Review of Public Engagement

Conducted by the Defra Social Science Expert Group (SSEG), a sub group of the Defra Science Advisory Council

Date: 10 October 2022

Acknowledgements

The Defra Social Science Expert Group (SSEG) and the Public Engagement Task Group are most grateful to all who have helped us to produce this Review. Particular thanks go to Dr Lara Mani (Centre for the Study of Existential Risk, University of Cambridge), who conducted the rapid review of the literature, and to the public engagement experts who participated so constructively in discussion sessions and gave generously of their time and ideas (a full list is in Appendix 4). We are also very grateful to the Defra Reference Group that advised the Task Group; to the Science Advisory Council (SAC) for constructive comments; to the SAC and SSEG Secretariats, the Defra Content Team and other Defra colleagues for support and enthusiasm during the various stages of review and report preparation; and to Defra policy and analysis teams for 'fact checking' earlier drafts of the case studies.

We thank the following for permissions to reproduce published material: The Royal Borough of Kingston upon Thames for the image 'RBK Citizens' Assembly on Air Quality, 2019'; Citizen Sense for the image 'Deptford workshop on air quality sensors (the Dustbox), 2016–17'; Mapping for Change for the image 'NO$_2$ levels from air quality monitoring, 2014–15' (all in air pollution case study); and White October for 'Infographic on the dialogue format of the Vizzata online tool' (bovine TB case study).

Finally, SSEG and the Task Group extend grateful thanks to an anonymous peer reviewer for considered and constructive comments on the draft report.

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Executive summary

Background and structure

Public engagement – in the sense of consultations, dialogues, citizens' assemblies, and co-productive and experimental exercises – has become a familiar feature of modern democracies. Governments and other bodies seek to elicit and understand public perspectives and concerns as a means of informing (or sometimes legitimising) a wide variety of decisions, policies and practices.

This report is the result of a review of public engagement conducted by a Task Group of Defra's Social Science Expert Group (SSEG), a sub-group of the Science Advisory Council. Political polarisation, the complexity of many social and environmental issues, and new technologies of engagement have all contributed to an increasing need for dialogue between publics and governments. The Review responds to these demands while taking stock of several decades of experience to reflect on lessons learnt and possible future directions for public engagement.

The Review focuses primarily on commissioned engagement exercises in which publics are invited to become involved. It considers the wider context for public engagement, including different ways in which people participate (and withdraw from participation) in modern democracies and the settings within which engagement takes place. This approach steps back from specific questions about methodologies and 'what works?' to identify key issues that all who seek to 'engage the public' should consider carefully before embarking on any particular course of action.

The Review has important messages for Ministers considering the benefits and potential pitfalls of public engagement, for policy teams thinking how best to incorporate public perspectives, and for natural and social scientists seeking to frame questions for engagement and interpret outputs in meaningful ways. The relevance of our findings and recommendations extends beyond Defra to other departments and non-governmental organisations, wherever public engagement is being considered or planned.

This report is presented in two parts, which form an integrated whole (cross-referenced where appropriate). Each section, and the individual case studies, can also be read independently.

Part I, which consists of four chapters, is concerned with the concepts, practices and experience of public engagement, as well as prospects for its future development in a rapidly changing environment.

Part II consists of five case studies covering aspects of public engagement in the contexts of air pollution, food, bovine tuberculosis, marine protected areas and nanotechnologies.

Additional information can be found in the Appendices. Appendices 1–4 provide further detail about the remit and conduct of the Review. Appendix 5, includes a full bibliography;

an annotated list of 'Twenty Readings on Public Engagement'; and a list of overviews and guides to good practice.

Part I

[Chapter 1](#) sets out the background to the Review and describes its remit and conduct. The methodology included a rapid review of the literature (undertaken by Dr Lara Mani of the Centre for the Study of Existential Risk, University of Cambridge); expert elicitation, involving twenty-four academics and practitioners; and case studies examining particular experiences with public engagement.

The chapter also introduces key themes and questions to be developed throughout the Review. Themes include the multiple, sometimes mixed, motivations for seeking public perspectives and involvement, and the recognition of diverse publics, rather than the singular entity so often invoked. Different approaches to engagement are outlined and questions concerning power imbalances in engagement practices are identified. While much has been achieved, critics have argued that (mis)conceptions of a public that is 'out there' waiting to be engaged, overly narrow framings of engagement exercises, and the lack of a broader, systemic approach (across a policy domain, for example) mean that institution-led public engagement as currently practised can sometimes disempower publics and limit capacities to learn from past experience.

[Chapter 2](#) discusses key contemporary issues in public engagement, drawing on lessons learnt from several decades of experience and paying attention to critiques of theory and practice in this field. The chapter begins by enlarging on different rationales for engagement (it is 'the right thing to do', or leads to better policy outcomes, or to the achievement of specific objectives). It then considers the diversity of publics, including representative 'mini-publics' (as recruited for many engagements) and 'issue publics', which coalesce around particular concerns, as well as groups who are disengaged (at least from questions of public policy). The issue of 'representativeness' – whether and in what ways those participating in particular engagement exercises can be deemed to be representative of a wider population – is identified as both important and complex.

