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Public Dialogue on Climate Adaptation: What does a well- adapted England look like?

Literature Review for Defra/Sciencewise

Rachel Harcourt and Suraje Dessai; University of Leeds



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What do we know about what UK residents know and feel about climate change risks and impacts?

Key messages

- There is now strong evidence that UK residents are concerned about climate change impacts as they affect the UK now. This sense of concern relates to ‘impacts’ as generally understood as well as a number of specific phenomena, including flooding, coastal erosion, hotter weather, loss of wildlife and cold snaps.
- Further, recent evidence shows that the Covid-19 pandemic has not displaced concern about climate change impacts which has remained high in surveys undertaken in 2020.

Implications for dialogue

- Climate change risks and impacts is a topic people are aware of and worried about, so participants are likely to be highly engaged.
- There is growing public awareness of risks other than flooding but there is an opportunity to further clarify what those are and why they’re important.

1.1 Expert assessments of climate change risks and impacts in the UK

According to the 2018 UK Climate Projections, the UK will experience hotter, drier summers and warmer, wetter winters in the future, as well as more frequent extreme weather events (Met Office, 2018). The 5-yearly UK Climate Change Risk Assessments (CCRA) consider what these changes in weather and climate might mean for the UK in terms of risks and opportunities. These have highlighted the present and future seriousness of risks from flooding and coastal change to communities, businesses and infrastructure, and from hotter weather to health, well-being and productivity (Committee on Climate Change, 2017). The most recent CCRA also highlighted risks to natural capital and ecosystem services, to domestic food production and international supply chains, and to the power system, listing 61 risks and opportunities in total (Climate Change Committee, 2021, Government, 2022). This most recent assessment makes clear the manner in which changing weather and climate threatens multiple and large-scale systematic changes to day-to-day life in the UK, additional to more acute experiences of periods of extreme weather.

Additional to the above assessments, there is growing research on the impacts of climate change on mental and physical wellbeing (Paavola, 2017), children and young people (Sanson et al., 2019), and furthering inequality (Benzie, 2014). Extreme weather events can risk people’s wellbeing and may even cause a threat to life while physical and mental health impacts can continue long after the immediate threat has passed (Walker-Springett et al., 2017, Paranjothy et al., 2011). Extreme weather events might also cause things of value to be damaged or lost, both in the immediate term, such as loss of meaningful valuables such as photos, (Tschakert et al., 2019), and in the longer term, such as irreversible changes to places and landscapes (Adger et al., 2013a). Some impacts might bring less severe but still disruptive changes to daily schedules and lifestyles (Toole et al., 2016). Understanding the lived experience of

climate change is a relatively new but developing area of study, and intends to raise awareness of factors that need to be taken into account during adaptation planning.

1.2 Public perceptions of climate change impacts

Researchers have asked UK residents their perceptions of climate change risks and impacts for at least the last 20 years. For much of that time, respondents tended to say they saw it as a serious issue but one much more for other countries and future generations. However, in the last few years a number of surveys have found that a high percentage of UK residents now see climate change impacts as a here and now phenomena. Due to that, the following will focus on only recently taken surveys, although we recognise there is much more literature in this area from five or more years ago.

1.2.1 Climate change is here and now

In large sample surveys taken in 2019, 64% of 1,401 respondents said that the UK is already feeling the effects of climate change, and in 2020 75% of 1,044 people said we are (Steentjes et al., 2020, Harcourt et al., in preparation). In the second survey, 91% agreed that the UK would be feeling the impacts within the next 10 years if not before (Harcourt, 2020). This compares to a 2013 study when only 45% of respondents thought the UK was already feeling the impacts (Ipsos MORI, 2013). Recent polling from Ipsos UK tells a similar story: 73% of Britons felt like Britain is already experiencing the effects of climate change (IpsosMORI, 2021).

Studies have shown that for some time already UK residents have viewed flooding as a serious risk now and in the future (Ipsos MORI, 2013, Steentjes et al., 2017). In comparison, hot weather has often been perceived as not a risk for the UK in the coming decades (Ipsos MORI, 2013, Taylor et al., 2014a). However, in a more recent study, 63% of participants said heatwaves are already a concern for the UK now (Harcourt, 2020), as are flooding, coastal erosion, loss of birds and other wildlife, and cold snaps. There is less clear understanding as to how UK residents perceive secondary impacts, such as to food production, supply chains and energy security. There is some evidence that people aren't sure what the main impacts of climate change will be in the UK beyond flooding, and if these impacts will be mostly positive or negative (Steentjes et al., 2017). Recent polling has suggested that, when asked, the majority of Britons also think poorer health will be an impact of climate change (IpsosMORI 2021; Gaffney et al., 2021). However, a series of twenty-two in-depth interviews found that, additional to time-limited periods of extreme weather, people are worried about increased uncertainty, increased disruption, changing seasonal patterns, and loss of wildlife (Harcourt et al., 2019).

Additional to perception of risks, UK residents have also reported experiencing changing weather over their life in the UK, including more frequent flooding and wet weather, heatwaves and hot summers, dry periods, and mild winters, as well as less frequent snow and cold winters (Harcourt, 2020).

1.2.2 Importance of issue and levels of worry

In a 2019 survey, Steentjes et al (2020) found that 23% of their 1,401 participants suggested climate change as the most important issue facing the UK in the next 20 years, second only to Brexit with 25%. When the research team had asked the same question in 2016, only 2% had put climate change (Steentjes et al., 2017). A similar question asking for participants top three issues for the UK today, found that 33% of participants included climate change, making it the second most selected option after the NHS and health care (Harcourt, 2020). When the same question had been asked in 2013, only 5% had selected climate change as a top 3 issue (Ipsos MORI, 2013).

