



Healthy Environments, Diverse Perspectives

Exploring the views of under-represented
groups on healthy environment research

November 2020 - July 2021

Suppliers:

Beard // Askew

Imperial College
London
Consultants



Helix
Centre

Funders:



Natural
Environment
Research Council



UK Research
and Innovation

This report is the independent work of the authors



Contents

Executive Summary	4
Introduction	8
Project Design	11
Public Involvement and Engagement Approach	13
Selecting Research Areas for the Films	17
Approach to Analysing Dialogue Insights	18
Findings: Public Understanding of a Healthy Environment	19
Findings: Public Views on Healthy Environment Research Issues	22
Findings: Wider Issues to Consider when Framing Healthy Environment Research	26
Conclusions from the Findings	31
Evaluation of the Approach	33
Conclusions from the Approach	40
Appendix	41

Executive Summary

Healthy environments are essential for people to live and prosper. At a time of rapid environmental change, research into the links between the environment and health helps us to understand what we need to do to support healthy populations. But what is a 'healthy environment'? The issues that matter to funders, researchers and policymakers aren't necessarily the same as those that are important to the public. This becomes problematic when the public, particularly people from under-represented groups, aren't involved in making decisions about the issues that are prioritised and funded. It could result in research that many groups feel is not relevant or useful to their lives. A more worrying outcome might be that advances in knowledge benefit some groups at the expense of others, increasing the gap between those who are able to live healthy lives, and those who aren't.

This report describes an innovative online public dialogue about healthy environments that was co-designed with a multidisciplinary team of researchers, designers, videographers, community involvement experts, and six community "co-creators", with a focus on engaging with under-represented groups using a creative approach. The aim was to gather nuanced insights to inform the UK Research and Innovation (UKRI) and Natural Environment Research Council (NERC)'s healthy environment research programme in making decisions about priorities for future research. The co-creators were members of the UK public who worked with the team throughout the project; they came up with ideas and were involved in decision-making.

Several interactive elements were developed to spark conversation, including: a project brand and welcome pack; 360° videos of different environments (with a Virtual Reality headset); videos about NERC research; and an online activity using the platform Miro that asked people to create their ideal healthy space. Each dialogue workshop was facilitated by a different "community host" who had links to under-represented groups, recruited the participants and who supported access needs. The report summarises the key insights that were shared across several community groups during the dialogue workshops, which could influence the direction of future research and activities.

Public Understanding of a Healthy Environment

Insight 1: Safety was an aspect that made an environment feel healthier. For wheelchair users, safety came from supportive infrastructure, and for others, it came from being among people. Busy urban spaces were where many participants felt safest, and this contributed to perceived environmental healthiness despite typically being more polluted than rural spaces.

Insight 2: Healthy environments were seen as **quiet**, except for natural sounds such as birdsong. On the reverse, noises from industry or vehicles made an environment seem less healthy to participants.

Insight 3: Environments that positively impacted participants' **mental health and wellbeing** were perceived to be healthy. Typically these were rural natural environments, but vast open spaces in cities were also beneficial to the wellbeing of city-dwellers.

Insight 4: Preferences for certain environments were often influenced by participants' **past life experiences**, and in turn reflected on participants' perceptions of healthy environments. For instance, seeing the countryside as healthy based on fond childhood memories, or beaches as unhealthy due to experiences of polluted coastlines.

In developing a future healthy environment research programme, NERC could consider:

- Research on noise pollution and perceived safety in relation to wellbeing and use of green spaces.
- Listening to diverse voices to better understand and define the characteristics of rural and urban environments that people consider to be beneficial to mental health and wellbeing.
- Research that seeks to understand the range of experiences communities have with the natural world, and how personal connection to nature, plays a role in maintaining healthy environments.
- That any one environment may not be viewed as 'completely' healthy. For instance, a city's crowded environment might invoke feelings of safety but also bring unwanted noise pollution.

Public Views on Healthy Environment Research Issues

Insight 5: Participants felt that **equal access to public space** was an important attribute of healthy environments and wanted to understand how this access can be improved, particularly through sustainable public transport.

Insight 6: Participants took a **long-term view** in selecting environmental research priorities, including considerations of **sustainability and social equity**. Where the outputs of such research have the potential to immediately impact policy or practice, participants encouraged highlighting these to secure popular and political support.

Insight 7: Participants encouraged research that looked to **prevent root-causes, rather than treat symptoms**, of environmental problems that pose a risk to human health. Particular areas where preventative measures were perceived to bring health benefits were improving air quality in cities, and innovative approaches to monitor the spread of infectious diseases (e.g. wastewater monitoring).

In developing a future healthy environment research programme, NERC could consider:

- Partnering with other sectors, such as architects and developers, to ensure equitable access to environments is considered in research, for instance considering those with physical accessibility needs.
- Ensuring long-term research remains appealing to relevant stakeholders (e.g. politicians) by highlighting potential short-term outputs that may have intermediate impact.
- Ensuring that despite long-term articulation, long-term research is funded now.
- Prioritising research that seeks to prevent further damage to the environment and to human health, such as improving air quality in cities and monitoring / prediction of future disease outbreaks.

Wider Issues to Consider when Framing Healthy Environment Research

Insight 8: Almost all community groups agreed there was an **intrinsic link between environmental and human health**, and that both should be considered in research funding decisions.

Insight 9: Participants highlighted the importance of **healthy environments and healthy choices being accessible to all**, and available to people with limited means. Affordable housing was identified as a fundamental requirement for health and inclusion in healthy environments research.

Insight 10: Participants felt that **community spaces and activities**, such as allotments and communal gardens, can contribute to a healthy environment and also encourage people to take action in supporting the environment.

Insight 11: Participants placed heavy emphasis on **research which helps empower communities with knowledge and encourages behaviour change**. This needs a tactful approach to avoid attributing blame to the public for issues that are beyond their control, since wider social determinants restrict behaviour change in some population groups.

In developing a future healthy environment research programme, NERC could consider:

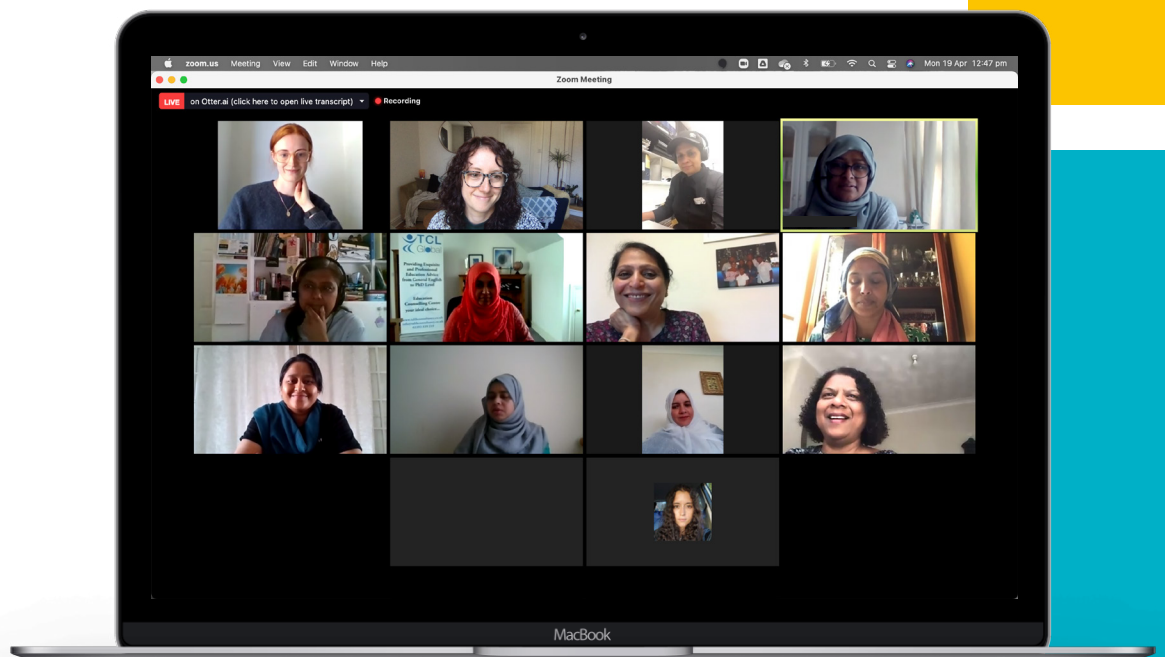
- The intrinsic link between environmental research and human health.
- That some more deprived communities may not engage in supporting healthy environment research without appropriate support and recognition that other societal issues might be more important to them.
- A more place-based approach to research, drawing on communities for co-design of participatory, action-oriented environmental research projects.
- That greater understanding of environmental issues empowers individuals to advocate for change locally and nationally.

Please see the final section for the [Evaluation of the Approach](#).

Introduction

Healthy environments are essential for people to live and prosper. Environmental factors impact the health and wellbeing of all of us, from access to stable water supplies, to biodiverse ecosystems, from nutrient-rich soils for healthy food production, to green spaces within cities. The [2030 Agenda for Sustainable Development](#), and its Sustainable Development Goals, also reflects the common understanding that a healthy environment is integral to the full enjoyment of basic human rights. As humanity increasingly exploits the resources that our living standards demand, environmental science must continue to monitor and understand the resulting degradation of the environment and the effect of this on the world's population and health. But what constitutes a 'healthy environment' is interpreted and understood by the public in a variety of ways. This is because people's associations of a healthy environment can be contradictory as well as culturally and historically imbued, which is problematic for policymakers and funders. With climate change high on the political agenda, the public, funders, and researchers, must embrace important trade-offs associated with a healthy environment, particularly if we are to meet our legally binding climate commitments.

The public, and particularly people from under-represented groups, are often not involved in informing decisions around research. Therefore the outputs of the research might not be relevant to them, or worse, increase inequalities.





In November 2021, [Beard Askew](#), in partnership with a team from the [Helix Centre](#) working independently via Imperial Consultants, were commissioned by UKRI/NERC to undertake an online public engagement exercise over seven months to gather nuanced insights from the UK public about healthy environments. This was to inform UKRI and NERC's healthy environment research programme in making decisions about priorities for future research. This piece of work followed on from a report by Ipsos MORI that formed the scoping phase of this project. The report recommended using innovative online methods to engage members of the public, particularly from under-represented groups, in conversations about healthy environments, with appropriate support. The Ipsos MORI report also suggested purposeful sampling of people from under-represented groups and to collect information about intersectional societal factors, such as level of deprivation and education. This work is also aligned with an objective of [NERC's public engagement with research and innovation strategy](#): 'To listen to the public through public dialogue to inform NERC'. This dialogue comes at an important moment for the UK and internationally with regards to environmental issues and research.

UKRI/NERC will use the outcomes and final report of this project as part of a wider range of communications efforts in the run up to COP26 (26th United Nations Climate Change Conference of the Parties).

The main report summarises the creative online approach and key insights that were shared across several under-represented groups after completing interactive activities and dialogue workshops. These insights could inform where future healthy environment research is needed. The second part of the report evaluates the approach, and is directed at an audience interested in replicating similar community-led approaches to reach under-represented groups.

Project aims

1. Future UKRI/NERC healthy environment research programmes and projects are informed by a range of inputs including public values and views, based on clear and actionable recommendations arising from this study.
2. A detailed understanding of public priorities relating to healthy environment research as well as research which intersects with NERC's healthy environment research programme, and a rich and nuanced understanding of the reasons why they hold those priorities.
3. To demonstrate an approach to engaging under-represented groups in discussions about the environment, considering issues of equality, diversity, inclusion and access, to support UKRI's planning for future investments in these areas.

Project objectives

1. To gather rich and nuanced insight into public understanding of a healthy environment.
2. To understand public views and priorities around NERC's healthy environment research programme, and the underlying values and principles.
3. To understand how answers to 1-2 vary across a diverse range of public participants, including people from different geographical locations across the UK and those less likely to be engaged with the natural environment.

Project Design

This public dialogue project placed creativity and inclusive design at the centre. The innovative public engagement method leveraged visual storytelling, public involvement, human-centred design, and co-creation to engage a wide range of under-represented audiences.

What is visual storytelling?

A good story makes us deeply think and feel in a way that crowded and complicated presentations and data visualisations often fail to do. Visual storytelling can be used to translate complex, abstract or sometimes distressing concepts into a tangible and immersive experience that resonate with people's sense of identity, values and worldview.

What is public involvement?

When members of the public are involved in a project, in a specific role, to bring the public perspective to influence and improve the project.

What is human-centred design?

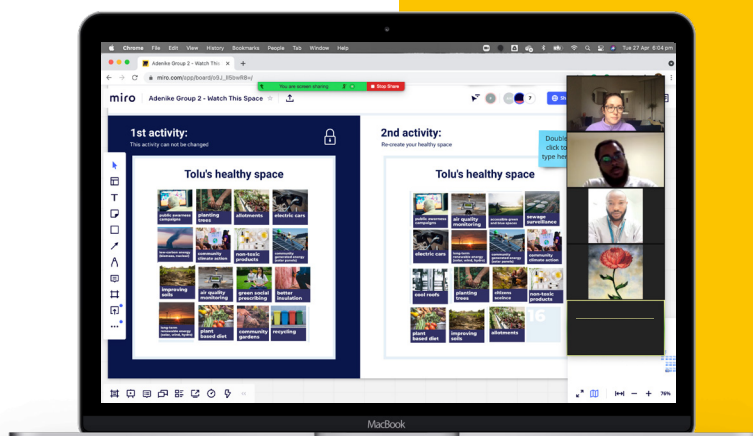
A creative method to research that allows designers and researchers to work closely with key stakeholders in order to craft carefully considered experiences around their needs and requirements.

What is co-creation?

When members of the public and other relevant stakeholders work together on a project from start to finish. Decision-making is shared and all knowledge is valued equally.

Participant Experience and Interactive Elements

Several interactive elements were developed to immerse participants in healthy environment research, and to create a neutral space to spark meaningful reflections and conversation.