The chapter considers the advantages and drawbacks of contemporary engagement practices, ranging from consultations through deliberative forums to co-productive approaches that generate data, materials (for example, air pollution sensors) and environments (such as low emission neighbourhoods). Using different formats in combination (with appropriate analysis and synthesis) offers opportunities to maximise benefits and tailor approaches to specific circumstances. There is evidence, too, that forging links with pre-existing, citizen-led engagements could contribute to a more joined-up approach and maintain momentum beyond specific exercises. A persistent critique of contemporary practice is its emphasis on one-off, issue-specific engagement exercises, sometimes without clear connections to policy processes. There are calls for more connected, continuous engagements, and there is broad agreement that tokenistic ('tick box') exercises should be avoided.

Further important aspects of engagement processes include analysis and interpretation of outputs, resource requirements, and evaluation. Better analysis of qualitative data, systematic archiving of materials produced in engagement exercises, and evaluation that extends beyond the short term are identified as important potential improvements to current practice. 'Effectiveness' is a crucial consideration, but cannot be addressed without asking: effective in what ways, and for whom?

In a final section, Chapter 2 draws together key points about the interrelations among public engagement, power and democracy. Power asymmetries and connecting public engagement with wider democratic systems will continue to present challenges but there is scope for further achievement, including transnational engagements.

Chapter 3 examines the changing context for public engagement, including fragmentation of publics; shifting 'infrastructures of engagement' (the physical and technical facilities or structures through which engagement and participation occur); and the emergence of environmental and science–policy issues that create uncertainties and require multi-level governance. The chapter compares the benefits and drawbacks of traditional face-to-face and more recent online approaches to engagement. Four possible lines of development are then reviewed: moving conventional participation to analogous online formats; using established online 'issue publics' to generate participatory engagement; developing digital participation platforms and engagement activities; and using the latter in translocal and other challenging settings. Questions about data analysis (identified in Chapter 2) are further considered, focusing on how the rich, qualitative findings from many engagement exercises might best be captured and how capacities to analyse and interpret such data within government and other institutions could be enhanced.

Chapter 4 draws together the key findings of the Review and makes twenty recommendations. It assesses 'where we are now' with public engagement, considering progress to date and identifying outstanding challenges. The importance of recognising and accommodating a diversity of publics, and of careful scrutiny of the meaning of 'representativeness', is reiterated. The chapter assesses contemporary engagement practices and draws out the implications of key critiques, including the need for greater connectivity and continuity of engagements within (and across) policy domains and the potential benefits of linking with pre-existing initiatives. Analysis and interpretation of findings from engagement exercises are always important; we identify a need for more consistent application of social scientific techniques at these stages, when qualitative data has been produced. Since public engagement is resource intensive, a case can be made for focusing on high quality, joined up and continuous engagements, with clear connections to policy processes. Finally, the chapter presents our findings on impact, evaluation and learning. We urge greater attention to the entire trajectory of engagement exercises, including application of findings, longer-term evaluation, provision of feedback and systematic archiving. Throughout the chapter, we identify critical issues and questions to be considered before initiating any engagement exercise.

Recommendations are set out in the context of particular findings. They are also listed in full at the end of this Executive Summary.

Part II – Case Studies

While by no means exhaustive, the five case studies in Part II were selected to cover a range of different approaches to public engagement in relation to diverse issues within Defra's field of interest.

Air pollution and public engagement

This case study considers initiatives addressing air pollution through community-oriented co-creation of proposals for action, principles and policies. Three London-based initiatives are compared: the Citizens' Assembly on Air Quality in the Royal Borough of Kingston upon Thames (RBK); the Citizen Sense research group in South East London; and the Mapping for Change social enterprise in the City of London. The different approaches involved various levels of social diversity, technological novelty and community empowerment. Outputs and outcomes included reports, films, data stories, policy and funding proposals, digital sensors, toolkits and air quality gardens. The case study shows how governments, stakeholders and diverse publics could work together to define problems, propose solutions and build capacity to ensure the ongoing viability of actions. In addition, the case demonstrates how different forms of engagement can be developed and adapted to particular situations in dialogue with participants.

Defra bovine TB citizen dialogue

This case study considers a Defra-commissioned citizen dialogue on bovine TB, focusing specifically on Defra's draft *Strategy for Achieving Officially Bovine Tuberculosis-Free Status for England* (2013). The exercise included stakeholder workshops, public workshops and online public engagement. Its objectives were to promote understanding and deliberation, inform policy, and enhance and build trust within a contested domain. Overall, the project was successful, with the in-person events meeting objectives more effectively than the online engagement. The findings were used by Defra and helped shape the policy environment in a general sense. However, clear examples of instances where the findings made a material difference to bTB strategy are more difficult to identify.

