were being done. However, the majority did support the view that flooding is an important area for research investment, particularly in light of:

- The cost of the clear-up and its impact on the 'public purse'. Many participants reflected that they were surprised – even 'astonished' – at the cost of responding to just one flood. If this cost could be saved by better knowledge and understanding around flood risk and impact, then that is a worthy cause.
- The emotional distress and disruption caused by flooding. A minority of participants had personal experiences that they drew on to illustrate this point. For example, one man had been flooded in his car, and said the experience was fairly traumatizing. Again, if research could prevent this emotional distress, then it was felt to be a valid use of public resources.
- In contrast to the above opinion, a significant minority of participants also perceived flooding to be an '*Act of God*' or '*just one of those things*' that affects a handful of unlucky people. Some of these participants also felt that, in general, research around flooding is of limited value since we'll never be able to prevent it completely and it is impossible to prepare for every eventuality.

Need to ensure research is used by local decision makers

- Those participants who were more supportive of flooding research stressed that it is only valuable if the wider system of decision makers (including local authorities, planners, regulators) are also committed to using and implementing the research, and if they have the necessary resources to do so.

Questions about adapting building and development practices

- Furthermore it was also felt there was a need for additional research and focus on the question of how building on flood plains can be made lower-risk. Participants noted that if the demand for affordable housing and cheaper land are not going to go away, then research needs to be invested in adapting buildings to better withstand flood risk. Participants mentioned building houses on stilts in vulnerable areas, and using architecture to design in improved water management, e.g. green roofs and water storage facilities.

Forums' priorities for research into flood risk management

Participants were then asked to rank each of the areas of flooding research according to their level of priority, from most important to least important.

1. Measuring and predicting when and where it will flood
2. Understanding the impact of land shape/type on flood risk
3. Understanding how changes in UK climate and land use can affect water flow
4. Understanding how flood defences can reduce the risk of flooding
5. Understanding the psychology of how people respond to risk of flooding
6. Understanding best practice in flood response
7. Understanding long term impact of flood recovery

Research to understand and predict flood risk/impact (types 1, 2, 3)

Across all the groups, these types of research were said to be important. In no cases were any of these ranked in the bottom three places. Participants were keen to prioritise research in modelling and prediction since they believed that, it could prevent devastating financial and emotional impacts on communities in the UK.

- Increasing confidence in predictions and models

Initially, some participants argued that there's little value in putting large amounts of resource into forecasting and particularly into long range weather forecasting / climate predictions *'when they can't predict what the weather will be like tomorrow'*. They felt they had experienced first-hand the inaccuracies of weather forecasts so they limited faith in investing in this kind of research to minimise flood risk. However, most of the comments of this nature were made towards the beginning of the session. Hearing examples of where forecasting had successfully led to greater lead times for flood warnings had an important impact on participant's views on the value of this kind of research. Also, as participants became aware of the different type of science needed to predict climate change versus the type of science needed to predict short term weather patterns, they began to advocate the value of these kinds of research.

- Predicting when, where and how it will flood helps to make the most of local resources

Discussing these types of research further, some participants highlighted that predictive models would also allow authorities and developers to make the most intelligent use of land available, since they would know where it was relatively safe to build. Similarly, other participants highlighted that food prediction and risk modelling were important in making sure there was a targeted use of flood defences.

- Distinction between impact of climate change and impact of development

One group within the forum were quick to point out that research into the impact of climate change and the impact of development on flood risk should be seen as two very distinct strands.

When arguing in favour of research into the long term impact of development on flood risk, it was mentioned that policy-makers need to manage pressures that could make this problem of development worse (e.g. uncapped immigration).

Research to improve flood defences (type 4)

- Varied opinions on the usefulness of flood defences in the long term

Opinions on the value of this type of research varied significantly. For one group, this type of research was the most important. If flood defences could be developed sufficiently well, then communities (and in particular the most vulnerable members of community) could be protected from flood damage. Similarly, another group placed this as the second most important type of research.

However, other participants were concerned that flood defences do not offer a long-solution to flood risk, since *'you can't keep building higher and higher flood walls'*. In response to this, other members of the group suggested that the priority should be placed specifically on innovative flood defences such as permeable paving materials, which would not cause such disruption to a place or a community.

- Need to understand flood defence maintenance, for best value for money

One group were particularly keen that research into flood defences should include research into how best to maintain and adapt flood defences that are already in place. As flood defences can be very costly assets, there is a need to make sure that public authorities get the best value for money from them.

Research to improve flood response and recovery (type 5, 6, 7)

Participants' confidence in the value of 'social research' to improve responses (of both the general public and of public services) to flood risk and flood events was more limited. During the course of the group discussion (both with and without the experts) confidence in this type of research did increase, but in general, these three types of research were all ranked lower than the other two categories discussed above. (The one exception, detailed below, is 'Understanding best practice in flood response', was placed as a number one priority by one group.)

It is interesting to note that some participants revealed that they only ranked these as less important as they believed they should be 'cheaper' and so should not need to be prioritised in terms of research spend.

- Varying levels of confidence in psychological research to improve public's response to flooding

Many participants were initially sceptical of the value of psychological research. They were of the view that was extremely hard to change people's behaviours, and you were better off putting your resources into understanding and adapting the environment.

However, one participant mentioned the significant shift in people's behaviors around smoking, as evidence of how it is possible to improve the public's response to flood risk.

'If you can get people to stop smoking, you can get them to not pave over their garden. Surely.'

Another participant mentioned the importance of doing local research into how to encourage a better response to flood risk:

'We need to look at local areas, everyone is different, so you should know that they're going to react different ways in different areas.'

- Research into flood response – should be common sense

One group placed this type of research as the most important area for spend and resource. They were of the view that flooding will inevitably continue to happen, so the biggest priority, in order to save lives, emotional distress and financial damage is the quality of our immediate response. The same group wanted to prioritise the protection of the most vulnerable groups in the community, – i.e. the young, the infirm and the elderly. Within this context, it was felt that case study research from previous episodes of flooding could have a lot to teach emergency services about their response.

However for all other groups, this was ranked as a low priority, in comparison to research that might help to *prevent* flooding. It was also felt that flood response should be 'common sense', and it was questioned why emergency services could not learn lessons from other disasters. Nonetheless, some participants recognised that these issues would probably be higher up the list if they had personally been affected by flooding and had experienced the aftermath.

Session 2: Research into adaptation to climate change

Introduction

The second session of the Living with Environmental Change (LWEC) citizens' advisory forum focused on the topic of adaptation to climate change.

The day consisted of introductory sessions led by OPM, presentations from expert speakers from UK Climate Impacts Programme (UKCIP), followed by group Q&A sessions with the experts, and a number of deliberative, discussion exercises.

Participants were asked to discuss their thoughts on the topic of adaptation, and also to reflect on where they think LWEC and its partners should prioritise research in this area. The key findings from the discussion are being fed back to LWEC to inform their future approach. This will help develop their climate change research strategy in 2011, of which adaptation will form an important part.

Forum's responses to adaptation to climate change

Many of the forum members were concerned about the impacts of climate change on our future, and were keen to know more about the ways in which we as a society will need to adapt in order to respond to these impacts. Some of the forum members felt that the discussion around adaptation was more challenging than the previous discussion around flooding, as explained below:

1) Adaptation to climate change is a new topic, about which little is known

Forum members noted that they were more used to hearing about how to limit climate change, then how to adapt to it. While many of the forum members were concerned about the extent of climate change, and talked about activities to reduce their own carbon emissions (e.g. using public transport, recycling etc), few had considered how they might have to change their behaviour in response to an altered climate:

'We all know about being green to stop climate change getting worse, but this is different and probably something we've not thought about much before.'