The ResilRisk project also found increased levels of worry, with 40% saying they are very or extremely worried about climate change, up from 20% in 2016 (Steentjes et al., 2017, Steentjes et al., 2020). Gaffney et al. tells a similar story, with 46% of participants from Great Britain saying they were extremely or very worried about the state of nature today, and 47% were extremely or very concerned about the state in which we will leave nature for future generations.

1.2.3 Effect of Covid-19 pandemic

Previous research shows that public interest and concern has not shown a steady increase over time but rather has waxed and waned (Pidgeon, 2012), as has media coverage (Boykoff and Yulsman, 2013). Some have argued that other large events, most recently the Great Recession, have crowded out climate change as a priority public issue (Scruggs and Benegal, 2012). With that in mind, additional surveys taken since the outbreak of the Covid-19 pandemic in early 2020 provide further notable findings. A survey taken in April 2020, a few weeks after the UK went into its first national lockdown, found that two thirds of British participants thought climate change was as serious as the Covid-19 pandemic and 70% thought the government would be failing them if it didn't act sufficiently (IpsosMORI, 2020). These findings were replicated in a survey taken in June 2020 in which participants considered climate change to be as serious as had those who had been asked the same questions in April 2019 (Evensen et al., 2021). Similarly, more participants in May 2020 than August 2019 thought that addressing climate change was of an extremely high level of urgency for the UK (CAST, 2020a), with the percentage agreeing increasing slightly again when the survey was repeated in October 2020 (CAST, 2020b). Levels of climate change worry have also continued to increase despite the Covid-19 pandemic, with 45% of participants describing themselves as extremely or very worried about climate change in a 2021 survey (CAST, 2021). Ipsos UK's tracking polling, The Issues Index, shows fluctuations in levels of concern about dominant issues, and evidences that, while other issues sometimes supersede climate change (for example, in the Issues Index for February 2022, the economy was the issue participants were most concerned about in the context of looming cost of living increases), climate change remains consistent as an issue of concern for British people (Ipsos, 2022). These findings have led Evensen et al (2021) to suggest that, despite the pandemic, climate change has now become a 'permanent member' of the 'finite pool of worry'.

1.3 Why perceptions of risk is important

Perceiving risks as personally relevant and serious is likely a necessary precursor for people to become engaged and willing to act in response (Grothmann and Patt, 2005), and expectation of negative affect can motivate people to take adaptive action (van Valkengoed and Steg, 2019). Therefore, if people do not perceive themselves as at risk they are unlikely to invest time and effort in adapting.

What do we know about how UK residents know and feel about climate change adaptation?

Key messages

- There has so far been much less research on public perceptions of climate change adaptation than on public perceptions of climate change risks and impacts
- Generally, people tend to be supportive of adaptation but this is based on research that has asked quite general questions. Support for specific adaptation policies or approaches is less well known, as is willingness to accept trade-offs.
- There is some evidence that UK residents think they should be doing more to adapt to the impacts of climate change. However, they often feel limited by a perceived lack of knowledge and self-efficacy, uncertainty about the appropriate allocation of responsibility, and questions regarding the effectiveness of individual action.

Implications for dialogue

- This may be a new topic for many of the participants and may require some time to become familiar. The aims of adaptation, as they differ from mitigation, need to be made clear.
- The dialogues will likely need to 'dig into' the general support for adaptation vs. specific scenarios involving choices and trade offs

2.1 Climate change adaptation

Climate change science and policy is generally divided into two broad areas of mitigation and adaptation. 'Mitigation' refers to actions taken to reduce emissions of greenhouse gases into the atmosphere so as to reduce the level of warming. The Intergovernmental Panel on Climate Change (IPCC), which produces the scientific reports used to inform international climate governance, defines adaptation as "The process of adjustment to actual or expected climate and its effects... adaptation seeks to moderate or avoid harm or exploit beneficial opportunities" (IPCC, 2014, p.5). However, a key theme developing from adaptation theory is that in practice adaptation in human systems is not necessarily an autonomous or straightforward response to expected climate effects. Instead, it is an ongoing decision-making process dependent on a range of interacting and changeable factors. For example, the decision to take adaptive actions will be shaped by what's agreed as acceptable levels of risk, which is likely to vary by hazard type and be further complicated by scientific uncertainty and political disunity. The choice of adaptation strategy may be influenced by the level of intended and/or acceptable change (Pelling et al., 2015), by the values and morals of the society in which it is taking place (Adger et al., 2009), and by the governance structure in which it is happening (Biesbroek et al., 2010, Termeer et al., 2012). Therefore, while the term 'adaptation' is inclusive of certain actions which can be taken to reduce risks such as building flood defences or redesigning buildings to be cooler, it also more broadly refers to an ongoing and dynamic process based on what a social group wants their future under climate change to look like and the choosing of the optimal ways to get there (Dilling et al., 2019).

2.2 Adaptation planning in the UK

The national government is legally mandated to lead adaptation planning in the UK (HM Government, 2008, Part 4, Provision 58). The government is required to respond to the 5-yearly Climate Change Risk Assessment with a National Adaptation Programme (NAP) that outlines how the government will respond to each of the identified risks. The NAP's stated central ambition is for the UK to become "A society which makes timely, far-sighted and well-informed decisions to address the risks and opportunities posed by a changing climate" (DEFRA, 2018, p. ii). Both the 2013 and 2018 editions of the NAP placed socially shared responsibility for achieving this ambition at the centre of their strategy which argues that "we need the engagement of all from outside the government... as we all work together to strengthen the resilience of our nation" (DEFRA, 2018, p. ii). The national government is presented as having a supporting and enabling role in this by communicating risks and opportunities so as "to engage ever more people to take action to adapt" (DEFRA, 2018, p. i). The NAP states that more aware and more informed residents will be "empowered... [by] understanding" and thus more likely to partake in adaptation initiatives (DEFRA, 2018, p. 5). It also argues that a more informed and engaged society will "help inform a more mature debate on how we adapt as a society" (DEFRA, 2018, p. iii). According to the NAP, therefore, UK society has a shared responsibility both in taking adaptive actions and in setting the adaptive strategy that will guide those actions.