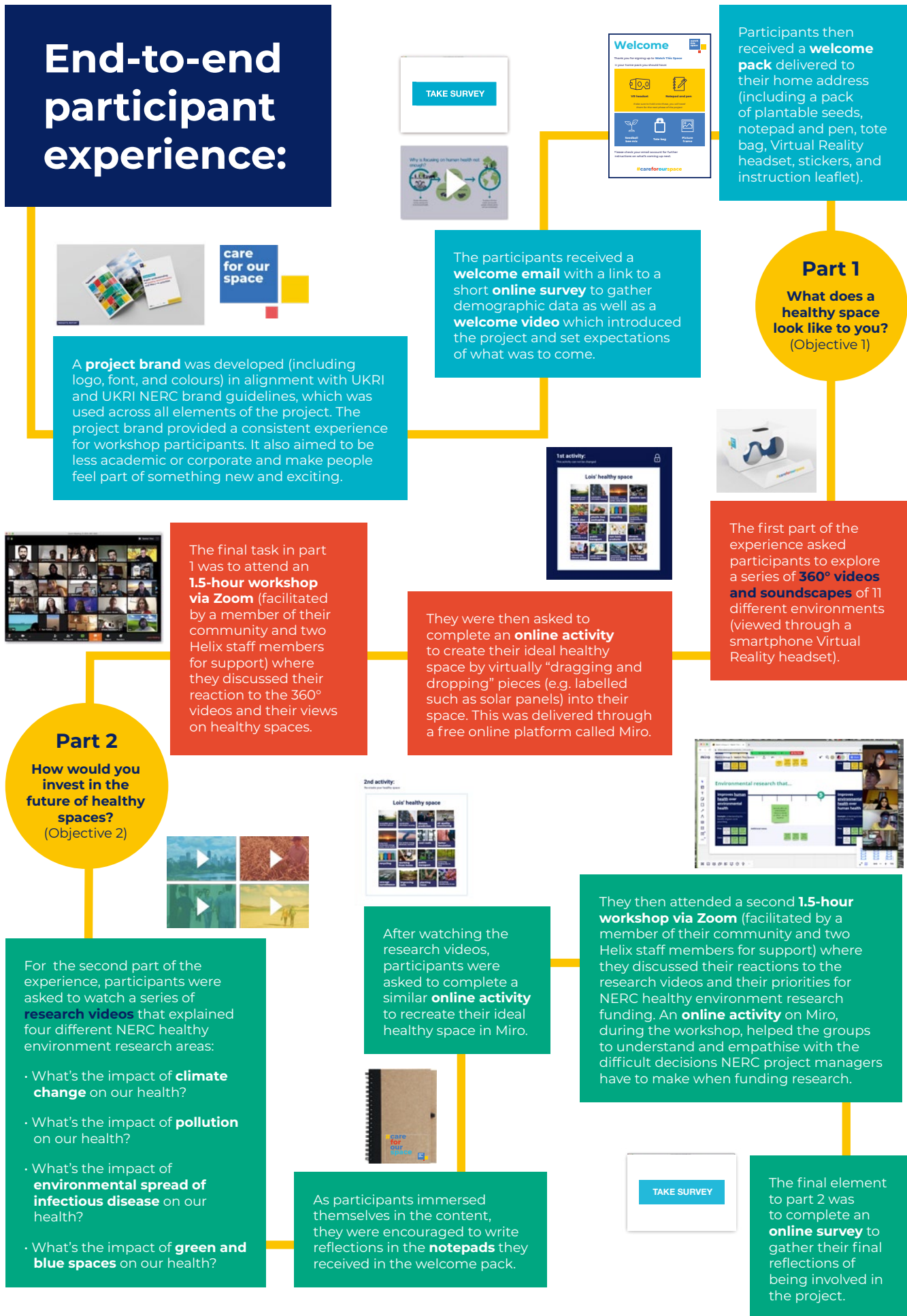


Figure 1: End-to-end experience of the workshop participants

Public Involvement and Engagement Approach

There were three levels of public involvement and engagement in the project: co-creators, community hosts and participants (see **Figure 2**). This community-led approach ensured that under-represented communities were engaged in the project. Under-represented groups were defined as those who were less likely to engage with natural environments ([Natural England report: Monitor of Engagement with the Natural Environment 2019](#)) e.g. older people, disabled people, people with long-term conditions, people from disadvantaged backgrounds, people from ethnic minority groups, and people from geographical areas where the report showed less engagement in natural environments. All community members were paid £25 per hour of their time and a £5 working from home expense, per online meeting.

See [Appendix C](#) for the recruitment process, support, training and access needs.

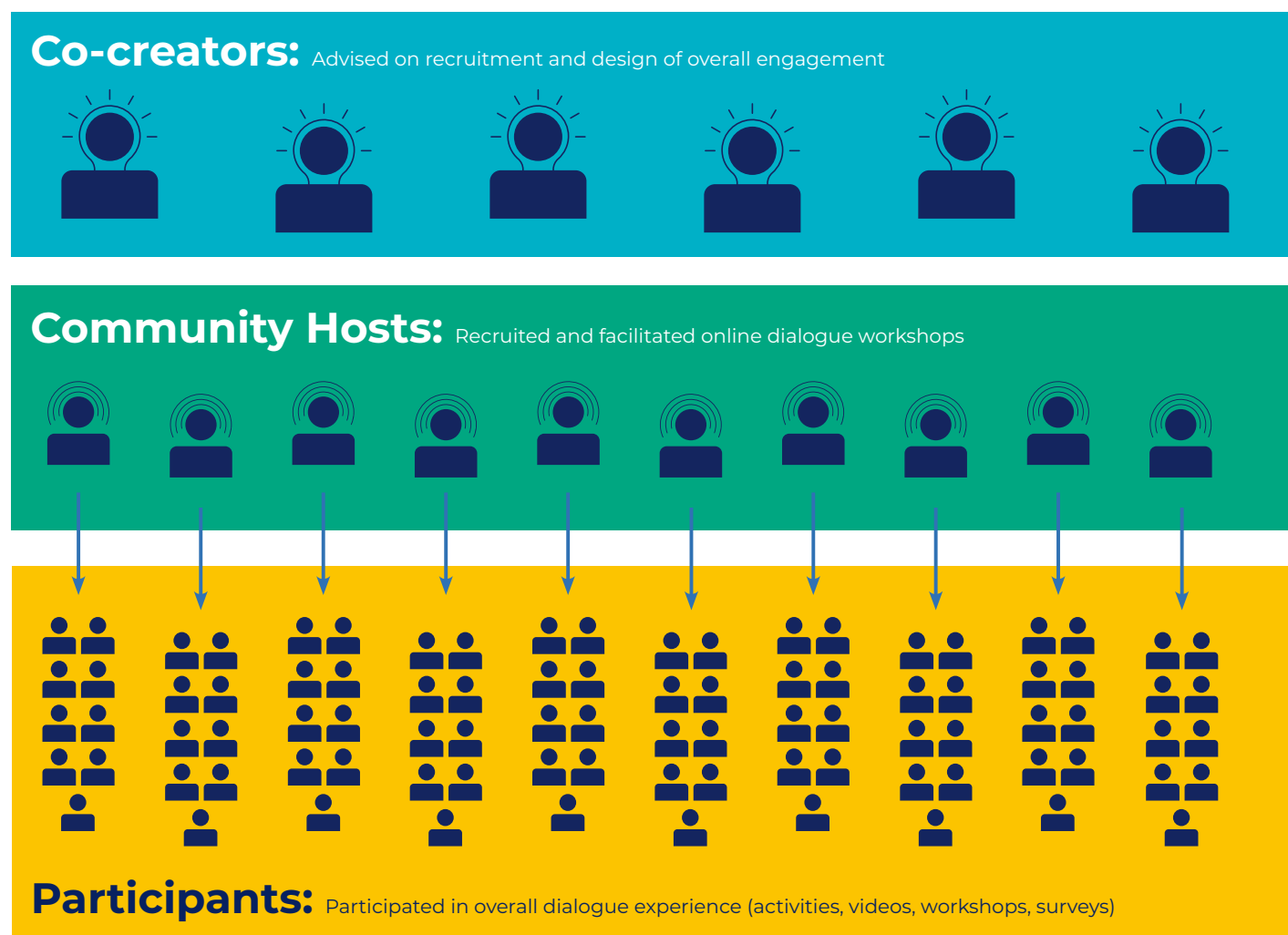


Figure 2: Levels of public involvement and engagement

Co-Creators

Six co-creators were involved in developing all aspects of the project from start to finish. The team used shared decision-making by involving the Beard/Helix team, UKRI/NERC staff and co-creators in generating and voting on ideas.

For example, **the Co-Creators were involved in:**

- Ensuring the project was accessible
- Coming up with a recruitment plan for the community hosts and disseminating to their network
- Developing a brand for the project
- Suggesting environments for the 360° videos
- Suggesting themes and case studies to focus on in the research videos
- Reviewing the online activity on Miro
- Ensuring questions in the dialogue workshops were clear
- Co-creating the public facing communication outputs

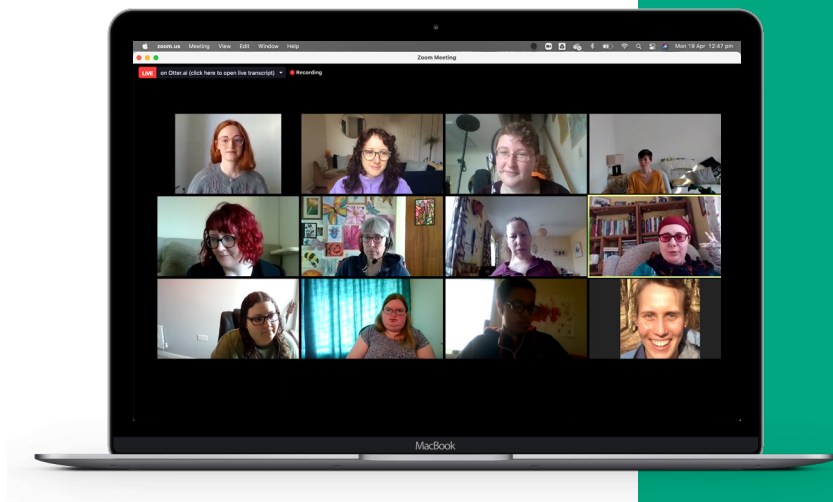
Co-creation was facilitated through six Zoom workshops and regular communication over the platform Slack. The co-creators represented age ranges from under 18 to 64 years; living in urban, rural, coastal and urban fringe areas; from England, Scotland and Northern Ireland; two people from an ethnic minority group (Pakistani and White Irish); and, one person with a visual impairment.

An iterative design approach was followed, consulting the UKRI/NERC team with each aspect and approach. An advisory group oversaw the project to ensure that the public engagement was balanced and informed by a wide range of relevant expertise in this area, and advised on the framing and the design of the public dialogue. The advisory group were not consulted in the writing of this report.

The advisory group membership included:

- Mick Beck, Sensory Trust
- Mike Christie, Aberystwyth University
- Rich Pancost, University of Bristol (Chair)
- Cheryl Willis, Natural England
- Judy Ling Wong, Black Environment Network

12 researchers, suggested by UKRI/NERC, were interviewed for the storyboarding phase of the videos, which subsequently led to six researchers being filmed. Their views also fed into the development of the pieces in the Miro activity. Due to the lack of ethnic diversity of researchers, Beard/Helix suggested adding a presenter from an ethnic minority background, to help ensure the videos were more relatable for our target audience.



Community Hosts

The key role of the ten community hosts was to recruit nine participants from under-represented communities and facilitate the dialogue workshops. The community hosts were specifically selected due to their links to under-represented groups and facilitation skills. They were aged between 18-64; three were males, one non-binary; five were disabled people; and seven were from ethnic minority groups (see [Appendix C](#)). One community host communicated with participants in another language (Bengali) and translated to English for the rest of the group. One community host had hearing loss and a palantypist attended each of their workshops to live caption the dialogue. The community hosts scheduled their own workshops to ensure the time was appropriate for their community group. For example, one group chose to hold workshops in the morning as they were fasting for Ramadan.

Participants

The participants' role was to engage with the 360° videos, online activity, research videos, actively contribute at the dialogue workshops and fill out two surveys. 95 of 101 participants from across the UK that initially agreed to participate attended the dialogue workshops, including 10 community hosts (although four participants only attended one workshop). Of the 95 participants, 39% were male, aged from 16-17 to 76+, 60% were from ethnic minority groups, 29% were disabled people and 29% had a long-term health condition. See [Appendix C](#) for more participant demographic details.

Please see the final section for the [Evaluation of the Approach](#), including reflections from the co-creators, community hosts, and participants.