With adaptation to climate change not being widely discussed, for example, in the media, there was a feeling that if we are to implement adaptation with any success, the profile of the topic needs to be raised.

In particular, some individuals were keen to know how young people are being educated about the need to adapt to climate change. One forum member noted that, in general, people tend to resist change in their lives, but young people are more flexible and respond more positively to messages about change. Therefore it is important that they are educated about climate change's effects from the point of view of adapting to them, and not just limiting them.

2) The uncertainty of climate change makes adaptation difficult to plan for

Forum members underlined the difficulty of making decisions about future adaptation, when there is such a high level of uncertainty about what the future will be like. Participants noted that this uncertainty adds a layer of complexity to discussions on adaptation. In comparison to discussions about flooding, which is already a reality faced by many communities, the decisions about adaptation seem far less clear cut and are dependent on a number of unquantifiable variables.

Indeed, the forum noted that future adaptation will have to respond to changes not only to our climate, but also to other factors, such as availability of resources, the size of our population, etc. Therefore while people accepted the need to look at adapting to a range of climate scenarios, some felt that this was quite a narrow focus for the purposes of the discussion.

'I suppose, for me, it's about understanding what scenarios they are using to plan... Will we be using land in the same way? Will we be able to import as much food? We may not have access to and use of fossil fuels. We will probably be in a very different world in many ways.'

A minority of the group felt that such is the level of uncertainty around climate change that it is unnecessary, and even counter productive to be overly concerned with adaptation to climate change. One participant referred back to the climate in the UK back in Roman times, as evidence of how hard it can be to predict changes in temperature, and therefore how hard it can be to prepare for them.

'In 50-400 BC Britain was much hotter...these things are incredibly difficult to predict.'

3) The need to prioritise adaptation in high risk areas

Despite the obvious difficulties of understanding how best to adapt to future climate change, some participants were quick to discuss some potential criteria for prioritising adaptation efforts. During the group discussions, one group were particularly keen to know whether adaptive efforts would be focussed on areas that are subject to high risk from climate change. Forum members noted that it would make sense to do so. For example, if an area is already at high risk of flooding, it would be sensible to focus efforts to adapt buildings and land use in that area, to prevent future damage and destruction as far as possible.

Forum's responses to research into climate change adaptation

The forum was keen to note that research into climate change adaptation is only of value if it is to be taken account of by key players such as government and 'big business' as well as by the general public. (This message also emerged strongly during discussions in the first forum session on research into flooding.)

And thinking beyond the role of the state and of large corporate players, the forum emphasised the need for further social research on how to convince the general public of the need to take up recommendation, and adapt their own behaviours.

Forums' priorities for research into adaptation to climate change

Participants were asked to discuss each of the following areas of research into climate change adaptation, and to reflect on how important they perceived each of them to be and if possible to rank them in order of priority from most important down to least important.

- Research into adaptation of land use
- Research into adaptation of national infrastructure
- Research into adaptation of natural resources
- Research into adaption of buildings
- Research into adaption of emergency planning

Participants noted that this exercise was particularly challenging since the many of the areas are intrinsically interlinked. For example, how far we are able to adapt to maintain natural resources, such as water and biodiversity, will impact on how far we will have to vary our land use.

This challenge was underlined throughout group discussions, and participants were keen to feedback that therefore all of the areas are important enough to receive funding and resources in the future.

Research to understand climate change adaptation for land use

Amongst forum members there was a strong feeling that adaptation of land use poses some of the greatest challenges for our future. Forum members underlined how challenging it will be to identify a collective approach to adapting land use. How do we change the way we use our land overall? And how do we get others to use land appropriately even if it's not in their immediate interest?

This was felt not only to be a challenging area of research, but also an important one. Some members noted that, compared to adaptation of buildings, there seems to be a greater risk attached to not 'getting this right'. The rationale was that if land is used inappropriately it can lead to 'disaster' situations where people's lives are put at risk (e.g. from extreme weather events), or forcibly and significantly altered (e.g. through a mass evacuation and relocation of people).

One group noted that the value of research into land use is very much dependent on what levers there are to influence decision making in this area. Some noted that much land is privately owned, with a handful of individuals owning large tracts of land. Some were not optimistic about the potential of research to influence change in this area. They argued that changes were unlikely to happen since there are multiple land owners, all looking out for their individual interests.

However, others felt that there is a potential to develop financial incentives and to use legislation to encourage and even enforce change. It was felt that land owners will be enthusiastic about making changes to their land, if they can derive personal benefit from these change, e.g. by growing a different crop that is in commercial demand. For this reason, and also because it offers ways to benefit from a changed climate, not just to survive it, forum members were keen to see continued research into new types of crops for the UK's future climate. Others were keen to see the use of government and EU incentives, and noted that the EU have a tradition of subsidising different types of agriculture:

'Could you pay people to grow apricots? This already happens.'

Therefore, overall, research into this field was felt to be important, only if it could be implemented through the use of various incentives and levers for land owners to take up change.

Research to understand climate change adaptation for national infrastructure

Forum members noted how dependent we are as a society on the travel infrastructure and the energy network in particular, and therefore how important is to understand the need to change and adapt this for the future. In general, forum members were keen for there to be more research exploring not only different materials for building key pieces of national infrastructure, but also exploring different locations to ensure they are protected from risk.

However, members were aware of the significant cost of implementing changes to national infrastructure. For example, a road or railway on stilts might be the best solution but it will be the most expensive. It was noted in one group therefore that current budget restraints may limit the potential of the fruits of research in this area. Rather than de-prioritising this research though, most people within the group felt that research should still be pursued, but with an emphasis on finding cost effective solutions.

In one group the UKCIP expert also introduced the idea that infrastructure is often controlled by competing private entities (e.g. water companies) – who may have more pressing concerns such as their reputation and their profit and share price. However, once again, forum members did not view this as a reason to de-prioritise this research. Given the importance of the national infrastructure in enabling day to day survival of our communities, it was felt to be a state responsibility to ensure adaptation is properly addressed in this field.

In one group, there was particular concern about the unsuitability of current refuse collection and disposal infrastructure for future climate scenarios, e.g. warmer average temperatures. There was a question asked about how much research is being done into this field, and it was felt that a new approach for refuse collection and disposal could address both climate change adaptation and mitigation at once.

Research to understand climate change adaptation for natural resources

Reflecting on the importance of research into adapting our natural resources, there were mixed opinions amongst different groups.

Firstly, some forum members were keen to prioritise research into adapting natural resources, as they felt there was more to lose by being ignorant about changes to our natural resources. Given that natural systems and ecosystems are very complex, if they go wrong it's not necessarily within our power to put them right again. In comparison we can be the 'masters' of man-made adaptation measures like buildings, infrastructure and emergency services and can probably react quite quickly if a mistake is made. Meanwhile, if natural systems go wrong there may be hidden consequences, which cause unforeseen issues.

Other forum members were less keen to prioritise research in this field, precisely because we can never be the masters of the natural world, and it will not be within our control to ensure the survival of a range of species.

Some participants were reticent to prioritise research into this field, since they felt that the value of the natural world upon human society can often be intangible and difficult to measure. In response, other forum members argued that there needs to be research done into how acceptable people feel it is if our biodiversity suffers, and what trade offs people are prepared to make – e.g. would it be acceptable if one specie dies away while another flourishes?

In one group, while they were not convinced of the importance of research into adapting natural resources such as plants and species, there was significant support for research into how we adapt our supply of water to future climate scenarios.