The government's progress in delivering its adaptation plans is subject to a bi-annual review by the independent Climate Change Committee. While the UK has generally been seen as a global adaptation leader (Massey and Huitema, 2013, Lesnikowski et al., 2015), the 2019 review found that the NAP was "incomplete" in addressing the risks raised by the CCRA and that the government was so far failing to deliver on its intentions outlined in the NAP (Committee on Climate Change, 2019, p.7). In reference to the shared responsibility model promoted by the NAP, the review argued that "leaving" other sectors of society to take on adaptation responsibilities "without a strategic plan is not a strategy" (Committee on Climate Change, 2019, p. 15). While the review didn't dissuade action from other groups it argued that this would be extremely challenging "without centralised support and direction" (p. 15). It concluded that attempts at "mainstreaming adaptation" had so far failed (Committee on Climate Change, 2019, p. 16). Additional reviews of adaptation action already happening in the UK find that it is so far dominated by government initiatives and government-led organisations, rather than the range of sectors and stakeholders the government plan advocates (Tompkins et al., 2010, Ford et al., 2011, Lorenz et al., 2019).

2.3 Studies of public perceptions of adaptation

While acute extreme weather events will remain more likely in some areas of the UK, in the future some impacts might affect the population at large, such as longer, hotter summers and risks to the food supply. Additionally, even those not personally at risk can engage with adaptation by supporting government initiatives and taking part in the national conversation shaping adaptation objectives and pathways. As such, is it important to understand what UK residents know and think about adaptation, although this topic is generally not as well researched as is perceptions of risks and impacts, particularly with nationally representative samples as opposed to those in higher risk areas (Taylor et al., 2014b, Adger et al., 2017). In 2013, the PREPARE research undertook a detailed investigation of perceptions using a national survey, workshops and in-depth interviews (Ipsos MORI, 2013). Since then, there have been some more qualitative and therefore narrower studies (Cotton and Stevens, 2019, Reis and Ballinger, 2020) and, recently, two large, national surveys from Steentjes (2020) and Harcourt (in preparation) which update and add to the findings from PREPARE.

2.3.1 General support for adaptation in the UK

One of the key learnings so far available is that generally UK residents support preparing for climate change impacts. In a nationally representative survey with over 2,000 participants, 68% agreed that the UK could avoid the worst impacts of climate change if it plans well for them (Ipsos MORI, 2013). Respondents also said they would support investing in adaptation which protects against flooding and future risks to food and water supply (Ipsos MORI, 2013). A 2016 survey, also with a large representative sample, found that 77% of respondents supported spending public money to prepare for (unspecified) climate change impacts (Steentjes et al., 2017). A series of workshops in Wales with several hundred mostly pupils and teachers found that young people were especially keen to know more about adaptation and the opportunities it might provide them in the future (exact numbers not provided) (Reis and Ballinger, 2020). When asked to allocate tokens representing an adaptation budget between protecting against actions now and in the future, the participants split the tokens evenly across the two timeframes (Harcourt, 2020).

2.3.2 Relationship between mitigation and adaptation

In a series of in-depth interviews taken in 2012 and 2013 which intended to focus on adaptation, participants showed some conflation between adaptation and mitigation, as well as sustainability more generally (Harcourt et al., 2019). For example, the term 'adaptation' was associated with ideas such as building flood defences, but also driving less and recycling more. Semi-quantitative research from 2015, found that the 30 participants did distinguish between adaptation and mitigation and that, for some, there was a much stronger preference for increasing mitigation efforts rather than adaptation because the effects of climate change might be too significant to effectively adapt to (Cotton and Stevens, 2019).

More recently in 2019, the ResilRisk research asked survey respondents whether the government should focus on mitigation or adaptation, and 91% said the government needs to do at least some of both and 50% said the two issues should have equal focus (Steentjes et al., 2020). In later questions, the participants tended to agree that if the UK focuses on becoming well prepared for climate change impacts, politicians (48%) and citizens (57%) might be less motivated to reduce the causes of climate change (although there were also sizable portions of the participants who neither agreed nor disagreed and, to a lesser extent, tended to disagree).

2.3.3 Support for specific adaptation policies

Two recent surveys have asked participants what areas of life in the UK should be prioritised in adaptation planning although the questions were asked in different ways. In ResilRisk, the respondent was shown each item and asked whether it should receive no to extremely high protection (2020). Considered most in need of high protection was the wellbeing of the most vulnerable in society, running of existing social services, water supply, health and wellbeing of UK citizens and affordable food supplies. Least supported was maintenance of historical sites and buildings and growth of the UK economy, however, all options were considered high or extremely high priority by a majority of the respondents, see Appendix 1 for full results. In Harcourt et al (in preparation), respondents were instead given a fixed number of tokens to allocate across a list of options to show preference. In this survey, there was a preference for food availability, health and wellbeing, and British farming, with least support for communities, jobs, and social stability, see Appendix 2 for full results. One of the findings from these two surveys is that UK residents tend to think there are many priorities within adaptation planning. As adaptation will involve decision-making and trade-offs, in part due to budget constraints, these conversations need to be further developed to better understand priorities.

