UK Research and Innovation

sciencewise

How can society live sustainably?

Insights from a decade of Sciencewise public dialogues

The UKRI Sciencewise public dialogue programme connects the public to decision making about science and technology, leading to better research, better policy and better outcomes.

Reports published on over 60 Sciencewise public dialogues, carried out with UK Government, the Research Councils and third sector organisations, have had major impact on UK science and innovation policy and research[2].

These reports represent a significant body of evidence about public views and preferences on socially important scientific and technological questions.

About this report

This report draws together findings from multiple Sciencewise dialogues conducted over the last decade in relation to the climate and the environment.

It is one of a series exploring what Sciencewise-supported projects reveal about public values and attitudes to contemporary scientific and technological issues, organised by Sciencewise's four key themes.

The report series is intended to be a resource to support policy makers and research funders considering their own dialogues or for those looking for societal insights.

Also published is an Executive Summary, synthesising key themes from across the series.

Sciencewise dialogues reviewed for this report

The Sciencewise Climate and Environment theme explores a broad set of issues focused on how society can live sustainably, particularly in the context of climate change. The dialogues considered here are those since 2010, on subjects including renewable energy sources, the future of cities and of homes, the food system, nuclear power, geoengineering, and carbon capture, usage and storage.

Given the public's interest in considering nature and 'natural solutions' alongside those which are more 'technological' (something explored in more detail below) the report also draws on dialogues focusing on biodiversity and the natural world, including water management, ecosystems, and living with environmental change.

Advanced Nuclear Technologies	Cambrian Mountains	Carbon Capture, Usage and Data Storage	Energy 2050 Pathways	Flood Risk Communications	Food System Challenges
Future Cities	Geoengineering	Geological Disposal Facilities	Global Food Security	Good Home Inquiry	Landscapes and Ecosystems Futures
Living with Environmental Change	Low Carbon Communities Challenge	Low Carbon Heat Technologies	National Ecosystem Assessment	National Food Strategy	Nature Improvement Areas
New Nuclear Power Stations	Shale Gas and Oil	Significant Water Management Issues	Social Impact of Offshore Renewables	Trajectories for Reducing Carbon Emissions	Water Catchment Planning

1 (Facing page) See forthcoming Sciencewise report: 'How can public dialogue deliver better outcomes? Key impacts from UKRI's Sciencewise programme'.

2 The four reports in this series each focus on one of the Sciencewise priority themes. The four themes are:

- Climate and Environment: How can society live sustainably?
- Data, AI and Robotics: How should society shape the digital world?
- Health, Ageing and Wellbeing: How should society live healthy lives?
- Life Sciences and Biotechnology: How should society shape the future of life?

Key themes

1. Solutions which the public perceive of as ‘natural’ are often preferable to solutions seen as more technological or more novel;
2. It is acceptable to use climate technologies to achieve what nature-based solutions on their own cannot;
3. Climate technologies must generate good jobs for local communities; and
4. Consumers need to be supported by government to help reach net zero.

Solutions which the public perceive of as 'natural' are often preferable to solutions seen as more technological or more novel

The public consistently prefer the use of what they see as 'natural' solutions wherever possible to address climate change and environmental damage. These are seen as safer than more 'technological' solutions to climate change and environmental damage.

Climate change is often understood by the public to be a result of human activity destabilising the climate[3]. Dialogue participants tend to favour supporting nature to repair itself through 'natural' solutions. This includes solutions which make use of existing natural resources such as using wind, solar and wave power as renewable energy sources to reduce carbon emissions.

Solutions which are perceived to be more natural are seen as long-term sustainable options to be prioritised while the more technology-driven ones are sometimes regarded as temporary solutions to symptoms (e.g. carbon capture and storage) which do not address the root cause (carbon emissions)[4].

While naturalness is often cited as a positive and desirable quality for climate policies, there are some indications that this is because naturalness as a broad term includes within it notions of familiarity and is perceived to be easier to understand. This ease of understanding is linked to perceiving 'natural' technologies, including renewables as lower risk; less 'natural' solutions are often felt to be insufficiently researched[5] and riskier[6].