'If we have too much or too little water then human life is at risk.'

One participant noted that we already have the technology to adapt to changes in precipitation and to respond to a more uncertain water supply in the future. He noted that we already know how to store rainfall and therefore to make houses self sufficient in supplying their own water. However, very few people are willing to install and use such new

technologies. This led to a discussion, once again, of the importance of social research in understanding the levers that will encourage people take up adaptation for themselves.

Research to understand climate change adaptation for buildings

Although forum members were interested in the ideas for adaptation of buildings put forward by the UKCIP experts, many felt that there is a limit to the potential of this research, and for various reasons, it should not be an overall priority for LWEC and its partners.

Firstly, it was felt that the potential for research into adapting buildings is limited since people will tend to resist changes to their own homes. Many noted that home owners would strongly resist 'retro-fitting', i.e. where existing buildings are adapted (e.g. by moving power points higher up the wall to reduce their risk from flooding), since it seems like a logistical and financial burden.

On the other hand, though, it was noted that research into how to adapt buildings is still important, as it should inform the way in which future construction is approached. And indeed, local authorities should be a key audience for this research, as they currently hold building regulation and planning powers. And the focus for this research, once again, must be finding cost effective adaptation solutions for buildings and homes:

'It's got to be something that can be done cheaply. The cost of new houses is already too high for most people.'

Although this area of research was felt to be important, it was generally categorised as less important for LWEC, than the other areas of research. Firstly, since the private sector leads on the construction industry, and generates profit from it, it was felt that they should be able to fund research where needed:

'Developers will fund their own research if there's money to be made here.'

Furthermore, forum members felt that this area of research might be less crucial to the survival of our communities, than for example, research into adapting our infrastructure or our natural resources:

'This one's more about comfort in comparison to the other options.'

Interestingly, one participant asked whether there is likely to be a situation in which there is a conflict between building design to save energy (like existing 'eco-buildings') and building design to adapt to climate change. In response, the UKCIP expert noted that increasingly designers and architects will be expected to achieve both. In response the group felt this combination of both adaptation and mitigation is an important focus for ongoing research and experimentation in building design and construction.

Research to understand climate change adaptation for emergency planning

Overall, participants recognised the importance of emergency planning to ensure that we are well prepared for extreme weather events in the future. However, generally there was a consensus that this was not an area to strongly prioritise in terms of LWEC's future research strategy.

Firstly, some doubted the value of research into this field. Participants asked:

'What more do we need to know, beyond what we can learn from looking at how emergency services have coped with emergencies in the past?'

When prompted by the expert to consider that in the future we may need to respond to new kinds of emergencies, such as heat waves, to which we are less accustomed in this country, participants felt that we could learn from practice on other countries, rather than needing to do our own research and investigation.

In another group, forum members noted the need to co-ordinate our emergency response in new ways in the future. They underlined the difficulty of making future-proof decisions in relation to emergency services, noting that decisions which made good sense in the past often do not make sense in a future world. For example, previously hospitals were located in the centres of town and cities, as this made them accessible to the largest concentrations of people in urban centres, and well networked in terms of transport. Now our centres of towns are congested with traffic, this no longer makes sense. This particular issue underlines the challenge of envisaging adaptation solely in relation to climate change. However, although planning an emergency response to this unknown world was identified as a challenge, it was not felt to be a challenge that research could necessarily help to solve.

The UKCIP experts encouraged forum members to think about the role of emergency services in preparing for and not just responding to extreme events. Again, this was not felt to be an area for the significant research, but rather an area for policy decisions and action. Furthermore, one participant felt that emergency services are already making an effort to prepare the public for extreme events, based on the fact that police officers and firemen make visits into schools to educate young people about safety and preventing risk.

It should also be noted that in one group discussion, this field of research was given less priority, primarily because it was felt that emergencies could largely be prevented if the other areas of adaption are properly addressed. For example, if our infrastructure is adapted and improved then we will not have to deal with train crashes caused by extreme weather.

Session 3: Governance and decision making in responding to challenges caused by climate change

Introduction

The third citizens' advisory forum session focussed on how far and by what means we should govern decisions about behaviours in response to some of the challenges posed by environmental change. The morning session focussed on the challenges posed by limited resource availability (specifically with regard to food and water), and the afternoon session focused on the challenge of the need to reduce our carbon dioxide emissions in the context of transport.

The morning session consisted of two parallel discussions. One group was asked to reflect on a future scenario in which food resources become limited, and the other was asked to reflect on a similar scenario for water. In each case, how should we as a society make decisions about the distribution of limited resources? Who should govern (make decisions regarding) our access to limited resources, and what criteria should inform decision making in this context?

The afternoon session took the format of a whole group discussion, punctuated by brief smaller, group discussions. The session focussed on how far and by which means we should seek to limit CO₂ emissions from transport use, reflecting on similar questions to those posed in the earlier discussions on limited resource availability: how should we as a society make decisions about reducing transport related CO₂ emissions? Who should govern (make decisions regarding) allowances for carbon emissions, and to what degree? And what criteria should be used to make such decisions?

Within this session report, we have provided detailed findings from each of the three discussion areas. These are set out below, organised under the following headings:

- Concerns about future availability of resources
- Location of governance and decision-making in the context of limited resource availability
- Criteria to be used when deciding upon access to limited resources

We have also provided an analysis of forum's overall perceptions of where governance and responsibility should lie in future climate change scenarios – please see page 56. For a higher level, conceptual analysis of the findings from this session and an overall picture of forum's understanding of governance and decision making in response to, please refer to Chapters 4 and 5 of the report.

Scenario A: Reduced availability of foods

Concerns about future availability of food

Although participants did not envisage a future in which food was severely limited as likely, many were all conscious of recent rises in food prices. One participant pointed out that food prices are set to rise even further, in line with the price of fuel. And while the availability of food in the future was not felt to be a major concern, participants were aware that the plentiful supply comes at a cost. It was underlined that intensive farming practices are needed to maintain food availability at the affordable prices we expect. The group reflected on what could be changed within the system to allow for more sustainable farming practices and therefore a more sustainable food supply⁷.

Participants were quick to point out that there is considerable waste within the system, and scope to reduce this waste. Firstly, supermarkets are responsible for considerable amounts of waste, choosing not to stock produce that does not conform to strict restrictions on shape/size/appearance⁸, and secondly individuals do not consume all the food they purchase, throwing a proportion of it away once it has passed its 'best before' date. It was felt that the current level of waste could be reduced, both by consumers and by supermarkets. In fact, during the initial conversation, participants placed the onus upon supermarkets and those regulating supermarkets to bring about a transition to more sustainable practices in food production and food trade to avoid a scenario whereby we as a society do not have enough to go around. Supermarkets were described as having too much power and a lack of regard for sustainability of food supplies, which if left unchecked will impact severely on food availability in the future.

Locating governance and decision making power in the context of limited food availability?

Throughout the remainder of the discussion, the group focussed on avoiding waste as the means through which we will respond to and limit the impact of reductions in the availability of food as a resource. Below is a summary of the different levels of roles in terms of

- Reflections on the role of the market

The consensus amongst the group was that the challenge of responding to an increasingly limited food supply cannot be left to market forces to regulate. An outcome whereby only those who can afford to pay for increasingly expensive food is not seen as satisfactory. The population as a whole needs to be able to access sufficient food, both in quantity and quality, to get the nutrients they need to stay healthy. This issue was said to be particularly important for young people, who need to be protected and require a guaranteed food supply of sufficient quantity and quality.

