Citizens' Panel on climate adaptation in the UK

Main report
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Specialists and the workshops they presented in

Name	Organisation	Point of contribution
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Dr. Richard Millar	Climate Change Committee	Learning Workshop 1
Prof. Richard Betts	Met Office	Learning Workshop 2
Dr. Kate Donovan	Edinburgh Climate Change Institute	Learning Workshop 2
Joshua Deru	Climate Change Committee	Learning Workshop 2, Workshop 5, Workshop 6
Jessica Gwyther	Office for Budget Responsibility	Learning Workshop 2
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With thanks to the Oversight Group for the provision of independent advice and oversight on the project.

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Executive Summary

The Climate Change Committee (CCC) commissioned Ipsos in January 2025 to deliver a Citizens' Panel, co-funded by UK Research and Innovation (UKRI) Sciencewise, to understand public views on climate adaptation in the UK. The panel explored what a well-adapted UK could look like and will inform the CCC's advice to the UK Government in the 2026 Well-Adapted UK report. The panel was centred on two key questions:

- Which of the impacts of climate change are you most concerned about and why?
- What do you think should be done to adapt to these impacts?

The panel ran between September and October 2025. The workshops were hybrid, with five taking place online (Workshops 1-2 and 5-7), and Workshops 3 and 4 taking place face-to-face over a weekend in Manchester. The workshops focused on five impacts of climate change:

- Overheating in homes
- The impact of climate change on nature
- Transport disruptions
- Flooding of homes
- Water and energy shortages and disruptions

The panel consisted of 30 panel members who were broadly reflective of the UK public and balanced for gender, age, income, ethnicity, disability, where panel members lived (including urban/rural), climate concern and political views. Most panel members (22) were recruited from Greater Manchester and surrounding rural areas; eight were recruited from Northern Ireland, Scotland, and Wales. The deliberative design of the panel combined specialist inputs, balanced materials, and facilitated discussions amongst panel members. Panel members' attitudes were tracked over time.

Cross-cutting themes

Panel members discussed the topic of adaptation in the different learning and topic workshops. Several themes emerged that were cutting across discussions of different climate impacts:

Panel members' concerns about climate change increased markedly during the learning workshops. Many were surprised by the speed, scale and irreversibility of climate impacts in the UK. Learning more about climate impacts globally and in the UK led to increased concern, even for those panel members who already reported high concerns about climate change before the workshops began.

Panel members viewed adaptation as important but repeatedly stressed it should not displace mitigation efforts. While accepting that some climate change impacts are now unavoidable, they wanted to see effective mitigation action to prevent further negative consequences.

Panel members wanted government investment in adaptation to start now and be done 'properly'. They prioritised proactive, durable measures, even if they cost more up front, over reactive fixes to support long-term resilience. For instance, members preferred investment in rail networks to short term fixes like painting rails white. This was tied to a dominant concern amongst some panel members that much of the UK's existing infrastructure was currently ineffective and needed improvement. They wanted to see adaptation measures occurring alongside or as part of improvements to infrastructure.

Panel members wanted a more robust and resilient UK with infrastructure that runs more effectively than at present. When reflecting on a well-adapted UK, they frequently emphasised the need for stronger infrastructure, which maintains or slightly reduces current levels of harm and disruption through targeted investment, despite worsening future climate risks.

Panel members wanted government support to prioritise the most vulnerable and argued that those with the financial ability should take greater personal responsibility. Panel members suggested vulnerable households could receive grants for property-based measures against flooding and overheating and be prioritised for support when there are infrastructure disruptions. For those who could afford to, this responsibility would include installing property-based adaptations and preparing for potential power outages or water shortages.

Panel members favoured nature-based solutions because of their co-benefits, such as biodiversity, aesthetics and recreational use. Their preference was evident from the learning phase, when nature-based solutions were first introduced. As workshops progressed, they also wanted to ensure that these solutions are effective and properly maintained.

Panel members' lived experience and perceived risk strongly influenced their concerns about climate impacts. Those who had directly experienced or knew people who had experienced these impacts showed greater concern, whilst those unaffected found these impacts less worrying. Flooding of homes emerged as the top concern, likely reflecting the panel's geographic composition - primarily Greater Manchester and Scotland, Northern Ireland, and Wales, which face lower heat risks than other UK regions, particularly in the south of England.

Panel members accepted, with some discomfort, that certain changes are inevitable and so resources should be focused where they will have most impact. They preferred protecting what could be sustained whilst planning managed responses for what could not, such as supporting relocation from areas becoming uninhabitable due to coastal erosion.

While panel members wanted to see a UK better adapted to the impacts of climate change, they were consistently concerned about the cost of living and financial strain. Throughout discussions, panel members often shared a common view that contributing more via taxes or paying more for services like public transport than they currently do was unfeasible for many people in the UK. By the final workshop, this may have reduced some panel members' willingness to invest in adaptation measures.

Panel members' concerns about the cost of living underlined the importance of transparency and accountability with any adaptation funding. They frequently doubted that government would spend taxpayer money in a responsible and transparent way, pointing towards previous examples of inefficient and untransparent government spending. As a result, panel members tied publicly funded adaptation spending to being transparent, accountable, and, where possible, ring-fenced. This was alongside their calls for a better use of current public money.

Panel members felt educating the public is vital. They wanted their friends and family to have access to the same information that had been provided to them in the workshops. This was driven by their own limited knowledge about the climate impacts and adaptation options before joining the Citizens' Panel.

Overheating in homes

These workshops aimed to understand panel members' levels of concern about overheating in homes, how this may change in the future, and their preferred adaptation options and willingness to pay for these.

Panel members viewed overheating in homes as less concerning than other climate impacts, except for its effect on vulnerable people - particularly those with health issues, the young and older people. Their views were influenced by location, with many describing their homes as 'cold' and considering short-lived heatwaves less problematic than risks like flooding, which were seen as a threat for more weeks each year.

When considering property-based adaptations, panel members valued low-cost, easily installed options, such as ceiling fans and dark curtains, or those with co-benefits, such as home insulation. Despite higher costs, the dual benefit of home insulation, offering warmth in winter and cooling in summer, appealed to many. Reactions to air conditioning were mixed. Whilst many saw it as an easy cooling solution, some raised concerns about electricity costs and potential health implications.

Panel members felt that the Government should provide targeted financial support to households most vulnerable to heat-related impacts. Most agreed that some form of government support was needed but wanted this to be focused on property-level measures and well targeted to keep taxpayers' costs low.

Community-level measures were also seen positively, particularly when considering co-benefits. Panel members were particularly positive about increasing the amount of green and blue spaces in urban areas – to help with overheating and improve access to nature. While they also supported street shading and more street tree planting, they were conscious of the costs of maintenance for all community measures.

Nature

The workshops aimed to understand panel members' levels of concern about the impact of climate change on nature, how this may change in the future, their preferred adaptation options and willingness to pay for these. They also captured views on nature-based solutions as a way of adapting to other climate impacts.

Panel members' primary concerns about climate change impacts on nature centred on consequences for people, particularly food system disruption and rising prices. A few, however, expressed strong concern, sadness and frustration about the decline of nature.

Panel members wanted investment focused where it could be most effective, accepting that some changes to species, ecosystems and habitats were inevitable. Despite some discomfort, they agreed it would be wasteful to invest heavily in delaying unavoidable losses. Instead, they favoured targeting resources towards nature that could be protected or recovered long-term and would likely benefit people directly.

Panel members had a strong preference for nature-based solutions to help adapt the UK to climate change over human-made interventions. They thought these would be more cost-effective in the long-term, require less maintenance, and preferred the additional co-benefits these offered. For example, panel members supported nature-based solutions such as rewilding areas that would both protect nature and reduce flood risk to homes.

Transport

The workshops aimed to understand panel members' levels of concern about transport, how this may change in the future, their preferred adaptation options and willingness to pay for these.

Panel members showed high awareness and concern about climate change impacts on transport. They frequently cited their own experience of disruptions, including flooded routes to the face-to-face workshops. They emphasised transport's vital role in daily life and connecting communities. Disruptions to emergency access, education, work and supplies made risks tangible, with particular concern for those dependent on medication, healthcare and support networks.

Panel members wanted transport adaptation to be well-funded and done properly rather than through short-term fixes, even at higher initial cost. Most supported significant upfront investment to break the cycle of ongoing repairs, citing the severe economic and social consequences of poor transport networks. They also supported research and development where good solutions do not currently exist, with investment prioritised for the highest-risk routes and regions.

Panel members accepted cost increases but insisted on spending transparency. Feeling that transport funding was often poorly managed, they viewed transparency and accountability as vital for taxpayer-funded adaptations.

Panel members were split on whether transport adaptation costs should be borne by service users directly (through taxes on car users, like fuel duty or toll roads or increased ticket prices for rail) or shared collectively, given the common benefits of functioning travel routes. They also frequently advocated for greater financial contributions from private companies, both train companies and heavy users such as delivery firms.

Panel members generally prioritised road over rail network adaptation, believing road disruption would have more severe impacts on people, businesses, services and the economy. They particularly emphasised the reliance of emergency services on roads.

Panel members were split over whether to prioritise adaptation and recovery of strategic routes or 'lifeline' routes serving remote communities, but agreed that remote communities should be prepared for connecting routes to be disrupted. Some argued for balancing both approaches, whereas others thought it was important to prioritise vulnerable households, rather than focusing on the type of connection. Regardless, panel members often proposed building rural self-reliance through local hubs or plans for when emergencies occur or a rural area becomes cut off from main transport lines. They asked for clear, consistent warnings, timelines, and supporting information during disruptions to help enable this.

Flooding of homes

The workshops aimed to understand panel members' levels of concern about the flooding of homes, how this may change in the future, their preferred adaptation options and willingness to pay for these.

Panel members' awareness and concern about flooding of homes were consistently high. They often had direct experience of this, were concerned about the potential financial and emotional toll it can cause and saw this as an immediate, tangible issue.

When prompted, most panel members said they would not remain in a home that had flooded once, citing safety, cost and insurability concerns – even for minor flooding. They typically assumed flooding would recur and said they would feel too anxious to stay. However, a few said they might remain if flooding was infrequent with limited impact, particularly if the property was cheaper than comparable unaffected homes.

Panel members prioritised government investment in flooding of homes and were willing to contribute towards it. In the final workshop, it consistently received one of the highest investment allocations.

Panel members felt households had a responsibility to prepare for flooding. They thought that those living in high flood risk areas with sufficient financial means should implement flood resilience measures on their property.

Panel members mostly agreed it was fair for those unaffected by flooding to help fund adaptation measures for higher-risk areas through general taxation. Some however, argued funding should come from local taxes in flood-prone areas instead.

Panel members were highly positive about Flood Re, a UK scheme that makes flood insurance affordable for high-risk households through contributions from all insurance holders. They valued that it was already working effectively whilst the cost had gone unnoticed on their own policies. Support was almost unanimous, though a few expressed concerns about potential future cost escalation.

Panel members overwhelmingly thought Build Back Better should be mandatory. Many panel members were surprised the scheme, which provides up to £10,000 for flood resilience repairs after a Flood Re claim, was not already compulsory. A few expressed some concerns around poor installation or the impact if costs required go above £10,000.

Water and energy

The workshops aimed to understand panel members' levels of concern about the impact of climate change on water and energy supply for homes, how this may change in the future, their preferred adaptation options and willingness to pay for these.

Panel members were less concerned about water and energy supply disruptions to homes compared to other impacts. Most had not experienced recent outages or shortages, recalling them as more common in the past. This limited recent experience led many to view these impacts as lower priority and manageable, typically assuming any outages would last no more than a day. Additionally, panel members attributed current disruptions to poor maintenance of infrastructure rather than climate-related impacts such as extreme weather events.

Nonetheless, panel members were concerned about how disruptions and outages would impact vulnerable people, particularly during long-term outages, and their knock-on effects beyond households. Panel members generally felt most other households could cope with short-term disruptions to water and energy supply.

Panel members thought households should become more self-reliant and prepared for outages. They provided examples, such as stocking up on items like candles and bottled drinking water, or purchasing equipment like camping stoves.

Panel members felt emergency response and direct support should target the most vulnerable during disruptions. They saw the key vulnerable groups as older people, those with young children, people with medical needs, disabilities or experiencing mental health challenges and people living alone with additional vulnerabilities. They praised the Priority Services Register (PSR) as an effective way to identify those needing support, whilst advocating regular communication about outages to prevent panic and enable effective household planning.

Panel members thought at a national level, the priority was fixing poorly maintained and inefficient existing infrastructure, ahead of building new facilities like additional water reservoirs. Property-level measures (rainwater barrels for water saving, efficient homes and appliances for energy shortages) were seen as potentially helpful but not adaptation priorities.

Panel members expressed very limited willingness to fund water and energy adaptation measures through increased bills or taxation, citing existing financial struggles and anxiety about affording further increases. They felt water and energy companies had failed in their responsibility to maintain and improve systems and should pay for adaptation measures. Any bill increases were only acceptable with strong safeguards ensuring money would be spent on adaptation, alongside evidence that companies were paying their fair share to improve these systems.

1 Introduction

1.1 Introduction to the project

In January 2025, the Climate Change Committee (CCC) and Sciencewise co-commissioned Ipsos UK to deliver a Citizens' Panel on climate adaptation. The Sciencewise programme helps ensure that policy and research are informed by the views and aspirations of the public through supporting government bodies to run deliberative dialogue processes.[1]

The Citizens' Panel built on previous dialogues[2] and discussed concerns and priorities of households on five key climate change impacts: **flooding** and **overheating of homes**, and the impacts of climate change on **utilities**, **transport** and **nature**. The aim was to explore what a well-adapted UK looks like by considering:

- Which of the impacts of climate change are you most concerned about and why?
- What do you think should be done to adapt to these impacts?

Findings from the Citizens' Panel will inform the CCC's recommendations and advice to the UK Government and Devolved Administrations by feeding into CCC's Well-Adapted UK Report (2026), which will provide policy relevant evidence on how best to address the most urgent climate change risks in the UK.

1.2 Adaptation in the UK

There is unequivocal evidence that climate change is making extreme weather in the UK more likely and more extreme. Across the UK, this may take the form of heatwaves and droughts, heavy rainfall, and wildfire-conducive conditions.[3] These changes will create increasing risks across society and therefore require proactive adaptation.[4]

Climate change adaptation refers to the actions required to manage the effects of unavoidable expected climate change.[5] These actions help reduce vulnerability to the current or expected impacts of climate change in terms of weather extremes and hazards such as heat and flooding that affect homes, nature and services like transportation and utilities. The CCC has warned that the UK's current adaptation efforts are insufficient to meet this challenge.[6]

[1] https://sciencewise.org.uk/

[2] Previous relevant work conducted in this area include a 2022 Defra Climate Adaptation Dialogue (commissioned by Defra and Sciencewise, and delivered by Ipsos in 2022), that explored questions around tolerable risk levels, goals and methods of adaptation in different areas, and what a vision of an England well-adapted to climate change could and should look like; the Environment Agency's adaptation and resilience pathways to flooding, and; CCC's wider evidence

[3] https://www.theccc.org.uk/2025/04/30/the-country-is-not-prepared-for-climate-impacts-say-advisors/

[4] https://www.theccc.org.uk/wp-content/uploads/2025/04/Progress-in-adapting-to-climate-change-2025-1.pdf

[5] https://commonslibrary.parliament.uk/research-briefings/cbp-9969/

[6] https://www.theccc.org.uk/publication/progress-in-adapting-to-climate-change-2025/

The public is keen to see more action on adaptation and to reduce climate related risks. However, there has been substantially less research conducted on what the public's priorities are for adaptation on a national level. This Citizens' Panel was designed to help address this gap.

1.3 Methodology

1.3.1 Governance and contract

The overall governance of this project consisted of the CCC, Sciencewise, an Oversight Group, Ipsos, and Ursus. The CCC set out the panel's objectives, co-designed the workshops and materials with Ipsos, and were among the specialists who presented to panel members during the workshops. Sciencewise co-funded the dialogue and provided expertise in undertaking deliberative processes and in ensuring policy and research is informed by the views and aspirations of the public, and Ipsos was the specialist contractor selected to design, deliver and report the findings of the panel.

An Oversight Group of external specialist professionals was convened to highlight risks and challenges and act as an independent sounding board for decisions about the panel's process and content. It included representatives from public agencies, academic specialists, sector specialists, and public engagement specialists and met four times throughout the project.

Ursus were commissioned as an independent evaluator of the Citizens' Panel. They assessed the project's full process and methodology (for example, panel materials, panel member communications) to ensure the highest quality standards and will publish an independent evaluation of the process. They also provided formative advice throughout the project.

1.4 Panel member selection

A total of 32 panel members were initially recruited from the Greater Manchester area, Cheshire, Derbyshire, Lancashire, Cumbria, Wales, Scotland, and Northern Ireland. Panel members were broadly reflective of UK population demographics (including gender, age, household income level, ethnicity, tenancy, disability, urban or rural location, political affiliation and climate change concern). Recruitment aimed to ensure adequate representation of groups who may face disproportionate climate impacts but are often under-represented in climate discussions, including younger people, ethnic minorities, and lower-income households. The geographic location of the majority of panel members means that there was no representation of parts of the country that are most prone to the impacts of extreme heat. This may have influenced some of the findings and should be considered when interpreting the results.

Central Fieldwork Ltd, a participant recruitment company, were used to recruit panel members through telephone cold-calls from regional qualitative panels and street recruitment. Recruiters determined eligibility and ensured panel members were recruited to an agreed quota. The full participant breakdown across all workshops is included in Table A1, in Annex 1.