> **"I am not against having it in my area but wonder if there are simpler solutions such as the tidal barrage which would produce energy instead of capturing carbon. Also, rivers could produce energy for small numbers of people. Plus, heating local homes from the hot water produced from mine shafts. I would prefer that these were all looked at first**
>
> **Dialogue participant, Port Talbot, Carbon Capture, Usage and Storage, 2021**

This suggests that a further exploration of understandings of naturalness, particularly in relation to climate technology designed to reduce carbon emissions, would be valuable. This would help build an understanding about the information the public require about technologies such as carbon capture and storage, and carbon sequestration. This perception of innovation and novel technology solutions being riskier goes beyond discussions about climate change and also emerges when the public discuss technological solutions to food challenges, such as lab-grown meat[7].

3 Geoengineering, 2010-11.

4 Carbon capture usage and storage, 2021.

5 Trajectories for carbon emissions reductions, 2013-14.

6 Geoengineering, 2010-11; Carbon capture usage and storage, 2021; Advanced nuclear technologies, 2021.

7 Food systems challenges, 2014-15; Futures cities, 2015-16; National food strategy, 2021.

Some dialogues which focused more on biodiversity and ecosystems found that people view nature as life-enriching and something to be supported and preserved as it brings social goods to communities, especially if those healthy natural environments are located nearby[8]. It is also seen as key to people having access to healthier foods[9]. This preference for 'natural' over man-made mirrors preferences for 'natural' solutions to climate change.

It is acceptable to use climate technologies to achieve what nature-based solutions on their own cannot

In some dialogues, when exploring how to reduce carbon emissions sufficiently, dialogue participants discover that 'natural' solutions such as renewable energy sources and behaviour change in consumption levels are not considered sufficient to stop emissions or climate change on the timescales required. As a result, technological solutions become more acceptable to help reach climate targets.

Participants become generally more accepting of the perceived risks of technology driven solutions, citing the scale of impact that can be achieved through these approaches.

Engineer inspec
trial roof mount

8 National ecosystem assessment, 2013-15.

9 National food strategy, 2019-20.

“I think the driver for net zero needs to be technology based. Trees won’t do it. Behavioural change will be very difficult. I started off thinking the sheer scale of what had to be done was a bit pie in the sky but with my technology brain in gear it did seem doable, as a sizable part of the mix.”

Dialogue participant, Liverpool, Carbon Capture, Usage and Storage, 2021

cting an indus-
ted solar panel.

This is further evidenced by the temporal limits which the public often place on their acceptance of technology driven solutions. For example, nuclear power is acceptable to dialogue participants but sometimes with the caveat that it meets a need which renewable energy sources are not yet developed enough to meet; when renewable energy sources are developed enough, we should aim to phase out the temporary solution of nuclear power and rely on renewables instead[10].

In other climate technology contexts short-term utility is perceived more critically. For instance, some dialogue participants view carbon capture technologies as a short-term solution that addresses only the symptoms of more fundamental issue[11]. This demonstrates the consistent view that while addressing climate change demands significant technological contributions, the public are often more comfortable with technology driven solutions in helping to provide a short-term answer in service of more natural solutions becoming the longer-term solutions.

When discussing the acceptability of using technology driven approaches to address climate change, the public also often highlight the need for using technologies as part of multi-pronged approaches[12]. This is unsurprising given the complexity of the challenge of climate change, but it also spreads the perceived risk of technology driven approaches.

Climate technologies must generate good jobs for local communities

Safety, efficacy and cost are important. Alongside this, one of the key requirements the public have for the expansion of climate technologies is that they must generate jobs for people in local communities, particularly in areas with fewer employment opportunities.

Climate technology such as nuclear power, CCUS and geoengineering approaches often need to be situated away from more densely populated areas both to find sufficient space and to be located at a safe distance from where people live[13]. Because of this the public see an opportunity for the development of climate technology in more rural areas to generate jobs for rural communities nearby. This is seen as particularly important in communities which have lost jobs or may lose jobs through the phasing out of fossil fuels such as coal and oil[14].

The public can see potential inequalities emerging and being exacerbated both by climate change itself and actions taken to address it[15]. Therefore, ensuring that action helps provide good jobs in communities with fewer employment opportunities is a common demand from the public when considering the use of climate technology.

10 Advanced nuclear technologies, 2021.

11 Carbon capture usage and storage, 2021.

12 Geoengineering, 2010-11; New nuclear power stations 2014-

13 Carbon capture usage and storage, 2021; Advanced nuclear technologies, 2021.

14 A two way conversation with the people of Scotland on the social impact of offshore renewables, 2016; Carbon capture usage and storage, 2021; Significant water management issues, 2013-14.