⁷ It is interesting to note that participants were being asked to reflect on a scenario in which food supply is limited, yet they tended towards a discussion on approaches to mitigating the impacts of reduced resource availability, rather than adapting to them. This echoes the difficulties experienced by participants in session two of the forum in discussing the scope for adaptation to rather than mitigation of climate change.

⁸ Although supermarkets stock decisions are likely to be based on public perceptions, forum members were quick to lay the blame on this aspect of waste within the system on supermarkets themselves

'Food's really important for young people in particular, who need the right types to be able to grow up safely and healthily.'

Forum members remarked that if the challenge of limited food supplies is left up to the market, supermarkets will retain too much power in the equation. Left un-checked, supermarkets will carry on with unsustainable production methods. The group reflected that supermarkets, as profit making organisations, will prioritise cheap and therefore unsustainable practices in order to satisfy share-holders. With an emphasis on profit making, supermarkets will not encourage consumers to waste less, and this is needed in order to make sure that we make the most out of increasingly limited food supplies.

- Reflections on the role of the individual

Asked whether or not as food prices continue to rise, consumers will naturally begin to waste less, participants were sceptical:

'I'd like to think we'd all be conscientious enough to respond to the scenario, but don't think we would.'

Although the group reflected that it cannot be left entirely up to consumers to waste less, there was a feeling that individuals should still retain choice and autonomy over their purchasing and consumption patterns. And education was felt to play an important role in encouraging individuals to understand the need to change behaviours, without being mandated or forced to. Indeed, amongst the group there was a strong belief in the power of education to convince people of the need for behaviour change around food. *'Start at grass roots'* urged the forum members, noting that the key challenge is to get the younger generation to understand the effects of a limited food supply. It was noted that an entire generation who grew up during the war and under the effects of rationing all understand ways to minimise waste and maximise a limited food supply. It was felt that the same imperative needs to be given to young people at school today.

Reflecting further, participants acknowledged that educating children can necessarily only have a limited impact, since it is the adults who purchase and prepare food, and young people will take their lead from their parents and the environment in which they grow up. Therefore there needs to be a focus on adult education too. Moving the debate forward, participants cited examples of recent educational campaigns around healthy and sustainable eating, which evidence the power of education, and the potential for it to encourage behaviour change, amongst an adult audience. One participant cited the success of the government campaign 'Five a day' (encouraging the consumption of five portions of fruit and veg a day) as evidence that government can effectively change behaviours through public messaging. A number of participants also remarked on the popularity of the recent Channel 4 season on sustainable fishing practices, as evidence of the public's appetite for and interest in issues of sustainability around food. The group noted that documentaries or 'edutainment' are a good way to educate the public on the issues, and can effectively prompt behaviour change. However, these comments were caveated with the warning that the responsibility for education and encouraging behaviour change should not be left up to private sector media organisations, and the government should take the lead in encouraging greater awareness of the need to waste less and adapt to changes in our food supply. .

- Reflections of the role of local level organisations

The group recognised the importance of local action in response to the need to provide sustainable food supplies. Indeed, it was felt that an increase in locally led food initiatives would provide resilience against fluctuations in global food supplies, thus mitigating the risk

within the UK to limitations in food supply. There was also emphasis on the importance of planning decisions, which are taken at a local level, in blocking the on-going expansion of the supermarkets and protecting the viability of local, independent shops.

However, forum members noted that the impetus to act in response to a limited food supply is more likely to come from a national level, with local organisations acting in response to decisions taken at a higher level.

- Reflections on the role of national bodies, and central government

According to the forum members, the greatest responsibility for decision making and action in response to limited food supplies, however, lies with the government at a national level. Indeed, there was an assumption that the greater the shortages, the more likely the government is to intervene and get directly involved in the business of distribution and ensuring equitable distribution. Responding to the current level of threat, there was a strong feeling that the government should intervene to regulate supermarket chains to ensure they transition to more sustainable business models:

'Someone like the Office of Fair Trading should take a harder line against supermarkets to ensure their practices are sustainable and not wasteful.'

However, one participant questioned whether in fact it was too late for the government to step up to this issue:

'Haven't supermarkets already been allowed to become too powerful to be regulated?'

One participant took the theme further stating that issues such as resource availability would only really be addressed by a whole scale economic reform, to remove the impetus for economic growth which encourages unsustainable production and consumption.

'The government's constant focus on economic growth gets in the way of the messages they are trying to give about environmental behaviours.'

Broadly, the group felt as though governmental taxation on food was not an appropriate lever to pull to control access to this resource. The group initially noted that if taxes were to be used, they should only be placed on non-essential foods. This then sparked a debate about which types of foods are deemed non-essential. For example, one participant felt that meat should be deemed an essential, while others noted the carbon intensive nature of meat and the consensus that as a society we could and should consume less. This conversation highlighted the cultural differences which impact upon food consumption, and will be important to consider in any future efforts to influence consumption behaviours.

Finally, participants advocated a change to current regulations that seem to promote waste within the system. Regulations on 'best before' dates were framed as overly cautious and hence wasteful, leading to the disposal of tonnes of food that would actually be fit for consumption.

- Reflections on the role of international governing bodies

It was highlighted that international organisations need to play a role in co-ordinating the response to future limitations in food supply, precisely because (some) foods are currently traded as internationally and therefore there is a global inter-dependency over food. Indeed, one participant suggested that there is a need for an international response now, in order to switch to more sustainable food production.

Individual countries would be encouraged to switch to sustainable farming practices if they

were part of a global movement. Otherwise countries are prohibited from implementing more cost intensive, sustainable farming practices because they lose their competitive price on the global market.

Scenario B: Reduced availability of water

Concerns about future availability of water as a resource

Participants acknowledged that prior to the discussion session they had not considered future scarcity of water as a threat. One participant who lived with their parents, and therefore had never paid a water bill, had little idea of the basis on which consumers accessed water. Others recognised water scarcity as an issue elsewhere, in other countries (e.g. in Australia where some have friends and family), but had not considered its relevance in the UK. Indeed, Forum members were shocked, for example that the water resources available (per head) in the South East of England amount to less than is available in Sudan.

Where should responsibility and decision making power sit in the context of limited food availability?

- Reflections on the role of the market

There was a general reflection that at present water is too cheap a resource, and this encourages and enables unnecessary amounts of waste. Generally the group felt that a rise in the price of water would support more responsible use and help to manage supply limitations. For example, the prospect of increased metering was welcomed by many in the group.

'Doesn't it all just come back to the money. The only reason your parents tell you to turn the light off, is because they know they'll get a big electricity bill, and the same should be true for water.'

Indeed two participants (both retired) had already moved to a metered water system and acknowledged that it saved them money as well as saved water.

'Water price needs to be a more important factor so we take more notice of it.'

Participants also questioned how far decisions that affect water distribution should be allowed to be taken by water companies. These are now private sector organisations, which should not be allowed to profit excessively from peoples need for a basic resource such as water. Indirectly participants emphasised the need for regulation and control of water companies by bodies such as OFWAT.

- Reflections on the role of the individual

The group recognised the need for individuals to make positive decisions about their use of water. Participants emphasised the need to educate the population on the risk of future water shortages, and to demonstrate the implications of wasting water. Participants would welcome more guidelines on what is normal and what is atypical in terms of water usage. The group noted that at present, individuals have very different views on what is an acceptable level of water consumption – e.g. where one person thinks a bath everyday is reasonable, another person will think that a shower every other day is reasonable. Participants noted that differences may be generational and linked to whether or not you directly pay the bills.

- Reflections on the role of national bodies, and central government

Aside from regulating water companies to ensure they do not act unfairly in pursuit of profits, participants did not see a big role for government in responding to limitations.