In the ResilRisk research, participants were asked about their support for a list of specific mitigation and adaptation policy options (2020). For all of the adaptation options, a majority of the respondents tended to or strongly supported them. Most supported were 'Building new reservoirs to store water during periods of drought', 'Introducing tight regulations on buildings to be able to deal with hotter and drier weather (e.g. insulation, air-conditioning)' and 'Spending public money now to prepare the UK for the impacts of climate change' (e.g. built flood defences). Harcourt et al (in preparation) also asked about preferences towards adaptation policies to manage two specific climate risks: flooding that affects people's homes and heatwaves which have negative impacts to individuals. Survey respondents were allocated a fixed number of tokens which they could 'spend' across a list of options. For both risks, respondents tended to spread their tokens across a number of options rather than put large spends on one or two items. However, there was a preference for built flood defences to manage flooding and planting more greenery in towns and cities to manage heatwaves. A third survey measured participants willingness to pay to reduce future deaths from climate change (Graham et al., 2019). While a majority (61%) were willing to pay those who said climate change was a serious issue and those with higher incomes showed greater willingness.

2.4 Individual and household adaptation taking place

According to the NAP, individuals also have a part to play in making the country more resilient by being aware of their own risks and willingness to act (DEFRA, 2018). Research undertaken in areas which have experienced, or at higher risk of experiencing, extreme weather events has aimed to assess to what extent those ambitions are being realised.

2.4.1 Engagement with climate change in higher risk areas

There are mixed findings as to the extent to which personal experience of extreme weather events affects an individual's engagement with the broad issue of climate change (Whitmarsh, 2008, Demski et al., 2017). However, studies tend to find that these experiences do increase an individual's awareness of their own risks (Demski et al., 2017), although more likely as something that might happen in the future rather than the present (Thomas et al., 2015). Even when people are aware of present risks they can be perceived as a concern for other people (Abrahamson et al., 2008) or as unlikely to happen to them (Bichard and Kazmierczak, 2012). Additionally, a number of studies find that those effected by extreme weather events might understand the events as caused by factors other than climate change (Dessai and Sims, 2010, Hopkins and Warburton, 2015). Experience of hotter weather, which is a more novel risk to the UK than flooding or coastal change, is also having a unique effect on risk perception as people tend to think of it as a positive experience, even though it can have serious health impacts (Lefevre et al., 2015).

2.4.2 Willingness to act in higher risk areas

In terms of willingness to act, there are some emerging findings to suggest that personal experience of climate related impacts can lead to behaviour change. One study found that experience of flooding increased people's willingness to reduce their energy use (Spence et al., 2011), and a second study found that it increased people's willingness to take adaptive action to heat threats (Demski et al., 2017). There are caveats: a secondary analysis of the data used in the first study found that this was only the case with more politically left-leaning survey participants (Ogunbode et al., 2017), and the second study did not ask about willingness to adapt to flooding, the impact recently experienced by the participants. Further, a third study into experiences of hot weather, found that while those effected had increased concern regarding energy security, this did not lead to a change in people's intentions to reduce their own resource consumption (Larcom et al., 2019). A systematic review of 15 studies found that more often there is limited adaptation happening at the individual and household level (Porter et al., 2014).

Individuals are more likely to take short-term, low-cost coping actions, such as changing clothes, than long-term adaptation actions, such as investing in insulation or cooling (Porter et al., 2014). Homeowners are also more engaged in climate mitigation or sustainable behaviours, such as reduced energy use or recycling, than climate adaptation (Bichard and Kazmierczak, 2012). More recent research based on six case-studies from around the UK found evidence of 86 different behaviours responding to climate change risks, more than half of which were classed as 'vulnerability reduction' actions most often in response to flooding (Power et al., 2020).

2.4.3 2. Willingness to act - national samples

As the experience of changing weather is starting to become more widespread across the UK, surveys have started to ask national samples what adaptive actions they might be willing to take. In one survey, a majority of respondents said they would be about as likely as not, fairly likely or very likely to take the actions now or in the future for all of the options, except installing air conditioning. Actions they were most likely to take were reading about how to avoid heat stress, fitting a water saving device to cisterns to save when flushing, and planting trees (Steentjes et al., 2020). A second study also provided lists of adaptation actions and participations that individuals could take and asked on a scale whether they 1. Strongly disagreed or 5. Strongly agreed with the statements (Harcourt, 2020). Overall the support for the statements was slightly over the mid-point of indifference but none of the statements has a mean level of support as high as 4. Those actions respondents said they most agreed with were providing food or re-wilded spaces for birds and other wildlife, having home flood insurance, collecting domestic waste water or rainwater to re-use, and supporting the national government issuing new laws, policies or investments to guide the UK's preparation for climate change impacts. These findings highlight a key challenge for public engagement and policy which is how to transform concern about climate change impacts into active engagement in adaptation (Corner et al., 2020).

What do we know about how UK residents view responsibility for climate change adaptation?

Key messages

- Aggregated findings show that people perceive the national government as most responsible for adapting to climate change impacts, but that other groups also have some responsibility
- However, there are discrepancies within this as some people accord much more responsibility to government while others think individuals and communities need to do more

Implications for dialogue

- This needs to be an area of focus and, based on previous research, may be an area of contention amongst participants which will need to be managed
- A further build on studies done so far would be to explore a more nuanced understanding of responsibility for *what*. This could be considered by hazard/risk and/or by adaptive approach.

The following will summarise findings on questions that explicitly refer to responsibility. However, we recognise that perceptions of responsibility can also be inferred through adaptation preferences. For example, Harcourt et al (in preparation) found a preference for built flood defences as a means of defending homes from flooding, This may be due to perceived efficacy but may also imply perceived responsibility.

3.1 Perceptions of responsibility with a general audience

From research undertaken with a general audience, there are three principle themes emerging: 1) when asked who is *most* responsible UK residents tend to say the national government but 2) they also tend to allocate at least some responsibility to a range of other groups. However, 3) there is some evidence that this is a contested issue.