The public want to be supported more to reach net zero

The public want government to significantly increase support to be made available to the public to help them make environmentally friendly choices. The types of support the public believes government should provide range from financial incentives in the form of grants to take up low-carbon technology to providing clear information on the carbon footprint of produce, and providing low-carbon alternatives.

> **“If it’s possible, modular installations could all be constructed in one or two sites in the UK then delivered to their destinations. This would enable a major plant to be operating (under strict regulations) in areas chosen for their high unemployment**
>
> **Dialogue participant, Scunthorpe, Advanced Nuclear Technologies, 2020**

Generally, the public are keen to see action to address climate change. However, the public often highlight their need for greater support from government to allow them to play their part. In terms of what they buy, dialogue participants want to see more information on labels of products like food packaging, making clear the environmental impact of producing and transporting that food, so that they can make informed, climate-friendly decisions about what they buy[16].

Making changes to people’s homes, particularly to how they are heated, is where the dialogue participants feel there is a significant gap between the level of people’s willingness to decarbonise and the information and financial incentives available to support them to do so[17]. The public are often open to making changes to their homes to decarbonise, such as having technologies like heat pumps installed, but consistently express major concerns that it is both too expensive for most people to afford and that there is too little guidance on what route to take as multiple technologies and approaches emerge[18]. The public are also wary of going into personal debt to decarbonise their homes and generally feel that the cost of this should not be shouldered solely by the consumer[19]. An opportunity which can be embraced in this area is for the public to make money by selling energy they themselves generate back to the grid. The public highlight this as a possible positive if the proper infrastructure is in place to help customers avoid heavily investing in a new technology which becomes a bad investment either due to policy changes or technological developments[20].

15 Geoengineering, 2010-11.

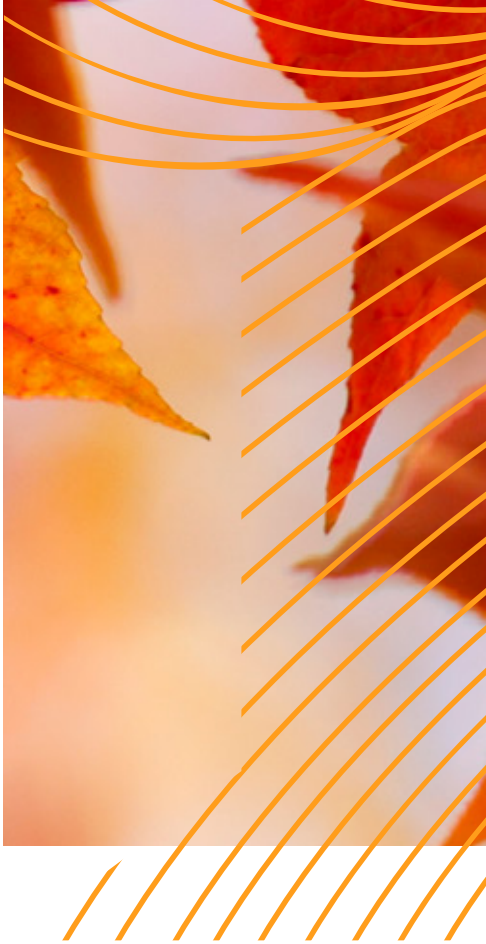
16 Food systems challenges, 2014-15; National food strategy, 2019-20;

17 Low carbon heat technologies, 2016;

18 trajectories for carbon emissions reductions, 2013-14;

18 Good home inquiry, 2021;

20 Low carbon heat technologies, 2016;;



Conclusions

Public preferences around climate technologies are often driven by a personal understanding of the climate and climate change. The public are more likely to be supportive of technologies which they are familiar with, or which appear to be more in tune with nature as this is often linked to perceptions of safety.