Participants rejected the idea of rationing, partly because water is so important to daily life and therefore consumers need to be able to make their own choices about consumption, and

partly because the notion of rationing appears to be overly 'alarmist' and could unnecessarily affect people's morale and sense of liberty:

'Rationing is a dirty word – it makes you think we're in dire straits.'

'Self-rationing is better. If you've got rationing from a body above you, that's different. And I don't see our society working like that.'

The role of central government should be around developing new pricing models and modes of access which effectively limit consumption. As well as pricing, the group considered other changes to models of access which would prompt an increased awareness and understanding of the importance of water shortages. For example having a stand pipe, from which people accessed water would remind people of the need to manage their use.

Participants also highlighted a role for central government in reconsidering quality standards for water, such that as a society we could make more effective use of grey water.

- Reflections on the role of international governing bodies

This group did not consider there to be a key role for international governing bodies in responding to potential limitations in water supply, in part because water is not internationally traded, at present. Forum members were focussed on how to face the challenge within the UK, and were not focussed on tackling global shortages.

What kinds of criteria should be used when deciding upon resource distribution/allocation?

Forum members noted that water is unlike other resources in that it is critical to human survival:

'You can even go for a few days without food, but you need water like you need air. It's critical.'

Therefore there was an emphasis on ensuring that everyone had access to the basic amount required. While some felt that it would be important to make allowances for examples of greater need levels, Forum members disagreed on what these might be. For example, people disagreed as to whether having a large family conferred the right to a larger allowance of water. Some pointed out that having a large family is a personal choice, the repercussions of which should not be borne by society at large. Beyond that, the group did not define specific criteria which would affect the overall distribution framework for water as a resource.

Scenario C: Reducing levels of carbon emissions from transport

Overall, there was real appetite amongst forum members to deliberate on the ways in which we will reduce our carbon emissions from transport. Indeed, the discussions around governing behaviours in relation to carbon emissions were more heated than those in relation to food and water during the morning and people drew more extensively on their own behaviours. Forum members noted that the need to reduce carbon emissions is already having a material effect on peoples' lives, principally in the form of fuel excise duty, which attempts to reduce the amount people use their cars.

Where should responsibility and decision making power sit with regard to reducing carbon emissions?

- Reflections on the role of market

In general, participants felt strongly that the issue of reducing dependence on carbon emitting transport cannot be left to market forces. One individual disagreed, pointing out that when cars were significantly more expensive than they are today, fewer people had them. However, in general forum members felt that the market would be incapable on its own of reducing our carbon intense transport dependency. Some members pointed out that fuel excise duty has only had a minimal impact on our transport choices, and so in general price rises are not the most effective lever to alter our behaviours around fuel consumption.

Furthermore, one participant pointed out that it would be imprudent to rely on the price of oil rising to such a level as to be prohibitively expensive (through the effects of decreasing supply and rising demand), since by the time we reached this point we would already have done irreparable damage to the environment through CO₂ emissions.

However, the market is not exempt from any responsibility in terms of reducing carbon emissions. Indeed, participants reflected that the private sector should lead on developing greener technologies that will reduce our need for behaviour change. And at a local level businesses should be incentivising consumers to reduce carbon emissions from transport, e.g. by encouraging employees to choose greener cars with smaller engines:

'Educate the businesses because if they won't change then we won't.'

However it was felt that companies would need to be encouraged or enforced to act in this regard by a national force.

- Reflections on the role of the individual

Forum members noted that even in an increasingly regulated system, there will need to be a recognition of the importance of decisions that individuals make regarding their use of transport. For example, if there was to be an introduction of personal carbon allowances, then individuals would have the capacity to choose exactly the way in which their allowances was used, including the option to trade whatever carbon is not used.

However, forum members also felt that with regard to the issue of carbon emissions, an individual's decision making power is already limited, given the power of oil companies and the international nature of the product. Further, individuals cannot easily opt out from activities which at present necessitate the use of a car, and individuals cannot easily influence the infrastructures on which they would otherwise need to depend without a car –

e.g. public transport.

- Reflections on the role of local decisions

There were varying degrees of comfortableness with the idea of local interventions. There was a natural assumption that some practical interventions to support carbon reduction are traditionally co-ordinated at a local level - e.g. local public transport. But overall there was a lack of emphasis placed upon local decision making in this context.

- Reflections on the role of national bodies, and central government

In lieu of the market, there was a strong avocation of state intervention:

'Traditionally we have a laissez faire attitude to things, this is one issue that we need to act upon. We need to act now in fact, but we are not.'

However, interventions led by the state need to be more innovative than just taxation, which on its own is not enough to bring about the required level of behaviour change. Some participants did fear an overly 'draconian government' which controlled individual behaviours, but in general participants noted that it must be the government that acts to make alternative, lower carbon options, feasible.

- Reflections on the role of international governing bodies

The group underlined the need for some decisions about carbon reductions to be made at an international level. Carbon emissions affect the biosphere as a whole, so they should be regulated by a global partnership. And furthermore, there needs to be an international consensus in order to guarantee a state by state response. Individual countries are unlikely to act alone, not least because it may reduce their ability to compete at a global level.

Overall, it was noted that such is the complexity of the challenge to reduce carbon emissions as a result of transport, no one layer of decision making can have greater legitimacy than any other. They went as far as to make the following observation in relation to improved provision of public transport and other alternatives to car use:

'The ones [interventions] that stand out for me are the ones that give a real alternative to using your car ...which there isn't at the moment... if they were to improve something like public transport then they'd need decisions to be made in support of that at an individual, local and national level – coordinated and not just action but one of those.'

'Even decisions which seem individual – like driving your car in a certain way to be green or whatever need some sort of push. You'd need national government to raise awareness and advise people to do this and educate people about how to do this.'

Decision making criteria

Discussing the need to reduce transport carbon emissions, potentially via such mechanisms as carbon allowances, participants were asked to come up with a range of criteria to use to inform the how much carbon individuals should be allowed to emit. Overall, forum members wished to see equity and fairness as the guiding criteria, meaning in practice that there should be a standard level of transport related carbon emissions allowed for all.

Individuals would be allowed to decide the ways in which they use their allowance, as long as they kept within their overall limit. This would allow for differences in attitudes as to which

journeys are essential and which are a luxury, e.g. some individuals think they 'need' to take their kids to school by car, while others view this as a luxury and note this is a relatively new phenomenon.

Having posited equity and equal allowances for all, as the overarching criteria, participants then identified certain groups who should be subject to larger allowances. For example, those with disabilities and those living in rural areas (both of whom are less able to use public transport and in general may have a greater reliance on cars as a means of transport) should be given a more flexible allowance.

It was also suggested that businesses should have a different allowance level, as economic growth should be a priority for the country, given that we live in a capitalist society that demands it. Such an allowance would not condone environmentally irresponsible behaviour, and indeed, there may be some opportunities for businesses to reduce travel (e.g. by encouraging staff to have phone calls rather than face to face meetings), but the focus should be on reducing non-essential and recreational travel first, before reducing work related travel.

However, at this point in the discussion, a number of forum members noted that achieving fairness is almost impossible, since almost everyone could be said to have 'special circumstances' in one way or another:

'Everyone will have their own reason why they need to use a car more, and it will be a case of whoever shouts loudest.'

Even creating a system that was 'not overly unfair' as opposed to 'completely unfair' was thought to be too much of a challenge. One individual made a parallel to the complexities of the benefit system, which does not easily or accurately respond to the needs and circumstances of different people.

What type of interventions will promote reductions in CO2 emissions?