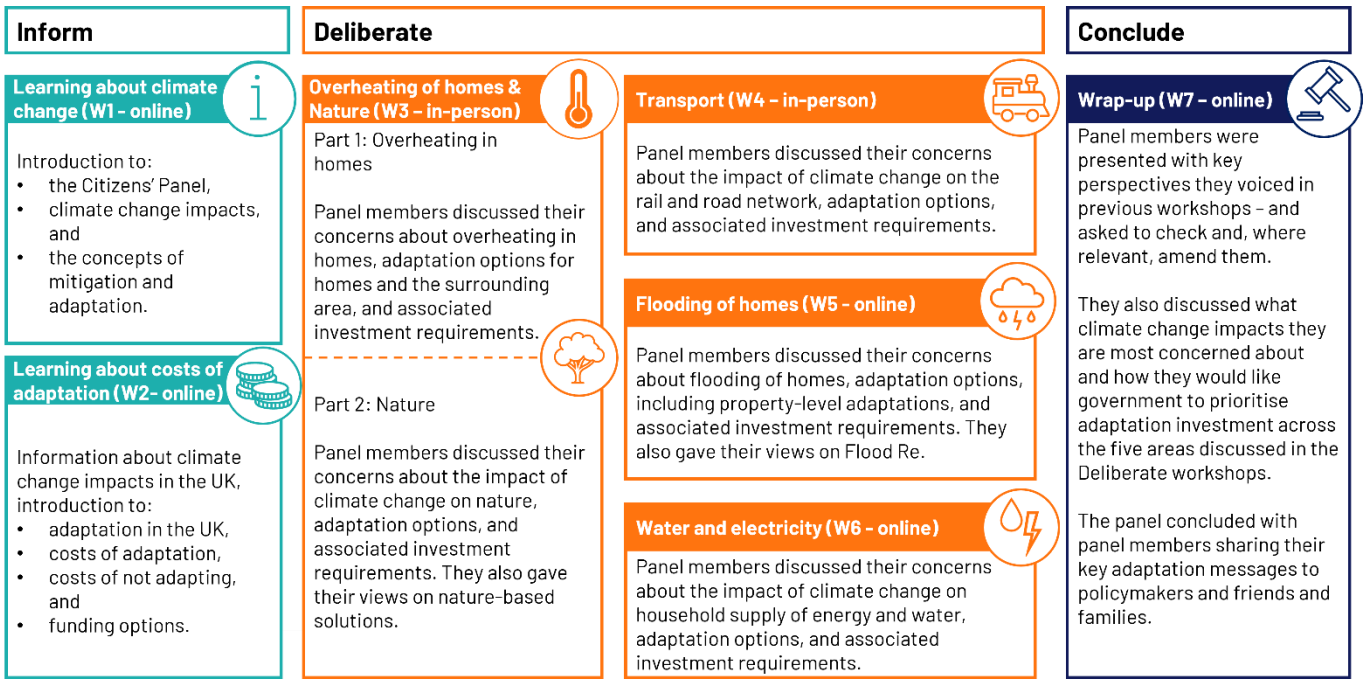
Panel members received a £600 incentive for their participation in all seven workshops. Travel and accommodation for face-to-face workshops were also covered where necessary, with other expenses such as childcare covered if requested to ensure accessibility and inclusivity. This approach was taken to ensure all potential panel members were able to engage effectively.

Out of the 32 panel members initially recruited, three panel members dropped out before Workshop 2. These panel members were replaced, and new panel members attended a short workshop with members of the CCC team to ensure they caught up on Workshop 1 discussions. There were two further panel members who did not attend from Workshop 3 onwards, meaning 30 panel members make up the full sample.

1.5 Structure and flow of workshops

The Citizens' Panel was comprised of seven workshops, which took place over the course of eight weeks, from September to October 2025 and followed the structure outlined in Figure 1.1 below.

Figure 1.1: Citizens' Panel structure



Alongside the workshops, panel members had access to an online community where additional questions were answered in writing.

1.5.1 What each workshop covered

All workshops were designed to be accessible and engaging. Workshops alternated between presentations from leading independent specialists and discussions, used clear and concise presentation materials, and employed "trump cards" to help the panel visualise climate impacts and adaptation options.

The topic workshops (3-6) all followed a similar structure.

- Panel members had initial discussions about the specific climate impact (focused on what they knew and felt about it).
- This was followed by a specialist presentation introducing the topic and how it impacts the UK today and possible impacts in the future.
- Panel members then had a chance to discuss the presentation content and deliberate about their level of concern about the impact.
- Then, panel members were introduced to different adaptation options and estimated investment requirements to reduce the risk of this climate impact.
- This was followed by a discussion about which adaptation options appealed and why, adaptation and investment priorities and panel members' ability and willingness to contribute to funding adaptation options.

The final workshop (Workshop 7) was designed to let panel members reflect on previous discussions about the topics and to prioritise adaptation action across different climate impacts.

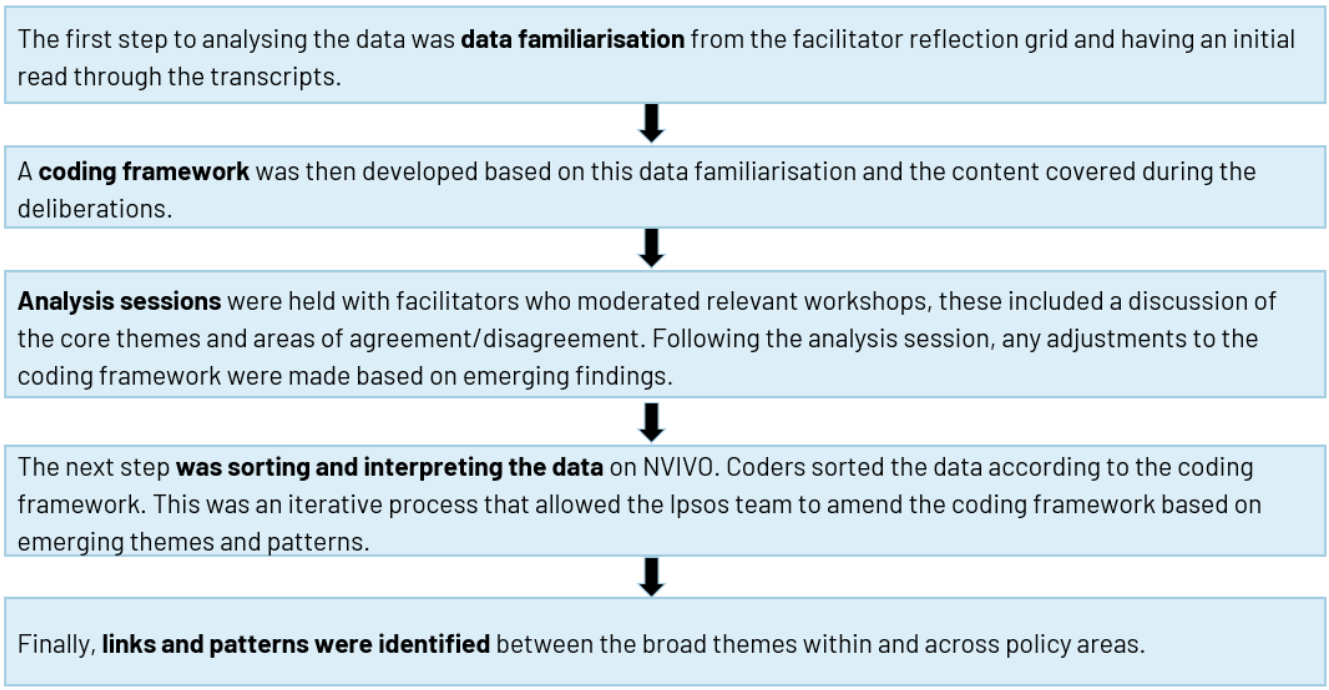
- Panel members were presented with a number of 'perspectives' that they or other panel members had expressed throughout previous topic discussions. The aim was to test emerging perspectives and allow discussions on conflicting perspectives. Panel members were able to amend perspectives to better reflect their views.
- Panel members were then given the opportunity to allocate tokens across the different topics to indicate where government should prioritise adaptation investment.
- The workshop also included discussions about what a well-adapted UK would look like in 20 years and what the key messages on adaptation for the public and policy makers should be.

In addition to panel deliberations, panel members were asked four quantitative questions in short surveys at the end of both learning workshops and the final workshop. This allowed us to track how panel members' individual views changed over time.

1.6 Analysis and interpretation

All sessions were recorded and transcribed. Facilitators also completed a reflection grid after each session, where they recorded the key points discussed by their groups and areas of agreement or disagreement. These reflections were used to create the perspectives discussed in Workshop 7 (see **1.5.1 What each workshop covered**), enabling the Ipsos team to incorporate panel members' feedback on early analysis of perspectives from across the process. The Ipsos team then analysed this data using a five-step approach, as outlined in Figure 1.2.

Figure 1.2: Data analysis approach



The Ipsos team used the following conventions of qualitative social science reporting in presenting its findings in this report:

- Typically, findings that are covered first were expressed most often.
- Strength of feeling is indicated (even when views were expressed by a minority) as this gives useful insight into the range of feelings which exist within different groups of people.
- Terms like "most", "many", "some" and "a few" are used to indicate areas of agreement and disagreement between panel members. They are not used as specific quantitative indicators of depth of feeling.
- This report covers panel members' perceptions rather than facts. Where findings have been inferred from what panel members said (for example through facilitator analysis), this is specified in the text.
- It is reported where panel members framed their views through personal experience by providing anecdotal stories.

1.7 Report structure

The remainder of this report covers key findings from the workshops (outlined below), cross-cutting themes, and thoughts on future deliberations.

- Chapter 2 – Initial reactions to climate change and adaptation
- Chapter 3 – Overheating in homes
- Chapter 4 – Nature

- Chapter 5 – Transport
- Chapter 6 – Flooding of homes
- Chapter 7 – Water and energy
- Chapter 8 – Bringing it together
- Chapter 9 – Future deliberations

2 Initial reactions to climate change and adaptation

What did the learning workshops cover?

- The learning workshops aimed to build a strong foundation of knowledge on climate change and adaptation amongst panel members.
- In Workshop 1, Professor Ed Hawkins (University of Reading) introduced climate change and its impacts, and Dr Richard Millar (CCC) explained the difference between climate change mitigation and adaptation.
- In Workshop 2, Professor Richard Betts (Met Office) presented on the current impacts of climate change in the UK and expected future impacts. Dr Kate Donovan (Edinburgh Climate Change Institute) introduced adaptation in the UK. Jessica Gwyther (Office for Budget Responsibility) and Joshua Deru (CCC) presented on paying for adaptation and the costs of inaction, and gave examples of estimated investment requirements to adapt to different climate impacts.
- These specialists highlighted that government and private sector spending on adaptation requires funding, which results in higher costs for households (e.g., through higher taxes or bills) or reduced spending elsewhere. However, they also stressed the high future costs of not adapting and that the long-term cost of inaction tends to be larger than the initial funding required for adaptation.

Panel members' initial reflections on climate change

- Most panel members were aware of climate change impacts at the start of the Citizens' Panel, before receiving any information. There was generally high concern about the rate of change seen in recent years, but a small minority were unsure about the severity.
- A small number of panel members expressed distrust in the human-made causes of climate change.

Panel members' responses to presentations on climate change

- After hearing from specialists, some panel members were surprised to learn about the speed at which the climate has been changing and the non-reversible nature of climate change impacts.
- Following presentations, panel members expressed greatest concern about flooding, food security, and impacts on vulnerable people and nature.

- Panel members felt frustrated by a perceived lack of adaptation action to reduce climate change impacts and believed more public education was needed.
- Panel members agreed that mitigation must continue alongside adaptation.

Panel members' lived experience of climate change

- Panel members reported already experiencing climate change impacts in the UK.

Panel members' reactions to the concept of climate adaptation

- Panel members reacted positively to the concept of adaptation and were particularly drawn to nature-based solutions during the first introduction to adaptation.
- Panel members had some awareness of adaptation options, particularly around flooding or storm events in the UK, and overheating abroad.
- Panel members initially suggested adaptation should be targeted to regional risks.
- From the start, panel members were concerned that adaptation costs could further increase cost-of-living pressures.

2.1 Initial attitudes towards climate change

This section focuses on panel members' views on climate change, mitigation and adaptation, before they saw any presentations from the first two workshops.

I. **Most panel members were aware of climate change impacts at the start of the Citizens' Panel, before receiving any information. There was generally high concern about the rate of change seen in recent years, but a small minority were unsure about the severity of climate impacts.**

The Citizens' Panel recruited members with diverse levels of climate concern, to reflect levels of concern in the wider UK public.

During opening discussions before specialist presentations, most panel members expressed concern about the pace of climate change. They frequently noted increasing frequency and intensity of climate impacts throughout their lifetimes, particularly rising temperatures. The panel broadly agreed climate change required serious attention, though early reflections remained fairly general.

> **"It seems to have happened in such a short space of time... it's been a sudden thing with the temperatures rising, all the flooding." –** Workshop 1, panel member from Greater Manchester

> **"I'm really concerned about [climate change] and I don't think we're taking enough action at the moment to actually help. I am quite anxious about it all." –** Workshop 1, panel member from Northern Ireland

A few, however, were not very concerned about climate change. These panel members were often either sceptical about the seriousness of the impacts of climate change, or thought other issues were simply more important.

> **"What I struggle with is trying to find out which things are more serious than other things, which things are real, which things are just temporary."** - Workshop 1, panel member from Wales

II. **A small number of panel members expressed distrust in the human-made causes of climate change.**

During initial discussions, a small number of panel members raised doubts about whether climate change is human-made. They cited previous ice ages and historical extreme heat events, such as the heatwaves of 1976, as evidence of natural cycles of cooling and warming.

> **"I wouldn't argue about climate change existing. I'm just not entirely convinced that it's a man-made thing. There's been so many occurrences throughout history. Like the ice age for example, [which] wasn't as a result of human actions, that just happened." –** Workshop 1, panel member from Greater Manchester

The issue of whether climate change is caused by human activities was raised in a Q&A session with Professor Ed Hawkins and as a response he outlined the theoretical and empirical evidence of the link between human activities and a changing climate. Following this, most panel members reflected in groups that this explanation made sense. While a small minority remained sceptical about the anthropogenic causes of climate change, many of those who were sceptical at the start were convinced by the specialist's explanation that human activity causes climate change. All panel members, even those still unsure about the anthropogenic causes of climate change, agreed that the UK would need to adapt to the impacts of climate change.

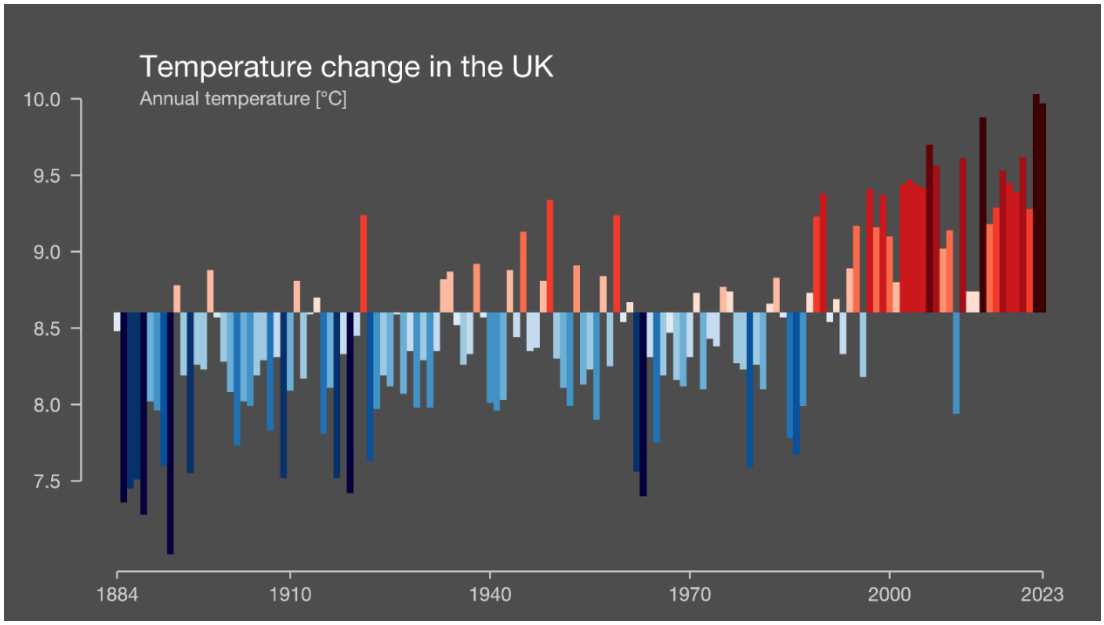
2.2 Responses to presentations on climate change

This section focuses on panel members' responses to presentations on climate change, and the introductions to mitigation and adaptation in the two learning workshops and any impact this information had on their views.

I. **After hearing from specialists, some panel members were surprised to learn about the speed at which the climate has been changing and the non-reversible nature of climate change impacts.**

Following the first presentation on climate science and impacts, many panel members expressed surprise at the pace of climate change, despite knowing it was occurring. The visual illustration comparing recent warming rates to previous decades (Figure 2.1) particularly struck them, as did learning that many current and future impacts are irreversible.

Figure 2.1: Graph showing temperature change in the UK since 1884



Some panel members who had previously been unaware of the scale and speed of climate change reflected that they now understood its seriousness. They worried that UK infrastructure could not cope with increasingly extreme and unpredictable weather, recalling how recent heat and cold had caused home discomfort and travel difficulties.

> **"The things that Ed talked about wouldn't have even crossed my mind before and I wouldn't have even linked them to climate change. So, I feel like I know a lot more now. The seriousness of [climate change] makes me [want] to make a difference."** - Workshop 1, panel member from Greater Manchester

> **"I think the presentation showed, if you do look at the facts, [climate change] is not just a temporary change that will pass eventually, like an ice age. I think [the data] shows it actually is a problem."** - Workshop 1, panel member from Wales

However, a small minority remained sceptical about the seriousness of climate change impacts:

> **"I think the information that we get is from one extreme to another. So, I never know what to believe. If I'm honest, I don't take it that seriously."** – Workshop 1, panel member from Greater Manchester

II. **Following presentations, panel members expressed greatest concern about flooding, food security, and impacts on vulnerable people and nature.**

After receiving an initial overview of climate impacts in the UK, panel members expressed greatest concern about residential property loss and damage from increasingly frequent and severe flooding. They particularly worried about vulnerable people - especially older people or those with disabilities - becoming trapped in homes, and areas becoming uninhabitable. Panel members expressed sadness that coastal flood-risk residents might be unable to sell properties due to erosion risk and rising insurance costs and worried about the implications of this on overall fairness.

> **"I think the thought of losing your home is probably the thing that makes me feel the most insecure. Like everything else, I feel like there's something to counteract it. But the thought of losing your home and your safe space, that's a very big lifestyle change and I don't think anything can be put into place." –** Workshop 1, panel member from Greater Manchester

Panel members also worried significantly about climate change threatening food security and prices – with concern about rising food costs likely influenced by the ongoing cost-of-living crisis at the time of the workshops.

> **"Climate change is affecting how much food people can grow, and that's going to directly affect the people and what they can eat, or prices might go up for certain food." –** Workshop 2, panel member from Greater Manchester

A few reflected on the impact of climate change on nature - particularly those who had experienced nearby wildfires, who expressed strong concern for Pennine wildlife.

III. Panel members felt frustrated by a perceived lack of adaptation action to reduce climate change impacts and believed more public education was needed.

Having learned more about the impacts of climate change, panel members frequently expressed frustration at insufficient action to combat them.

> **"It's not like [climate change] has only started happening five years ago. People have been banging on about this for a long time. It's usually only when we get to the really serious end of things that we as humans will react." –** Workshop 1, panel member from Greater Manchester

Panel members consistently stated the UK needed greater investment in climate adaptation. They frequently cited transport infrastructure, where most had experienced weather-related disruption, as already unable to cope. They felt there was either insufficient investment or a lack of will to upgrade infrastructure to combat rising temperatures and extreme weather.