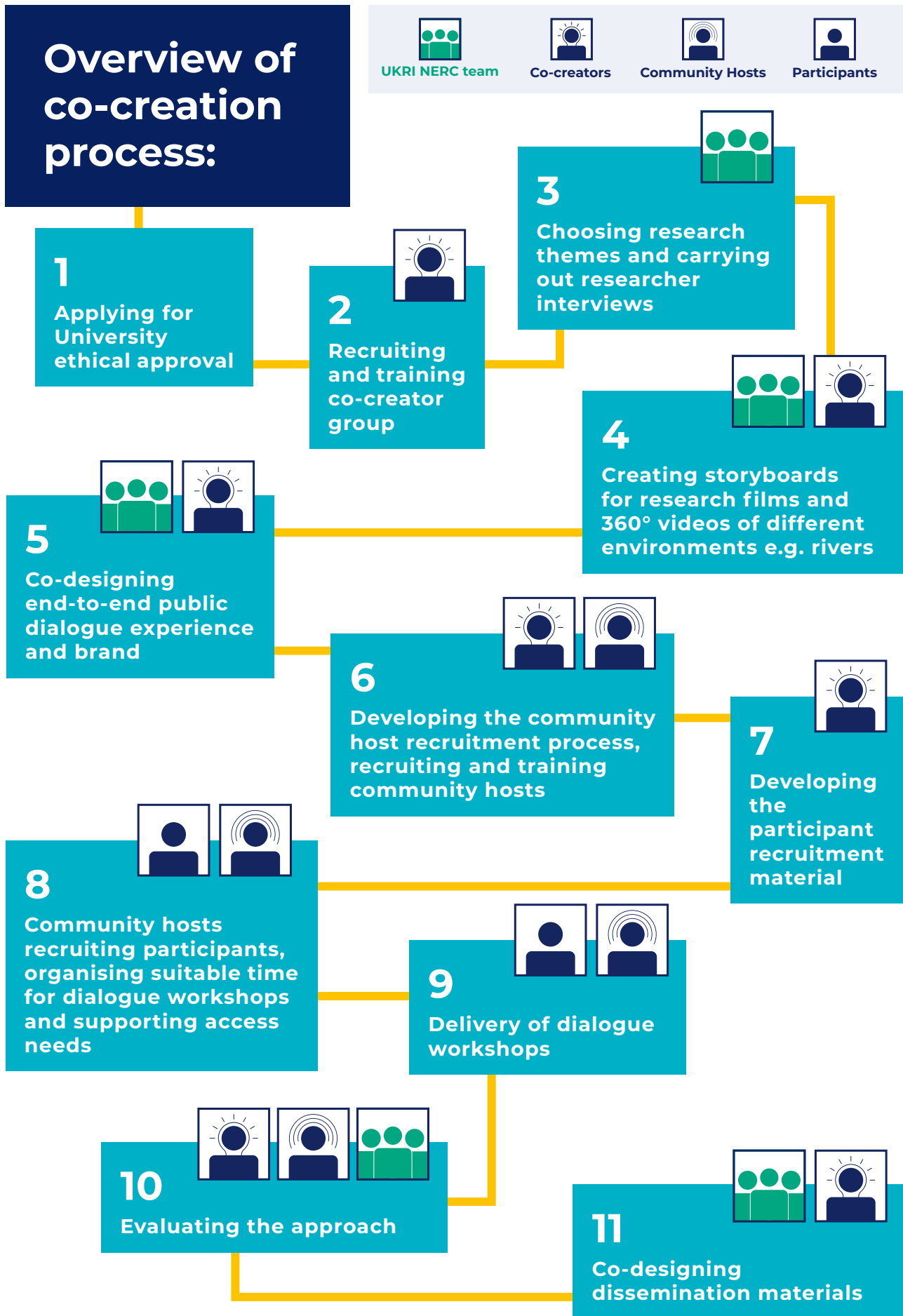


Figure 3: Overview of co-creation process

Selecting Research Areas for the Research Films

<p>Film 1: What's the impact of climate change on our health?</p>	<p>Film 2: What's the impact of pollution on our health?</p>	<p>Film 3: What's the impact of environmental spread of infectious disease on our health?</p>	<p>Film 4: What's the impact of green and blue spaces on our health?</p>
<p>Key issues:</p> <ul style="list-style-type: none"> • Increase temperature leading to urban heat island effect and flooding • Spread of disease and invasive pathogens (dengue, zika, blue tongue) from travel and trade <p>Discussion points:</p> <ul style="list-style-type: none"> • Changing daily habits (eg. diet, travel and energy) • Costs and aesthetics of changing architecture design/buildings • Adapting oversea travel and trade behaviours (eg. spray pesticides) 	<p>Key issues:</p> <ul style="list-style-type: none"> • Air pollution from transport (burning fossil fuels, particulates from breaks and tires) • Inequalities of air pollution and impact on life expectancy • Chemical pollutants in our water and soil <p>Discussion points:</p> <ul style="list-style-type: none"> • Opting for active travel over individual transport • Changing the design of tyres to be more durable and more expensive • Biodiversity impact of transport systems and within our food chain 	<p>Key issues:</p> <ul style="list-style-type: none"> • Unknown spread of infectious disease through water systems (COVID, AMR) • Pharmaceuticals getting into our environment (eg. antibiotics) • Systemic problems of our water system (not regulated, dead rivers) <p>Discussion points:</p> <ul style="list-style-type: none"> • Wider impact of drug use on animals, plants and human health (eg. AMR, reducing biodiversity) • Water pollution impact on health • Accepting monitoring of our wastewater 	<p>Key issues:</p> <ul style="list-style-type: none"> • Inaccessible green and blue spaces (route to the space, the space, safety, maintaining space) • Complexities around mental health (green and blue spaces is only part of the solution, advocacy can be too simplistic) <p>Discussion points:</p> <ul style="list-style-type: none"> • Tension between human and biodiversity needs (bee stings, hay fever, ticks, biodiversity loss) • Land is valuable in cities - factoring in heritage, demand for housing and infrastructure when building green spaces

Figure 4: Showing the breakdown of each research area and the key issues and main discussion points used for film scripting

Due to the project timeline and resources, the wider project team (Helix Centre, Beard Askew, UKRI and NERC) had to collectively come to a decision on selecting 4 out of the 12 research areas within the NERC Healthy Environment research programme for the research videos. This allowed us to clearly communicate the research and case studies to participants and gather more rich and nuanced insights during the dialogue workshops.

Selection criteria for research areas:

1. Research area must have UK case studies available (for filming purposes)
2. Research areas must have a spread of different environments (urban, rural, coastal, suburban)
3. Research areas must have a range of uncertainty
4. Which research areas are the most engaging for the public (gathered data from the co-creators)
5. Which are the most engaging from a storytelling perspective (using Beard Askews expertise)
6. Mapping the possible or likely benefits and disbenefits of each research area

Approach to Analysing Dialogue Insights

In total, the workshops generated over 40 hours of recorded dialogue which was automatically transposed to typed transcripts. Three independent coders then used a qualitative analysis software to tag each transcript with codes, or standalone insights, that pertained to the project objectives or to the experience as a whole. Next, the codes derived from all workshops were combined. The coding team then convened to generate overarching themes from the data. This process was iterative and is illustrated in part in [Appendix B](#). The final insights are majority views that were shared across several community groups and are presented in three sections, then in order of importance to the NERC Healthy Environments Team in the [Findings: Public Views on Healthy Environment Research Issues](#) section of this report. The views expressed in the findings are those of the workshop participants, and not of Beard/Helix or UKRI/NERC.

Some limitations to the approach affected the findings. For instance, the dialogue workshops were fast-paced and group-focused, therefore some opinions expressed were not fully explored or justified (compared to a qualitative interview or focus group). Reasoning and values behind opinions, where explicitly provided by participants, are outlined in-text. Workshops were community host-led and, unlike traditional dialogue, researchers weren't present.



Public Understanding of a Healthy Environment

Insight 1: Safety was an aspect that made an environment feel healthier. For wheelchair users, safety came from supportive infrastructure, and for others it came from being among people. Busy urban spaces were where many participants felt safest, and this contributed to perceived environmental healthiness despite typically being more polluted than rural spaces.

Conversations around feelings of personal safety were brought on by the 360° videos - cities were often cited as an environment where some participants felt safest. Being surrounded by people in cities, in contrast to the social isolation felt in rural settings, contributed to this sense of safety. A few conversely expressed feeling secure when relatively isolated in rural settings due to these environments being familiar to them.

That feeling of blending in in a city environment was heightened for one black participant who, when in the countryside, saw nobody who looked like them. Safety was also a key consideration for wheelchair users who were perceptive to features of environments that would provide them safe access, for instance lighting along a wide path.

On the contrary, the industrial environment with wide roads, lorries, and 'big and imposing' cooling towers made participants feel unsafe. A few also expressed feelings of isolation and loneliness when lacking access to green spaces.

"It probably is not a physically healthy space pollution-wise, but I always feel safest in the city."

Insight 2: Healthy environments were seen as **quiet**, except for natural sounds such as birdsong. On the reverse, noises from industry or vehicles made an environment seem less healthy to participants.

Most participants commented on sensory elements of an environment, particularly sounds, and how these features determined whether or not they considered a space to be healthy. Natural sounds, such as birdsong, were often described as a source of enjoyment in both rural and urban settings; a variety of birdsong from different bird species was seen as a feature of a healthy environment. Others enjoyed the quietness of the natural environments shown in the 360° videos; a few considered this as a welcome break from noisy wheelchairs and ramps in their home environment.

This aspect of a healthy environment can be seen to conflict with the perception that, as mentioned under insight 1, busy cities can also be considered healthy environments.

"I think I realised the importance of the birdsong and where there was a variety of different birds singing...that kind of to me felt like it was a healthier space."

Insight 3: Environments that positively impacted participants' **mental health and wellbeing** were perceived to be healthy. Typically these were rural natural environments, but vast open spaces in cities were also beneficial to the wellbeing of city-dwellers.

Most participants said they felt relaxed and at peace in healthy environments, particularly in vast open spaces, or near the coast and other blue spaces. For many participants that lived in busy cities, the sense of calm in rural and coastal settings was respite from 'hectic city life' and 'overwhelming' urban areas. The beneficial effects of green and blue spaces on mental health were said to be heightened as a consequence of having spent months in lockdown during the COVID-19 pandemic. In urban areas, vast, open spaces, even if not natural, were viewed as a contributor to a healthy and relaxing environment by one participant.

Community spaces, such as allotments, had a positive impact on several participants' wellbeing. For a few the sense of community, as well as the self-sustaining aspect of growing food, were preventative measures against mental illness.

"You could see for a good few hundred metres... even if it was an urban environment, as long as you weren't kind of closed in by buildings and stuff like that... as long as you feel you have some kind of space in front of you, then it can lead to a person feeling more relaxed and, in turn, maybe being slightly more healthy."

Insight 4: Preferences for certain environments were often influenced by participants' **past life experiences**, and in turn reflected on participants' perceptions of healthy environments. For instance, seeing the countryside as healthy based on fond childhood memories, or beaches as unhealthy due to experiences of polluted coastlines.

Many participants could attribute feelings about certain environments to specific life experiences; of childhood memories, time spent with family, or current environmental issues. For most participants, memories from past experience determined whether they liked an environment or had an aversion to it, and this in turn affected whether they would consider it to be healthy or not.

As one example, the hilly rural scenes in the 360° videos made a few participants feel connected to their South Asian homeland. Familiar environments were preferred, even if they were known to have a poor effect upon health.

A few expressed negative associations with particular environments, one such with the coastal environment due to adverse past experience. Although not necessarily explicit in the 360° videos, individual comments were made about beaches or fishing areas typically being polluted, making participants view those spaces less favourably. Similarly, a city-dweller felt negatively towards views of urban housing as they had previously lived in poor housing conditions.

Additional connections were made by a few participants that weren't necessarily derived from past experience, rather existing knowledge or biases. For instance, areas with train tracks were viewed as places where crimes took place, and cooling towers were associated with pollution, nuclear power, and breathing problems.

"Am I weird? I quite like the industrial areas... I completely appreciate the health repercussions but they just remind me of home. That urbanness is kind of like something I'm quite chill with and I quite like it. It's like, oh, I know my place around here."

"I know the urban coastal area will have problems with pollution, I just know it. You can't see it in the video, but I know that to be the case because the boats discharge and the fishing industry discharges as well so they're bound to."

In developing a future healthy environment research programme, NERC could consider:

- Research on noise pollution and perceived safety in relation to wellbeing and use of green spaces.
- Listening to diverse voices to better understand and define the characteristics of rural and urban environments that people consider to be beneficial to mental health and wellbeing.
- Research that seeks to understand the range of experiences communities have with the natural world and how personal connection to nature plays a role in maintaining healthy environments.
- That any one environment may not be viewed as 'completely' healthy. For instance, a city's crowded environment might invoke feelings of safety but also bring unwanted noise pollution.

Public Views on Healthy Environment Research Issues

Insight 5: Participants felt that equal access to public space was an important attribute of healthy environments and wanted to understand how this access can be improved, particularly through sustainable public transport.

The ability for an environment to facilitate access and travel was a strong focus. This was particularly true for participants with physical disabilities and those that valued 'greener' travel options. For instance, the peatland bog scene in one 360° video was appreciated for its 'accessible-looking boardwalk'. This is because of the lack of such accessibility features, making outdoor spaces 'impossible' for wheelchair users. As such, spaces like the rocky coastal area, while appreciated by many, had 'sad', 'exclusive', and 'uncomfortable' connotations for some participants who recognised that they could not be enjoyed by all people.

Public transport, particularly when clean, accessible, and affordable, was a high priority for a community group including people with physical disabilities in the North of England. Several of these participants had grievances against buses that were difficult to board in a wheelchair, yet were reliant on public transport systems to travel. Public transport was seen by one participant as a prerequisite for having a job and regular income, whereas some participants didn't see public transport as a priority since it is already in place and high on political agendas. Some mentioned the difficulty of travelling in a 'clean' way, for instance when visiting family abroad, or living rurally with limited public transport.

Pedestrianisation and cycle lanes were particularly important aspects of a healthy environment for a community group of young people (aged 18-25) in the South of England. Cycle lanes were viewed by some as improving air quality and safety, yet many in cities are narrow and off-putting. Pedestrianisation of streets was viewed by a few participants as vital for allowing people to travel in a way that is less polluting, however all peoples' accessibility needs must be considered in the design of these features, for instance those using inclusive cycles.

In general participants could appreciate and enjoy the natural environment in rural locations but, for a permanent living base, expressed a preference for environments where they had access to the facilities they needed, such as local shops. They felt there was a need to find the right balance of green space in urban settings, bringing nature into the city.

"Accessible green and blue spaces. And I mean that in every sense of the word in terms of being accessible, not just for people who find it easier just to walk into a park, but also people who might not be able to move as much. It's just finding clever ways of making those spaces, not just your stereotypical parks."

"I think, although I think I'd like to be in a very green place, with not much going on. I think I would rather live in a city with green spaces because, you know, you start to think how can I get my shopping done or will I ever see anybody? Will I be isolated? And I think a healthy space kind of has more to it than just it being that kind of greenery."

Insight 6: Participants took a long-term view in selecting environmental research priorities, including considerations of sustainability and social equity. Where the outputs of such research have the potential to immediately impact policy or practice, participants encouraged highlighting these to secure popular and political support.

When creating their 'healthy space' in the first online activity, some participants justified their choices as those that would promote long-term sustainability of the environment, including natural resources and wildlife. Healthy space choices that were often associated with sustainability included use of renewable energy, plant-based diets, and protecting biodiversity on land and in the sea. Some, and most often it was younger participants, prioritised these options over those that would have more of a direct impact on themselves on an individual level. After watching the research videos, more discussions were centered around the importance of research that thinks long-term, for sustainability.