Participants were introduced to a range of possible interventions which may work to reduce CO2 emissions from transport, and asked to reflect on which types of interventions are likely to be most effective, including whether the focus be on incentives or penalties, on carrots or sticks?

Given the sensitivity around people's access to cars and personal transport, many participants reflected that it may be (more) politically viable for governments to offer incentives rather than restrictions. Democratically elected organisations may fear losing their mandate by penalising those who fail to reduce their carbon emissions.

Also, participants underlined that penalties in terms of price rises are not always effective.

'We have seen the lack of impact of price rises on things like cigarettes and fuel already, they don't work on their own.'

However, participants noted that there would need to be a combination of both incentives and penalties.

Where penalties are used transparently, and 'as long as there's a clear argument and reason as to why we're doing it' they are felt to have a far greater potential to positively influence behaviours. Forum members' emphasis on this point links to the broader call for greater levels of information and education for the public on the impetus to address challenges.

Participants highlighted that at present, it is felt to be too difficult for individuals to make a positive decisions to reduce their carbon emissions from transport. A range of factors

including the state of public transport, and the nature of capitalist society which deems time as money, continue to favour use of the car. Therefore government should not focus on penalising car use, or incentivising behaviour change, but on changing infrastructures so as to make behaviour change more feasible for individuals. For example, there needs to be greater investment in transport, and a change in attitudes amongst employers who will be able to offer flexibilities (e.g. in terms of remote working) that make employees less reliant on personal car use.

Pulling together some of the findings from all three of the above discussions, the table below sets out detailed findings on the forum's perceptions of the location of responsibility and governance around future climate change issues.

Detailed findings on perceptions of where governance and responsibility should lie in future climate change scenarios

	Perceived degree of current power and influence	Recommended degree of power and influence in the context of future climate change
Local organisations (including councils)	<ul style="list-style-type: none"> • Comparatively low level of power and influence in determining access to and consumption patterns of resources such as food and water • Higher level of power and influence in determining the extent to which individuals have a viable local alternative to private motor travel, i.e. local public transport infrastructure, community based car-share schemes, supporting businesses to act in environmentally responsible ways – although still lower in comparison to national government. 	<ul style="list-style-type: none"> • Unlikely to have 'clout' needed to regulate access to food and water - these are seen as issues of national importance requiring a consistent rather than locally variable approach. • Opportunity to support local action for providing sustainable food supplies – e.g. local farmers' markets. But will lack proximity to players and arenas critical to influencing key determinants of consumption patterns, e.g. price as set by international markets / governing bodies and national-level supermarkets. • While there is a perceived role for regionally based water companies to act in accordance with an agreed criteria for determining access to limited resources (e.g. fairness in accessing a vital resource), there is little role for organisations at a more local level than this. • Overall perception that national rather than local government should be responsible for driving forward changes in transport behaviours and carbon emissions.
Markets and corporate organisations	<ul style="list-style-type: none"> • Perceived to be hugely powerful – especially supermarkets which are seen to have a near monopoly on how we access food; awareness of the role of international trading of food is lower • Seen to act in accordance with market forces (i.e. profit driven) so unlikely to have any natural incentive to encourage pro-environmental behaviours that encourage us to consume and 	<ul style="list-style-type: none"> • Members highly sceptical of allowing private sector companies to make too many decisions around distribution of critical resources, or relying on them to help reduce our carbon intense transport dependency. • Perceived need for more checks and balances in the form of national and international regulation (from bodies such as OFWAT, Office for Fair Trading and the EU) to ensure:

	<p>spend less (unless this links to a companies brand or 'usp')</p> <ul style="list-style-type: none"> • Price is seen as a key determinant of consumption patterns. For example water is considered too cheap a resource currently and this is seen to encourage waste: <p><i>'Doesn't it all just come back to the money? The only reason your parents tell you to turn the light off, is because they know they'll get a big electricity bill, and the same should be true for water.'</i></p>	<ul style="list-style-type: none"> - the drivers underpinning capitalism such as the incentive to encourage higher and higher levels of consumption and mobility do not completely override the need to respond to climate change - big business doesn't unfairly squeeze or destroy smaller players such as independent food suppliers, thereby limiting consumer choice - fairness as well as ability to pay is a underpinning criteria for allowing people access to critical resources – a future scenario in which only those who can afford to pay for increasingly expensive food, water and fuel was not considered to be acceptable - we don't wait until market forces 'kick in' to reduce our use of resources such as carbon based fuels – as by the time this is so prohibitively expensive that we are forced to consume less irreparable damage to the environment may have already occurred. <ul style="list-style-type: none"> • Conversely, increased 'marketisation' of limited resources could be helpful in some instances where there is currently high levels of waste – e.g. increased metering of water to help consumers understand how much they are consuming and incentivise them to be less wasteful. However, it was felt that fuel for transport was already too 'marketised' and should not be made even more expensive to reduce wastefulness. <p><i>'Water price needs to be a more important factor so that we take more notice of it.'</i></p> <ul style="list-style-type: none"> • Perceived opportunity for the private sector to lead on developing greener technologies and encourage uptake of greener choices by employees (e.g. smaller and greener company cars)
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<p>National government and regulators</p>	<ul style="list-style-type: none"> • Belief that currently national regulators do not have sufficient powers to compel big business such as supermarket chains to transition to more sustainable business models. <p><i>'Haven't supermarkets already been allowed to become too powerful to be regulated?'</i></p>	<ul style="list-style-type: none"> • National level governance should have a strong future role in leading, supporting and enabling more responsible resource consumption (e.g. by making alternative, lower-carbon transport options feasible). However interventions led by the state need to be more innovative than just taxation (e.g. on carbon based fuel). • Need for central regulation of market forces to ensure private sector organisations do not act unfairly or unduly irresponsibly in the pursuit of profits. <p><i>'Someone like the Office for Fair Trading should take a harder line against supermarkets to ensure their practices are sustainable and not wasteful.'</i></p> <ul style="list-style-type: none"> • In line with their broader political views, some participants are wary of excessive government intervention unless we're in an unequivocal crisis – to this end, many members of the forum reject the idea of rationing as a response to resource limitations (although there is an assumption that should resource limitation turn out to be more severe than expected the government should step in to intervene). <p><i>'Self-rationing is better. If you've got rationing from a body above you, that's different. And I don't see our society working like that.'</i></p>
<p>International governing bodies</p>	<ul style="list-style-type: none"> • Very mixed levels of awareness of the current role of international governance and markets in determining consumption patterns of globally traded commodities such as food and carbon based fuels – those with higher levels of engagement in environmental issues tend to be more informed. 	<ul style="list-style-type: none"> • Perceived need for more powerful international governance relating to food production. Members felt that individual countries would be encouraged to switch to more sustainable farming practices if they were part of a global movement. Otherwise countries are prohibited from implementing more cost intensive sustainable farming practices because they lose their competitive price on the global market. • Similarly, perception that some decisions about carbon

		<p>reductions should be made at an international level because carbon emissions affect the biosphere as a whole. Consequently carbon emissions should be regulated by a global partnership and there needs to be an international consensus in order to guarantee a state by state response – individual countries are unlikely to act alone, not least because it may reduce their ability to compete at a global level.</p>
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Appendix B: Forum session agendas

Session 1: Research into flood risk management

Saturday 16th October, 11am – 4pm. Leftbank Centre, Bristol.