> **"The UK isn't really prepared for the level of change that is coming. The temperatures rise annually. That's a fact. It's not a myth. Most people are just concerned about living, they're not concerned about the long-term changes because they just have day-to-day challenges to face." -** Workshop 1, panel member from Wales

They also argued that everyone should have access to the same information about climate change impacts they had received to improve public awareness and understanding.

> **"We're in this sort of mess where we are now, some people believe [climate change] is imminent, some people believe it's never going to happen. So, we have to really show them that it is serious. That's where I am." -** Workshop 1, panel member from Greater Manchester

IV. Panel members agreed that mitigation must continue alongside adaptation.

Panel members found focusing discussions on adaptation challenging. They were more familiar with mitigation policies and thought it was essential to prevent worsening climate impacts. They strongly felt adaptation should not eclipse mitigation efforts, concluding both approaches required investment.

> **"I realised that even if we make all of the necessary mitigations and changes, we are still going to be dealing with the fallout. I didn't really appreciate that no matter what happens, we're actually still going to be dealing with the consequences of climate change." -** Workshop 2, panel member from Greater Manchester

> **"I think at this stage is very important that we do both [mitigation and adaptation]. We do need to prepare, we need to get ready, we need to look after vulnerable people and these are good easy adaptable steps. We need to adapt as mitigation is not enough anymore."** – Workshop 1, panel member from Greater Manchester

Many noted the importance of international mitigation efforts given global emissions. Some felt it unfair that the UK pursued legally binding Net Zero targets whilst other high-emitting countries continued increasing emissions.

2.3 Lived experiences of climate change

This section focuses on how panel members' own lived experiences shaped their early views on climate change, mitigation and adaptation.

I. Panel members reported already experiencing climate change impacts in the UK.

The types of impacts that panel members recalled were influenced by where they lived: Greater Manchester, rural areas in Derbyshire and Cumbria, and a smaller number from Northern Ireland, Scotland and Wales.

Reflecting on lived experience, panel members frequently highlighted climate change-related impacts like flooding and mudslides, which caused travel disruption.

> **"The situation I look at and wasn't prepared [for] is actually the opposite of heat. It was when it was really bad snow and our road was muddy. I had a shift about five miles away from my house and I had to walk because no cars could go on the road apart from Range Rovers." -** Workshop 2, panel member from Greater Manchester

A few recalled friends' or relatives' flooded homes. One described their own home flooding, detailing severe life impacts from high repair costs and forced relocation.

> **"[Climate change impacts have] already happened especially around Cumbria with a lot of flooding. In my old house, I had to move due to floods and [this impact] is becoming increasingly [more frequent]. It's something that I think is a big concern for the future." -** Workshop 1, panel member from Greater Manchester

Others experienced wildfires in the Pennines, with one having to evacuate due to smoke and fire. Some faced summer heatwaves, though several only knew overheating impacts through family experiences or travels to warmer countries like Dubai, Spain and Italy. Those familiar with overheating described adaptations from behavioural change, like siestas and adjusted working hours to property-level adaptations like shutters and air conditioning.

2.4 Reactions to the concept of climate adaptation

This section focuses on panel members' first reactions to the concept of climate adaptation and an overview of adaptation approaches and funding that they were introduced to in the first two workshops. Chapters 3-7 have more detail on attitudes towards adaptation options to address different climate impacts.

I. Panel members reacted positively to the concept of adaptation and were particularly drawn to nature-based solutions during the first introduction to adaptation.

Panel members responded positively when first introduced to adaptation measures. They particularly liked the sponge city example in West Gorton Community Park, Manchester, which could reduce overheating and flooding whilst increasing biodiversity.[7] Panel members also welcomed integrating nature-based solutions into city redevelopment projects as part of infrastructure upgrades.

[7] The sponge city is a concept which refers to a way of urban water management that allows cities to resolve urban waterlogging, improve water storage and discharge capacity, and was a key adaptation option taken as part of Manchester's Green and Blue Infrastructure Strategy. Manchester City Council. 2022. Appendix B Green and Blue Infrastructure Strategy Review. Available online at: https://www.manchester.gov.uk/download/downloads/id/28588/appendix_b_green_and_blue_infrastructure_refresh.pdf

"The sponge cities in Manchester stood out to me. A lot of cities are having a lot of road works and infrastructure changes, and they should expand on the sponge cities at the same time." – Workshop 2, panel member from Greater Manchester

II. Panel members had some awareness of adaptation options, particularly around flooding or storm events in the UK, and overheating abroad.

When invited to share examples of adaptation they were aware of, panel members highlighted various flood prevention measures: bespoke home flood defences, the Thames Barrier, reinforced riverbanks, and river diversion or dredging.

"A friend of mine owns a big property on a river in Monmouth and the Welsh government actually gave them quite a bit of funding, a few hundred thousand pounds to build a really big flood defence to put alongside and underneath their home to stop the water coming in and below their home and undermining it." – Workshop 1, panel member from Wales

Those in flood-risk areas or with friends and family living in those areas, described evacuation processes, warning sirens, sandbags (but criticised them as insufficient) and newly installed flood defences.

"We did have the floods, and they've just built a brand-new flood barrier system across the coastline. So, I've recently seen the changes, and I've recently seen the investments and even some of the farmland that they're digging holes in the ground [in agricultural farmland] to try and capture the water." – Workshop 2, panel member from Greater Manchester

Some panel members acknowledged the information they had heard on adaptation was entirely new to them.

III. Panel members initially suggested adaptation should be targeted to regional risks.

During the learning workshops, panel members argued adaptations should be targeted based on the risks in different areas. They suggested making southern England more resilient to overheating and drought whilst directing flood adaptation funding to higher-risk areas.

IV. From the start, panel members were concerned that adaptation costs could further increase cost of living pressures.

In presentations, panel members were informed that state-funded adaptation programmes would require public funding through increased taxes or changes in government spending, and that investment from private companies would likely feed through to increased consumer prices. They also learned that a failure to invest in adaptation would result in much larger future costs (e.g. for recovery after an extreme weather event).

Panel members grappled with the trade-off between investing now versus paying more later. Whilst recognising the future costs of inaction, they equally worried about adaptation costs being funded by households who could not afford it.

> **"In the back of my mind I'm thinking: which politicians are going to be brave enough to push through with this when the cost-of-living situation is proving to be so divisive and problematic ... it's unfortunate that it comes at this point in our financial climate." –** Workshop 2, panel member from Greater Manchester

Concerns around how to fund adaptation dominated discussions throughout. Panel members frequently highlighted existing cost of living pressures, expressing frustration that many, including themselves, already struggled financially and would find additional costs difficult to manage.

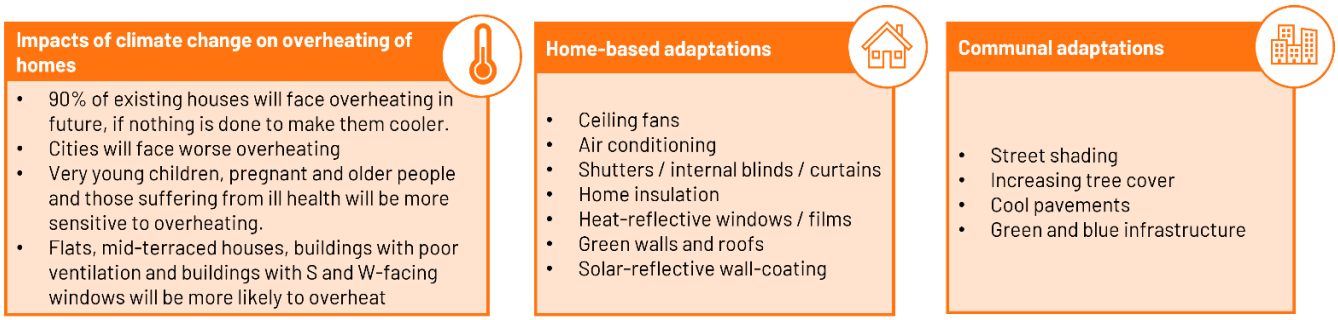
> **"When they were talking about putting money aside for the future, I thought I can hardly pay my bills now, never mind putting money aside. So, I don't know how people are going to be expected to do that." –** Workshop 2, panel member from Scotland

3 Overheating in homes

What did we cover on climate change's impact on overheating in homes?

- The impacts of climate change on overheating in homes were discussed in Workshop 3 and Workshop 7.
- In Workshop 3, Professor Anna Mavrogianni (University College London) introduced the panel to overheating in UK homes, including its current extent, future risks, and impacts on different groups including heat-related mortality. Panel members also viewed a video of a pregnant woman describing how overheating affects her, and her concerns for her unborn baby.
- Owen Bellamy (CCC) introduced panel members to a range of adaptation measures that can be installed in homes (e.g. shutters or air conditioning) or applied to surrounding areas (e.g. trees, green spaces or shading canopies), their effectiveness and associated costs. Panel members also received information on estimated investment costs to support lower income households with the uptake of some of these measures.

Figure 3.1: Summary of the impacts of climate change on overheating in homes and adaptation options presented to panel members during workshops



Panel members' awareness of and concern about the impact of overheating in homes

- The majority of panel members had not experienced overheating in UK homes, with many attributing this to where they live.
- Panel members were less concerned about overheating in their own homes than about its impact on vulnerable people and other areas in the UK.
- Overall, the panel expressed greater concern about being able to heat their homes in winter, than to stay cool in summer.

Panel members' approach to adapting to overheating in homes

Home-based adaptation measures:

- Overall, panel members strongly supported smaller home improvements as quicker and more cost-effective than larger-scale alternatives. Cost was an important consideration for all measures.
- Panel members expressed mixed views about air conditioning to cool homes, but felt that people will likely opt for portable air conditioning systems as a 'quick fix' in the future.
- Panel members felt that households had a responsibility to implement small-scale home adaptation measures where possible.
- Although smaller-scale adaptation measures were strongly supported, many preferred insulation for its dual benefit of warmth in winter and cooling in summer.
- Panel members felt the Government should provide financial support — especially for vulnerable people who are on low incomes — to help implement home adaptations but were split on paying higher taxes to fund this.
- Panel members saw an opportunity in new builds, noting it is easier to incorporate solutions from the start than to retrofit homes later.

Communal adaptation measures:

- When discussing communal adaptation options, panel members strongly preferred nature-based solutions such as tree-planting and green space creation in urban areas to man-made solutions but supported alternatives where space constraints exist.
- When discussing communal adaptation options, panel members felt more vulnerable areas should be prioritised.
- Panel members were concerned about the costs of communal measures like nature-based solutions and street shading, and suggested different ways to try and fund these.

How panel members prioritised overheating in homes compared to other impacts

- Panel members were less concerned about overheating in homes, compared to other climate impacts, but did not want overheating in homes to be disregarded as an issue.
- Panel members still wanted the Government to direct some investment to adaptation for overheating in homes, targeted to support vulnerable people on low incomes.

3.1 Awareness of and concern about the impact of overheating in homes

I. The majority of panel members had not experienced overheating in UK homes, with many attributing this to where they live.

Most panel members had not experienced overheating in UK homes and were surprised to learn it is an increasingly recognised problem. They typically associated it with other countries, citing their experiences abroad or seeing it in news coverage. They noted that overheating was not currently an issue in northern England, Northern Ireland and Scotland (where most lived), suggesting it might only become problematic in the more distant future. This finding may reflect the sample's geographical composition.

> **"I don't know much about it as a northerner; it would be nice to understand more…in general, in the UK we don't get a lot of it usually—only the last couple of years we seem to get better summers." –** Workshop 3, panel member from Greater Manchester

> **"To me personally, it has had no impact on me. I will be honest; I have enjoyed it when it is warm and nice. I have never felt like I am overheated." –** Workshop 3, panel member from Greater Manchester

A small number reported experiencing overheating at home and outdoors, affecting themselves, or family and friends through poor sleep, reduced productivity, heat stroke and seizures. Those whose homes had overheated typically lived in older buildings, student halls with floor-to-ceiling windows, properties with restricted window opening, or rooms lacking shade.

> **"I remember being really uncomfortable, buying three fans to move air around the house." -** Workshop 3, panel member from Wales

> **"My friend is 36. During the heat wave, he had a massive seizure, heat stroke, and he was in the hospital for four days, all due to overheating." -** Workshop 3, panel member from Wales

II. Panel members were less concerned about overheating in their own homes than about its impact on vulnerable people and other areas in the UK.

Most panel members viewed overheating in homes as insignificant for themselves, believing it affects the UK for only a few days annually with sufficient time to adapt through home-based or communal measures. Some gave specific examples of successful adaptation abroad (such as Spain's use of tree shade) and experiences of recent heatwaves reassured them that rising temperatures were manageable. Several even welcomed warmer weather as a benefit rather than a threat, at least for now.

> **"[Overheating] is in the next 20 years. I just feel as long as we are preparing it's not a major worry yet." –** Workshop 3, panel member from Greater Manchester

However, concern was markedly higher for vulnerable groups including people from lower socioeconomic backgrounds, older adults, newborns, and those with heat-sensitive health conditions. Panel members particularly noted that lower-income households would struggle to afford adaptation measures, concluding that government investment should target those most vulnerable to overheating impacts who lack financial means to adapt.

> **"You can mix it up, subsidise for those who fall within that vulnerable group, to help keep you safe. If you are in the poorest 10% and vulnerable, it would [cost less] to support that."** – Workshop 3, panel member from Greater Manchester

III. Overall, the panel expressed greater concern about being able to heat their homes in winter, than to stay cool in summer.

Most panel members felt that staying warm in the winter was a bigger concern than cooling down in the summer, particularly in colder parts of the country.

> **"At the moment, I'm more worried about heating rather than keeping it cool. I like warm weather." -** Workshop 3, panel member from Greater Manchester

3.2 Approach to adapting to overheating in homes

The panel was presented with a range of home-based and communal adaptation measures. Where text is *italicised*, this indicates a perspective that panel members discussed and agreed on during the final workshop.

3.2.1 Home-based adaptation measures

This subsection presents findings related to the home-based adaptation options summarised in Figure 3.1.

I. **Overall, panel members strongly supported smaller home improvements as quicker and more cost-effective than larger-scale alternatives. Cost was an important consideration for all measures.**

Those who had experienced overheating had already made small adjustments including blinds or dark curtains, ceiling fans and portable air conditioning units. Panel members favoured these low-cost, easily implemented measures that proved effective without affecting home aesthetics.

> **"Internal blinds and curtains are quite a doable thing; it is accessible to everyone. Not for a select few, a lot of people will be able to afford that." -** Workshop 3, panel member from Greater Manchester

Despite this support, panel members worried that certain measures could increase ongoing costs through higher electricity bills (from air conditioning) or increased rent (if landlords installed adaptations). Those unable to afford such increases said these home measures would become unviable.

> **"I rent privately; I would love to have shutters – but if I asked for that they would up my rent a lot. I'm too scared to ask them for anything as they will put my rent up." -** Workshop 3, panel member from Greater Manchester

> **"I see the benefit, but I can't pay that. How am I going to find that money?" -** Workshop 3, panel member from Wales

A less prominent concern was that these measures might prove temporary, becoming ineffective as overheating intensifies over time.

Panel members expressed less support for larger-scale improvements, such as solar-reflective paint on external walls and rooftops and tinted windows. They doubted their effectiveness and worried about the substantial coordination required between councils, landlords and tenants, alongside larger upfront costs.

"If my neighbour painted their house they would have problems with the council. They have caveats of what you can and cannot do." - Workshop 3, panel member from Greater Manchester

II. **Panel members expressed mixed views about air conditioning to cool homes but felt that people will likely opt for portable air conditioning systems as a 'quick fix' in the future.**

Most panel members were positive about air conditioning, especially cheaper portable units, viewing them as quick, effective solutions accessible to renters with low upfront costs. However, some raised concerns about running costs, noise, sustainability and potential aggravation of respiratory conditions, which might deter some households from choosing air conditioning.

"In terms of implementation, air conditioning is the only thing here that is actually realistic." Workshop 3, panel member from Manchester

"The cost of cooling is as expensive as heating; it's concerning to me." – Workshop 3, panel member from Northern Ireland

"I am not a fan. I have an autoimmune illness, which affects my ability to breathe. When there is a lot of air conditioning, I cannot breathe." – Workshop 3, panel members from Greater Manchester

III. **Panel members felt that households had a responsibility to implement small-scale home adaptation measures where possible.**

They believed households had a responsibility to take action where possible, even if requiring minor financial contribution, particularly when it came to small-scale home improvements.

"I think this is something we need to invest in within our own homes, but wages, incomes and cost of living mean people are going to have to sacrifice things in their lives. I think we should take a hit in our income to support our future comfort." - Workshop 3, panel member from Greater Manchester

The idea of households taking responsibility for installing smaller-scale property-based measures was revisited in the final workshop, where panel members agreed with a key perspective that: *We should take responsibility for adapting behaviours and homes to manage extreme heat, supported by information on how to do so, and financial support if they cannot afford to do so.*

IV. **Although smaller-scale adaptation measures were strongly supported, many preferred insulation for its dual benefit of warmth in winter and cooling in summer.**

Panel members valued insulation's co-benefits across seasons – reflecting their greater concern about heating homes in winter over cooling them in summer. Nevertheless, a few raised concerns about the fitting of home insulation, citing previous bad experiences with low quality installation.

> **"At one stage, I purchased a thatched cottage. I was told at the time that thatch is wonderful, in summer it is cool, in winter it is warm. Historically, there were solutions; thatch is natural. Insulation can work two ways." –** Workshop 3, panel members from Northern Ireland

The idea of prioritising measures that offer additional benefits as well as adaptation was revisited in the final workshop, where panel members agreed with a key perspective that: *We should prioritise adaptation options that provide multiple benefits (for example, good insulation which can keep homes warm and cool, or green infrastructure in urban areas).*

V. Panel members felt the Government should provide financial support — especially for vulnerable people who are on low incomes — to help implement home adaptations but were split on paying higher taxes to fund this.

Panel members were concerned that lower-income households could not afford home adaptation measures, particularly those with higher upfront costs. They strongly advocated government support through targeted grants for lower-income and vulnerable groups (older people or those with health conditions).

> **"My mother, who was 93, would not light a candle if it would cost money. Elderly people are vulnerable." –** Workshop 3, panel members from Northern Ireland

> **"To be fairer, making sure it's not tiered where the poorest get nothing and the richest get it all. There are a lot more vulnerable groups, people living off pensions, older and younger vulnerable people, who need help." -** Workshop 3, panel member from Greater Manchester

However, their views diverged on funding these grants through tax increases. While most wanted to contribute in principle, some felt they could not afford higher taxes in practice. Panel members concluded that any tax increases should be proportional to income, protecting lower-income households from bearing the same burden as wealthier ones.

> **"I'm not [paying] for everyone. If there were a newborn baby or an elderly person, then I would pay more."** – Workshop 3, panel member from Greater Manchester

> **"In an ideal world I would pay [the highest amount], but at the moment I can't afford it**." – Workshop 3, panel member from Scotland

VI. Panel members saw an opportunity in new builds, noting it is easier to incorporate solutions from the start than to retrofit homes later.