While looking to the future was seen as important to participants, many saw a counter-argument to this approach being that research focusing on problems we are aware of now, would in turn mitigate against problems that may have otherwise occurred in future. Some thought this 'short-termism' would be more likely to attract the attention of politicians. One participant urged for short-term solutions to be designed with sustainability in mind so as to avoid recurring issues. An analogy between human and environmental health was made, with one participant stating that prevention was better than a cure, in that forward thinking should be a research priority.

Younger generations were seen as the 'hope for the future' and some participants expressed the need to both raise children that are environmentally aware, and preserve the natural environment 'for our children's sake'.

Barriers to sustainability were discussed by a few participants, for instance, the initial financial cost of implementing measures like solar panels, a minority of actors 'offsetting' others' good efforts, and our throwaway, consumerist society. Further, electric cars being powered by coal power stations were a concern of a few; one participant hoped for a future with electric cars powered by clean energy.

"I put renewable energy, because I mean, the biggest kind of challenge facing mankind is climate change."

"Whatever decisions we are making now, or whatever insight we have now, it will definitely benefit the next future generation and they would definitely be proud that we had thought about them."

"The amount of food waste that there is, is horrendous... how can you have a land where there's food being wasted and people starving?"

Insight 7: Participants encouraged research that looked to prevent root-causes, rather than treat symptoms of environmental problems that pose a risk to human health. Particular areas where preventative measures were perceived to bring health benefits were improving air quality in cities, and innovative approaches to monitor the spread of infectious diseases (e.g wastewater monitoring).

Prior to watching the research videos, many participants spoke of the big issue that is environmental pollution, but many were shocked to hear of its 'omnipresence'. Monitoring of air quality was seen as a priority for research by many, particularly those who were personally affected by health issues due to poor urban air quality.

A few commented on how the air quality in London had drastically improved over the last few decades, whereas those in York felt their city was still badly affected by air pollution. One participant felt their asthma was triggered due to living near an airport, and another experienced poor air quality living near a steelworks.

Air pollution in urban environments meant that exercising was seen to be difficult, and it was suggested that city planners look to address this. For instance, a comment was made regarding outdoor gyms and how some are located near busy roads, such that the pollution is off-putting.

Some participants commented on how the default to 'cleaner' transport options during lockdown, such as walking or cycling, were shown to improve air quality, but that more recently people were reverting to original habits. Transport was seen as a target for 'drastic policy action' by one participant, with another pushing for more electric buses.

Some participants were surprised by the lesser-known effects of climate change presented in the research videos, such as deaths that occur due to heat, and they wanted to see more widespread prevention of these issues. One research video presented cool roofs which can mitigate impacts of warming by reflecting sunlight and reducing heat. To these participants, cool roofs seemed like a viable solution to mitigate poor health effects from increasing temperatures.

Pollution of water from plastics and medications, as portrayed in the research videos, was also an issue some participants felt strongly about. Many were already aware of the negative effect on marine life from microplastics due to media coverage, but the research broadened their understanding of the problem. This issue was a particular concern and source of guilt for those who were prescribed medications for long-term conditions, a source of single-use plastic and harmful chemicals leached into waterways. Some participants, specifically those who used medications daily, felt powerless in this situation since they had no choice but to follow the medication regime prescribed to them. The effect of non-recyclable plastics and chemicals from medications on waterways was seen by some as a key target for further research, to raise awareness and affect change through policy.

Wastewater monitoring was a topic introduced in the research videos that generated discussion among participants during the second workshop. Participants felt strongly that, in light of the COVID-19 pandemic, wastewater monitoring is an important process that should be taking place for disease preparedness and health protection. A few participants went on to explain the fact that diseases can very quickly wipe out animals and humans, and that much of the focus is on curing disease whereas prevention can have a bigger impact. Others saw the disease prediction research as 'ahead of the curve' and hopeful, and questioned why, if it is relatively low-cost, more of this research isn't being done. Wastewater monitoring was also seen as an important process to prevent dumping of excess waste into rivers, making them unsafe for swimming, a particular concern for those participants that lived beside a river.

"Air quality monitoring also ranked fairly high because I think the video I watched was explaining how bad air in the form of a problematic amount of [pollutants] can adversely impact the brain, particularly in children. So I put that right at the top."

"One of the down sides is that they're near roads. And if the traffic builds up, then it defeats it all because you're breathing in all these fumes while trying to get some exercise and keep your lungs clear."

"In the first lockdown, they'd actually sold out of bikes. Everybody was buying bicycles and they were cycling. And now that things are different, not so many people actually think to themselves, right, I'm going to get on the bike and I'm going to think about pollution."

"Yeah, I have loads of plastics. I mean, it's unbelievable, it's shocking. I have tubes and syringes, all these different things that are, you can't recycle them. And it's like, I started having... it was all this guilt because it went against everything that I believe in."

"I found that [wastewater monitoring research video] slightly more uplifting, because it was like, look, here's a thing that we actually can do that is achievable."

In developing a future healthy environment research programme, NERC could consider:

- Partnering with other sectors, such as architects and developers, to ensure equitable access to environments is considered in research, for instance considering those with physical accessibility needs.
- Ensuring long-term research remains appealing to relevant stakeholders (e.g. politicians) by highlighting potential short-term outputs that may have intermediate impact/benefit.
- Ensuring that, despite long-term articulation, long-term research is funded now.
- Prioritising research that seeks to prevent further damage to the environment and to human health, such as improving air quality in cities and monitoring / prediction of future disease outbreaks.

Wider Issues to Consider when Framing Healthy Environment Research

Insight 8: Almost all community groups agreed there was an intrinsic link between environmental and human health and that both should be considered in research funding decisions.

In the second workshop, participants were asked to choose which they considered most important for future research: environmental health topics that didn't directly impact humans, or topics that determined human health impact from environmental exposure, such as green social prescribing. Some groups couldn't come to a consensus, finding it too difficult to separate the two from one another, whereas most were in favour of funding research that focused on environmental health without an explicit benefit to humans.

On one hand, most participants felt that humans that are in good health are more likely to channel their energy into protecting the environment, and so investing in research like green social prescribing that can improve human health will in turn benefit the environment. On the other hand, one participant thought that many humans living in cities don't see the decline of the natural environment and so wouldn't focus their energy on protecting it.

Many participants also saw environmental health as a prerequisite for human health; without thriving green environments, good human health and health-promoting behaviours were seen as unobtainable. A few also saw the huge disparity between knowledge on human health versus that on environmental health, with a lot of research already focused on the former. Additionally, investment in environmental health was seen by one participant as a more sustainable and cost-effective approach.

"I just really don't see how they can be separated - it seems just like Yin and Yang"

"If you invest in human health, you could just die the next day but if you invest in environmental health, you could be saving thousands of lives across the years."

Insight 9: Participants highlighted the importance of healthy environments and healthy choices being accessible to all and available to people with limited means. Affordable housing was identified as a fundamental requirement for health and inclusion in healthy environments research.

Most participants included 'basic necessities' for their own health and wellbeing in their ideal healthy spaces. Without the security of a house and other basic necessities, some participants explained people may be less able to support environmental research or play a part in addressing environmental issues.

"If you don't start tackling those [housing] problems first, you're not going to hold people's attention long enough, because they'd be too concentrated on their immediate needs."

Housing that is sustainable and affordable was seen as an environmental element of high importance for human health, particularly amongst South Asian or young participants and by those living in York, where lack of social housing was said to be an issue.

There were instances of participants expressing class-related barriers to lifestyle choices that have a less negative impact on the environment. The issue of affordability was raised by a few, where only the middle-to-upper classes could afford to buy Fairtrade and organic products, for example. Making healthy lifestyles attractive and accessible to all was seen as a way of combating this stereotype.

“The first thing a human being needs is housing. And as long as they have a roof over their head, other things can fall into place.”

Insight 10: Participants felt that community spaces and activities, such as allotments and communal gardens, can contribute to a healthy environment and also encourage people to take action in supporting the environment.

A sense of community, brought about through initiatives like allotments, was widely seen as a contributor to a healthy environment in that it fostered social connection and positively impacted both physical and mental health.

The inclusivity of spaces like community gardens and local shops was seen by some participants to contribute to a healthy environment and prevented isolation. One participant wanted to see ‘liveable streets’ where communities could socialise without the noise and air pollution from cars.

Some thought that a local focus was better for the environment; for instance, community-generated energy could save individuals money while being perceived to have a less negative impact on the environment. Local shops were also seen, by a few participants, as a way to reduce carbon emissions through reduced transport and packaging.

Community activities were perceived to negate harmful impacts that large companies and corporations can have on the land. For instance, growing food in community gardens could reduce demand for mass land use by the food industry. Some participants expressed views that people could be encouraged to be involved with environmental research through community networks, and in turn these groups could empower people to put pressure on governments to make evidence-based change. One participant wanted to see more disability environmental justice advocates. They felt that having a disability meant they were more affected by global warming, for example they might become more vulnerable to contracting infectious disease.

“I spend nearly all of my spare time there, growing food is one of the things that I can do to share with other people. It’s one of my kind of positives in life. It’s something that I can give back, you know. There’s only so many things connected to the allotment, and it gets me outside, which is obviously the main one.”

“I’m a great believer in our local high streets, because I don’t think everybody has access to areas outside and it’s often the thing that stops isolation from people they can pop down to their local shop.”

“Community-generated energy - solar panels and things...I think it is really good because it reduces use and also people can save money... they can use that money on other things. So it is one time you spend money on this, and then can save a lot the rest of your life.”

Insight 11: Participants placed heavy emphasis on research which helps empower communities with knowledge and encourages behaviour change. This needs a tactful approach to avoid attributing blame to the public for issues that are beyond their control, since wider social determinants restrict behaviour change in some population groups.

Prior to watching the research videos, most participants believed individual behaviour change was the way forward, whereas few put the onus of environmental protection on higher powers, such as governments and corporations. Small changes made by individuals were seen to make a difference, whereas few articulated that institutions and government needed to push for action, mandates, and 'step up' to make change.

Some participants were initially optimistic about the changes individuals could make to protect the environment, whereas others felt guilt about not being able to do enough. Concerns were aired by a few participants that people were too entrenched in their own habits, or felt too far removed from environmental issues to change.

Environmental issues at the forefront of participants' minds were those frequently portrayed in the media, including the effect of plastic on oceans and marine life, plant-based diets, and climate change. It was generally accepted by participants that the public should reduce plastic use and, where purchasing of plastic packaging is unavoidable, learn how to recycle plastics properly. However, also discussed was that there are rarely plastic-free options in shops, and not all plastics can be recycled - in these instances individual behaviour change was not seen as a viable solution. A cultural barrier was also mentioned by a participant from a South Asian community that some communities, such as their own, are not used to practices like recycling and need targeted education.

After watching the research videos participants could see that several issues, such as air pollution, were out of the hands of individuals and the responsibility of governments to address. These issues were seen by many as systemic problems, and a result of a small fraction of the population's actions. In these instances, most participants voiced that to see meaningful change, politicians must take action. It was agreed by some participants that where such problems go unaddressed, individuals and communities should lobby for industry and government to resolve these issues.

"Things that individuals can do actually does hold weight in society. Even like, recently, this similar situation with their Superleague. I know, it's football, it's not about the environment, but it just showed you the people power can work, because if the opinion is so set against something, it can change the outcome."

"What happens to the [recycled] stuff is beyond our control, and it's appalling what happens to it. I don't think that recycling needs to start at the grassroots, I think recycling needs to start at the top, and then have proper policies. And unfortunately they're more interested in making money than in saving the planet."

"There's no point putting plastic in there if it's going to be damaging the environment ...I mean, a lot of these issues ... People can't really do too much, it's more industry and corporations that have power, but I mean, I suppose people can try and lobby for it in some small way."

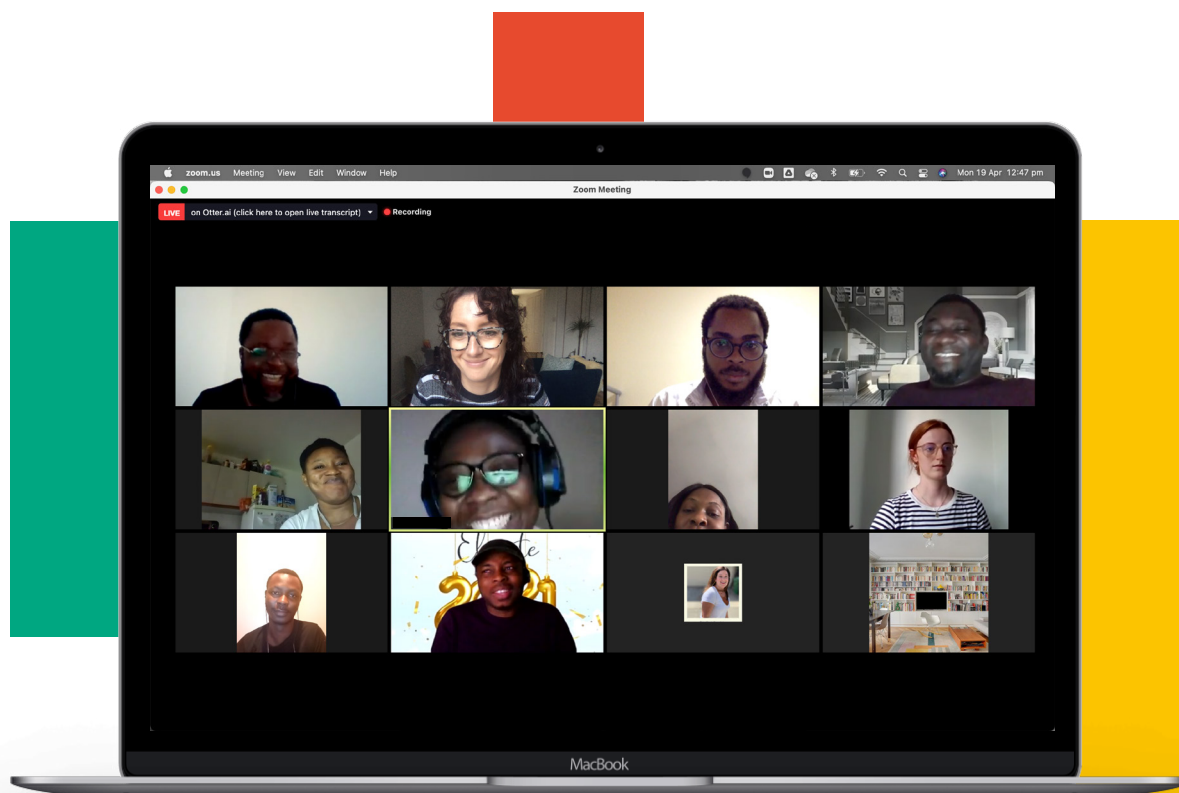
"The politicians need to make legal changes...obviously the politicians have their own agenda and there is a risk to that, but if there was pressure through good research, solid research, then it would make a positive change in the long-term."