3.1.1 Who is most responsible for adapting to climate change impacts?

In the 2012/13 PREPARE survey, 65% of respondents said that the government was *mostly* responsible, compared to only 12% who said individuals and 11% who said industry (Ipsos MORI, 2013). In the 2019 ResilRisk survey, participants were given a long list of groups but were only allowed to select the one they perceived as *mainly* responsible for preparing for impacts (Steentjes et al., 2020). Fifty-eight percent of participants selected the national government, most closely followed by individuals with 11%. Other surveys have allowed participants to select multiple answers but these also suggest that the government is perceived as most responsible. For example, in a large sample survey taken in 2020, participants were asked to allocate tokens representing responsibility between the three groups of the government, individuals and communities. Forty-four percent of all tokens were allocated to the government, while 28% were allocated to each of the remaining groups (Harcourt et al., in preparation). One study asked whether actors were responsible or not responsible for managing items within Defra's portfolio (Rocks et al., 2017). The study was not climate change focused so included non-relevant risks, e.g. avian influenza, but also several that are: poor air quality, risks from coastal erosion, the risk of

regional-scale flooding, loss of marine biodiversity, the risk of a derogation of water quality, and the risk of a loss of wildlife biodiversity. For all of the risks, a large majority of the participants perceived the government as being responsible, with lower levels agreeing that scientists and industry are responsible, and very few participants suggesting that they themselves are. The disparity between perceived government and self-responsibility was particularly large for management of flooding and coastal erosion.

3.1.2 Responsibility of other groups

However, some surveys also find that UK residents think that other groups have at least some responsibility. In the PREAPRE survey, respondents were also asked who has *some* responsibility. While the government was still selected most frequently by 85% of the participants, 61% also selected individuals, 60% selected local authorities, and 59% selected business and industry (Ipsos MORI, 2013). When participants in 2020 were also asked a scale question from '1. Not responsible at all' to '5. Very responsible', the government was still ranked the highest ($M=4.48$, $SD=0.87$), but both other groups also had a mean score over 4, suggesting medium-high perceptions of responsibility (individuals $M=4.02$, $SD=1.02$, communities $M=4.06$, $SD=0.97$) (Harcourt et al., in preparation).

3.1.3 Contested issue

More qualitative studies, which are better able to pick up nuanced opinions, have found that there are some discrepancies. For example in the in-depth workshops that supported the PREPARE survey, there was some indication that those who saw risks and impacts as caused by anthropogenic climate change were more likely to see it as a government responsibility, while those who didn't tended to see it more as individual responsibility to protect against hazards (Ipsos MORI, 2013). Further, more responsibility was accorded to individuals and homeowners when asked specifically about flooding, than about climate change impacts more generally (Ipsos MORI, 2013). A study which intended to develop typologies of adaptation opinion, found that despite general agreement as to the importance and relevance of adaptation in the UK, perceptions of responsibility was the most prominent differentiator between the groupings (Cotton and Stevens, 2019). Two of the groups favoured government leadership even as they differed on whether efforts should concentrate on adaptation or mitigation; a third group supported a much greater, values-driven role for individuals in adaptation; while the fourth group was sceptical of adaptation but displayed a preference for shared efforts to mitigate climate change.

3.2 Perceptions of responsibility in higher-risk areas

When those who have experienced, or are at higher risk of experiencing, extreme weather events are asked they tend to say that the government is responsible for protecting homes and communities from the risks. This has been found in regards to flooding (Porter et al., 2014), drought (Dessai and Sims, 2010) and sea level change (Thomas et al., 2015). However, as above, this is not a completely settled issue. In one high flood risk area some respondents said that the government was responsible for protecting the area *and* voiced support for a shared responsibility model between government and homeowners (Bichard and Kazmierczak, 2012). This study also found low levels of household scale adaptive action suggesting that the extent to which there is a willingness for people to take on responsibility in managing their own exposure to risks is not yet being capitalised on (see also Section 2.4). In one case study, household level adaptation to flooding was higher if the authorities were perceived as also acting to manage the risks (Adger et al., 2013b). However, a more recent study based on six case studies around the UK, found evidence of 86 unique adaptive behaviours in response to a range of climate change risks (Power et al., 2020). This study does not attempt to calculate the amount of actions observed versus what might be needed to achieve optimal management of the risks, however, it does provide evidence of household and community scale action.

What impacts and adaptation information and narratives might UK residents already have been exposed to?

Key messages

- UK residents have likely been exposed to limited adaptation discourse, and the topic will be much less familiar than mitigation/net zero
- Much of the discourse relating to climate change impacts and adaptation is strongly negative. Media coverage of flooding, which is the most high profile sub-discourse, tends to be visually dramatic and focused on human suffering
- The discourse is also notable for the lack of agency accorded to groups other than the government: this is the case both for UK adaptation specifically and in the presentation of climate change impacts more generally
- Some residents will have been exposed to risk information relating to flooding and to a lesser extent hot weather but this might not have been presented and/or understood as relating to climate change

Implications for dialogue

- The workshop planning should assume limited pre-existing knowledge of the topic and ensure this is presented to the participants as required
- Where there is prior awareness of the adaptation topic, this might be in a narrow sense i.e. in relation to government responsibility or in relation to built flood defences. The breadth of possible adaptation options and pathways needs to be conveyed.
- There may be an opportunity/need to reframe adaptation as a positive, proactive response to climate change risks and impacts