Time	Content
11: 00 - 11:10	<p>Intro (OPM)</p> <p><i>Thank you for attending. Explain overall objective – to ensure that the public have a voice in setting the priorities for how money is spent on research into environmental issues. Explain objective of today's session – to explain how the forum will work, and what your role will be, and then to move onto our first topic – flooding. We'll present an overview of the topic, then we'll hear from some expert speakers, and then it will be back over to you to discuss your thoughts.</i></p>
11:10 – 11:20	<p>Icebreaker (OPM)</p> <p>Ask participants to get into pairs, and to introduce themselves: name, where from, best and worst thing about living around Bristol? Then introduce each other back to the group...</p>
11:20 – 11:45	<p>Role of citizens' advisory forum and its members (OPM)</p> <ul style="list-style-type: none"> • General introduction to the value and role of public engagement in informing science and environmental issues. (ref Sciencewise ERC material) • Overview of principles of deliberative research, e.g. reassure participants that you don't need to be an expert or to have direct experience of the topics we'll be discussing to play a valuable role. The aim of today is to provide you with enough information so that you can make an informed contribution. You'll have opportunity to explore the relevant information, ask questions, reflect on the issues, (both on your own and in group discussion) and revie/refine your views over the course of the day. • Explain that we'll be aiming to provide participants with all the information they need – but if there are outstanding questions, please do ask. If we're not able to answer them here we'll do our best to answer them outside of the meeting today • Underline that we're as interested in what kind of factors inform opinions and recommendations as much as the opinions themselves. There are no right or wrong answers. • Explain how the group was selected – e.g. broadly representative of Bristol, range of attitudes towards environmental issues, etc • Clear explanation of what will happen to the outputs from this session – feeding into the LEWC research strategy, a draft of which will be available online in December (Kate to confirm?). Remind that their

	<p>opinions/considerations are only one strand that will feed into the development of the research strategy – along with series of expert reviews.</p> <ul style="list-style-type: none"> • Outline of future sessions – confirm there will be two further sessions, arrangements for keeping in touch in the meantime (e.g. support line at OPM, email details etc), likely themes. <p>Ways of working together (OPM)</p> <p>To establish a group consensus on the style of discussion that we'll have.</p> <p>We have found the following principles useful:</p> <ul style="list-style-type: none"> • E.g. it's good to disagree and challenge others but need to be respectful, need to listen and contribute • There are no right and wrong answers – all opinions are valid • We want to give everyone an equal opportunity to have their say, so if the facilitator has to move you on, that is just so that we can keep to time. <p>Ask participants to suggest additional principles that they want to work with.</p>
<p>11.45 -12:00</p>	<p>Intro to LWEC (LWEC – Andrew)</p> <ul style="list-style-type: none"> • Who is LWEC? I.e. what are the organizations that make up the consortium? • How is it funded? • Why was it set up? • What are the objectives of the organisation? • Examples of recent outputs/outcomes? <p>Participants to have opportunity to ask questions/clarifications?</p>
<p>12:00 -12.45</p>	<p>Overview of flooding and flooding research (OPM)</p> <p>(See powerpoint slides 11-17)</p> <p><i>Overview of flooding: definition, causes, impacts, case study of flooding</i></p> <p><i>Present 7 types of research that can be done around how flooding risk can be reduced/managed, and how impact can be reduced/managed</i></p> <p>Ask for initial impressions from participants:</p> <ul style="list-style-type: none"> • Did you learn anything new or surprising from this initial presentation? Anything new about flooding or research that is done around flooding? • Do you think there are any key areas of research that are not covered here? Any questions or issues that you think are important that would not be covered by this research?

	<ul style="list-style-type: none"> • At this stage, which of the areas of flooding research seem most important to prioritise? Can you say why? • And which seem least important to prioritise? Can you say why?
12.45-13.15	Lunch
13:15--14.00	<p>Expert contributions</p> <p>OPM to invite each EA speaker to talk about their relevant areas of research. NB – caveat that they work in this field, but may not be able to answer every question.</p> <p>1. Owen Tarrant</p> <ul style="list-style-type: none"> ▪ Measuring and predicting when it will flood ▪ Understanding the impact of land shape and type on water flow <p>2. Geoff Baxter</p> <ul style="list-style-type: none"> ▪ Understanding how changes in climate and land use can affect water flow ▪ Understanding how flood defences (including barriers, dams, dredging) can affect water flow <p>3. Michael Ny</p> <ul style="list-style-type: none"> ▪ Understanding the psychology of responding to risk ▪ Understanding best practice in flood response ▪ Understanding long term impact of flooding <p>Speakers will be asked to answer the following questions on each of the above types of research:</p> <ul style="list-style-type: none"> • What is this type of research? Describe and explain • How can it help reduce the risk of flooding, or the impact of flooding? • What are the disadvantages of prioritising research in this area? (e.g. risk of low impact) • Illustrate with vignettes/examples <p>Participants will be asked to keep notes on any questions that come to mind – they will have the chance for Q&A in group work afterwards</p>
14.00-14.30	<p>Group work: Deep dives</p> <p><i>Participants to be split into three groups of 5-6 participants, with a facilitator per table.</i></p> <p>Each speaker (Owen, Geoff and Michael) to spend 10 minutes with each group, answering questions/asking for clarification on the areas of research they covered.</p>

14.30: 15.15	<p>Group work: Priority setting</p> <p>Participants to stay in three groups, each with their table facilitator. Expert speakers to move to the side, where they are on hand for queries (facilitators to bring them in as appropriate).</p> <p>Facilitators to ask the following questions, prompt and note-take.</p> <ul style="list-style-type: none"> • What areas of research do you think are the most important and why? • What areas of research do you think are least important and why? • Ask participants to rank the areas of research from most to least important, (using pre-prepared cards) as a group. Can you reach an agreement on this? <p><i>The negotiations between participants will provide useful data on criteria for decision making. However, where groups cannot reach a consensus they should be encouraged to produce more than one ranking.</i></p> <ul style="list-style-type: none"> • What is the reasoning behind your choices? • Would you have liked access to any more information to support this decision making process? What type of information? • What (if anything) have you heard this morning that has influenced your opinion? Why? In what way?
15:15- 15:45	<p>Plenary discussion</p> <p>Representative from each group to present their rank order of priorities to rest of the forum.</p> <ul style="list-style-type: none"> • How easy was it to arrive at this rank order? • Where were the main disagreements/areas of consensus? • Where did you find it difficult to prioritise? Why? • What further information (if any) would you have needed to help you?
15.45:16:00	<p>Close (OPM)</p> <p>Feedback on session:</p> <ul style="list-style-type: none"> • What did you get out of today? Have your opinions on this type of research changed at all? • What would you like to get out of the next two sessions? What would you like to focus more or less on? • Remind of arrangements for keeping in touch (via OPM) between the sessions, should you have further comments/thoughts after today? • Discuss opportunity to respond to online consultation on the LWEC flooding research strategy – to be published end of November (OPM

	<p>to send details nearer the time)</p> <ul style="list-style-type: none"> • Distribute evaluation forms <p>Preparation for next session:</p> <ul style="list-style-type: none"> • What will be the topic? Continuation of flooding theme, followed by 'Adaptation'. i.e. research into how we will need to change as a society to live with impacts of climate change, rather than research into how we can prevent climate change. We'll send out more material nearer the time. Mention that next time there may be videoing. • Admin: OPM to distribute incentives and travel expenses forms.
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Session 2: Research into adaptation to climate change

Saturday 27th November, 11am – 3pm. Leftbank Centre, Bristol.