Politicians were seen as better informed than individuals as they have access to an evidence base, and participants thought their influence was essential to facilitate change amongst individuals and communities. They were also seen to have the power needed to implement simple solutions, such as cool roofs, which can't be adopted by individuals without their backing. However, some participants weren't confident that the government would act in the best interests of the public, or respond to research in the best way. There were also concerns amongst most participants that policies take time to translate into action.

Many participants expressed a desire for the public to be more empowered with knowledge. They stressed that the public are 'often treated as though we're stupid' and not provided with important research insights. They suggested that for individuals to change their behaviour and pressure their local councils and policymakers, they first need to see an evidence-base, including messages that are relatable to them as individuals. A few participants mentioned that, ultimately, more people will be on board if they know that what they're doing is making a difference. Education through media such as television was viewed as an appropriate means for promoting collective responsibility, and education was seen as a pathway towards humans treating the environment with more care.

"But I don't agree that politicians being given the science in any way changes their minds. And the pandemic is a great example to you know, they had tons of the best science, probably some of the best science in the world in the UK... and they acted against expert opinion."

"So you can never make proper change without all being on the same page - you can only be on the same page if you share information. I remember before recycling was a thing, like way back when, and then the awareness about climate change happened. And the scary documentaries were released... and then suddenly recycling bins popped up. And now that's the norm. And we only did that through public awareness campaigns and changing as a collective rather than changing as pockets and communities."



In developing a future healthy environment research programme, NERC could consider:

- The intrinsic link between environmental research and human health.
- That some more deprived communities may not engage in supporting healthy environment research without appropriate support, and recognition that other societal issues might be more important to them.
- A more place-based approach to research, drawing on communities for co-design of participatory, action-oriented environmental research projects.
- That greater understanding of environmental issues empowers individuals to advocate for change locally and nationally.

Conclusions from the Findings

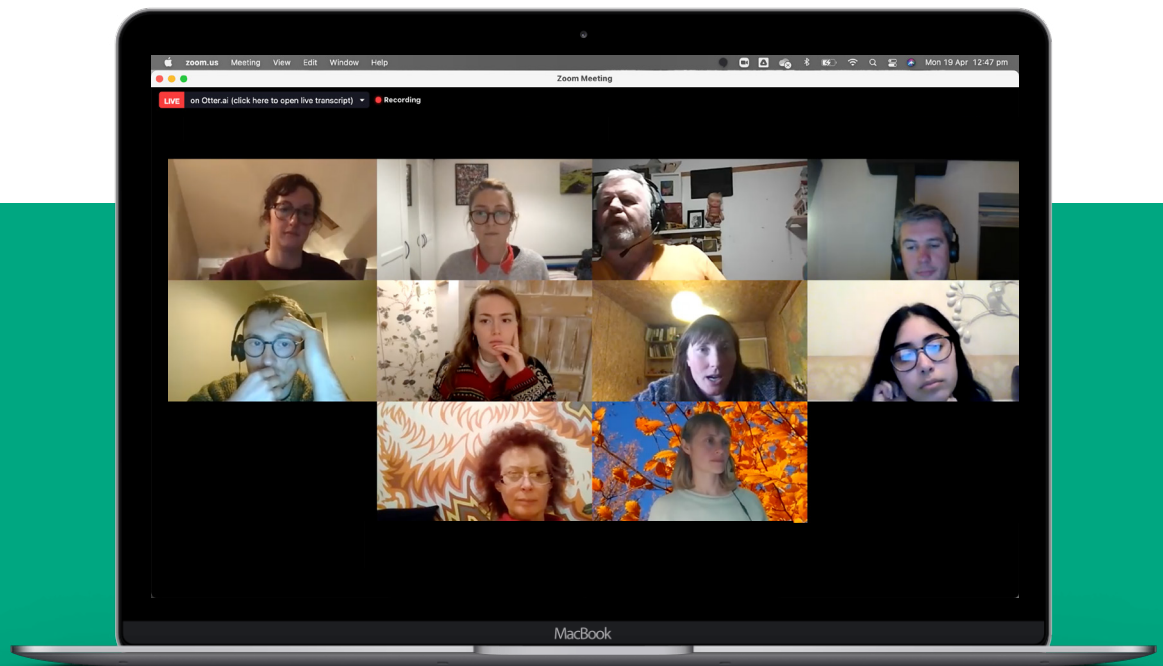


Through this dialogue project we learned that participants' views of healthy environments varied across and between community settings, and that participants' access needs and past experience brought nuance to the meaning of healthy environments.

In general, healthy environment attributes that were agreed upon by most participants related to sounds, safety, benefits to wellbeing, and familiarity. These attributes can conflict, leading to a conclusion that it may not be possible for one environment to be considered 'completely' healthy. The 360° videos and related discussions highlighted to participants that healthy environments aren't exclusively natural and green, but that we need various types of environments to live - including green, residential, and industrial. Several conversations revolved around how the public could change their behaviour to better the natural environment, but there was also concern for individuals taking on the burden of issues outside of their control that should be tackled with a top-down approach.

The research videos were enlightening to participants and considerably changed the focus of the dialogue. During the second workshop, participants expressed the importance of community empowerment as well as certain healthy environment research areas, many of which were previously unknown to them. Novel research areas that sparked interest among participants included cool roofs to mitigate deaths from environmental heat, and wastewater monitoring for early detection of infectious disease outbreaks. Physical environment accessibility, and greener and more inclusive transport were areas that participants, particularly those with physical disabilities, felt were lacking in current research agendas.

Participants also discussed wider issues to be considered in healthy environment research programmes such as the power of community, and effect of inequalities on individuals' engagement with environmental research, and that the public should be better informed about research that impacts them. Almost all community groups agreed there was an intrinsic link between environmental and human health, and that both should be considered in research funding decisions.



While some views were more strongly articulated by particular community groups, and these are outlined in the above descriptions of the findings, individual participants contributed their own unique views and experiences to the dialogue. While there was potential for individual participants, when in dialogue with a community group with similar characteristics, to adopt the views of others, this wasn't the case. In general, participants voiced their own thoughts and values, even when this meant conflicting with others'.

Our findings present insights that strengthen already known views of the UK public and also contribute views that were previously unconsidered by UKRI/NERC. These views that both broaden, and strengthen, the evidence base, should be considered when developing future healthy environment research programmes.

Evaluation of the Approach

Reflections on being a co-creator

What went well?

Co-creators influenced the project and made it more engaging:

The co-creators came up with new ideas and improved many aspects of the project, including the project name; ensuring the recruitment poster focused on what people would gain from the experience and making the Miro online activity more like a game. They helped to ensure the materials created were understandable, engaging, and accessible. For example, they suggested the community hosts should have facilitation experience and be supported in this role to ensure they gathered rich data from the discussions. They also came up with the idea of the facilitators and participants using an online whiteboard (Miro) with information in the breakout rooms at the workshops to aid discussion, followed by consensus voting.

Co-creators felt listened to and learned from the experience:

They were involved in shared decision-making through interactive workshops. For example, the co-creators came up with novel ideas for brand name, logo, and colours in small groups. The designer then worked up these brands and the co-creators, Beard/Helix team, and UKRI/NERC staff were asked to vote on their favourite and least favourite. See [Appendix E](#) for the brand design creative session and voting. The co-creators reported learning about healthy environment research, design, and using new platforms e.g. Miro and Slack.

Regular communication: Having a key contact in the Beard/Helix team, and using Slack (online chat platform), helped to ensure the co-creators were up-to-date with activities, felt part of the team and could be involved in decision-making in the fast-paced project.

The following insights on the involvement experience were collected through surveys and online workshops with the community hosts and co-creators.

"I think discussions helped challenge assumptions about the types of images, the language and approaches used in the research. I also feel that the gaming concept came from the group and certainly the visual ID [brand] was inspired by the group. Our own networks and contacts possibly had an impact also and I think there was a healthy debate about the level of responsibility and role of the facilitators [community hosts] that benefited from our collective experience of working with people." - Co-creator

"The entire vibe felt very honest. People were given time and listened to with respect. Communication channels were open at all times which I felt was important." - Co-creator

What could be improved?

Time to test interactive elements with under-represented groups:

Due to the fast-paced nature of the project and only six members, the co-creators (although representing different backgrounds, including older people and someone with visual impairment), were not fully representative of the groups we were looking to engage. They could therefore not ensure the materials were completely relevant or accessible to different groups or those with specific needs. Having more time to advertise the co-creator opportunity to people who were linked to under-represented groups, would have led to a greater involvement of these groups in the development of the interactive elements. More time would have allowed the Beard/Helix team to have a more iterative approach, where they and the co-creators could have tested outputs on relevant audiences.

Shared decision-making: Although we aimed for a co-created project, there were aspects where the decision-making was top-down. For example, although the co-creators voted on areas and case studies to include in the videos, UKRI/NERC made the final decisions about which case studies and researchers to use, because of the expert research knowledge needed for this task. Deciding on final decision makers for different aspects of the project at the start would ensure transparency and help manage expectations of the co-creator role.

Reflections on being a community host

What went well?

Making the opportunity attractive and remuneration:

Many of the community hosts were encouraged to get involved because of the unique learning opportunity and to build on existing skills. Many were keen to apply because there was a strong message that the project was looking to involve under-represented groups and they wanted to give their seldom-heard communities a voice. Some were encouraged by the link to a well-known University, as they thought that would ensure a professional project with appropriate support. Some community hosts were encouraged to apply because it was a paid opportunity for themselves and the under-represented communities they represent.

"I have to say, as somebody that really is really passionate about representing under-represented voices and enabling them to have a voice. The fact that you offered to them, payment for their time and money, really, really meant something to the people." - Community host

Trusted community leaders and snowball

recruitment: Having community members who were well-known in the community meant that under-represented communities, who would not normally hear about research opportunities, were recruited. 94% of participants strongly agreed or somewhat agreed that they felt comfortable at the dialogue workshops. However, since the sample was relatively small and not representative of all parts of the UK, conclusions for the UK public cannot be drawn.

"I think sometimes when you are the influence in the community, people want to know and get involved and it just becomes easier for them, because you've built that trust." - Community host

What could be improved?

More time: A few community hosts reported that they would have liked more time to recruit and plan their workshop dates. Some also reported they would have wanted all of the details and activities at the start of the project, so they had a full overview before recruiting their participants. For this project this was not possible due to the iterative approach to working with UKRI/NERC staff and the co-creators, so activities were being finalised throughout the project. The project also fell over Easter bank holiday weekend and Ramadan. With more time and flexibility it would be important to confirm all the activities before recruiting participants and to avoid cultural holidays and events.

More interaction between groups: Several of the community hosts agreed with one community host's suggestion of having a joint event at the start of the project with all the participants, where the project team could give training as to how to use the interactive elements (e.g. Miro and VR headset), and to hear what further support was available. They also suggested that this could help participants understand they were part of a wider project with a diverse group of people from across the UK. Although the approach was to keep the different community groups separate to allow people to feel comfortable, the Beard/Helix team agreed that there could be a benefit in having further workshops with mixed groups as this might lead to nuanced debate about why different communities might have different views and values about the topic. This mixing could be done after people felt more used to the topic and sharing their thoughts.

Communication within groups: Some community hosts suggested setting up a private group on a chat platform. This would help to add a buzz around the project, to prompt people who were less frequent email users, and better organise the dates for workshops.

Reflections on being a participant

The following information is taken from the final survey sent to the participants.

What encouraged participants to sign up?

When asked to pick their top reasons for signing up to the study, finding out more about healthy environment research (65 out of 89) and having a say on issues about healthy environments (53 out of 89) were the top reasons. 47 people signed up because they could be involved from their own home. The online and remote nature of the project increased accessibility in some respects, as it allowed people from all over the UK, disabled people, and people who were shielding due to the COVID-19 pandemic, to be involved.

"Felt comfortable expressing views, even if they were different. Enjoyed doing this at home. Loved the pack of free stuff - my seeds are already growing!" - Participant

What went well?

Overall, from the 89 participants (who filled out the final survey), looking at strongly agreed or somewhat agreed, 97% said they enjoyed being part of the project, 93% felt like their voice was heard, and 97% would recommend experiences like this to others. See **Table 1**.

"The videos were quite compelling and informative. It changed my perception about environmental health. The interactive zoom session was also very nice as it presented the opportunity to hear other views and also share mine. It was my first time using Miro, that is a plus for me." - Participant

STATEMENT	% STRONGLY AGREE OR SOMEWHAT AGREE
Enjoyed being part of the project	97%
I liked using the VR headset to watch the 360 videos of different locations	65%
Thought the research videos were understandable	96%
Gained knowledge from the research videos	96%
Understood how to participate on Miro	92%
I felt comfortable at the workshops	94%
There was enough info sent to me	97%
I understood why I was at the workshop	93%
I felt my voice was heard	93%
I would recommend experiences like this to others	97%

Table 1: Taken from participants final evaluation survey

An educational and interactive experience: Some participants reported that the experience broadened their thinking. 87% learned a lot, or quite a lot, about healthy environments research. Some participants were keen to share the research videos with their wider communities e.g. to invigorate younger friends and family members. Some participants, particularly those who were shielding or disabled people, reported an enjoyment in using the VR headset, as it allowed them to experience nature. 65% somewhat agreed or strongly agreed that they liked using the VR headsets.

"I really learned so much about research that is going on. In the second lot of videos I learned so much, it was really interesting. I also absolutely loved the VR headsets and how it took me to places I can't go to." - Participant

What could have been improved?