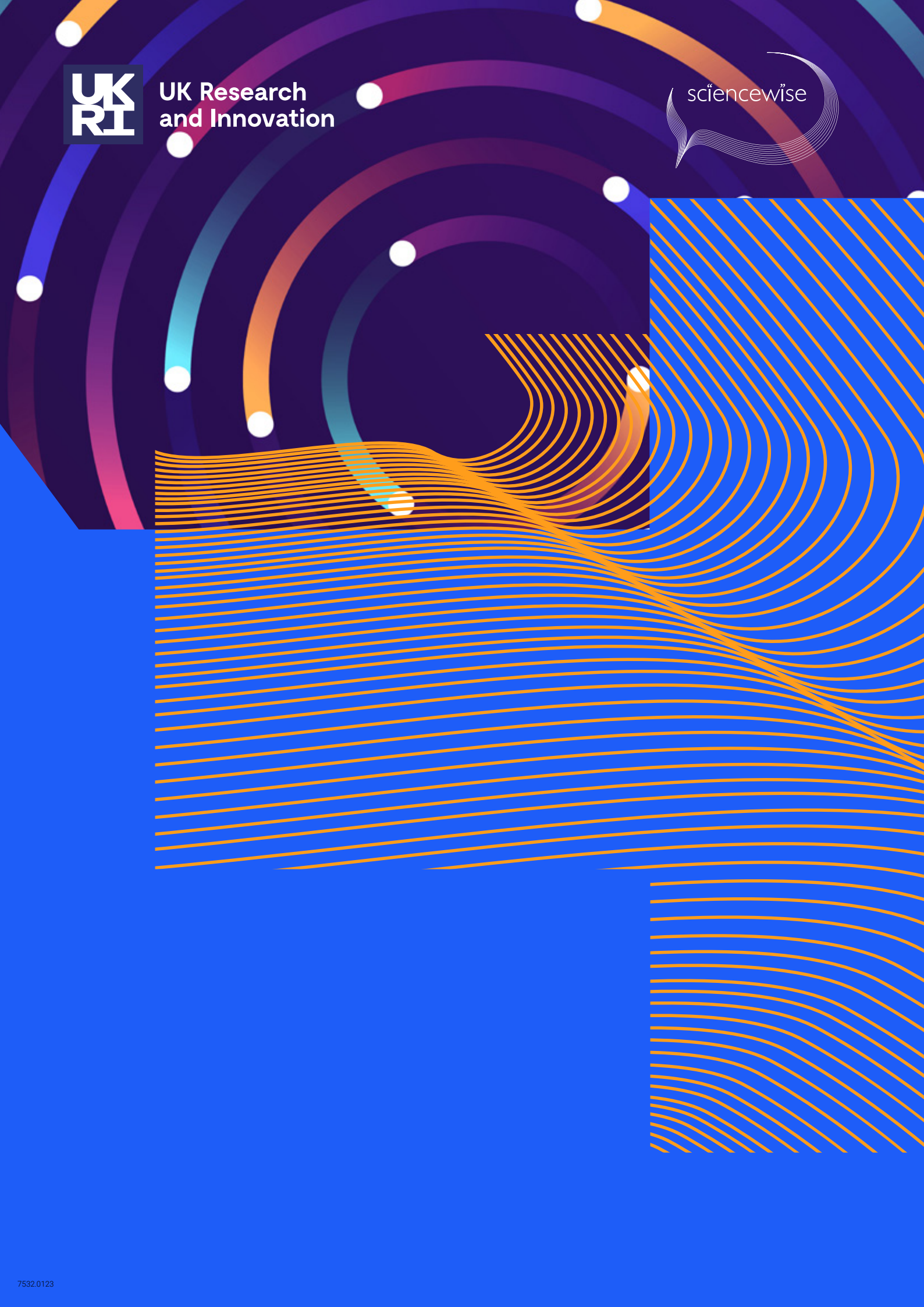
However, when the public understand the scale of the challenge posed by climate change, they are more accepting of solutions they perceive to be more 'technological'. Often, they see these technologies as important for dealing with the immediate problem of climate change, as part of a pathway to a world where solutions they see as more natural have become the norm.

As with other technologies, the public see benefits as well as risks arising from the development and application of climate technology. In particular, they see potential benefits to the economy and for employment, but are keen to see that these are realised equitably.

While the public are willing to take action to address climate change, they can also see the limits of the impact individuals can have and the risks to them if not adequately supported by society and government. This can be mitigated by such measures as information to support people to make more informed choices, through to financial support to help people to make necessary investments to change their homes and lifestyles.

About UKRI Sciencewise

- The report is commissioned by Sciencewise, a UKRI funded public dialogue programme that supports government departments and other public bodies to listen to and act on diverse voices, to shape science and technology innovation policy and priorities. Important benefits of the programme include:
- Helping decision makers to formulate policy with a deeper understanding of public views, concerns and aspirations;
- Supporting high quality, best practice public dialogue; and
- Bringing credibility and independence to public sector-led public dialogue projects.
- Further information on the Sciencewise programme including impact case studies can be found at the following link: https://sciencewise.org.uk/
- To get in touch please contact: simonburall@sciencewise.org.uk and graham.bukowski@ukri.org



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