Panel members preferred investing in adaptive design to ensure homes stay warm in winter without overheating in summer for new builds, rather than later retrofitting. They viewed government regulation and building standards as the mechanism to achieve this.

> **"You can start with new builds. Make a difference through actual impact, building a house that you can do in less than a year. It's a real change for now. Then we can consider an older building." –** Workshop 3, panel member from Greater Manchester

They also identified a key trade-off between aesthetics and practicality – particularly with popular floor-to-ceiling windows that worsen overheating.

> **"A new build was what I went into; it was meant to be brand new, and I baked alive, so I hated it." –** Workshop 3, panel member from Greater Manchester

3.2.2 Communal adaptation measures

This subsection presents findings related to communal adaptation options summarised in Figure 3.1.

I. When discussing communal adaptation options, panel members strongly preferred nature-based solutions such as tree-planting and green space creation in urban areas (see Chapter 4 – Nature, for more detail) but supported alternatives where space constraints exist.

Panel members favoured nature-based solutions for their multiple co-benefits: improving mental health and biodiversity, reducing flooding, providing urban green space access and enhancing aesthetics. Some noted the need for caution and proper maintenance to prevent issues like pavement damage from tree roots.

> **"The more trees, nature, and wildlife, [the more] benefit [for] residents and mental wellbeing." –** Workshop 3, panel member from Scotland

> **"If they choose the right trees with ones that don't have massive roots that spread, that might be good." –** Workshop 3, panel members from Greater Manchester

Drawing on international experience, panel members supported alternatives for densely built cities where they felt limited space would restrict the ability to implement nature-based solutions. One example of this was painting solar-reflective paths within dense cities. They noted that an additional advantage of this approach is its reversibility, where communal path-painting could be removed if residents decided against this measure in the future.

> **"I like the solar reflective floors and painted pavements – in highly dense areas like London, where there are no greenery options." –** Workshop 3, panel member from Wales

II. When discussing communal adaptation options, panel members felt more vulnerable areas should be prioritised.

Panel members suggested targeting government investment in communal adaptations in areas most susceptible to overheating, benefiting at-risk communities whilst allowing government to learn and refine solutions for future implementation.

> **"We should do something in the areas currently having difficulty, and not in areas like mine where I am not having difficulty." -** Workshop 3, panel member from Northern Ireland

This approach was reinforced in the final workshop, where panel members agreed with the perspective that: *We should start slow, targeting areas that need it most and that are already experiencing overheating, and test out what works, incorporating learning from other countries.*

III. **Panel members were concerned about the costs of communal measures like nature-based solutions and street shading, and suggested different ways to try and fund these.**

Panel members supported these solutions, but were concerned about the ability of local government to afford adaptation measures without impacting other services, and were particularly worried about seeing increased costs in local taxes. Whilst some panel members would accept higher taxes (either local or national) to fund adaptation measures, they wanted reassurance that additional revenue would be spent on adaptation.

> **"I would [pay] to help other in society knowing my house is in order. We all support people anyway, we all contribute" -** Workshop 3, panel member from Greater Manchester

Some also wanted major business contributors to climate change taxed or required to invest in adaptation measures directly.

> **"You should not exclude the business enterprises ... we aren't warming up the planet as much and they should be paying." -** Workshop 3, panel member from Greater Manchester

> **"I want to see major corporations contribute as well." -** Workshop 3, panel member from Scotland

3.3 How overheating in homes was prioritised compared to other impacts

The following section summarises how panel members viewed overheating in homes when compared to other topics (climate impacts on nature, transport, energy and water and flooding of UK homes).

I. **Panel members were less concerned about overheating in homes, compared to other climate impacts, but did not want overheating in homes to be disregarded as an issue.**

When asked about their greatest concerns, panel members typically highlighted flooding of homes and transport disruption; they felt these were more direct, tangible impacts on people, requiring immediate action and investment for adaptation. However, while most did not view overheating in homes as a top priority, some expressed strong concern about its increasing severity in the future.

Panel members emphasised that investment should support solutions with co-benefits – for example, nature-based solutions, like increased tree planting.

II. Panel members still wanted the Government to direct some investment to adaptation for overheating in homes, targeted to support vulnerable people on low incomes.

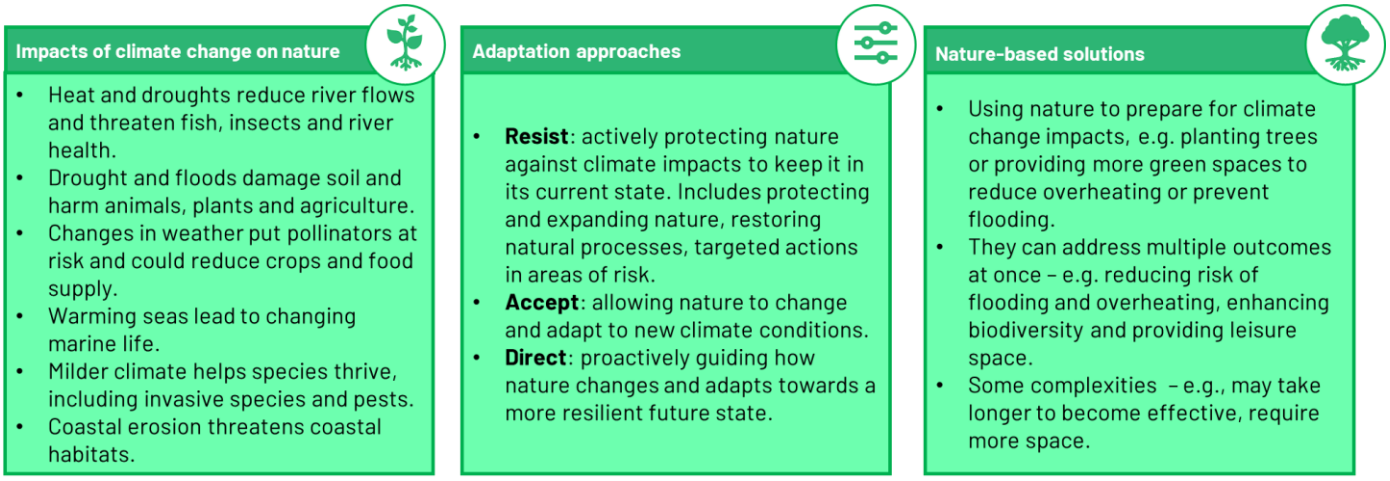
In the final workshop, panel members indicated that whilst overheating was less urgent, some investment should target vulnerable people on low incomes. They acknowledged overheating would likely become more significant in future and required some funding now to support preparing for this.

4 Nature

What did we cover on climate change's impact on nature?

- The impacts of climate change on nature were discussed in the afternoon of Workshop 3 and in Workshop 7.
- In Workshop 3 Mike Morecroft (Natural England) introduced the panel to the impacts of climate change on nature in the UK and ways people can support nature in adapting to these impacts. They also received information about the estimated investment cost to increase nature resilience in the UK.
- Kit England (Paul Watkiss Associates) gave an overview of the concept of nature-based solutions, associated benefits and complexities, and examples of nature-based adaptation projects.

Figure 4.1: Summary of the impacts of climate change on nature and adaptation options presented to panel members during workshops



Panel members' awareness of and concern about the impact of climate change on nature

- Panel members most closely associated nature with what they could access and interact with regularly.
- Most panel members recalled observing or experiencing a decline in the visibility and diversity of nature in their lifetimes and were concerned by this.
- Most panel members were concerned about the impact of climate change on nature in the UK, particularly how these changes would negatively affect people.
- The minority of panel members who were less concerned about climate change impacts on nature had either not experienced changes or believed nature could adapt itself.

Panel members' approach to adapting to the impact of climate change on nature

- While most felt nature had intrinsic value, panel members agreed they wanted to: *Prioritise adaptation options which would benefit people the most (e.g., protecting pollinators to ensure food production).*
- Panel members overall agreed with the perspective that: *We should accept some changes are inevitable, and we should not try to 'resist' or prevent them.*
- Panel members preferred nature-based solutions to other adaption measures, agreeing that we should: *Prioritise adaptation options that work within nature where effective.*
- Most panel members were willing to contribute financially to protecting nature, but wanted public money spent transparently and on the most effective solutions.
- Some panel members wanted to see private and charity sectors help fund or deliver nature-based solutions.

How panel members prioritised nature compared to other impacts

- Panel members were generally less concerned about climate change impacts on nature compared to other impacts but did not want nature forgotten.
- Investing in nature itself was typically not the top priority, but nature-based solutions for other impacts were viewed positively.

4.1 Awareness of and concern about the impact of climate change on nature

I. Panel members most closely associated nature with what they could access and interact with regularly.

When asked what nature meant to them, panel members typically referred to nearby places they regularly encountered - from gardens and local parks to rural areas they could easily explore. Wildlife and green spaces were also central to their understanding of nature.

> **"[It's] a critical part of life to walk out in nature – how good a feeling is that?" –**
> Workshop 3, panel member from Greater Manchester

II. Most panel members recalled observing or experiencing a decline in the visibility and diversity of nature in their lifetimes and were concerned by this.

Panel members often noticed reduced numbers of mammals, birds and insects, with bees and other insects frequently cited as key, visible indicators of nature's decline. There was some demographic variation within this, for instance, older panel members and those living in more rural areas more often saw visible evidence of these changes – particularly fewer insects in hedges, gardens or whilst driving than in the past. Younger members, living in urban areas may not have seen these changes occurring, but were aware they were happening.

"This year, I tried to count how many bees I saw – I couldn't see anything." – Workshop 3, panel member from Northern Ireland

"When I was a kid, we had lavender bushes outside our house, and there were hundreds of bees all summer. Now, I have similar bushes, rose bushes, and I rarely see one." – Workshop 3, panel member from Wales

III. Most panel members were concerned about the impact of climate change on nature in the UK, particularly how these changes would negatively affect people.

Despite noticing some changes, panel members were surprised by the full scale of climate impacts on UK nature. Many had previously considered this an issue for other countries, referencing well-known international conservation efforts, or viewed nature's decline as abstract rather than directly affecting their lives.

Most were concerned about the impacts presented and particularly worried about effects on agriculture and food production through droughts, declining pollinators and unpredictable weather. They were alarmed to learn from Natural England that these changes were already occurring, threatening future UK food production and potentially increasing food prices.

"I was thinking nature was somewhere in the countryside, but after seeing that, I realise it affects everything, including food, with changes to food prices. All those things affect us daily; it's not just a distant issue in the countryside." – Workshop 3, panel member from Greater Manchester

Panel members had additional concerns around declining fishing industries (noted by a Welsh panel member), increased coastal erosion threatening habitats and communities and more frequent wildfires endangering people, plants and wildlife. These concerns were linked to broader fears about water systems, pollinators and overall ecosystem health.

"I think nature is a sublime system that just works, and we are impacting on it. We are veering it off in directions it should not go and taking species out and leaving a void." – Workshop 3, panel member from Northern Ireland

They expressed sadness about the idea that future generations would not experience or have access to the same nature they had known.

"I think it's very important and sad that things are dying off. Our children and our children's children won't see certain species and bees and butterflies are dying. If we can help it, we should help it. If we can prevent it or save it, we should." – Workshop 3, panel member from Scotland

IV. The minority of panel members who were less concerned about climate change impacts on nature had either not experienced changes or believed nature could adapt itself.

Despite overall strong concern about the impacts of climate change on nature, a few panel members reported lower concern, often based on personal experience. Those who had not seen significant changes or still regularly encountered nature tended to be less worried.

Some also believed species could adapt to future conditions or viewed changes as part of natural cycles, while others disagreed, arguing that the speed and scale of change would not allow species time to adapt.

> **"I do not see it [the impacts on nature] as being a continuous thing. All the other countries with hotter weather than ours seem to cope." –** Workshop 3, panel member from Greater Manchester

> **"I see what you mean about changing species. Yes, we gradually see this change, but the change we are seeing now is unlike anything we have seen before." –** Workshop 3, panel member from Greater Manchester

4.2 Approach to adapting to the impact of climate change on nature

The following section focuses on what panel members thought should drive adaptation approaches, rather than specific adaptation options. Where text is *italicised*, this indicates a perspective that panel members discussed and agreed on during the final workshop.

I. **While most felt nature had intrinsic value, panel members agreed they wanted to*: Prioritise adaptation options which would benefit people the most (e.g., protecting pollinators to ensure food production).***

Panel members generally wanted nature protected, but for many its intrinsic value was superseded by its practical benefits to people. In the final workshop, they suggested focusing on benefits to people as a realistic prioritisation given finite government and public resources, though some felt selfish about this stance.

> **"It's the impact on human life that we're trying to skew towards rather than just looking after the whole ecosystem of plants and the birds and the bees, whilst not neglecting their need." –** Workshop 7, panel member from Greater Manchester

This perspective emerged most strongly regarding nature's role in agriculture. Panel members prioritised protecting pollinators and other nature essential for affordable food production over species without similarly vital human benefits. Whilst recognising nature as an interconnected system where losses have wider impacts, they maintained that adaptation should focus on reducing impacts on people.

> **"I suppose realistically, can we really [protect everything], and do we then have to prioritise the stuff that is more important in regards to the food chain?"** – Workshop 7, panel member from Greater Manchester

A few strongly disagreed, arguing it was morally important to protect threatened nature regardless of human benefit.

II. **Panel members overall agreed with the perspective that: *We should accept <u>some</u> changes are inevitable, and we should not try to 'resist' or prevent them*.**

Panel members were consistent throughout the discussions on nature, that preventing inevitable losses would waste resources that could be better spent on more cost-effective adaptation measures. They emphasised this acceptance applied only to genuinely unavoidable changes.

> **"I think this one [some species loss] is inevitable, it is not necessarily worth our mental time. Even if we stopped emissions today, we are where we are. If we make progress, this is going to happen – we need to plan for where we see ourselves in 20 years." –** Workshop 3, panel member from Greater Manchester

> **"If we try to resist and fail, you've squandered money that could have been spent elsewhere." –** Workshop 7, panel member from Wales

A key example of this was coastal erosion, where panel members acknowledged the change in coastal landscape as sad but inevitable, advocating a practical approach rather than expensive attempts to prevent change. However, they stressed that nature should not be forgotten and should be protected wherever possible.

> **"Things will change and we have to accept it, but we should try and limit some of it and look after what we have in abundance." –** Workshop 7, panel member from Scotland

III. **Panel members preferred nature-based solutions to other adaption measures, agreeing that we should: *Prioritise adaptation options that work within nature, where effective*.**

Throughout the nature workshop, panel members favoured nature-based over human-made[8] adaptations, even before learning about nature-based solutions specifically. They preferred planting trees along riverbanks to installing flood defences, believing natural approaches offered better long-term effectiveness and prevented future harm.

> **"Not building man-made structures, [...], just letting the environment manage itself, so there are potentially no negatives in the long run." –** Workshop 3, panel member from Wales

They liked that nature-based solutions are natural processes, believing that this would enable nature to better stabilise itself.

[8] This term refers to adaptation options which are engineered, involving using structural, technological, and institutional interventions to reduce climate change risks. An example of this would be sea walls or flood barriers. The term 'human-made' is used in this report as it reflects how panel members discussed these options.

> **"It makes sense. You're using nature to combat what will happen." –** Workshop 3, panel member from Wales

Panel members appreciated the long-term benefits and multi-impact effectiveness of nature-based solutions (particularly for flooding and extreme heat). They often preferred these despite greater complexity and longer implementation times, with some willing to pay more for natural approaches.

> **"I'd pay [the highest investment] if it's well-managed." –** Workshop 3, panel member from Greater Manchester

To address potentially longer timescales required for implementing nature-based solutions, panel members suggested combining approaches where urgent adaptation was needed – such as using temporary street shading whilst trees grew. Most felt that since nature-based solutions would take longer to be effective, immediately starting to invest and implement them was essential.

However, a few wanted guarantees of effectiveness before choosing nature-based over human-made measures. Others raised practical urban considerations including space constraints where land might be needed for housing, and ongoing maintenance costs for green spaces.

> **"It [nature-based solutions] is a gamble [...], there is a chance it does not continue to be viable with changes to the environment around it. Solutions, in theory, may work, but may not go as expected."** – Workshop 3, panel member from Wales

IV. Most panel members were willing to contribute financially to protecting nature, but wanted public money spent transparently and on the most effective solutions.

Most panel members were happy to contribute through increased taxes to protect nature from climate change impacts – and were keen to see sufficient investment to enhance as well as protect the current state of nature.

They wanted cost-effective investment directed towards the measures that specialists deemed most reliable, with some also specifically favouring nature-based solutions addressing multiple hazards (flooding and overheating) rather than having a single impact.

> **"Some investment strategically and correctly done would be good, or it may be a waste of money." –** Workshop 3, panel member from Northern Ireland

As with other sectors, panel members demanded transparency and accountability in public spending - for some, this was essential before they would feel comfortable to see government invest in nature-based solutions.

"If there were tangible results, evidence of what it's gone on or where it's going [...]. I would be happy to spend more if I knew where the money was going and saw the results." – Workshop 3, panel member from Greater Manchester

"There is a lot of mistrust about where the money is going. Is it going to be used for that purpose, or is it not?" – Workshop 3, panel member from Northern Ireland

V. Some panel members wanted to see private and charity sectors help fund or deliver nature-based solutions.

Whilst most expected taxpayer funding for nature-based solutions, some felt investment should come from additional sources:

- Charities and non-profit organisations: A few panel members were reluctant to see government investment in nature-based solutions, believing existing nature protection organisations currently have this role, though they did not discuss how these would be funded.

- Businesses: A few panel members, prompted by an example of greening supermarket car parks, thought businesses should be encouraged to invest in nature-based measures - either through demonstrating long-term savings for businesses or through government mandating businesses to invest in nature-based solutions.

4.3 How nature was prioritised compared to other impacts

The following section summarises how panel members viewed climate impacts on nature when compared to other impacts (climate impacts on overheating in homes, transport, energy and water and flooding of UK homes).

I. Panel members were generally less concerned about climate change impacts on nature compared to other impacts but did not want nature forgotten.

Panel members typically the expressed highest levels of concern about flooding of homes and climate change impacts on transport - citing severe, direct, tangible impacts on people requiring immediate adaptation. Most did not see investment in adapting nature to the impacts of climate change as a top priority. However, a few expressed strong concern about nature's decline as their primary worry.

II. Investing in nature itself was typically not the top priority, but nature-based solutions for other impacts were viewed positively.

In the final workshop, panel members re-emphasised wanting nature protected, with investment delivering co-benefits and addressing other climate impacts. They felt that without investment in nature, challenges in other sectors would worsen.

> **"If we can get nature back to how it should be then it would take a lot of our problems away." –** Workshop 7, panel member from Greater Manchester

When allocating investment across the five impacts, panel members saw nature playing a crucial but secondary role. Most wanted nature investment to match other adaptation spending but focused less on protecting nature itself and more on using it to address flooding or overheating of homes and roads.