Digital exclusion: Although steps were taken to make the experience accessible to participants, as described above and in **Appendix C**, the innovative and interactive nature of the project heavily relied on technology and all participants having access to a smartphone (for the VR headset) and a laptop/tablet to use Miro. This may have excluded people from lower-income households or people who are less digitally literate. More budget and time would be needed to ensure access needs are covered. For example, dongles were offered to all participants without the internet (although no one requested this). It would take more time to order and post the dongles to specific households and support individuals to use them. Community hosts were paid to support their participants with access needs. For example, one community host went to a participant's house to show them how to use the online platforms. More funding could have allowed for devices to be loaned to participants, alongside more paid support from the community hosts. Alternatively, funding could allow a local community organisation to deliver this support

VR headset could have been adjustable to accommodate larger phones: The aspect with least agreement was the VR headset, of which 20% strongly disagreed or somewhat disagreed that they “liked using the VR headset to watch the 360° videos of different locations”, with one person reporting that it made them feel sick, one person found it tiring and needed to take breaks, and others said that their smartphones were too large to fit the headset. However, the videos of the environment were still able to be viewed without the headset, so participants could still take part in discussions about the environments.

A better platform for the online activity: The online activity on Miro did not work on smartphones. Therefore, a different free platform could be used which is accessible on smartphones. Alternatively, more budget and time would allow the development of a more interactive, user-friendly game, which could have been co-designed with the co-creators to be more engaging, as well as have easier data to analyse.

Language in research videos: One participant reported “vulnerable group” could be upsetting to some people and another reported that talking about “minority communities” needing to enjoy the environment more grated on them. Therefore, specific triggering terminology/phrasing could be determined with community members at the start of the project and the video script could be reviewed by community members from different backgrounds.

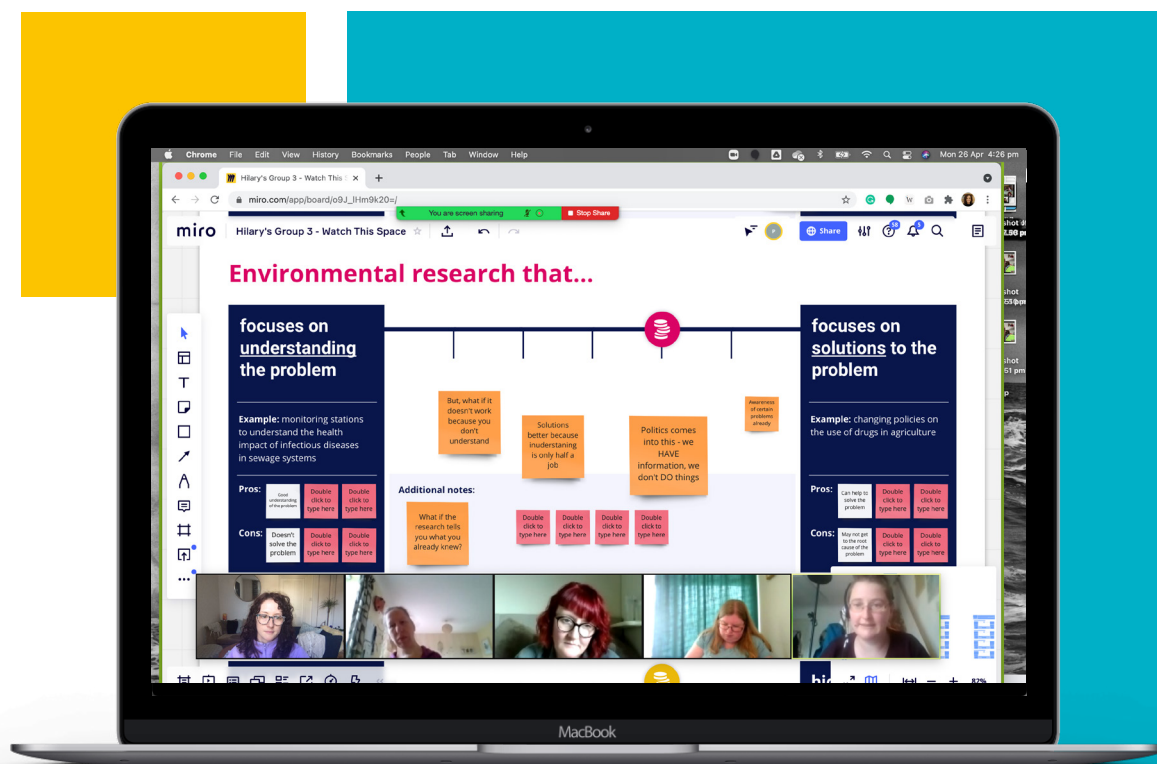
More time for discussion: Some participants reported that the conversation at the workshop felt rushed at times, with 39% stating they would have liked more time. 57% thought the 1.5-hour workshops were the right length..

Other outputs

Cohort of community champions: A suggestion from a community host was that the community hosts could continue to be involved in other research projects for the Beard/Helix team or UKRI/NERC and become a trained cohort of community facilitators, who were linked to under-represented voices. They suggested setting up a train-the-trainer model to train other community members as facilitators.

Participants encouraged to be involved in future projects: Community hosts reported that some of their participants had never used Zoom before, but enjoyed the experience and have since been inspired to get involved in more research activities for other organisations.

Potential future project to take Virtual Reality headset to hospices: A participant had a very positive and emotional response to the 360° videos. They approached Helix to potentially collaborate on a project to take VR headsets to hospices, to allow people to experience nature who might not be able to go outside.



Recommendations for UKRI/NERC based on the engagement approach:

Using a community-led and co-creative approach:

- Working in a **co-creative way with community members and designers can lead to an engaging and enjoyable experience** for participants and the community members involved.
- Embed a **diverse group of community co-creators** (who represent the audiences you are looking to reach e.g. those with specific access needs) from the start of a project to be involved in shared decision-making and to ensure the project is accessible and engaging.
- Involve **trusted community hosts (e.g. religious or community leaders)** to recruit participants and facilitate workshops to encourage participants from under-represented groups to sign-up and meaningfully contribute to conversations.
- **Recruit community hosts based on specific criteria and characteristics** (e.g. to be well-connected in different communities and have facilitation skills). They can be recruited through community organisations, clearly showing what they will gain from the experience.

Encouraging people from under-represented groups to take part:

- Offer fair **payment to all community members** for their time (e.g., £25 an hour and £5 working from home expense if online). This allows people to feel valued for their contribution. Those receiving benefits may need to seek advice as to whether the payment would impact their benefits.
- Have a **flexible budget** that can be used for accessibility services (e.g., a palantypist) and additional time for community hosts to support their participants.
- **Time, money, and support are needed** to prevent excluding people who may lack access to or skills in digital technology (e.g., providing dongles, devices and training). However, holding activities online opens up the opportunity to some groups who would have difficulty accessing in-person workshops (e.g., disabled people).

Using interactive online elements to spark conversation about a complex topic:

- **Engaging videos made with community members** can increase understanding of the topic and spark meaningful conversation at a subsequent workshop.
- Use an **online activity on a free platform that is available on smartphones and easier to navigate** than Miro.
- Use **Virtual Reality headsets** (cardboard headset that participants put their smartphone in) for an immersive experience, particularly when working with those who are not able to travel or go outside. If any participants find using the headsets uncomfortable, ensure the videos can be viewed without.

How to gain richer insights:

- Once participants feel confident after initial workshops and engaging in the topic within their communities, explore options for **continuing the conversation between different community groups**. This could lead to more in-depth conversations about different values and opinions of people from different backgrounds.
- The workshops could include a **researcher as a co-facilitator**, who could help develop the discussion further on important points or have a two-way conversation to ensure full understanding of the topics discussed. However this could change the dynamic, and could make participants feel less comfortable and less likely to express their views.



Conclusions from the Approach

In conclusion, the innovative online approach was successful in exploring under-represented groups' perceptions of healthy environments, learning about people's priorities for research, and differences in views between community groups. Using a community-led snowball approach, we were able to recruit a diverse group of participants, including those with specific access needs (e.g. hearing loss, neural divergence and those whose primary language was not English).

Using human-centred design, co-creation, and storytelling to create an interactive online experience (with Virtual Reality headsets, videos, and an online activity) led to almost all the co-creators, community hosts, and participants agreeing they felt listened to and enjoyed the experience. Having a flexible budget to support access needs and conducting the whole project online encouraged people who might not normally be able to attend in-person dialogues. Over half of the participants were encouraged to sign up because they could participate from home. This meant that almost a third of the participants were disabled people, a similar number had long-term conditions, and a quarter had caring responsibilities. Nearly all of the participants agreed the research videos were understandable and increased their knowledge of the topic. Using these interactive elements helped to spark conversation at the workshops and led to almost all of the participants agreeing they would recommend experiences like this to others.

Appendix A

Lois' space

Instructions:

- 1** After having watched the research films, repeat the exercise. Think about what you **saw** and what you **learned** from the films. Has anything changed for you? Think about which squares would now make up an ideal **healthy space for you and your community**. Feel free to make your own squares too.
- 2** With this in mind, click and drag down the squares you would choose to make your ideal **healthy space for you and your community**. Try to also think about how to **balance the needs of people, plants and animals**. As you drag your squares down into your healthy space, **put them in order of importance to you**, 1 being the most important.

Nature




Travel






Housing





Energy



Food




Waste




Community





Monitoring

Create your own

You can also copy and paste an image if you wish to

Double click to type here

Double click to type here

Double click to type here

1st activity:

This activity can not be changed



Lois' healthy space



2nd activity:

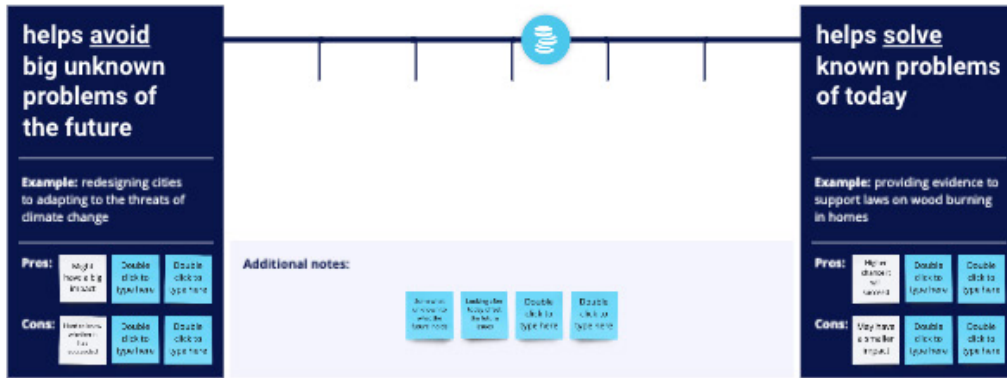
Re-create your healthy space

Lois' healthy space

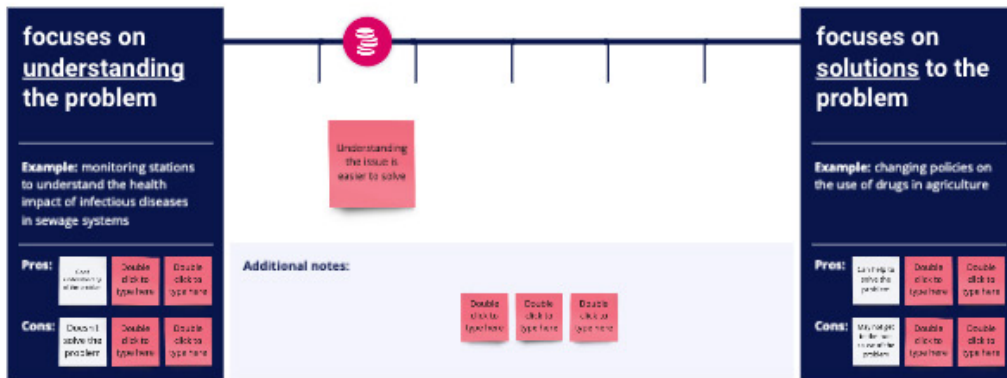


Figure 5: Miro activity to build ideal healthy environment (prior to both workshops)

Environmental research that...



Environmental research that...



Environmental research that...



Environmental research that...

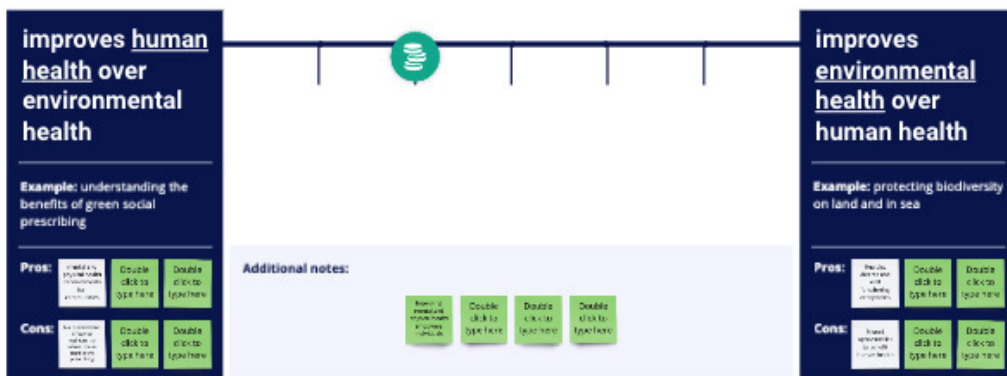


Figure 6: Miro activity to prioritise research (during second workshop)

Appendix B

The screenshot shows a software interface with a search bar at the top containing the text "Focus on the problem may lead to the solution" and a close button. Below the search bar is a toolbar with icons for list, zoom, search, and refresh. The main content area displays two search results. The first result is a blue link "<Files\\Manos workshop 2 full transcript>" with a grey box containing the text "- § 1 reference coded [0.07% Coverage]". Below this link is a grey box labeled "Reference 1 - 0.07% Coverage" followed by the text "if we focus on the problem itself, it would lead to a solution, and it might be more accurate in the long run". The second result is a blue link "<Files\\Rowshonara 2>" with a grey box containing the text "- § 2 references coded [0.23% Coverage]". Below this link is a grey box labeled "Reference 1 - 0.14% Coverage" followed by the text "So once we understand the problem, that automatically has a ripple effect, we try and already, you know, solve, once you understand we know what to do it then in turn, reduces that problem is what I'm thinking.". Below that is another grey box labeled "Reference 2 - 0.09% Coverage" followed by the text "Yeah, this one is fine because if we understand our problem, yes, we know what is the roots. So maybe we have also some solution".