4.1 Adaptation discourse in the UK

4.1.1 Science discourse

Approximately every 5-years the IPCC issues an Assessment Report (AR) summarising the latest best-available knowledge on climate change, as well as intermittent special reports. While the reports have low readership they are widely reported on by the media. Media coverage is a key source of information for non-experts about risks generally (Kasperson et al., 1988) and climate change specifically (O'Neill et al., 2015, Barkemeyer et al., 2016, Reis and Ballinger, 2020) so how the media covers the reports will effect what people know and think about the topic (Anderson, 1997, Allan, 2002). Generally, media coverage of the IPCC reports are more pessimistic and employ more dramatic and emotive language than the source material (Barkemeyer et al., 2016). Broadcast, print and new media coverage of the most recent IPCC impacts and adaptation report (AR5 released in 2014) was dominated by disaster

framing (O'Neill et al., 2015). Similarly, images used to accompany media coverage of the IPCC's special report on extreme weather most often expressed negative emotions such as fear and guilt, as well as passive responses such as helplessness and vulnerability (Nerlich and Jaspal, 2014). The disaster narrative of climate change is an established and familiar media story so new events, such as IPCC reports, can be easily framed within this existing narrative while also further perpetuating it (O'Neill et al., 2015). The IPCC also contributes to this by including more images of impacts than adaptation in its reports (Wardekker and Lorenz, 2019).

4.1.2 Media discourse

Aside from those studies mentioned above which look specifically at media coverage of IPCC adaptation reports, Harcourt et al (2020) reviewed newspaper coverage of adaptation in regional and national UK newspapers, sampling from 2013, 2015 and 2017. Their analysis identified five prominent narratives: (1) due to flooding the government should build more flood defences and (2) homeowners should buy insurance. Due to flooding and other risks (3) individuals should make more informed decisions to limit their own exposure while due to a combination of weather and climate impacts (4) the farming industry should innovate while (5) the natural environment should strive to adapt as best as possible. Reading across the narratives they found that newspapers present adaptation as principally a response to flooding and much less so to other climate risks likely to affect the UK now and in the future. Adaptation action was presented as still largely dependent on the actions and support of the national government with few and narrow responsibilities for individuals. The range of adaptation options under consideration were limited and principally aimed to maintain the current way of life while trying to protect those most at risk from acute weather impacts. In summary, newspaper coverage presented a restricted view of as to when the UK should adapt and how it could adapt.

Additionally, there are a number of studies which review media coverage of flooding in the UK (Gavin et al., 2011, Escobar and Demeritt, 2014, Cologna et al., 2017, Valencio and Valencio, 2018). These studies find that while there is a growing link being made between flood events and climate change it is not yet a principle frame, with coverage instead focusing on event reporting and the human interest of the story (Gavin et al., 2011, Escobar and Demeritt, 2014). However, coverage does include some discussion of what should be done in response to flooding and, to a lesser extent, climate change. Homeowners are increasingly presented as responsible for protecting their own home, and there is discussion of the role of the private insurance industry in providing financial protection to homeowners (Escobar and Demeritt, 2014). There is also growing discussion of the policy response, particularly in regards to flood defences and management, but also in regards to acting as part of the global community to mitigate climate change (Escobar and Demeritt, 2014). Media coverage of heatwaves and hot weather has generally been less and thus also studied less. However, there is some evidence that in recent years media coverage of climate related issues increases during heatwave periods, suggesting a growing link being made between climate change and the extreme weather event (Hopke, 2020).

Although it is hard to measure the direct influence of media coverage on people's opinions and actions there is some evidence that the adaptation media conversation is having real-world influence. One study found high correlation between media images of impacts and people's first visualised associations with climate change (Smith and Joffe, 2013), while a second found similarities between media coverage of adaptation in Canadian agriculture and farmers' own opinions (Wall and Smit, 2006). In Ireland, the government's approach to managing flooding seems to reflect the preferences of the news media (Devitt and O'Neill, 2017).

4.1.3 Government communications

A review of adaptation communications in 10 countries, including the UK, found that 77% of the 278 identified were issued by government institutions (Wirth et al., 2014). While this is a mixed-country study and therefore not able to give an accurate view of the UK, it suggests that government so far dominates adaptation communications as has been found in other UK studies regarding adaptation initiatives and actors (Tompkins et al., 2010, Lorenz et al., 2019). Only a small number of the communications evaluated in the study were considered 'successful' in terms of being well designed to increase awareness, knowledge and action (Wirth et al., 2014). Therefore, it also suggests that current government-led communication plans will likely fail to deliver the NAP's objectives of increasing awareness and thus engagement.

Government agencies also issue public risk communications, providing information and advice about specific events or threats. While not all weather related risk communications will include information about climate change, they might be some people's principle interaction with the impacts and adaptation topic so far. The UK has a long history of coastal and fluvial flooding (Haigh et al., 2015, Stevens et al., 2016) which has led to significant effort in developing flood risk communications. The Flood Forecasting Centre, which brings together expertise from the Met Office and the Environment Agency, provides various flood risk communications, including flood maps, subscription flood warnings for those in higher risk areas, publicly disseminated flood warnings during periods of high risk, and advice about preventative and preparative actions (EA, 2015). However, a review of the flood risk communication system found that the advice as to how people could become more flood resilient was less visible than advice about available warning systems (EA, 2015, p.28). This might limit people's perceived sense of agency in being able to reduce their own flood risk ahead of flood events happening. A review of the information available about hot weather risks found that the British public are not sufficiently informed and, further, there is little guidance available to communicators on how best to communicate this growing risk (Howarth et al., 2019, Brimicombe et al., 2021). This lack of information might suggest to people that hot weather is not yet something to worry about, despite this being directly contrary to the findings of the latest Risk Assessment.

What do we know about what motivates greater personal engagement with climate change adaptation?

Key messages

- There might be lots of reasons influencing the extent to which someone engages with climate change adaptation, and caution should be taken when making generalisations
- However, there is some growing evidence that key motivators are: perceived outcome efficacy, perceived self-efficacy, and social norms.