> **"Flooding is a big issue getting more prevalent where I live in Wales. Allowing nature to have cost-effective ways to manage that, like naturalisation of the river, I wish they would do things like this for me."** – Workshop 3, panel member from Wales

There were outliers on both sides of this majority view. A few panel members consistently emphasised the inherent value of nature and prioritised it above other impacts, whilst a small minority deprioritised nature investment altogether.

> **"I love nature. I just think it's so important and I just go back to what I said before. We've caused a lot of this, and I just think it's unfair that nature suffered because of the things we have done." –** Workshop 7, panel member from Greater Manchester

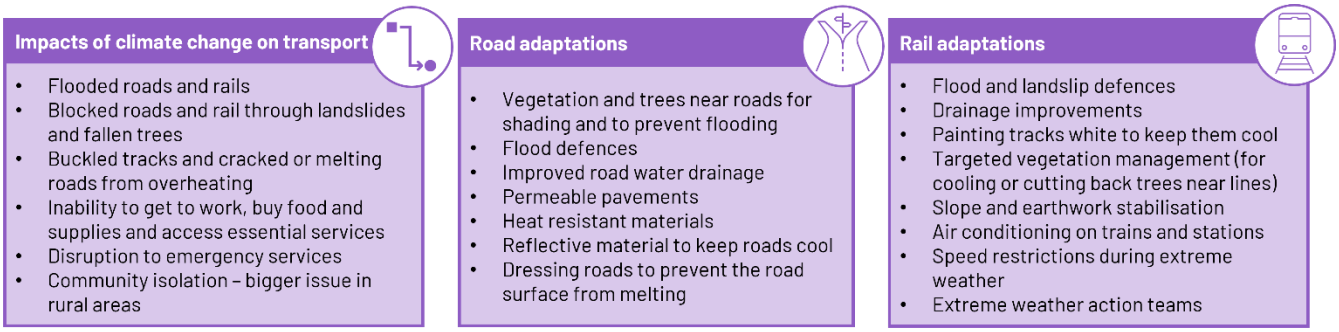
> **"I'd like to see more [investment] in flooding and overheating, and less in nature [...]. I put people first."** – Workshop 7, panel member from Scotland

5 Transport

What did we cover on climate change's impact on transport?

- The impact of climate change on transport was discussed in Workshop 4 and 7. Transport covered both rail and road.
- In Workshop 4 Ann Carruthers (Leicestershire County Council) presented on the current and future impacts of climate change on the road transport system, including disruptions from flooding, landslides and melting roads. Rachael Everard (RSSB) presented similar climate impacts on the rail system.
- Ann Carruthers and Rachael Everard then presented adaptation options for road and rail networks. Panel members learned that despite available adaptation options, both systems will likely experience greater disruptions in future.
- Panel members also received information on the estimated investment needed to adapt road and rail systems. They learned that road network adaptation will likely cost more than rail adaptation, though clear road cost estimates are not yet available.

Figure 5.1: Summary of the impacts of climate change on transport and adaptation options presented to panel members during workshops



Panel members' awareness of and concern about the impact of climate change on transport

- Panel members could easily relate to the impacts of climate change on transport through past experiences of disruption.
- Panel members expressed a high level of concern about the impacts of climate change on transport. They felt that transport disruptions would impact everyone and all areas of life but were especially concerned about vulnerable people.
- Panel members expressed frustration over the badly maintained transport system and the existing repair backlog and were concerned about the additional challenges this may mean for withstanding climate impacts.

Panel members' approach to adapting to the impact of climate change on transport

- Panel members agreed that: *Adaptation measures should be done properly instead of sticking-plaster measures, even if it takes longer and is more expensive.*
- Panel members generally accepted that transport adaptation would lead to some increased costs for them but worried about adaptation spending being poorly managed or wasteful.
- Panel members were split on whether transport adaptation costs should be borne by service users directly (through taxes applied to car users such as fuel duty or toll roads, or increased ticket prices for rail users) or shared collectively, given the common benefits of functioning travel routes.
- Panel members wanted to see more financial contribution to adaptation from private companies that operate and/or use the transport network.
- Panel members generally prioritised adapting the road network over rail, whilst recognising the need for investment in both.
- Panel members were split about whether to prioritise strategic routes (e.g., motorways) or 'lifeline routes' (that serve remote communities) for adaptation and recovery.
- Panel members wanted to see rural and remote communities become more self-reliant and therefore more resilient to being cut-off from transport routes.
- Panel members felt that better preparedness by communities and households is an essential part of adaptation, but this must be supported by good communication from transport operators and authorities.

How panel members prioritised transport compared to other impacts

- Transport was one of the most concerning areas of risk for panel members.
- Panel members wanted to see government investment in transport adaptation as a priority and generally had a higher acceptance of increases in costs for households to pay for transport adaptations.

5.1 Awareness and concern about the impact of climate change on transport

I. Panel members could easily relate to the impacts of climate change on transport through past experiences of disruption.

Most panel members had experienced sufficient transport disruption to relate to the impacts this causes on daily life. Some had experienced disruptions that were directly caused by extreme weather such as flooded roads and rail, landslides, fallen trees, and warped trainlines caused by overheating. Their experiences meant they could easily envisage what increased disruption due to climate change would look like.

"There is a roundabout near me that floods…The changes they made do not work." – Workshop 4, panel member from Greater Manchester

"I use the train to get everywhere. So, I've already experienced a lot of the issues, we have had that in South Wales where the tracks are warped. It's happening now." – Workshop 4, panel member from Wales

II. **Panel members expressed a high level of concern about the impacts of climate change on transport. They felt that transport disruptions would impact everyone and all areas of life but were especially concerned about vulnerable people.**

Panel members reflected on how increased transport disruption would affect everyday life - preventing access to work, school, friends and family, food supplies, and emergency services.

"I put an 8 [high concern]. We must go to work, and it's the industry and social impact. Not being isolated is a big part of mental health. Spending time with friends can be challenging if there are travel disruptions, as you might not be able to go too far or get shopping delivered. Transport is the main one I'm concerned about." – Workshop 4, panel member from Greater Manchester

"It's really important, it affects us all and all parts of our lives. It's really important to keep the network open for the future, we should be investing now…it will cost a lot but just to make a change as much as they can." – Workshop 4, panel member from Scotland

They were concerned about immediate risks like landslides and flooding, particularly the extended time needed to clear debris and restore roads and railways after severe disruptions.

Panel members were most concerned about the impact of transport disruptions on vulnerable members of society. Some panel members shared personal vulnerabilities, including reliance on regular medical appointments or medication that cannot be stored long-term. They also highlighted the broader health risks that arise when vulnerable citizens cannot access healthcare, alongside the stress and panic this causes.

"It'll be my health I'm concerned with. I inject medication for myself. I would worry about deliveries of medication, as it's not something I can stock because there are use-by dates, and it needs to be stored correctly in a cool place. I need regular blood tests as well, so if I couldn't get to that, I would panic." – Workshop 4, panel member from Greater Manchester

Panel members also worried about those particularly affected by isolation during transport disruptions - older people, those with mental health struggles, and disadvantaged young people dependent on community and educational networks.

> **"I'm a headteacher of alternative provision, people come to school and it's the only hot meal they are going to get, and then they get out and socialise. Schools have such a positive impact on people that these vulnerable individuals will face consequences." –** Workshop 4, panel member from Greater Manchester

Additionally, they expressed concern for workers who cannot work flexibly or from home, especially those on low incomes who would struggle with lost pay.

III. Panel members expressed frustration over the badly maintained transport system and the existing repair backlog and were concerned about the additional challenges this may incur for withstanding climate impacts.

Panel members often shared their frustration about frequent travel delays and disruption, whether these were due to climate change and extreme weather or not. They felt roads and railways were poorly maintained with improvements already overdue, and that the UK had fallen behind other countries in transport technology advances. They felt the poor condition of the transport system may increase the likelihood of disruption due to climate change impacts.

> **"The infrastructure is inadequate, and it will get more inadequate. When one of those structures breaks down the others take the load and they are already at capacity. You need to listen to the experts, and I wonder why we didn't do something years ago." –** Workshop 4, panel member from Greater Manchester

They were shocked at the scale and expense of the existing road repair backlog – and were sceptical about the ability to fund adaptation measures when current repair backlogs are so large and already exceed existing budgets.

> **"We should be spending a lot on improvements, but what they were saying about costs and backlogs is a lot of money. Even with raising taxes, it's not enough; it's expensive." –** Workshop 4, panel member from Wales

Panel members cited Japan, the USA and Italy as examples of efficient, punctual and resilient transport networks that function well despite experiencing temperature extremes and severe weather. They viewed these countries as better equipped for extreme and varied weather and exemplars of best practice for UK transport adaptation.

> **"There must be fixes available from other countries — in Colorado, it's -20°F in winter and 110°F in summer; they don't have tarmac that melts." –** Workshop 4, panel member from Northern Ireland

5.2 Approach to adapting to the impact of climate change on transport

The following section focuses on what panel members thought should drive adaptation approaches, rather than specific adaptation options. Where text is *italicised*, this indicates a perspective that panel members discussed and agreed on during the final workshop.

I. Panel members agreed that: *Adaptation measures should be done properly instead of sticking-plaster measures, even if it takes longer and is more expensive.*

Most supported high investment in transport adaptation, citing severe economic and social consequences of poor networks. They expressed frustration with 'sticking plaster' fixes, viewing these as ultimately more expensive whilst perpetuating maintenance backlogs.

Panel members urged for investment to focus on permanent and long-lasting interventions. Whilst acknowledging higher upfront costs, they believed this would save money long-term and break the cycle of ongoing repairs. This preference made them sceptical of measures like painting rail tracks white to cope with heat, which seemed inefficient and temporary.

They also wanted investment in research and development where good solutions do not currently exist, potentially leading to better road surfaces and railway materials. When asked, they accepted that spending on research and development would not always succeed but felt such investment was essential to advance technology.

> **"The money is put in the wrong space, painting the tracks white, which is wasted time. By the time you paint enough, you are back around to painting it again. Spending the same amount of money over different periods of time." –** Workshop 4, panel member from Greater Manchester

> **"My investment would be into research and future proofing rather than quick fixes. We need to do research on new tarmac; that's yesterday's problem not tomorrow's." –** Workshop 4, panel member from Greater Manchester

This theme carried through to the final workshop with panel members confirming their position that: *Adaptation measures should be done properly instead of sticking-plaster measures, even if it takes longer and is more expensive*.

II. Panel members generally accepted that transport adaptation would lead to some increased costs for them but worried about adaptation spending being poorly managed or wasteful.

There was willingness to accept some increased cost to households to fund transport adaptation, although this was not shared by all panel members, and was not always enthusiastic. A key reason for acceptance of increased costs was typically due to the reliance all citizens have on the transport system working reliably, for travel but also for freight and services.

> **"It affects me, and I get something out of it [...]. This is a problem that affects everyone [...]. This is infrastructure, it's a permanent solution. Long term, if a road can deal with [extreme weather] and will in 10 years' time, I can justify this." -** Workshop 4, panel member from Greater Manchester

Panel members had strong concerns about how investment is managed throughout the workshop on transport and in the final workshop. They felt that transport investment is often poorly managed or wasteful and pointed to prominent examples where they felt money had been mismanaged (for example, HS2). They worried that similar issues could limit the effectiveness of adaptation investment and overwhelmingly wanted there to be greater transparency and accountability in how taxpayer money is spent.

> **"Accountability is key. For HS2, they spent £2 billion. Who signed it off and who cancelled it? Every Government project overspends, and we as taxpayers, are forced to swallow it. There is very little transparency in decision-making." -** Workshop 4, panel member from Greater Manchester

Panel members stated that transparency and accountability for spending would increase public support and acceptance of spending on transport adaptation, even if this costs households more.

Panel members sometimes supported the idea of resource re-allocation for rail adaptations, where existing budgets could be reduced to direct some funds towards adaptation, hopefully reducing the financial burden on customers[9]. While they did not want to see trains become less reliable or less frequent, some said they would accept less comfort on trains if services were more reliable and resilient. This was especially the case if this re-allocation meant that train fares would not increase.

> **"I'm more towards resource reallocation. We keep paying and paying, but where is everything going to end up? I'm happy to have less comfort to have stuff going better in the future." –** Workshop 4, panel member from Greater Manchester

III. Panel members were split on whether transport adaptation costs should be borne by service users directly (through taxes applied to car users such as fuel duty or toll roads, or increased ticket prices for rail users) or shared collectively, given the common benefits of functioning travel routes.

Although not proposed in stimulus materials or presentations, some panel members wanted service users to contribute directly. For car users, this could be through taxes like toll roads or fuel duty; for rail users, this could be through increased ticket prices. They favoured this approach because it would allow for funds to be ring fenced for adaptation that benefits service users directly whilst providing an element of choice. Some also felt it fairer that only service users pay for maintenance and improvements.

[9] Panel members were referring to maintaining the current amount of resources allocated on transport, but changing where this funding meant to avoid customers needing to pay more to fund adaptation measures.

> **"I don't want to pay anymore for something I'm not using and am not sure where the money is going. Why can't they charge road users?" –** Workshop 4, panel member from Northern Ireland

Others disagreed, arguing costs should be shared collectively since all citizens benefit from transport networks through freight, deliveries and emergency services. These panel members also opposed toll roads, seeing them as a form of privatisation that would increase costs and potentially divert traffic to surrounding areas.

> **"It's something we all need to deal with, even for people that don't drive because it moves food and produce. Everyone should be paying. I would be willing to pay more than what I would pay for anything else… Everyone uses the roads." –** Workshop 4, panel member from Scotland

These panel members also voiced their concern about rail fares increasing if adaptation is paid for directly by service users. They felt that rail fares are already too high, with further increases likely to encourage more driving, in turn increasing emissions and straining the road network to the point that it becomes even less resilient.

> **"I think if it was any more expensive, I would use them [trains] even less. I already only travel once or twice a year on the train." –** Workshop 7, panel member from Greater Manchester

In the final workshop panel members discussed and refined a draft perspective to compromise that: *It is acceptable to increase costs for users of roads, if this money is used to improve road networks*. Several groups intentionally removed references to rail from this statement due to the concern about increasing rail costs becoming prohibitive.

IV. Panel members wanted to see more financial contribution to adaptation from private companies that operate and/or use the transport network.

Panel members believed businesses profiting from transport networks should contribute more towards improving resilience. They cited courier, freight and logistics companies as heavy users, alongside companies reliant on these services like large online retailers. Some suggested carbon taxes on major polluters as one way to do this, whilst others proposed demonstrating the business case for investment to protect future profits. They felt companies could be compelled to invest given their significant exposure to increased transport disruption affecting deliveries, supply chains and movement of employees and customers.

In the case of rail, panel members often wanted to see private rail companies paying for improvements, and prioritising adaptation over shareholder profits. Whilst less pronounced than with water companies (See Chapter 7, Water and energy), this sentiment remained prevalent during rail investment discussions.

"We have the highest public transport costs in Europe; I think that should be on the [rail] company rather than public. If they want profit, they should future-proof it." – Workshop 4, panel member from Wales

V. Panel members generally prioritised adapting the road network over rail, whilst recognising the need for investment in both.

While panel members wanted to see efficient, reliable and resilient rail services, they generally felt that disruption to roads would have a more severe impact on people, businesses, services, and the economy.

Panel members felt that emergency service operations must be prioritised, especially as conditions that cause transport disruption can often lead to other emergencies such as injury, flooding, or fires. Some felt that this alone justifies prioritising road adaptation over rail, as emergency services rely on roads.

"Emergency services use roads. There are a lot of goods transported. People get parcels, food delivered. You know, they're all by road, not rail." – Workshop 7, panel member from Greater Manchester

Panel members also noted practical interdependencies: many passengers cannot reach train stations without functioning road networks. They added that residents who rely on public transport could use buses when their rail routes are disrupted, with some suggesting that bus and coach services be increased during rail disruption to keep as many public transport users connected as possible and avoid too many people switching to private car use long-term.

The final workshop validated this position with panel members confirming that: *Road should be prioritised over rail*.

Even while supporting this statement, panel members shared concerns that underinvestment in rail has already led to increased reliance on road, which will likely worsen if rail networks are not adapted and improved. They clarified that whilst roads were priority, rail still required some investment.

VI. Panel members were split about whether to prioritise strategic routes (e.g., motorways) or 'lifeline routes' (that serve remote communities) for adaptation and recovery.

Panel members were often divided about which types of transport routes should be prioritised for adaptation and recovery in the event of widespread disruption. Sometimes this division was between panel members of differing views, but it was also often individual panel members who felt unable to decide what they thought was right.

Most agreed that prioritising major routes (main roads, motorways, and key rail connections) would benefit more citizens, maintain connectivity, and support essential services and goods movement, whilst minimising economic disruption.

While 'lifeline routes' serving remote communities affect fewer people, panel members worried about the severe consequences for these areas. They thought about rural communities that may have very few, or singular routes that connect them to major hubs of services and shops to access healthcare and food. Panel members particularly feared emergency services being unable to reach rural areas, with some having experience of being cut off when lifeline routes are disrupted.

> **"If you don't have those lines, it effects people. Retail workers can't work from home. As soon as it's gone as an option [...], it really effects lower economic areas that rely on [lifeline routes]."** – Workshop 4, panel member from Wales

> **"Where I live is a coastal city, the train goes along the coast, so when it's flooded, the trains don't run. So, I have been stuck before because I can't travel anywhere." –** Workshop 4, panel member from Greater Manchester

Some panel members felt the widespread benefits of major routes outweighed impacts on remote areas and favoured prioritising these.

> **"I think the [major roads] and then move to cut-off communities. Because there is so much more happening on these roads. There's more of them, when you deal with that you can deal with smaller stuff**." – Workshop 4, panel member from Scotland

Others found the rural community concerns too significant to decide. Some added that most residential areas do not connect directly onto a major road or rail route, and therefore many citizens would still be unable to travel without smaller connecting routes being well adapted or quickly restored. In the final workshop, panel members did not reach a consensus on whether to prioritise major or 'lifeline' routes.

VII. Panel members wanted to see rural and remote communities become more self-reliant and therefore more resilient to being cut-off from transport routes.

Panel members felt that areas vulnerable to being cut-off (i.e., those that rely on specific routes to connect them to crucial services) must be supported by government to begin preparing so that they are more self-reliant in the event of transport disruption.

They envisioned 'self-reliant' communities as able to access healthcare, food and crucial supplies locally for several weeks. They suggested a range of adaptation actions to increase the self-reliance of rural communities, including building and improving community hubs, developing and communicating emergency plans, and establishing local support networks to keep rural communities functioning during periods of extreme weather. Panel members proposed learning from small island communities about functioning independently from major cities and services.