Figure 7: Example of transcript quotes being assigned a code (written at the top)

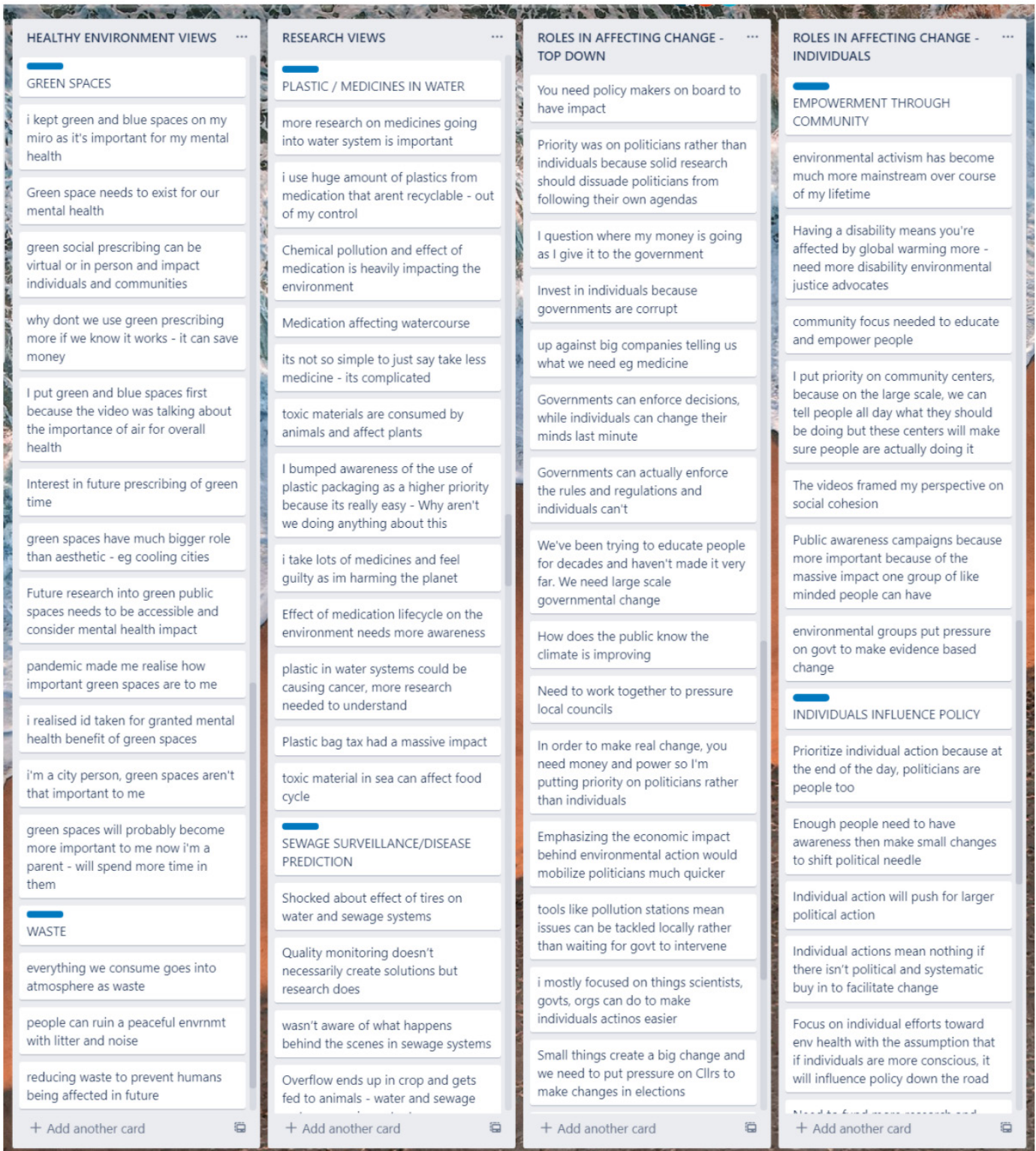


Figure 8: Analysis of the workshop transcripts

Appendix C

Public recruitment process:

The co-creators and community hosts were recruited through existing community groups, such as charities and networks, that helped us target under-represented groups e.g. COVID-19 Mutual Aid Groups and social media. The co-creators and designer created a recruitment poster clearly explaining what community hosts would gain from the experience, and a phone number for those not online (see Figure 8). Co-creators and community hosts filled out a short application form to gather basic demographics, the communities that they were linked to, and why they thought they would be a good fit for the role. Two members of the project team independently and anonymously scored the applications using criteria linked to the questions. Demographic criteria were agreed with UKRI/NERC to ensure the community hosts represented, and were linked to, groups who were less likely to engage with natural environments. 74 people applied to the community hosts role with 47% from ethnic minority groups, 34% were disabled people, and 30 different languages were spoken across the group.

Support and access needs:

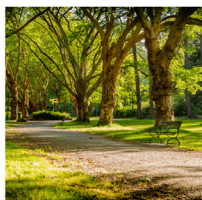
All community members involved were trained and supported appropriately. For example, community hosts attended general facilitation training, a briefing meeting per dialogue workshop, and were sent information over email, the facilitation guide in the post, and had a direct contact for any questions. The co-creators attended eight co-creator workshops and built their skills in team work, public involvement, design, and healthy environments. All community members were paid for their time (£25/hour and £5 per meeting for online expenses).

The project was carried out online due to COVID-19. To ensure the project involved people who might otherwise be digitally excluded, access needs were supported. For example, separate one-on-one sessions were held for people with specific needs (such as lower digital literacy and neuro-diversity). A palantypist was present for the workshops where a participant or community host had hearing loss. One community host went to a participant's home to train them to complete the online activity on Miro.



Do you want to help your community have a say in influencing research?

We are looking for well connected community leaders, based anywhere in the UK, to **host online discussions about healthy environments with members of their community**, who's voices aren't normally heard.



What will you gain?

- The opportunity to watch **new films made with community members**.
- You will **receive training** in facilitating online communication and helping groups have meaningful discussions.
- You will be appropriately supported and **paid for your time** (about 9 hours until end of June 2021).
- You and your community will **gain knowledge** about healthy environments and influence research.

For more details and to apply fill out this form by **18th March**
<https://tinyurl.com/5yf4smjn>

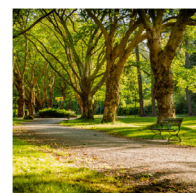
Any questions?
Email: anna@helixcentre.com
Call: 07795 353032

Do you want to have a say in influencing research about healthy environments?



What will you do?

- Receive a **welcome pack** with a cardboard headset for a smartphone to experience immersive films
- Play an **online game** to build your dream healthy environment
- Watch **5 short films** about healthy environments and research, made with community members
- Share your views at **two online workshops** in mid/late April
- Fill out a some **short surveys**



What will you gain?

- **Learn about** healthy environments and research being carried out
- Your views will be collected anonymously and **influence research**
- **Access needs** can be supported
- **Training and support** to access Zoom and internet can be provided
- You will be **paid for your time** at £72.50 for about 3.5 hours

Any questions get in touch with the **community member** that got in touch with you or with Anna at anna@helixcentre.com or **07795 353032**

You'll need access to a smartphone and the ability to join Zoom for two workshops. **You don't need to** have knowledge of healthy environments.

Figure 9: Recruitment poster for community hosts and participants

Table 2: Demographics of the Community Hosts

Demographic information for 10 community hosts

AGE	SUM OF NO.
16 - 18	1
25 - 34	1
35 - 44	4
45 - 54	3
55 - 64	1
Grand Total	10

GENDER	SUM OF NO.
A man	3
A woman	6
Non-binary	1
Grand Total	10

DISABILITY	SUM OF NO.
No	5
Yes	5
Grand Total	10

ENVIRONMENT	SUM OF NO.
Coastal	2
Urban (town/city)	6
Urban fringe (outskirts of city)	2
Grand Total	10

ETHNICITY	SUM OF NO.
African	2
Bangladeshi	2
Pakistani	1
White	3
White and Asian	1
White Irish	1
Grand Total	10

LANGUAGES	SUM OF NO.
Bengali, English and Hindi	1
English	4
English and Tagalog (almost fluently)	1
English being the predominant language, although I can also liaise in Bengali (Shyleti).	1
Ma'di language. English and Arabic	1
Urdu, English, Bengali, Punjabi, Hindi	1
Yoruba, English	1
Somalian and Arabic	1
Grand Total	10

UK COUNTRY	SUM OF NO.
England	8
Scotland	1
Wales	1
Grand Total	10

COUNTY	SUM OF NO.
Basildon	1
Brent	1
Edinburgh	1
Epsom	1
Hampshire	1
Cardiff	1
North Lincolnshire	1
Southampton	1
Wokingham	1
York	1
Grand Total	10

Table 3: Demographics of those who applied to be a Community Host

Demographic information about those who applied to community host role - March 2021

AGE	SUM OF NO.
16 - 18	4
19 - 24	3
25 - 34	11
35 - 44	18
45 - 54	23
55 - 64	10
65 - 74	5
Grand Total	74

UK COUNTRY	SUM OF NO.
England	61
Northern Ireland	1
Scotland	5
Wales	7
Grand Total	74

GENDER	SUM OF NO.
A man	18
A woman	52
fluid	1
Non-binary	3
Grand Total	74

ENVIRONMENT	SUM OF NO.
Coastal	8
Other - please describe	1
Rural (countryside) - please describe	4
Urban (town/city)	49
Urban fringe (outskirts of city)	12
Grand Total	74

ETHNICITY	SUM OF NO.
African	8
Arab	1
Bangladeshi	9
Black British	1
British mixed Latin	1
Caribbean	1
Chinese	1
Indian	2
None of these	1
Other White Background	4
Pakistani	5
White	34
White and Asian	1
White and Black African	2
White and Black Caribbean	1
White Irish	2
Grand Total	74

DISABILITY	SUM OF NO.
Blank	7
No	42
Yes	25
Grand Total	74

Appendix D

Healthy Environments, Diverse Perspectives

Exploring the views of under-represented groups on healthy environment research

What we did:

- ◆ An innovative, co-created approach to public engagement that involved over 100 people, and brought research to life in an immersive online workshop to explore conversations about healthy environments.
- ◆ A multidisciplinary team worked together with 6 co-creators (members of public) to design the project, create films, hold workshops and carry out research.
- ◆ Community hosts were recruited from under-represented groups. These community hosts each recruited up to 9 participants from their own communities.

Why we did it:

- ◆ To include the public's voice in informing NERC's (Natural Environment Research Council) healthy environment research programmes, particularly those from groups that are less likely to engage with the natural environment.
- ◆ We wanted to understand how these groups viewed healthy environments, what their opinions were of research in this area, and how opinions varied between different groups.

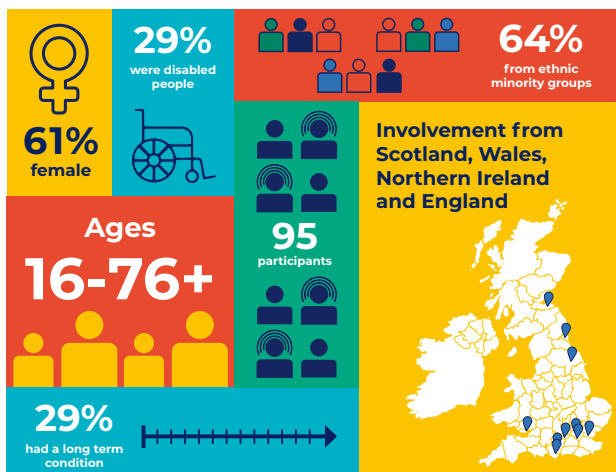
Co-creators



Community Hosts



Participants



97%

of participants enjoyed being involved and would recommend similar experiences to others



Developing all aspects with co-creators meant the project was

accessible and engaging

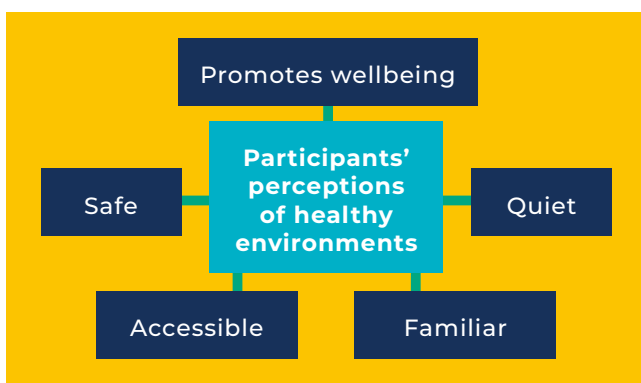


Having community host facilitators meant participants felt

comfortable at the workshops

How we did it:

- ◆ Participants watched 360° videos of environments through virtual reality headsets, prompting them to think of their perceptions of healthy environments.
- ◆ Participants then watched environmental research videos and completed an online activity. Both stimulated thinking about research issues.
- ◆ Community hosts were given training to facilitate the sessions to improve rapport and community ownership of conversations.