Implications for dialogue

- The public dialogues are not intended to encourage the participants to undertake more adaptive actions. Therefore, some of the literature referenced below may not be directly applicable. However, it is worth noting that adaptation decision making is influenced by many factors beyond awareness and perception of risk.
- There are also some potential opportunities for engagement which could be pursued in the sessions, particularly to answer the questions regarding to what extent and in what ways the public want to be part of the NAP process. For example, people might become much more engaged in this process if they can clearly see roles for themselves within it (self-efficacy); that they also see other groups in society adapting (social norms); and there are clear aims and trajectories for achieving them (outcome efficacy).

5.1 Adaptation motivators

Public awareness of climate change threats is at a high, see section 1. However, so far public participation in adaptation remains low, see section 4.2. Therefore, there is growing interest in understanding how to better motivate and enable individual, household and community participation in adaptation. As this section focuses on engagement in adaptation more than taking specific adaptive actions, we haven't included discussion of material motivators, such as financial incentives for home adaptations. However, we recognise these are also important if the aim is to increase the uptake of adaptive action. Further, we haven't elaborated on two likely important motivators, which are perceptions of risk and perceptions of responsibility as these are covered in sections 1 and 3, respectively.

5.2 Knowledge and information

The 'information deficiency model' suggests that if sufficient information is provided to people they will respond accordingly. For example, if people are made aware of flood risk and means of protecting their home from flooding, they will undertake those actions. There is some evidence that people don't feel well informed as to what actions they can take to protect themselves (Bichard and Kazmierczak, 2012). In comparison, people are much more familiar with climate mitigation campaigns and are more likely to consider themselves as partly responsible for limiting levels of global warming (Bichard and Kazmierczak, 2012, Thomas et al., 2015). This then suggests at the need for more information.

However, a multi-country, multi-sector, meta-analysis of the relationship between motivational factors and adaptation behaviours found only weak relation between knowledge and adaptive action (van Valkengoed and Steg, 2019).

Research participants have said that they would like to know more about adaptation (Reis and Ballinger, 2020); that investing in information campaigns should be prioritised within adaptation planning so that the potential agency of individuals and communities in taking action could be realised (Ipsos MORI, 2013); and that looking for information on how to manage hot weather would be one of the adaptive actions they are most likely to take (Steentjes et al., 2020). However, when asked to prioritise the adaptation budget across possible actions, first to manage flooding and then to manage heatwaves, spending on public information campaigns was one of the least supported ideas (Harcourt et al., in preparation).

5.3 Perceptions of self-efficacy and outcome efficacy

In van Valkengoed and Steg (2019) and Power et al (2020), both perceived self-efficacy, meaning the perception that an individual can undertake meaningful action themselves, and outcome efficacy, meaning perception that the actions taken will have beneficial outcomes, were found to be key motivators. There is some evidence that people doubt their own efficacy to act (Dessai and Sims, 2010, Thomas et al., 2015). There is also some evidence that people are more sure in the effectiveness of individuals working together in groups (Harcourt et al., 2021). For example, 60% of participants said they tended to or strongly agreed they were confident that, together, people in the UK can prepare the country to cope with the impacts of climate change (Steentjes et al., 2020).

Self-efficacy and outcome efficacy require more research to test their robustness across different individuals and social groups, and, if they are effective, to understand how best these feelings can be engendered. Particularly in relation to self-efficacy, there is some evidence that this is not being encouraged. For example, newspaper narratives of adaptation feature very few and narrow roles for individuals with most of the responsibility accorded to government (Harcourt et al., 2020).

5.4 Social norms

Two recent studies have found that social norms is a strong motivator for adaptive action (van Valkengoed and Steg, 2019, Power et al., 2020). The (mis-) perception that society has lower levels of climate change concern can negatively affect an individual's willingness to commit themselves to pro-climate positions (Mildenberger and Tingley, 2017). In contrast, there is evidence that a perceived consensus regarding climate change can be a causal factor in increasing public support for climate policy (Van der Linden et al., 2015). While the potential of social norms as a communication approach that cuts across differing social groups and areas has been recognised (Howarth and Parsons, 2021), there is not yet much focus on adaptation social norms can be developed and disseminated.

5.5 Values

The influence of values, both in terms of values people hold and things of value, on adaptation support and action has had some consideration. Climate change risks are perceived as of concern in terms of how they threaten the things people value (Harcourt et al., 2019), and 'good' adaptation is defined as actions which can safeguard those things of value (Harcourt et al., 2021). Having a shared sense of what's valuable, and therefore what triggers the need for an adaptive response, can be effective in facilitating the development of agreed adaptation plans across otherwise diverse social groups (Barnett et al., 2014). Therefore, promoting adaptation behaviour change within the framework of values is likely to be effective (O'Brien and Wolf, 2010). However, not everyone holds the same values or values the

same things so promoting behaviour change which relies on this approach needs to be appropriately informed and nuanced.

What have we learned from other climate-related public dialogues?

Key messages

- There has not so far been an adaptation focused public dialogue or assembly
- Dialogues need to be clear on their intended outcomes (and limitations) and set the scope of the sessions accordingly

Implications for dialogue

- Some or all of the principles developed by the UK Climate Assembly in relation to net zero policies could also apply to adaptation. This might provide a useful means of discussing the relationship and interdependencies between mitigation and adaptation efforts.
- The design of the dialogue will to some extent, and perhaps significantly, influence the outcomes. One key decision is whether a 'top down' or 'bottom up' approach to the discussion of ideas is more appropriate for the aims of this dialogue.
- The role of the participants and their outputs, and opportunities or otherwise for follow up, need to be clearly stated. It is likely participants may be enthusiastic about citizen involvement in the NAP so may need some suggestions ready of what this might look like.