"We could learn [from] island communities. We could initiate a plan to have these community groups and then we will have a plan. [We could] have emergency planning so we know what's going to happen." – Workshop 4, panel member from Scotland

Some emphasised pragmatism, recognising the expense and impracticality of making all lifeline routes resilient as meaning these communities would inevitably be affected. Others emphasised personal responsibility, arguing that those choosing to live in transport-vulnerable areas should prepare for associated risks.

"If you live in a remote area, you should plan ahead and not rely on other people." – Workshop 4, panel member from Greater Manchester

VIII. Panel members felt that better preparedness by communities and households is an essential part of adaptation, but this must be supported by good communication from transport operators and authorities.

Panel members viewed household and community preparedness as crucial for managing transport disruptions but recognised this required good communication about preparation and response. They saw this communication as an adaptation measure itself, helping citizens know what to stock at home or in cars if stranded, and where to access or provide local help. They felt this guidance and communication should come from government, local authorities and local services.

Panel members also felt that clear communication during transport disruptions is vital to increase tolerance towards delays and ensure the safety of citizens, whether they are already travelling or unable to travel.

When discussing what they would consider to be 'good communication', panel members felt the following would be important:

- Clear, detailed information about disruption timescales. Not vague updates about 'ongoing issues'.

"We need to know what's going on and the timeframe expected. Even if you're not certain, it would help me plan." – Workshop 4, panel member from Greater Manchester

- Explanation of what recovery work is being prioritised. Panel members felt many households affected by disruption would be more accepting of delays if they knew why their route was not being prioritised, especially if access to internet and telephone infrastructure, and access for emergency services was being prioritised.
- Information (such as who to contact and where to go) on accessing food, water and healthcare, particularly for vulnerable groups
- Proactive rail delay notifications rather than requiring passengers to check actively.

This priority was confirmed by panel members in the final workshop where they agreed that: *It is essential to communicate about disruptions and decisions made*.

5.3 How transport was prioritised compared to other impacts

The following section summarises how panel members viewed transport disruptions when compared to other impacts (climate impacts on overheating in homes, nature, energy and water and flooding of UK homes).

I. Transport was one of the most concerning areas of risk for panel members.

They typically saw impacts on transport as being more concerning than overheating in homes, or impacts on nature, water and energy. Panel members often cited transport disruption alongside flooding of homes as the issue they found most concerning. They also often reflected that the impacts of climate change on transport are unlikely to occur in isolation: if a motorway is cut off due to flooding, panel members noted that it was likely homes had been flooded, too.

They also highlighted the importance of the transport system in a connected UK, with disruptions to transport impacting businesses, the economy, the ability to access food and medicine, and enabling emergency services to function. They were, however, concerned by the cost and scale of work that was needed to adapt existing road and rail infrastructure.

II. Panel members wanted to see government investment in transport adaptation as a priority and generally had a higher acceptance of increases in costs for households to pay for transport adaptations.

Panel members wanted to see government investment in adaptation spent on transport adaptation as a priority alongside adaptation to prevent the flooding of homes.

While not always fully supportive of increased costs for households, panel members were generally more willing to accept increased costs to pay for adapting the transport system compared to most other climate impacts discussed. The exception was flooding of homes, where there was an equal willingness to pay for increased costs of adaptation.

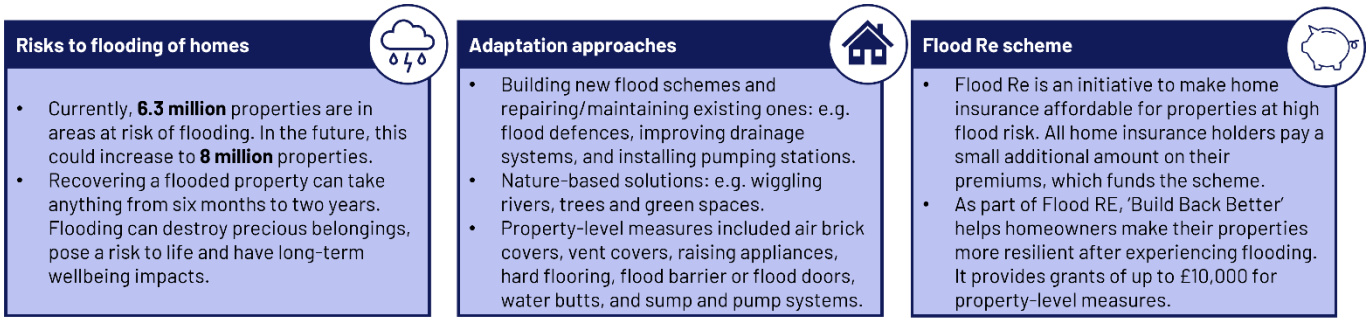
This prioritisation and higher tolerance for costs often reflected panel members' perception of the scale of investment needed, and their reliance on functioning transport networks.

6 Flooding of homes

What did we cover on the impact of climate change on flooding of homes?

- The impacts of flooding of homes were discussed in Workshop 5 and 7.
- Ben Lukey (Environment Agency) presented on the current and potential future extent and impact of flooding of homes and panel members were introduced to different adaptation options to reduce the risk of flooding. They also viewed a video documenting the experience of a household being flooded.
- Joshua Deru (CCC) introduced the estimated investment requirements for reducing the risk of flooding in the future.
- Jonathan Kassian (Flood Re) introduced panel members to the concept and outcomes of the Flood Re scheme (see Box 1).

Figure 6.1: Summary of the impact of flooding of homes, and adaptation options presented to panel members during workshops.



Panel members' awareness of and concern about flooding of homes

- Panel members consistently saw flooding of homes as one of the most concerning impacts of climate change.
- Panel members had good awareness of flooding as a hazard, and a few had experienced flooding of their homes.
- Panel members typically said they would not be willing to live in a home at risk of flooding if it had already flooded once.

Panel members' approach to adapting to flooding of homes

- Panel members thought that government investment to reduce flood-risk to homes should be a priority and were willing to contribute via taxes.
- Panel members wanted government to invest in proactive community- and infrastructure-based measures and public education.

- Panel members felt households who could afford to do so should take personal responsibility to prepare for flooding.
- After debate, panel members mostly agreed that: *It is fair for people not directly impacted by flooding to help pay for adaptation measures in areas at higher risk*.

Panel members' views on Flood Re

- Panel members were highly positive about Flood Re, though some raised concerns about future costs and coverage gaps.
- Panel members unanimously agreed that: *Flood Re should continue but Build Back Better (BBB) should be mandatory when you receive a Flood Re payment.*

How panel members prioritised flooding of homes compared to other impacts

- Panel members often highlighted flooding of homes as the most concerning climate impact.
- Panel members in the final session saw flooding prevention as vital investment because it affects both homes and wider infrastructure.

6.1 Awareness of and concern about flooding of homes

I. Panel members consistently saw flooding of homes as one of the most concerning impacts of climate change.

Panel members had immediate emotional reactions to flooding of homes, expressing consistently high concern driven by the emotional toll of dealing with a flooded home, financial impact, and the sense that floods were difficult or impossible to stop. They frequently talked about loss, anxiety and fear when considering the impact of flooding on people's homes.

> **"Flooding, to me, is just the most horrific thing. It's a trauma, an absolute trauma, for everybody involved in it." –** Workshop 7, panel member from Greater Manchester

Their concern persisted throughout the panel process. Even in the final workshop, after learning about other climate impacts, panel members still frequently identified flooding as one of their greatest concerns.

Whilst most rated flooding concern highly, a small number were less worried because they were not personally at risk. These panel members viewed flooding of homes as regional or localised, arguing it affected only some areas whereas disruptions to transport, energy or water supplies could impact much larger populations.

II. Panel members had good awareness of flooding as a hazard, and a few had experienced flooding of their homes.

Panel members were more familiar with flooding than any other climate impact discussed, and most readily associated it with climate change. This may reflect the workshop location, with most panel members from Greater Manchester having some experience of flooding.

> **"[Flooding is] scary. It happens just down the road over in [town], they were impacted last year. So, really, it is on the doorstep, and it is scary. It's scary." –** Workshop 5, panel member from Greater Manchester

Many had been personally affected. Several described travel disruptions from surface water flooding in Manchester whilst travelling to the face-to-face workshops, and a few had experienced their own homes flooding.

This direct experience reinforced panel members' strong concern about flooding of homes as a climate change impact.

III. Panel members typically said they would not be willing to live in a home at risk of flooding if it had already flooded once.

When asked about acceptable flood risk levels, most panel members said they would not remain in a home long-term after one flood. Their primary concerns were the safety of family and pets, damage to possessions, recurring costs, insurability, and the persistent stress and anxiety about future flooding.

> **"I just wouldn't put myself or my dogs in that scenario." –** Workshop 5, panel member from Greater Manchester

A few took a different view. Whilst sharing others' concerns, they said their decision would depend on flood frequency and severity. Infrequent, mild flooding might be acceptable, especially if they knew the risk when moving in.

> **"If it was once a year and it was mild, if it flooded by an inch [...]. I suppose if it was once in a while, I would consider staying where I was." –** Workshop 5, panel member from Greater Manchester

Most maintained they would not want a flood-prone home even at reduced cost, though a few said this would depend on the price difference.

6.2 Approach to adapting to flooding of homes

The following section focuses on what panel members thought should drive adaptation approaches, rather than specific adaptation options. Where text is *italicised*, this indicates a perspective that panel members discussed and agreed on during the final workshop.

I. Panel members thought that government investment in flooding should be a priority and were willing to contribute via taxes.

When asked about the scale of investment they would be comfortable with, panel members broadly supported funding to either maintain current flood-risk levels or reduce future risk below today's levels. They expected this would come through general taxation.

> **"I think it [adapting to flooding] requires a lot of money and I would be happy to put in a little bit more money, so I feel like I've done my part and feel a little bit more mentally secure that there is money available to the government so that they can invest in the infrastructure." –** Workshop 5, panel member from Greater Manchester

Some panel members were wary of allocating too many resources to areas that could be considered 'lost causes'. These panel members felt that for some places – particularly parts of the coast facing erosion, or areas repeatedly flooded where risks would worsen – continued investment in defences or repairing properties would be poor value. Instead, they suggested providing support to households in those areas to relocate.

> **"There's no point putting all these defences up and spending all this money that would be useless in ten years when it's even worse [...]. Should we not be using that same money to give people in those areas, homeowners, a grant or subsidy to buy a property that's not in a flood risk area?"** – Workshop 5, panel member from Greater Manchester

This still presented a willingness to invest amongst these panel members, and panel members remained broadly comfortable investing in flood prevention measures, reflecting their significant concern about this impact.

In the final workshop, panel members confirmed this priority. They scored flooding of homes, alongside transport, highest in terms of areas that should receive central government investment. Panel members recognised flooding would affect multiple sectors beyond homes, strengthening their desire to invest in flood prevention generally.

II. Panel members wanted government to invest in proactive community- and infrastructure-based measures and public education.

Panel members favoured government investment in large-scale flood prevention such as flood defences, sea walls, and substantial nature-based solutions like re-wiggling rivers or sponge parks.[10] They viewed these preventative measures as important for reducing flood risk across whole areas and saw them as cheaper than reactive responses.

[10] One of the nature-based solutions panel members were introduced to was the sponge park in West Gorton in Manchester. This park has drainage features such as swales, rain gardens, permeable paving and tree pits to reduce the amount of water entering the sewage system from run-off as a way of reducing flood risk in the area.

> **"I'd prefer to see [investment] go more towards infrastructure... like if you re-wiggled rivers to slow down the rainfall when it's coming." –** Workshop 7, panel member from Greater Manchester

Some also advocated for investment in education about managing flood events, warning systems, and preventative measures households can take to minimise damage. They wanted households to make informed decisions about where to live based on flood risk awareness.

III. Panel members felt households who could afford to do so should take personal responsibility to prepare for flooding.

Whilst supporting government investment to reduce flood risk, panel members believed households should take responsibility for minimising damage to their homes during floods. They felt this would reduce the need for government investment in the aftermath of flooding events.

> **"I think basically homeowners should take some responsibility for their own home. I don't think you can expect the council to come and give everybody the same level of protection."** – Workshop 5, panel member from Greater Manchester

Panel members cited property-level adaptations presented during the workshop (see Figure 6.1) as examples of homeowner action.

However, they recognised government support was essential for those with limited choices, particularly lower-income households or renters. They suggested grants to help these households install property-level adaptations.

> **"I think the onus is on a person to do some things to protect their own home as well. And if people aren't in a financial position to do so, then maybe [support] should be means-tested." –** Workshop 5, panel member from Greater Manchester

Panel members also expected property-owners (referring to landlords and those who own multiple properties rather than only owner-occupiers) and developers to ensure properties were not built in flood-prone areas or included necessary adaptations if they were. Some wanted regulations on new build homes, which would ensure they were safe and buyers are aware of flood risks.

Notwithstanding those with limited ability to choose, panel members believed property-level adaptations should remain homeowners' responsibility. Some felt strongly that those who knowingly chose to move to flood-prone areas should not expect government support for property adaptations.

IV. After debate, panel members mostly agreed that: *It is fair for people not directly impacted by flooding to help pay for adaptation measures in areas at higher risk*.

In the flooding workshop, panel members expressed differing views on whether people in low flood-risk areas should help fund adaptations elsewhere. Those who thought they should, argued that high-risk households may have had no choice in location (due to affordability) or were unaware

of risks when moving in. They particularly wanted vulnerable households - those with older people, young children, disabilities, or lower incomes - to be able to access support.

Others disagreed despite their strong concern about flooding. They felt it unfair to pay for prevention in flood-prone areas when their own homes were not at risk. Some proposed funding large-scale adaptations through local rather than national taxation, allowing authorities to invest based on their specific risks like flooding or overheating. Others emphasised personal responsibility, particularly for wealthy households choosing desirable high-risk locations.

> **"I hope I'm not going to have to pay for someone who lives by the sea to have their defences. That sounds a bit selfish, but I think there are other ways the money could be diverted to my community where I live, where there is no flood risk." –** Workshop 5, panel member from Greater Manchester

These views led some panel members to suggest a nuanced approach to direct support for households:

> **"[*I think our approach should be*] giving grants to people who really can't afford to implement these in their homes, giving subsidies to people that can maybe afford it and then just not giving anything to a rich person that's decided to buy on a flood plain." –** Workshop 5, panel member from Greater Manchester

In the final workshop panel members shifted towards collective responsibility, agreeing it was fairer for most households to support those at flood risk. They highlighted several factors that influenced their reasoning:

- Recognition that climate change would expand flood risk to previously safe areas, including where panel members lived.

> **"How do we know who's impacted? I mean, I've never had a flood where we live now. But that isn't to say that in the future, if the climate gets worse, with more water, that there could be a flood." –** Workshop 7, panel member from Greater Manchester

- Acknowledgement that not all flood-prone households can choose where they live, afford relocation, or flood prevention measures – and that some may have sentimental attachments to their home.
- Understanding that flood damage costs would challenge many households beyond traditionally vulnerable groups, alongside the emotional devastation of a flooded home.

Whilst most ultimately agreed those in low-risk areas should help fund adaptation through general taxation, a few remained uncertain, concerned about escalating future costs as flood risk increases and maintaining the importance of personal responsibility.

6.3 Flood Re

Towards the end of the flooding workshop, a representative from Flood Re gave a presentation on the Flood Re insurance scheme (described in Box 1). This section outlines panel members' views on Flood Re.

Box 1: What is Flood Re?

Flood Re is a joint initiative between the Government and home insurers (in the UK flood insurance is included as part of home insurance). Flood Re was established in 2016 to make home insurance affordable for properties at high risk of flooding. Before it was established, many homes at highest risk of flooding could either not obtain home insurance or were subject to significantly higher insurance premiums.

Flood Re operates through a cross-subsidy: all home insurance policyholders (households) pay a small additional amount on their premiums, which funds the scheme. This allows insurers to transfer the flood-risk element of insurance for high-flood risk properties to Flood Re, significantly reducing premiums for those households at highest risk, ensuring they can access affordable cover. To be eligible for Flood Re the property must be a home and constructed before 2009. Flood Re is currently planned to end in 2039, after which home insurance could return to a normal market where prices reflect each property's flood risk.

Build Back Better is an extension of Flood Re that helps homeowners make their properties more resilient after a flood. In addition to standard repairs after a flood occurred, eligible households can access a grant of up to £10,000 for flood-resilience measures – such as flood doors, raised electrics, and water-resistant materials. The aim is to reduce future damage and speed up recovery.

I. Panel members were highly positive about Flood Re, though some raised concerns about future costs and coverage gaps.

Before learning about Flood Re, panel members had no awareness of the scheme and often worried about insurance availability in flood-risk areas. Once introduced to this cross-subsidy scheme, they responded very positively for several reasons.

Firstly, they welcomed discovering that effective action was already underway without them noticing the cost on their insurance premiums, easing concerns about accumulating adaptation costs.

> **"It makes sense that [Flood Re] cogently ties up with the fact that you're buying home insurance and, therefore, it's going to help other super high-risk homes and it's doing so in a fairly transparent manner." –** Workshop 5, panel member from Scotland

Secondly, knowing the programme works addressed their prior concerns about flood-prone homes becoming uninsurable.

Finally, they valued Flood Re's transparency - a clear pot of money with defined spending. Whilst a few initially wanted reassurance that insurers could not profit from the scheme, they were positive once this was confirmed. This transparency addressed a persistent concern across the workshops about whether money raised through taxes or bills is spent as promised.

> **"My biggest worry while we've been sat and having these discussions is that the money that we're paying personally, we're dedicating to these things, isn't actually going to the thing that we think it should be going to. So, if something like this exists and there is somebody at the other end receiving it, ensuring it goes to the right avenues, then I think it's a superb way of doing it." –** Workshop 5, panel member from Greater Manchester

Panel members generally wanted Flood Re to continue beyond its planned 2039 end date. However, some worried about costs increasing with growing flood risk, potentially making home insurance less affordable for all policyholders.

> **"At the moment we're paying it and it's a hidden cost and you know, we've accepted it, but would it get out of control? I mean obviously looking at the figures that the average flood claim is, it's going to take a lot to cover it. So, are they going to keep putting everyone's insurance up because of that?" –** Workshop 5, panel member from Northern Ireland

Some suggested that funding mechanisms could shift in future if costs were to increase too much. These suggestions included:

- Charging higher insurance premiums for high-risk homes, while maintaining some element of cross-subsidy so this remained affordable.
- Reducing the level of support for households choosing to live in high-risk areas and for landlords or multiple property owners.
- Adding a means-tested element to the subsidy.

Others noted coverage gaps, particularly households unable to afford to purchase any home insurance (which means they are not covered by Flood Re) or living in properties built after 2009.

Despite these concerns, panel members were very positive about Flood Re as a scheme overall and wanted it to continue.

II. Panel members unanimously agreed that: *Flood Re should continue but Build Back Better (BBB) should be mandatory when you receive a Flood Re payment*.

Panel members strongly supported Flood Re's continuation beyond 2039 and, despite some concerns, unanimously felt BBB should be mandatory to prevent repeated flooding and reduce future costs.