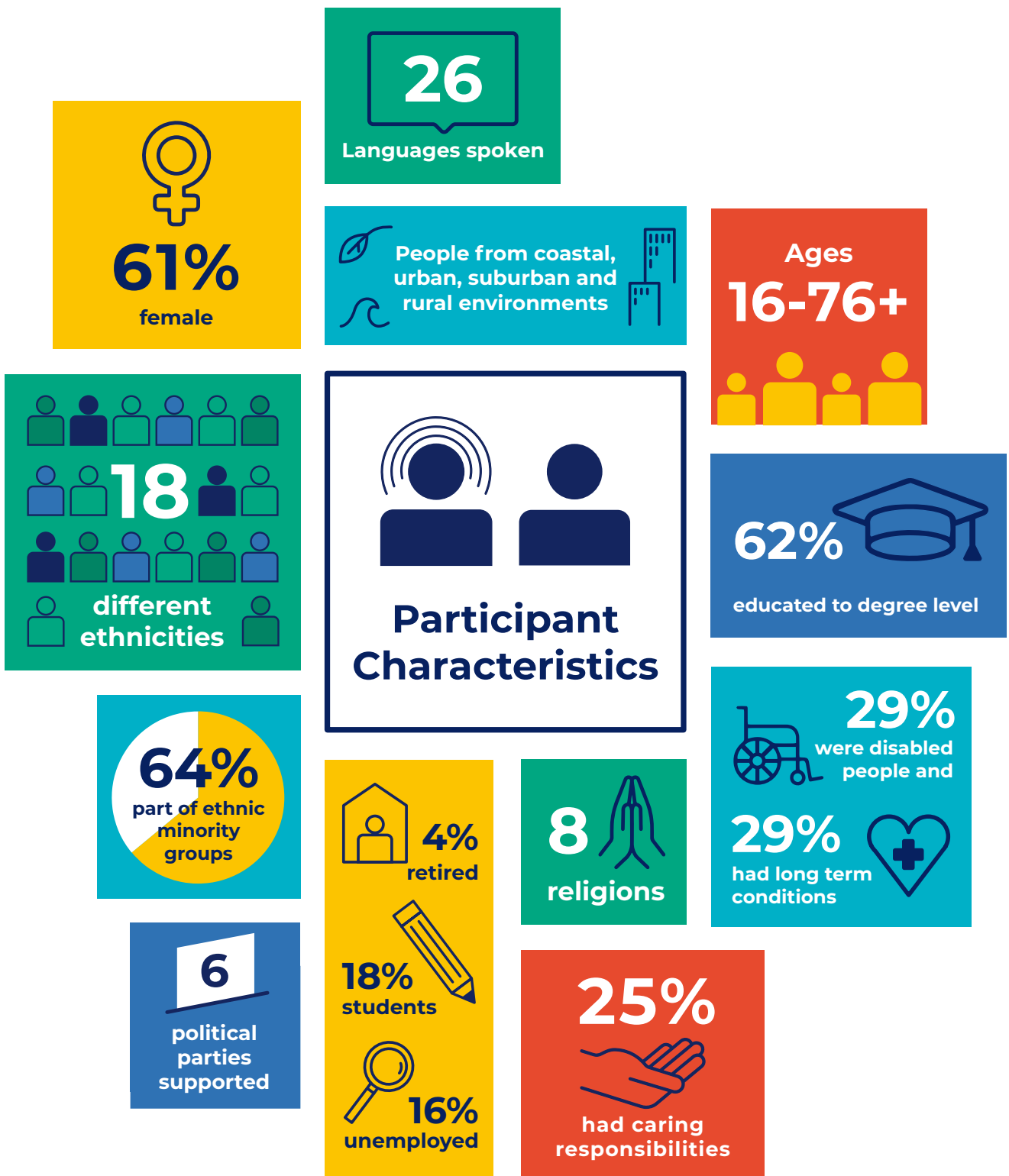
Participants told us they wanted environmental research to focus on...

- 1 Sustainable living
- 2 Social equity
- 3 Prevention of poor health
- 4 Empowering communities

For more information contact Pip: pip@helixcentre.com

The project took place between December 2020-July 2021

Figure 10: Lay persons infographic summarising the overall project



First survey, April 2020, including community hosts and participants

Figure 11: Lay persons infographic summarising the demographic data of participants

Appendix E

Example of shared decision-making process with co-creators; designing the project brand.

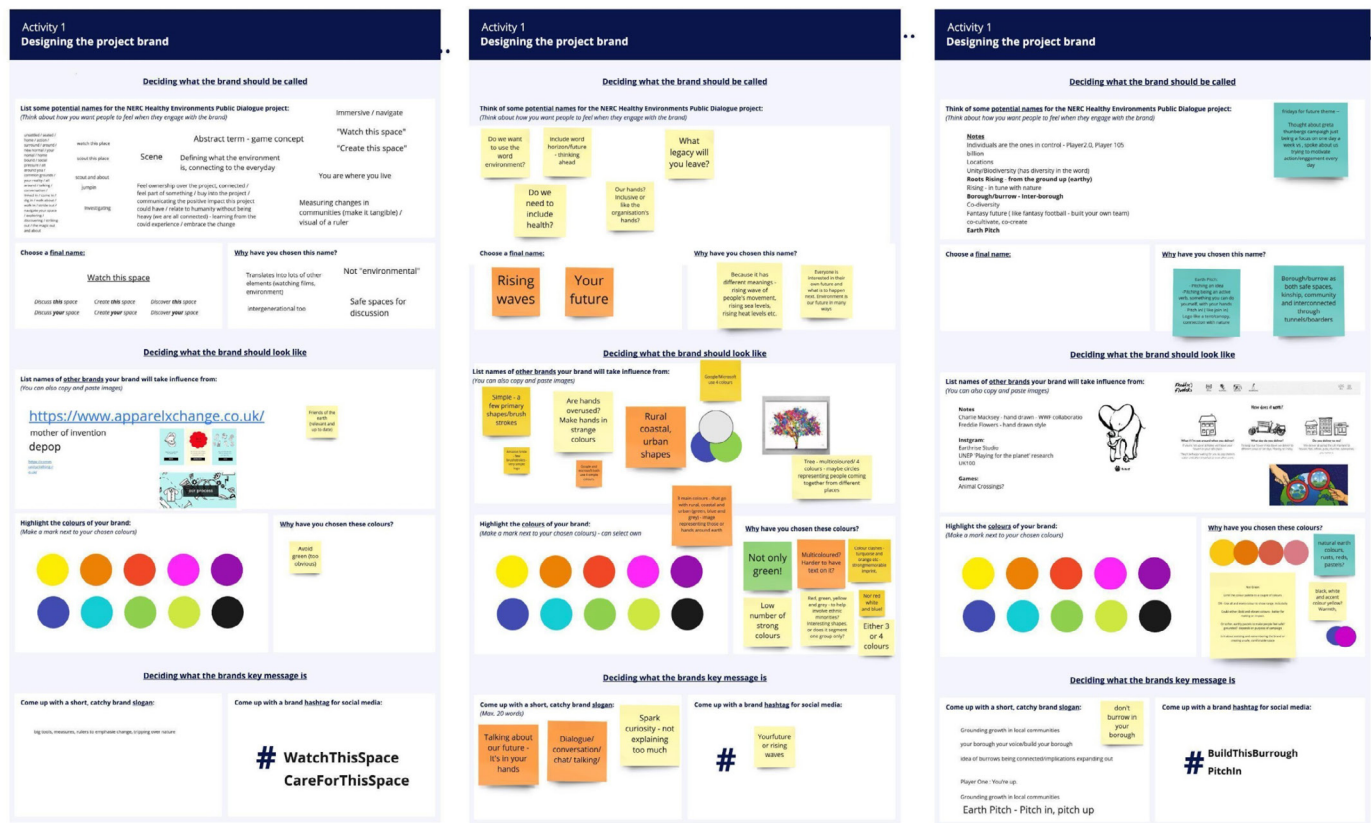


Figure 12: Miro board activity in 3 breakout groups (Step 1)

Overview of 5 brand directions

Co-design with co-creation group



Idea 1:
Watch This Space

#CareForOurSpace
watchthisspace.today



Idea 2:
Roots Rising

#RootsRising
rootsrising.uk



Idea 3:
Talking Futures

#TalkAboutOurFuture
talkingfutures.online



Idea 4:
Burrow

#Burrow4YourBorough
burrow-project.co.uk



Idea 5:
The Earth Pitch

#PitchIn
theearthpitch.com

Idea 1: Watch This Space

#CareForOurSpace

- Originated from the idea of navigating, exploring and **discovering the space around you**; within your community or a place you have a strong connection to
- 'Watch' refers to encouraging the public to **engage and immerse** in healthy environment films and VR videos
- The word 'space' also relates to creating **safe spaces for discussion** and to shared **public spaces**
- The saying 'watch this space' implies there is **something exciting and innovative to come**
- Having an **action in the name** helps provide guidance
- Using a less informal name for the environment (space) aims to **connect the individual to their local environment**, helping to realise that they engage in the environment every day
- It is not a stereotypically environmental brand and will **appeal to target audience**, its intergenerational too

Potential risks:

- Space could be perceived as outer space
- May be exclusive to people with visual impairments



Figure 13: Synthesis of names and ideas (Step 2)

Voting Booth


● 1ST CHOICE
+ 2 points

○ 2ND CHOICE
+ 1 point

● LEAST FAVOURITE
- 1 point

	Idea 1: Watch This Space	Idea 2: Roots Rising	Idea 3: Talking Futures	Idea 4: Burrow	Idea 5: The Earth Pitch	Additional Idea 1: Nature Talks	Additional Idea 2: Look Up
Co-creators	● ● ○ ○ ●	● ● ●	●	● ● ● ● ○	○ ● ○		○
Staff	● ● ● ●	●	● ○		●	○ ○ ○	●
Points	13	-1	2	0	3	3	0

Figure 14: Voting and feeding back on different routes (Step 3)



Idea 1:
Watch This Space

#CareForOurSpace
watchthisspace.today

Feedback on concept:

- It is an **original and simple** concept
- Loved the versatile, diverse and **adaptable nature of the brand**
- Would work well with all the **onboarding and practical activities** of the project
- Has a sense of challenge and **unseen potential/underdog** about it which could play up in the marketing
- It is **not obviously alluding to a green agenda** giving people the scope to explore
- Aligns with the **film** aspect of the project
- Potential for **gamification** (eg. squares are a common measurement and component to games design)

Figure 15: Developed popular route (Step 4)



What does a healthy environment look like to you?



Figure 15 continued: Developed popular route (Step 4)

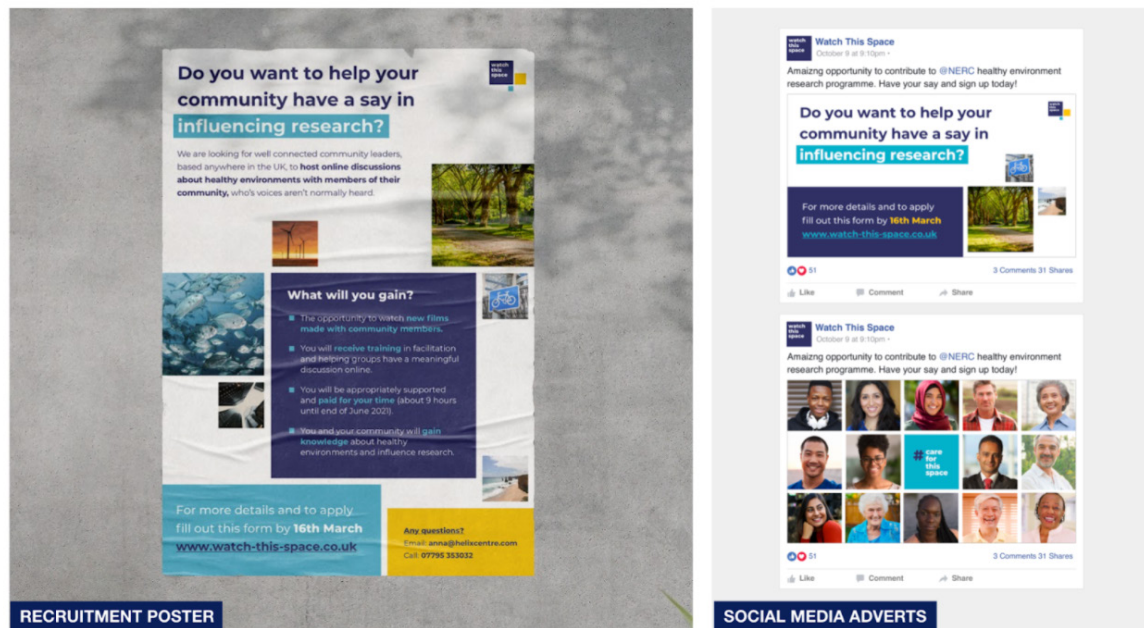
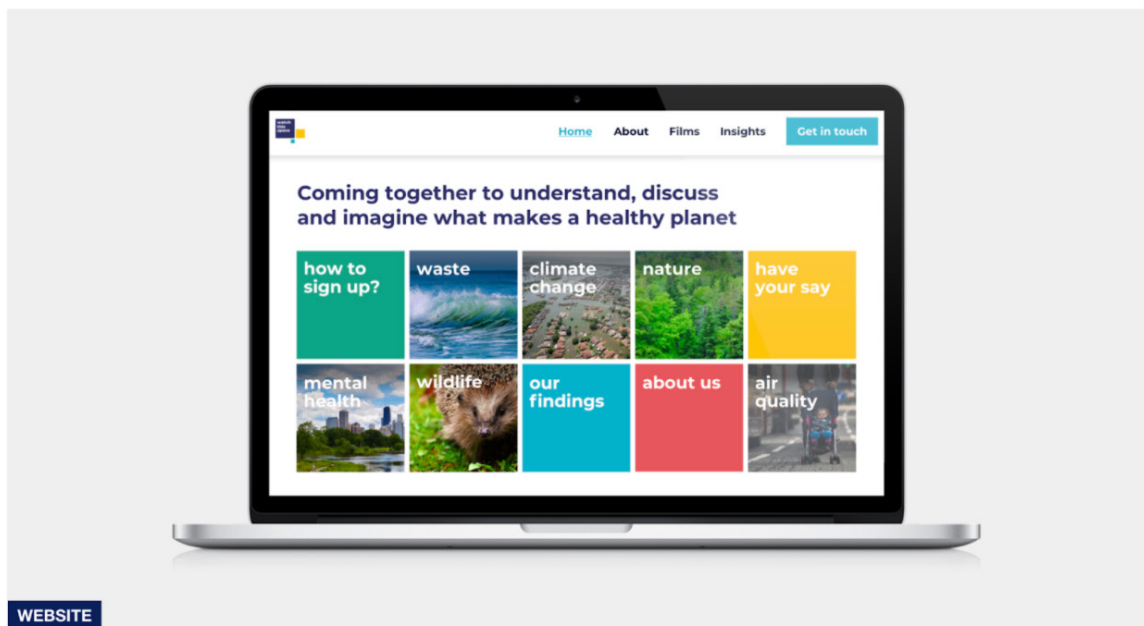


Figure 16: Feedback and iterated final version (Step 6)