The below comments pull together learnings from other climate assemblies and public dialogues. So far the UK has not run an adaptation-focused public dialogue, so the learnings will need to be adapted to our needs. However, they do provide some thinking points as we plan the sessions.

6.1 Principles of climate action

In 2020, the UK held a Climate Assembly which produced a set of specific recommendations as to how the UK could optimally reach net zero. As such the topic and type of output differ from the aims of this public dialogue. However, the Assembly additionally agreed a set of principles for mitigation policy including: education and information, fairness, freedom and choice, co-benefits, protecting and restoring the natural world, strong and clear leadership government, ensuring solutions are future proofed and a joined-up approach across society (Climate Assembly UK, 2020). As we work with our participants, it may be that they identify a similar set of practices to underpin the development of adaptation in the UK.

6.2 Climate Assembly speakers

Previous assemblies have involved participants in the selection of speakers, for example by providing a list to choose from (Shaw et al., 2021). This intends to increase the autonomy of the participants and ensure they hear from experts on knowledge gaps and/or areas of particular concern.

6.3 Scope and design of the conversations

A KNOCA report pulling together findings from several assemblies across Europe, finds that setting the most appropriate and useful scope of the conversations is a key challenge (Shaw et al., 2021). If too broad a topic or too many topics are covered, the participants will be unlikely to have sufficient time to develop opinions, and findings might lean towards the expert information provided. Conversations also

need to be not too broad as to lead to overly broad conclusions such as ‘managing climate change should be done fairly’.

During the UK Climate Assembly, which principally related to achieving net zero, the recommendations of the participants were more far reaching than expected (Cherry et al., 2021). While net zero is likely a more familiar topic, and arguably more straight forward, than adaptation, nevertheless the sessions need to be designed to allow for the potential of ambitious discussions.

Unsurprisingly, the design of the sessions heavily influence how the participants respond. One key consideration here is whether to use a top down or bottom up approach. For example, a top down approach, as largely used in the UKCA, provides a pre-prepared list of options, ideas or policies for participants to assess. A bottom-up approach would allow participants to develop their own ideas. The latter approach may better allow the emergence of new ideas, however, it can also lead to recommendations that are impractical or otherwise undesirable.

6.4 Importance of values and worldviews

There is some evidence that values, worldviews, and political ideologies influence opinions much more than scientific and technical information (O'Brien and Wolf, 2010, Corner et al., 2014). Dialogue design needs to be mindful of the influence of values throughout the process, for example, including in the playback of the results to the participants (Cherry et al., 2021). This is to ensure that the accuracy and complexity of views is captured, rather than participant values being simplified through polls and other consensus mechanisms.

6.5 Communications and engagement

Generally, participants leave the sessions in support of much more future communications and engagement so we might expect support for citizen involvement in the NAP to be high. If so, how can this be achieved? Can we offer some example means of engagement to the participants?

For the French Citizens Assembly on Climate, President Macron had promised participants that their recommendations would feed directly into policy, a claim that was not later realised (Cherry et al., 2021). There have been other example of poor follow up which can lead to disillusionment after what is generally a very positive experience. Therefore, we need to be clear with the participants from the outset what their roles are, what the outputs will be and how they'll be used, and expectations around follow-up, if any.

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Additional polling data:

<https://www.ipsos.com/en-uk/high-levels-concern-about-climate-change-scepticism-whether-britons-will-change-behaviours>

<https://www.ipsos.com/en-uk/public-recognise-link-between-climate-change-and-health-and-generally-do-not-have-strong-views-role>

<https://globalcommonsalliance.org/wp-content/uploads/2021/08/Global-Commons-G20-Survey-full-report.pdf>

Appendix

Appendix 1: “In the future, if our climate continues to change, we will need to prepare for and respond to the impacts. For each of the following items, please indicate what level of protection they should receive when preparing the UK for a changing climate” (ResilRisk: Steentjes, 2020)

	No protection %	Minor protection %	Sum %	High protection %	Extremely high protection %	Sum %
Well-being of the most vulnerable people in our society (e.g. elderly, poor, young people)	2	13	15	39	47	86
Running of existing social services (e.g. emergency services)	3	14	17	38	46	84
Uninterrupted water supply for citizens and businesses	2	15	17	45	39	84
Health and well-being of all UK citizens	2	15	17	41	42	83
Affordable food supplies across the UK	2	15	17	44	39	83
Uninterrupted energy supply for citizens and businesses	2	19	21	50	29	79
Maintenance of the UK coastline	2	21	23	50	27	77
Protection of plants, animals and people from new pests and diseases	3	21	24	43	33	76
Quality of infrastructure such as roads and buildings	2	23	25	54	22	76
Protection of natural landscapes and biodiversity	3	23	26	45	29	74
Quick and reliable help for people and businesses affected by extreme events (e.g. storms)	3	25	28	49	23	72
Increasing growth of the UK economy	5	33	38	46	16	62
Maintenance of historical sites and buildings	6	40	46	40	13	53

Appendix 2: Climate change impacts might affect the UK in different ways. The UK will need to choose how it divides its available budget between different priorities. Please allocate your 18 tokens between the options below to show what you think should be prioritised in adaptation planning. (Harcourt et al, in preparation)

Priorities	% of total tokens allocated
Food availability	15
British farming	13

Health and wellbeing	13
Birds and other wildlife	12
Homes, workplaces and public buildings	11
Infrastructure	11
Communities	9
Jobs	8
Social stability	7

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For more information

3 Thomas More Square
London
E1W 1YW

t: +44 (0)20 3059 5000

www.ipsos.com/en-uk
<http://twitter.com/ipsosUK>

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