> **"Build Back Better should be a mandatory aspect of that. If you have an insurance rebuild, it's got to be done to a better standard with preventative measures incorporated." –** Workshop 5, panel member from Northern Ireland

> **"I don't think we can keep doing that [*repairing the same house consistently*] with rising costs. Because [...] it's just going to be vast amounts of money and it's not fair that the same people keep having the same payouts." –** Workshop 5, panel member from Greater Manchester

Despite this support for BBB in principle, panel members raised several implementation concerns:

- **Quality oversight:** Panel members wanted insurers, Flood Re or professional bodies to ensure measures were appropriate and properly installed, possibly through approved supplier networks.
- **Spending oversight:** Panel members wanted monitoring to ensure households used funds on appropriate home measures.
- **Affordability concerns:** Panel members worried lower-income households might struggle even with £10,000 from Flood Re. Some strongly felt BBB payments should not be capped if mandatory, alternatively suggesting reasonable adjustments - households unable to afford measures beyond the £10,000 should remain eligible for future Flood Re payouts.
- **Insurance continuity:** Panel members feared mandatory BBB might cause households to lose coverage through technicalities, poor installation not meeting specifications, or inability to afford required measures.

> **"Instead of paying out an additional sum and trusting people to make reasonable amendments to their home, would it not be better if insurance companies offer to continue to cover on the provision that they are allowed to make reasonable amendments to your home." –** Workshop 5, panel member from Greater Manchester

> **"If it's mandatory and if by not doing it you fail to become insured, then they have to be able to say right, you need to do this, here's how much it's going to cost, here's a recommended company, and here's the money to do it." –** Workshop 7, panel member from Greater Manchester

6.4 How flooding of homes was prioritised compared to other impacts

The following section summarises how panel members viewed flooding of homes when compared to other impacts (climate impacts on overheating of homes, transport, energy, water and nature).

I. **Panel members often highlighted flooding of homes as the most concerning climate impact.**

Panel members frequently identified flooding of homes as the most concerning climate change impact. They viewed it as the most widespread impact in the UK, and the one with the greatest emotional toll, although a few noted overheating causes higher excess mortality.

II. **Panel members in the final session saw flooding prevention as vital investment because it affects both homes and wider infrastructure.**

Panel members wanted government to prioritise flood prevention investment due to its severe negative impacts. In the final workshop, they highlighted that flooding affects not only homes but also nature, transport, and water and energy services. Consequently, they viewed flood adaptation as essential for protecting households whilst reducing risks to transport networks and essential services.

> **"I think flooding [should be prioritised for investment] because it has a large knock-on effect on everything else. It affects the roads, it affects the water supply, it affects the power lines." –** Workshop 7, panel member from Greater Manchester

7 Water and energy

What did we cover on climate change's impact on water and energy?

- The impact of climate change on water and energy (or utilities for households) was discussed in Workshop 6 and 7.
- Dr Emily Wallace (Met Office, Visiting Professor University of Strathclyde) presented on the impacts of climate change on the supply of water and energy, including scarcity and disruptions to supplies.
- Rachael Steller (the CCC) then introduced adaptations options for water and energy and the support available for vulnerable households. Panel members also learned about estimated investment requirements to reduce the risk of climate change impacts on household water and energy supply.

Figure 7.1: Summary of the impacts of climate change on water and energy supply and adaptation options presented to panel members during workshops

Risks to water and energy	Adaptation approaches
• Supply lines can be disrupted through flooding, land movement or storm damage. This can lead to short-term water and energy outages, which impacts everyday use of water and energy. • Heatwaves and droughts can lead to longer term water shortages.	• **National and regional approaches** include: wastewater treatment, seawater desalination, national leakage targets, infrastructure upgrades, large reservoirs, utility-scale storage, weatherproofed electricity grids, and flexible energy generation. • **Local and individual approaches** include: rainwater barrels, drought-tolerant gardens, community leak-fixing groups, local energy advice, smart systems, and efficient homes and appliances.

Panel members' awareness of and concern about the impact of climate change on water and energy supply

- Only a few panel members had recent experiences of energy or water outages.
- Panel members were less concerned about impacts on water and energy supply for households than other impacts and attributed risks to poor maintenance rather than climate change.
- Panel members felt most people can cope with more frequent outages in the future.
- Although concern was lower compared to other climate impacts, panel members still expressed worry about potential impacts on water and energy supply.

- Panel members' concern about outages mainly focused on those who may be most vulnerable.

Panel members' approach to adapting to the impact of climate change on water and energy

- Panel members emphasised the need for households to become more self-reliant and prepared to cope with outages, supported by public communications.
- Panel members felt direct support should be focused on vulnerable residents.
- For national level adaptations, panel members felt the priority should be fixing and improving what we already have in place (e.g., water pipes), before paying for new infrastructure (e.g., desalination plants).
- Panel members wanted energy infrastructure investment targeted geographically and balanced between prevention and emergency response.
- Panel members generally liked measures that would save water and energy in their home but felt they only had a small impact on wider resilience.
- Panel members had very little willingness to pay for water and energy adaptations, partly due to high bills and the rising cost of living but primarily driven by frustration with utility companies.
- Panel members believed the utilities system needed fundamental reform, with companies required to prioritise infrastructure over profits.
- Some panel members indicated they would be willing to pay more for water and energy if there were guarantees that the additional funds would be spent on adaptation and not contribute to company profits - or if water services were nationalised.

How panel members prioritised water and energy compared to other impacts

- Panel members were less concerned about the impact of climate change on water and energy supply for households than some of the other impacts.
- Linked to their strong feelings around water and energy companies, panel members strongly felt that households should not have to pay for improvements.

7.1 Awareness and concern about the impacts of climate change on water and energy

For findings in relation to water supply it should be noted that panel members focused their conversations more on complete outages of water instead of more prolonged water shortages.

I. Only a few panel members had recent experiences of energy or water outages.

Most panel members reported that they had not experienced many or any disruptions to energy supplies at home in recent years.

A small number of panel members said they experienced more regular outages (around three times yearly, sometimes lasting over a day). They noted outages typically occurred in winter when heating loss was most problematic.

> **"If it's a short [power cut], if it's an hour or two, it's fine, but if it's a winter's night and you're going to bed and there's no lights and there's no heat, you suddenly feel very sorry for yourself very quickly." –** Workshop 6, panel member from Greater Manchester

As with energy, very few panel members had experience of frequent water disruptions. Those who did were typically the same panel members experiencing regular power outages, usually those living remotely. These panel members described low water pressure or intermittent supply, though noted suppliers communicated well and distributed bottled water through schools or community centres.

> **"We've had a couple of water outages recently. [Water company] were on site for about two weeks and they were just using bowsers to fill up the water supply. It was a bit of a pain. Some mornings it would work and other ones it wouldn't. It was more inconvenience than anything." –** Workshop 6, panel member from Greater Manchester

II. Panel members were less concerned about impacts on water and energy supply for households than other climate impacts and attributed risks to poor maintenance rather than climate change.

Panel members viewed climate change impacts on water and energy supply for households as less concerning than other climate impacts. Some could not imagine outages and shortages becoming significant issues, particularly compared to flooding of homes and transport disruption. For water shortages, this may reflect the panel's predominantly northern England composition, where droughts are less common.

> **"I see reservoirs going down, then within a week or two they have come up massively. I do not feel it is a long-term problem from what I can see." –** Workshop 6, panel member from Greater Manchester

> **"We've always had lots of heavy rainfalls and disruptions. It is the same... I've not experienced anything here at all." –** Workshop 6, panel member from Greater Manchester

Many attributed utility disruptions to poor maintenance and infrastructure upkeep, such as excessive pipe leakage depleting reservoir storage. They viewed these as existing problems potentially worsened by, but not caused by, climate change.

> **"With water we've maybe had two [outages] in 20 years and they've all been caused by pipes leaking, not by climate change. So, unlike the other things we've discussed, it's kind of hard to visualise just because we haven't experienced it yet." –** Workshop 6, panel member from Wales

However, some panel members connected supply issues directly to climate change, observing historically low reservoir levels and linking these to changing rainfall patterns.

> **"The reservoir near where I live, it's practically empty at the minute and I know the other one up the road is. So, whether we're getting enough rainfall to fill those is another thing ... There's parts of it that are visible now that have never been visible." –** Workshop 6, panel member from Greater Manchester

III. Panel members felt most people can cope with more frequent outages in the future.

Panel members often assumed water or energy outages would last about a day, which they thought would be manageable with stored water (including in the kettle) and toilets flushing briefly before running out. Panel members thought that longer outages, particularly energy-related, would prove more challenging as devices lost charge and people cannot warm their homes. Some felt they could cope for up to a week with blankets, camping stoves and supplies, but acknowledged longer disruptions would have worse impacts.

> **"We've got lots of blankets and gas bottles, an old camp stove, so we've got things like that. But obviously that's for a week or more. I think we'd be all right for a week."** – Workshop 6, panel member from Greater Manchester

> **"Up to one day you can still flush toilets from your reserve cold water tanks in your house. Usually, you may have enough water stored in a kettle to survive."** – Workshop 6, panel member from Northern Ireland

When asked about energy outages, panel members often recalled childhood experiences from decades ago when outages were much more common. Some viewed these memories nostalgically, describing making do with candles, playing cards and enjoying community spirit with neighbours.

> **"I'm an 80's baby and I remember having power cuts all the time. And I've got really fond memories of those power cuts because, we'd get our candles out, we'd go out on the street, and we'd have that sense of community spirit." –** Workshop 6, panel member from Greater Manchester

Whilst acknowledging the UK's increased dependency on energy, these panel members felt past experiences demonstrated that outages remained manageable for most people. In the final workshop, panel members reiterated this view, refining wording to develop then agree the perspective that: *Most people can cope with more frequent outages in the future*.

Panel members clarified this did not mean outages were 'acceptable', but rather acknowledged a reality that non-vulnerable households could generally manage.

IV. Although concern was lower compared to other climate impacts, panel members still expressed worry about potential impacts on water and energy supply.

Panel members described how *outages* would affect them, though did not share concerns about water *shortages*. Most anticipated inconvenience whilst others worried about more significant life impacts.

For water outages, panel members particularly worried about accessing drinking water and flushing toilets, especially beyond one day. They were also concerned about not being able to shower or wash clothes.

> **"Water is the worst thing you could possibly be without. I think because it's just showers, the toilet, flushing the toilet, all that kind of stuff. It's just drinking everything. It's just my worst nightmare is not having water." -** Workshop 6, panel member from Scotland

Energy outages raised concerns about heating loss (especially in winter), food spoilage, and not being able to cook. Panel members worried for those needing lifts to access homes and about losing internet connectivity, limiting communication with loved ones, ability to work from home, and access to updates during blackouts.

> **"If you lose your electricity, the chances are if you've not charged your phone, you lose your communications, your entertainment goes out the window if ... And it's those luxury kind of things that have become part of our life that you would lose." -** Workshop 6, panel member from Greater Manchester

Panel members also noted wider impacts: transport disruption, shops unable to process sales, and potential panic-buying behaviour. Some recalled COVID-19 lockdowns or power outages abroad as reference points for these impacts.

Others worried more about knock-on effects from severe outages - economic disruption, reduced farm productivity affecting food availability, and business closures. Even those able to manage personally recognised they'd still face these secondary impacts.

> **"Probably up in Scotland I'm not going to see any local effects or ... get lots of outages or water problems. But I know that all those problems that happen around the UK are eventually going to be shown on my bill." -** Workshop 6, panel member from Scotland

Some panel members felt today's UK population was less prepared than previous generations, less likely to stock emergency supplies and provide community support. See section 7.2(I) below.

V. Panel members' concern about outages mainly focused on those who may be most vulnerable.

Whilst panel members expressed some worries for themselves, their greatest concerns centred on vulnerable groups during outages: older people, those with young children, people with medical needs and disabilities, and those experiencing mental health challenges. They also felt that people who live on their own faced additional difficulties, especially if they also experience another type of vulnerability.

Some vulnerable panel members shared how outages would affect them. Several relied on refrigerated medication, facing physical health impacts and severe distress if unable to cool it properly. They noted medication spoilage would also create significant NHS costs.

> **"We store something called biologic medication for my son. We get it on the NHS, but it is about £20,000 worth in a fridge at any particular moment. If that spoils, and also that keeps him in remission, that would be really serious." –** Workshop 6, panel member from Greater Manchester

> **"Home heating would affect me because I'm immune-compromised, so that is something that I have to pay attention to." –** Workshop 6, panel member from Greater Manchester

Other panel members described specific vulnerabilities in their family, including:

- A family member needing a stairlift to access their bathroom.
- An autistic child who would struggle with a disrupted routine.
- A panel member whose own mental health would deteriorate without heating and communications.

7.2 Approach to adaptation measures and priorities for water and energy

The following section focuses on what panel members thought should drive adaptation approaches, rather than specific adaptation options. Where text is *italicised*, this indicates a perspective that panel members discussed and agreed on during the final workshop.

I. Panel members emphasised the need for households to become more self-reliant and prepared to cope with outages, supported by public communications.

Panel members felt most households should take personal responsibility for self-reliance during water or energy outages.

They worried that today's UK population, accustomed to reliable services, does not anticipate coping without consistent utilities. Panel members saw this as part of declining household resilience over time, contrasting with past generations who routinely stocked candles and tinned food for emergencies.

> **"In the 70s, we had regular power outages, and they would last all night, and everyone had candles in the home and we were all prepared." -** Workshop 6, panel member from Wales

Recognising households might not know how to prepare, panel members suggested national public education to encourage stocking essentials and inform households about their specific needs based on family size and circumstances.

Panel members strongly emphasised good public communication as key to managing more frequent outages. They envisioned this including: affected area maps; estimated outage durations; prompts to share information with those potentially unreachable; links to volunteer services; and local support hub information.

Beyond enabling self-reliance, they felt good communication would prevent panic and encourage positive community behaviour – helping to avoid hoarding and promoting neighbour-to-neighbour information sharing.

Some panel members already prepared for emergencies with torches, blankets and bottled water. Several, particularly rural residents, had installed generators after experiencing outages or extreme weather (for example during Storm Amy), making them more confident about being able to cope with future disruptions. However, these panel members also anticipated sudden generator demand spikes and suggested advance planning could prevent shortages in the available of fuel for these across different households.

> **"I can mention about five or six neighbours locally that have generators now for when the electric goes off. We've got a shed full of bottled water for when the water goes off." -** Workshop 6, panel member from Greater Manchester

II. Panel members felt direct support should be focused on vulnerable residents.

Panel members strongly believed emergency responses and direct support during outages should target those most vulnerable. They strongly supported the Priority Service Register[11] (PSR), with some having personal experience of it, although in general panel members felt awareness of it should be increased amongst eligible households.

> **"I find it really useful being on the vulnerable customers list for both water and energy because they can get to me and if I'm stuck for anything they can help out there. And I think everyone should know about that who needs access to it. So, getting that information out there..." -** Workshop 6, panel member from Greater Manchester

They favoured strengthening existing support for vulnerable households through local welfare units coordinating outreach, and making support distribution more efficient and responsive to

[11] The Priority Services Register (PSR) is a free UK-wide service which provides extra advice and support, including when there's an interruption to a customers' electricity, gas or water supply.

local needs. They thought support services should include distributing pre-charged power banks, blankets and hot meals and that those who were unable to travel or communicate easily should be able to request assistance.

Panel members reinforced this theme in the final workshop alongside household self-reliance, with panel members approving the perspective that: *Emergency response should focus on the most vulnerable people first; most other people have a responsibility to prepare themselves for outages*. Some amended this to specify that accurate and timely communications must be provided to help households navigate outages themselves.

III. For national level adaptations, panel members felt the priority should be fixing and improving what we already have in place (e.g., water pipes), before paying for new infrastructure (e.g., desalination plants[12]).

Panel members shared a near unanimous view that current issues with water and energy supply issues stemmed from companies inadequately maintaining infrastructure and being slow to fix leaks.[13] They therefore preferred investing in improving current infrastructure and, for water, expanding existing reservoirs rather than building new ones. A few panel members supported new infrastructure being built alongside improving what is already there.

> **"I think just building bigger would just [be] upscaling more inefficiency. Let's get what we've got running at the minute... Repair and prepare." -** Workshop 6, panel member from Greater Manchester

When considering water supply, panel members' preference for fixing existing infrastructure led to mixed responses about desalination plants. Panel members viewed these as very expensive and more suitable for southern England than the north. They felt desalination should only be considered where improving existing water infrastructure would prove insufficient.

> **"Don't we get enough water in this country for about a year? Don't we make more use of saving it? Like you said, with better reservoirs, building a reservoir would be probably better than actually building a desalination unit, which I think would only be used down the southeast." -** Workshop 6, panel member from Greater Manchester

IV. Panel members wanted energy infrastructure investment targeted geographically and balanced between prevention and emergency response.

For energy, panel members suggested national investment in weatherproofing infrastructure should target areas most affected by specific climate risks (such as overheating in the south). They believed geographic prioritisation would enable more efficient spending than adapting all

[12] Desalination is the process of turning seawater into drinking water by removing the salt. It is used when groundwater reserves do not supply enough water for the population. Desalination plants are where this process occurs.

[13] Due to this strong view, most groups focused their discussion on water adaptation rather than energy adaptation.

energy infrastructure nationwide, whilst reserving funds for emergency repairs and vulnerable household support.

Panel members reviewed this approach in the final workshop, and some groups approved the following perspective: *Investment should focus on a mix of responsiveness to emergencies and on preventative options.*

V. Panel members generally liked measures that would save water and energy in their home but felt they only had a small impact on wider resilience.

Whilst strongly supporting household self-reliance, panel members, at a fairly high-level, viewed measures that improved energy and water efficiency in the home as having minimal impact compared to national-level changes.

> **"We can all adapt to the local [adaptations]ones ourselves ... we can make our homes more efficient, but is it going to make a big difference in the grand scheme of things, really?" –** Workshop 6, panel member from Greater Manchester

Panel members showed moderate interest in property-level rainwater collection, with some having already installed these systems. They valued using rainwater for garden watering and toilet flushing during outages or shortages, but recognised limitations - not all households could install them (particularly flats) and as they do not provide drinking water, the benefits are limited.

> **"The thing is about rainwater barrels, is it just to collect water to water your garden? Because it's not as though you can drink it, is it?" –** Workshop 6, panel member from Scotland

While not presented as an adaptation option, some panel members had seen toilets that use recycled water. They thought this was a good adaptation to reduce water usage, especially for large or new buildings.

> **"They had all signs up basically apologising for the colour of the water in the toilets but saying that it was because it was all recycled water ... Which is a really good idea. Why, why aren't we doing that more?" –** Workshop 6, panel member from Greater Manchester

Panel members also felt that shortages could be better managed if households had more energy- and water-efficient appliances and habits. They noted many people treat water and energy as unlimited resources, potentially worsening the impact on strained supplies during shortages. Panel members wanted to see the public encouraged to monitor usage with smart meters, use off-peak hours, and switch to efficient appliances, with public education supporting these changes.