Time	Content	Supporting resources
11: 00 - 11:15	<p>Intro (OPM)</p> <ul style="list-style-type: none"> – Welcome – Explain agenda/logistics of the session. – Warm up exercise – reminder of ways of working defined in last session 	<p>Powerpoint: Welcome slide</p> <p>Handout: Agenda/reminder of ways of working</p>
11:15 – 11.55	<p>Introduction to adaptation (OPM)</p> <ul style="list-style-type: none"> – What does it mean? How does it fit with mitigation? Why is the topic important to LWEC? – Introduction to a future climate scenarios – (NB: need to introduce as possible scenarios – not definite outcomes) This introduces the participants to a world in which adaptation is necessary so gets them thinking about the research that is needed. – Capture initial questions and reflections on adaptation from the forum <p>[NB – this is an opportunity for the forum to ask questions for clarification, as well as for us to understand what are top of mind reflections to the topic – this is useful to inform LWEC's future communication on the topic]</p> <p>–</p>	<p>Powerpoint: Introduction to adaptation, and 4 degree model,</p> <p>Handout: With content as per slides, but formatted for handout.</p>

<p>11.55 – 12.30</p>	<p>Introduction to research topics (OPM and UKCIP experts)</p> <p>Present and explain 5 priority areas for adaptation in conjunction with experts, via a facilitated dialogue :</p> <ol style="list-style-type: none"> 1. land use (Roger Street) 2. national infrastructure (energy, water, transport, waste and communications) (Chris West) 3. buildings (Gerry Metcalf) 4. natural resources (Chris West) 5. emergency planning (Gerry Metcalf) <p>Questions for experts to answer via facilitated dialogue:</p> <ul style="list-style-type: none"> – What is the main advantage of research into this area? – What outcomes has this research had so far?/How is this research currently being used? <p>What are the pitfalls/limitations of research into this area?</p>	<p>Powerpoint: Placeholder slides – content is all on handout.</p> <p>Handout: With content as per slides, but formatted for handout.</p>
<p>12.30 – 13.00</p>	<p>Lunch</p> <p>NB – voxpops filming over lunch</p>	
<p>13:00 -13.30</p>	<p>Group discussions with UKCIP experts</p> <ul style="list-style-type: none"> – Q&A session, in carousel – each expert to spend 10 minutes with each group. – To give groups a chance to explore the topic with each expert in more depth. 	
<p>13.30 – 14.20</p>	<p>Group discussion and priority setting exercise, as per last session</p> <p>Facilitators to ask the following questions, prompt and note-take.</p> <ul style="list-style-type: none"> – What areas of research do you think are the most important and why? – What areas of research do you think are least important and why? – Ask participants to rank the areas of research from most to least important, (using pre-prepared cards) as a group. Can you reach an agreement on this? <p><i>The negotiations between participants will provide useful data on criteria for decision making. However, where groups cannot reach a consensus they should be encouraged to produce more than one ranking.</i></p>	<p>Powerpoint: Discussion questions</p> <p>Laminated cards with research areas, and flip chart paper</p>

	<ul style="list-style-type: none"> – What is the reasoning behind your choices? – Would you have liked access to any more information to support this decision making process? What type of information? – What (if anything) have you heard this morning that has influenced your opinion? Why? In what way? 	
14.20 – 14:50	<p>Plenary feedback</p> <p>Representative from each group to present their rank order of priorities to rest of the forum. Facilitator to ask:</p> <ul style="list-style-type: none"> – How easy was it to arrive at this rank order? – Where were the main disagreements/areas of consensus? – What further information (if any) would you have needed to help you? 	Flipchart recording
14.50- 15.00	<p>Session close:</p> <ul style="list-style-type: none"> – Thank participants for coming – Reminder of arrangements for next session – Reminder of contact details for OPM. 	

Session 3: Governance and decision making in response to challenges posed by climate change

Saturday 5th February, 11am – 4pm. Leftbank Centre, Bristol.

Time	Content
11: 00 - 11:15	<p>Intro (OPM)</p> <ul style="list-style-type: none"> • Welcome • Explain agenda/logistics of the session. • Warm up exercise • Reminder of ways of working defined in last session
11:15 – 11.45	<p>Introduction to discussion – Decision making around limited resources (OPM)</p> <p>– What will we be talking about?</p> <p>We will be discussing resources, such as energy, food and water which may be in more limited supply in the future, due to the impacts of climate change. And we will be asking for your opinion on how decisions should be made about our access to these potentially limited resources in the future.</p> <p>We want to get your views on questions such as:</p> <ul style="list-style-type: none"> ○ Who should be responsible for making decisions around access to limited resources in the future? Should it be you and me as individuals or should we be led by governments or even international organisations? ○ What types of information and ideas should decision makers use? What criteria should inform decisions? E.g. Equality? The need to protect the most vulnerable? <p>– Contextualise. Use recent story of access to FLU jab, as an example to introduce the themes of limited resources, problems of supply and demand, and the different layers at which decisions are made.</p> <p>– Explain why this is relevant? LWEC considering developing a programme of research into this field – to understand in more depth how the government, big business and the public make decisions about policies/ their own behaviours in relation to environmental change.</p>
11.45 – 12.00	<p>Introduction to group discussion exercise (OPM)</p> <p>Present 2 areas for group discussion.</p> <ol style="list-style-type: none"> a. Food b. Water <ul style="list-style-type: none"> • Why are these relevant for discussion? There is the potential for them to be in

	<p>some way limited in the future because of the impacts of climate change.</p> <ul style="list-style-type: none"> Organise forum members into two, pre designated groups.
12.00 – 13.00	<p>Group discussions: Decision making in relation to food and water</p> <ul style="list-style-type: none"> Introduction to X resource – ask for group's reflections on their use of X Explanation of the current layers of governance around our use of X resource, - giving overview of personal decisions to international decisions Reflections on decision making in response to future scenario where resource may be limited. Series of questions to understand group's opinion on who and how decisions should be made in the future around public access to X resource.
13.00– 13.30	<p>Lunch</p>
13:30 -14.00	<p>Plenary session (OPM)</p> <p>OPM Facilitator to ask each group to feed back key points from discussions:.</p> <ul style="list-style-type: none"> Overall reflections on discussions? Surprises/new information/new perspectives? Areas of disagreement within the group?
14.00 – 15.15	<p>Whole group discussion: Decision making in relation to carbon emissions, from transport (OPM and Carbon emissions expert: Dr Ben Lane)</p> <ul style="list-style-type: none"> Introduction to the need to reduce carbon emissions in the future (transport as key source of carbon emissions) Overview of the current range of tools used to enforce/regulate/incentivise transport related carbon emissions (e.g. fuel taxes, incentives for greener cars) Reflections on decision making - Discussion of how far tools should be used to regulate vs encourage? – Discussion of the level at which these tools should be implemented – e.g. local / regional / national / international?
15.15 – 15.45	<p>Session close and evaluation (OPM and Diane Warbuton)</p> <ul style="list-style-type: none"> Thank participants for coming. Check RE: future contact from LWEC Evaluation questions (Diane)

Appendix C: Composition of the Forum

Recruitment specification for forum members

Forum total: 18 members

Gender	Age	Ethnicity	SEG/Working status?	Disability	Family situation	Urban/Rural
9 male 9 female	2 people age 16 – 19 2 people age 20 – 24 3 people age 25-34 4 people age 35-44 3 people age 45-54 2 people age 55-65 2 people age 65+	Minimum 3 people from BME groups	2 people: A 3 people: B 4 people: C1 3 people: C2 3 people: D 2 people: E 1 Student 2 Retired	Minimum 2 people with disability (Physical or sensory) Remainder: no quota	5 parents, including 1 lone parent Remainder no quota	14 from urban areas (spread of N/S/E/W of Bristol city) 4 from rural areas at least 5 miles from the city centre (e.g. Felton, Brockley, Salford, Norton Hawkfield)