VI. Panel members had very little willingness to pay for water and energy adaptations, partly due to high bills and the rising cost of living but primarily driven by frustration with utility companies.

Panel members expressed particular frustration about funding water and energy adaptation through bills or taxes, more than for any other climate impact. They often cited high bills and limited budgets within the current cost-of-living crisis, with some expressing real anxiety about affording any adaptation contribution.

Some described ongoing efforts to minimise energy use and reduce bills, making them unwilling to accept increases for adaptation costs.

> **"We just got our electricity bill and it has gone up again. My husband just permanently says to me, 'turn the lights off, turn this off'. So why then would I be willing to pay £50 extra to the electricity company when we can hardly afford to heat the house ourselves?" –** Workshop 6, panel member from Northern Ireland

Beyond affordability, panel members expressed anger at how both water and energy was managed in the UK. This sentiment was particularly strong when referring to water companies, but was also present when thinking about energy companies. Panel members expressed frustration at receiving inadequate service and poorly-managed infrastructure, despite very high bills. For water supply in particular, this anger drove their opposition to adaptation costs being passed to customers, believing water companies should pay instead.

Panel members frequently discussed privatisation's impact on crucial services, particularly water. Their frustration linked closely to awareness of reported profits, shareholder payouts and bonuses within the water industry. They regularly cited news headlines and statistics about poor performance alongside profits to justify their unwillingness to pay more.

> **"Nearly a third of what you pay [in a water bill] goes to finance debt and dividends. So, there you go, all that should go in [to adaptation]. That's billions." –** Workshop 6, panel member from Greater Manchester

> **"Finding out [online] how much shareholders got paid and the money wasn't put into fixing leaks, taking bills down for customers, new infrastructure. That's a real sticking point for me." –** Workshop 6, panel member from Greater Manchester

Panel members returned to these themes in their final workshop and mostly agreed on two perspectives:

- *It is not acceptable for energy[14] and water bills to go up to make networks more resilient, even if this means that more outages may occur – the companies must pay for this before profit.*
- *Companies have a responsibility to prepare energy and water infrastructure for the impacts of climate change.*

[14] It is worth noting that panel members sometimes removed the word 'energy' from this statement to specify that this applies to the water sector only.

VII. Panel members believed the utilities system needed fundamental reform, with companies required to prioritise infrastructure over profits.

Panel members nearly unanimously believed water and energy companies had obligations to maintain and improve the resilience of the services they profit from - obligations they felt were not being met.

They strongly advocated systemic change to UK utilities provision. They frequently suggested profit caps, mandatory infrastructure investment before profit-taking, or renationalisation. Some argued the original privatisation 'promise' of better public value had failed, instead leading to the prioritising profits over public good.

> **"When everything was privatised, it was to make things better for the public, so the public would get a better deal…Everything's privatised now, it's definitely not turned out that same way. It really just kept going up and up and up. Whereas before, when it was nationalised, you didn't have to make a profit. Everything could go back in as long as you covered your costs." –** Workshop 6, panel member from Greater Manchester

Panel members also urged for better transparency and accountability from water and energy companies, feeling that the lack of maintenance and investment resulted from a culture where there were no consequences for failure and missed targets.

VIII. Some panel members indicated they would be willing to pay more for water and energy if there were guarantees that the additional funds would be spent on adaptation and not contribute to company profits - or if water services were nationalised.

Despite most believing the public should not pay for utilities adaptations, some panel members would accept small bill increases under strict conditions: funds must be clearly earmarked for adaptation only, not profits or bonuses. Some added they would expect future bill reductions as adapted infrastructure became more efficient.

Others stated they would accept small cost increases if water services were nationalised, as this would ensure money did not benefit companies they no longer trusted.

> **"'I'm prepared to pay that extra for the system to be improved and carry it forward and prevent it … [But] if we were to stump up extra money, I think we would want stewardship of the company. And that brings us back to privatisation." –** Workshop 6, panel member from Greater Manchester

For some panel members, their willingness to pay more depended on whether the increases were for energy or water, reflecting particular frustration with water companies. In the final workshop, some removed 'water' from this statement to apply it only to energy: *It is acceptable for energy bills*

to increase if we can be sure that the additional money is spent ONLY on making networks more resilient. Others rejected this statement entirely.

7.3 Water and energy compared to other impacts

The following section summarises how panel members viewed climate change impacts on energy and water supply for households when compared to other impacts (climate impacts on nature, transport and flooding and overheating of UK homes).

I. Panel members were less concerned about the impact of climate change on water and energy supply for households than some of the other impacts.

Water and energy discussions did not inspire the same strength of feeling as other impacts, particularly flooding of homes and transport disruptions. Panel members viewed adaptation for household water and energy services as less of a priority than preventing flooding of homes or addressing the impact on transport.

> **"It seemed a little less impactful than the other things we've been discussing, [which] had quite dramatic consequences. ... It's bad, [but] it didn't strike me as being as dramatic as other things." –** Workshop 6, panel member from Wales

II. Linked to their strong feelings around water and energy companies, panel members strongly felt that households should not have to pay for improvements.

More than any other climate impacts, panel members expressed clear anger about the management and privatisation of this industry, particularly for water companies. Whilst they showed some frustration towards private companies related to other climate impacts (for example with rail companies), they voiced far stronger opposition to utilities companies. This anger shaped how they responded to questions around investment in water and energy, as most deeply distrusted these companies to spend funds responsibly and believed they should face legal requirements to do so. Panel members also believed these companies already had sufficient profits to invest in system improvements, but chose not to.

8 Cross-cutting themes

The following chapter highlights key, cross-cutting themes. These appeared consistently in discussions of the different climate impacts across all or most of the seven workshops.

I. Panel members emphasised that mitigation is crucially important and needs to be pursued alongside adaptation.

Throughout the workshops (including in the final workshop), panel members agreed that whilst adaptation was important, mitigation must continue.

> **"I've got a feeling that the juxtaposition of mitigating and adapting, it's becoming clear that the horse has bolted [...], we now seem to be saying we need to accept that we've got to adapt [...]. But it [addressing climate change] will be a dual thing going along."** – Workshop 2, panel member from Greater Manchester

II. Panel members had differing levels of concern about climate impacts, shaped by their own experiences.

Panel members' concerns linked directly to their experiences and ability to adapt. Those who had experienced or could imagine experiencing specific impacts typically expressed greater concern, though some prioritised impacts with greatest national consequences. Energy and water outages were partial exceptions - previous experiences suggested these were manageable for most households. However, panel members struggled to envisage prolonged water shortages rather than outages, reporting they had not experienced them.

Overall, panel members expressed most concern about flooding of homes and transport system impacts. They showed less concern about water and energy supply disruptions and home overheating.

> **"I've had a power cut once in my life, I've had the water out once in my life. It's such a small priority when we're talking about flooding and heating." –** Workshop 7, panel member from Greater Manchester

Where panel members lived likely influenced concerns, with most panel members from Greater Manchester and Northern Ireland, Scotland, and Wales facing higher risks from hazards like flooding than overheating.

> **"Overheating is probably, out of everything, the one that affects me the least." –** Workshop 7, panel member from Greater Manchester

Their concerns about nature were qualitatively different. Whilst a few prioritised climate impacts on nature above all else, most integrated nature into broader climate concerns, viewing it as essential for reducing other risks.

III. **Panel members showed high concern for vulnerable people throughout, wanting investment to prioritise preventing impacts on, and supporting recovery for, these groups.**

Panel members prioritised protecting vulnerable individuals from climate change impacts throughout the workshops.

> **"I think if we have done the right things, we shouldn't see any needless, stupid situations where people are harmed, or people are put in harm's way [...]. We know where those people are and we know who the most vulnerable people are."** – Workshop 7, panel member from Scotland

Whilst not explicitly defining vulnerability, panel members' discussions suggested three aspects:

- Location or housing type increasing exposure to risk.
- Medical vulnerability - children, older people, those with physical or mental health conditions or disabilities.
- Limited ability to adapt - including lower incomes, living alone, or renting (restricting property-level adaptations).

> **"Prioritise support for people who are most at danger from overheating."** – Workshop 7, panel member from Greater Manchester

Panel members focused most on vulnerable groups when discussing property-level adaptations or disruptions (power outages, home adaptations for overheating or flooding). However, for larger-scale interventions like flood barriers or infrastructure improvements, they typically favoured approaches benefiting the greatest number of people rather than specifically targeting vulnerable groups in areas at risk.

IV. **Ultimately, panel members agreed everyone should help pay for those most at risk of climate impacts.**

Despite initial contention, panel members reached a general consensus that those unaffected by particular hazards should help fund protection for those at risk. For example, they accepted that people in low-flood risk areas would contribute through taxation to fund adaptation solutions like flood defences.

> **"I would say I'm willing to make some contribution to flooding because [...] I believe that flooding is a more serious problem, I'm willing to contribute to people who are greatly affected by this, even though I am not affected just because of how serious or how heavily it affects them."** – Workshop 7, panel member from Greater Manchester

V. **Panel members argued for the importance of taking personal responsibility for climate adaptation where possible.**

Panel members believed households with financial means or ability should protect themselves from climate impacts, particularly if they chose to live in higher-risk locations.

> **"I think each household does have a bit of a responsibility to protect yourself to a certain degree."** – Workshop 7, panel member from Greater Manchester

This emerged strongly in property-level adaptation discussions. Panel members supported grants for those unable to afford measures like air conditioning, but expected those who could afford them, to self-fund. They also advocated personal responsibility for preparedness - maintaining emergency supplies and battery chargers for power outages as standard precautionary practice.

VI. Panel members wanted adaptation to start now and be done properly.

Panel members wanted proactive rather than reactive adaptation, believing this would ultimately cost less and reduce climate impact risks.

> **"Spending the money in prevention and preparation is actually much better value and cheaper than having to fix."** – Workshop 7, panel member from Greater Manchester

They wanted public money invested in upgrading systems, infrastructure and new measures to reduce future climate impacts, rather than simply reacting when events occur. For example, panel members wanted investment in making road and rail networks more resilient to flooding and overheating through upgraded infrastructure like overhead lines and improved road drainage.

They recognised many desired changes were large-scale or needed time to become effective (such as nature-based solutions), meaning work must start immediately.

> **"Don't wait too long to start, because it will only get more expensive."** – Workshop 7, panel member from Greater Manchester

VII. However, panel members were torn between investment needs and concerns about household costs, wanting accountability and appropriate funding sources.

Despite recognising the importance of investment, panel members worried they could not afford property-level measures or contribute through increased taxes or bills, even if willing. They noted others not involved in the workshops would face similar challenges.

> **"It's great making all these adaptations, but again it comes back to the cost balance and if we're going to pay for it [...]. But it's finding that balance of what essentials are needed [...] and finding the right price point."** – Workshop 5, panel member from Greater Manchester

This concern accompanied strong frustration about already high taxes and bills without adequate services in return. Panel members' willingness to invest depended on greater accountability from private businesses and improved transparency about spending. This sentiment proved particularly

strong for water and to a lesser extent for energy, where panel members believed private companies providing these services should largely fund adaptation themselves.

VIII. This tension meant panel members wanted government to ensure public adaptation investment was targeted where needed most, was effective and provided good value for money.

Panel members' adaptation preferences centred on targeting, effectiveness and avoiding waste. They believed adaptation warranted investment when it:

- Is targeted at areas of most acute risk and vulnerable people.
- Is focused on proven effective measures, learning from other countries' successes.
- Provides good value for money (not simply choosing the cheapest options), particularly for publicly funded adaptations.

Alongside government investment, they also wanted to see government holding private companies to a high standard of accountability, ensuring that these companies recognise the responsibility they have to deliver climate change adaptations.

IX. Panel members felt inevitable losses shouldn't consume effort and funding to delay them – focus should instead be on achievable outcomes.

Consistent with their focus on effective, value-driven investment, panel members accepted certain unavoidable losses or disruptions.

> **"Why spend money trying to stop that happening when it is inevitable?"** – Workshop 7, panel member from Northern Ireland

They wanted resources concentrated on areas that could be maintained. For instance, panel members recognised coastal erosion would force community relocations and preferred supporting moving processes rather than resisting inevitable change. Similarly, they saw no value in attempting to save species that cannot be, preferring investment in protecting and preserving struggling but recoverable nature.

> **"We should accept some changes are inevitable and we should try to resist and prevent to a point."** – Workshop 7, panel member from Wales

> **"Some things will change and we have to accept it, but we should try and limit some of it and look after what we have in abundance."** – Workshop 7, panel member from Greater Manchester

X. Panel members often lacked trust in government spending, wanting transparent investment through ring-fenced adaptation mechanisms.

Panel members expressed willingness to invest in adaptation with one consistent caveat: they wanted transparency about taxpayer spending (local or national) and accountability for wasted or diverted funds.

> **"[Accountability for public spending is important] because I think if we don't know what we actually spend our money on, then we're not going to have confidence in anything that's being done."** – Workshop 7, panel member from Greater Manchester

This reflected their lack of trust in government resource allocation. They frequently cited examples of wasteful or controversial spending, making their investment willingness contingent on guarantees that funding would specifically support climate adaptation.

Panel members also often wanted to see climate change in general, but specifically adaptation, be removed from the 'political' sphere, becoming a non-partisan, long-term issue.

They felt most comfortable when seeing clearly ring-fenced funding. Flood Re exemplified this - panel members overwhelmingly praised its transparency in funding sources, spending purposes and support for highest-risk households. Another example was toll roads which were suggested by panel members as a way to funding infrastructure improvements through direct user charges.

> **"You can bring in a toll [where the money] could actually be [reinvested] on the [upkeep of the] roads. Our road tax doesn't go on the roads, but a road toll has been done very well in the past for the motorways."**– Workshop 7, participant from Greater Manchester

XI. Panel members favoured adaptation options with co-benefits, particularly nature-based solutions, even if more expensive.

Panel members preferred options with co-benefits for two reasons.

Firstly, they wanted good value for money, viewing co-benefit options as better value. Parks in urban areas, for example, could mitigate heat islands, reduce flooding and preserve nature simultaneously.

Secondly, panel members valued nature-based solutions for protecting nature whilst reducing other climate risks. They typically accepted the longer implementation timescales for these measures. However, support was not universal - some worried nature-based solutions took too long or offered less direct benefits than alternatives like flood defences. Others raised practical concerns including space requirements.

XII. Panel members emphasised that adaptation should be locally led, with no one-size-fits-all approach.

Panel members reluctant to invest in UK-wide adaptation often favoured locally led approaches. Some suggested creating a central fund that local authorities could access for area-appropriate adaptation measures.

> **"The local government should be ring-fencing money for certain things; it's going to cause a problem where in their local areas it should be down to them."** – Workshop 7, participant from Scotland

Whilst not explicitly stated, panel members appeared driven by pragmatism - believing areas should adapt according to their specific needs in ways proving most effective and offering best value locally.

XIII. Panel members thought a well-adapted UK will experience similar or slightly decreased risks for climate change impacts compared to today, despite a warming planet.

When asked to envision a well-adapted UK in 20 years, panel members saw nature-based solutions providing easier nature access, whilst upgraded infrastructure would deliver improved services and transport systems. Ultimately, panel members wanted sufficient investment to maintain or slightly reduce today's impact levels.

> **"If the right decisions are made, we'll probably be where we are. We wouldn't have made much difference; we will just have stopped deteriorating."** – Workshop 7, panel member from Scotland

They emphasised that a well-adapted UK would avoid most crises and emergencies through effective systems managing extreme weather - minimising human losses and damage to infrastructure and nature.

> **"If we got all the sums right, we won't have any emergency situations that we're currently experiencing. So, we're not going to be getting the flooding, the forest fires and the grass fires, and transportations are not going to be disrupted. But that is your perfect world."** – Workshop 7, panel member from Greater Manchester

XIV. They felt it is vital to educate the public on climate change impacts.

Throughout workshops, panel members frequently expressed surprise at climate change's various impacts. The first two workshops marked a significant perspective shift, with presentations increasing panel members' concern at the scale of the impact.

In the final workshop, panel members wanted their friends and families to understand the scale and challenge of climate change. Many admitted previous unawareness of its severity and now wanted others to gain similar understanding. They particularly wanted the public to grasp three points: the scale of the adaptation challenge; individuals' ability to take meaningful home

adaptations; and how proactive adaptation, whilst requiring upfront investment, proves far more cost-effective than later reactions.

Annex 1

The table below illustrates the breakdown of panel characteristics. A total of 30 panel members made up the sample.

Table 1A: Breakdown of panel members' characteristics

Characteristics	Characteristics breakdown	Recruitment target (min quota)	Total no. of panel members	% of panel members (out of a total 30)
Gender	Female (F)	13	13	43%
	Male (M)	13	16	53%
	Non-binary/Other/Prefer not to say	No quota – flexible	1	3%
Age	16-24	4	4	13%
	25-44	8	9	30%
	45-64	8	10	33%
	65+	6	7	23%
Devolved government	England	17	22	73%
	Scotland	3	3	10%
	Wales	3	2	7%
	Northern Ireland	3	3	10%
Urban / rural	Urban	18	23	78%
	Rural	5	6	20%
	Remote	3	1	3%
Ethnicity	Asian/Asian British	No quota – good mix	3	10%
	Black/Black British		1	3%
	Mixed/other		1	3%
	White British/Other	16	25	83%
Disability	Yes (physical or mobility disability)	3	7	23%
	No	20	23	78%
Household income level	£0-£10,000	2	1	3%
	£10,001-£25,000	6	5	17%
	£25,001-£50,000	11	11	37%
	£50,001-£75,000	No quota – good mix	12	40%
	£75,001+		1	3%
Tenancy	Homeowner	12	20	67%
	Renter	4	5	17%
	Social renting	3	3	10%

Characteristics	Characteristics breakdown	Recruitment target (min quota)	Total no. of panel members	% of panel members (out of a total 30)
	Other	1	2	7%
Attitudes to climate change	Concerned	19	23	78%
	Not concerned	7	7	23%
Political affiliation	Reform	2	3	10%
	Labour	2	7	23%
	Conservatives	2	5	17%
	Liberal Democrats	1	1	3%
	Green party	1	1	3%
	Other party	No quota - flexible	3	10%
	Independent		7	23%
	Mixture/in-between		0	0%
	Don't know/prefer not to say		3	10%
Climate change impacts – day-to-day life disrupted by changing weather conditions? e.g., flooding, storms, heatwaves	Home has been impacted	No quota - flexible	7	23%
	Access to transportation/ commuting has been disrupted (e.g., road closures, public transit delays, etc.)		14	47%
	Access to school/work/services has been impacted		2	7%
	Close friends or family have been impacted		1	3%
	Have not personally been impacted		6	20%
Transportation / commuting	Car	No quota – good mix	20	67%
	Public transportation		7	23%
	Cycling		0	0%
	Walking		3	10%

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