The case study highlights two key analytical issues: first, the extent to which engagement processes can be thought to capture something bigger than the events themselves (so might be regarded as 'representative' or indicative of how others think and act); and second, the need for more thoroughgoing social analysis of qualitative data. It also highlights the need for better-evidenced 'paper trails' to identify the policy and strategic impacts of engagement exercises. Finally, experience with this dialogue suggests that when conflict is already well developed, emphasis should shift from simply 'giving voice' to generating collective approaches and workable solutions.

Public engagements relating to food

This case study reports on the experience of public engagement in two food-related initiatives: the Independent Review of the Food System led by Henry Dimbleby, and the Living Landscapes project, commissioned by the Royal Society and intended to inform

agriculture and environment policy following EU exit. Both initiatives sought input from publics via a series of dialogues. The projects were incomplete at the time of the Review but were chosen as a case study because they produced interesting interim findings on public perspectives and on the implications of moving engagement activities online because of the COVID-19 pandemic.

Phase 1 of the dialogues for the Independent Review involved face-to-face meetings with diverse groups in February and March 2020. Phase 2, involving the same publics, took place later than intended (in October 2020) and was moved entirely online, as was the final Citizen Summit. An interesting feature is the substantial effort made to ensure that the quality of the dialogue remained as high online as it had been in person. The face-to-face workshops planned for the Living Landscapes project similarly had to move online. The case study emphasises that lessons can be learnt about the differences between virtual and in-person formats, including the nature of the evidence produced.

Stakeholder engagement in site selection for Marine Conservation Zones

This case study considers the experience of stakeholder engagement in the selection of Marine Conservation Zones (MCZs) and more highly protected 'Reference Areas' in 2009–11. It focuses on the effects of the engagement on participants and subsequent policy developments. Later consultations on site designation are also discussed. The stakeholder engagement initiative, ambitious and successful in many respects, nevertheless led to disillusion among some of those who participated. The experience highlights the importance of early and sustained engagement and clear communication about procedures, roles and possible outcomes (given various constraints). It shows how differences of interest and worldview can become entangled with procedural issues, with the latter being blamed for perceived shortcomings. An important lesson is that irreconcilable differences should be explicitly acknowledged and approaches that are not consensus-dependent considered. With hindsight, the case also shows that when assessing the outcomes of engagement exercises it is vital to take a long-term view. The more recent Benyon Review into Highly Protected Marine Areas (2020) illustrates how experiences from earlier engagements can be built upon.

Public engagement with nanotechnologies

This case study considers a series of public dialogues on nanoscience and nanotechnologies. Three of the four dialogues were designed as experiments in 'upstream' public engagement, which aims to engage publics at an early stage in the development of novel technologies. The experiments were funded by the then Office for Science and Innovation and run by Demos in the period 2006–08. Defra commissioned the fourth dialogue, which took place in 2014–15. Employing a range of different approaches and methodologies, the dialogues sought public perspectives on nanotechnologies in general, responsible research, specific applications and appropriate regulation.

A number of interesting lessons emerge. One is that public dialogue on complex aspects

of science and technology is possible and can be constructive and productive. Another is that clarity is needed from the outset about the purpose and structure of any engagement, but without otherwise predetermining outcomes. Exercises like these should not be too narrowly framed. There is evidence, too, that civil servants on the receiving end of the outputs, often accustomed to quantitative analysis, sometimes struggled to know what to do with the types of qualitative data produced. A fundamental lesson is that, while individual dialogues can be worthwhile for those involved, upstream public engagement requires sustained commitment, substantial resources and well-developed capacities on the part of analysts and decision makers to interpret and act upon the findings.

Recommendations

The recommendations listed below can also be found in Chapter 4, where they are set within the context of specific findings. As noted above, these recommendations are aimed primarily at analysts, policy-makers and those seeking to organise public engagement within Defra. Some require high-level co-ordination across policy domains, and potentially across different government departments.

1. Defra should reflect on, and reconsider, the nature, purpose and practices of public engagement. This re-think should involve a system-wide process across Defra's remit, with high-level oversight.

2. Greater effort should be made by those commissioning and designing public engagement exercises to work across and combine different formats and methods (with appropriate analysis and synthesis) in order to find the most suitable overall approaches for distinct publics and topics.

3. New infrastructures of engagement, including digital formats, offer considerable opportunities but need careful assessment and should not be treated as unproblematic, cheaper alternatives to in-person events. Ethical implications, including data privacy, merit serious consideration. Hybrid formats, combining in-person and online engagements, are promising and should be the subject of further attention and experimentation.

4. Those commissioning engagement exercises should ensure that agendas and tendering processes are not too narrowly defined, and allow scope for tailored approaches.

5. Those designing, organising and recruiting for public engagements should work to ensure equitable and pluralistic approaches to participation. Care should be taken to address the diversity of publics, including groups that might be under-represented or excluded. Choices should be justified in the engagement plan.

6. There is a need for greater awareness of community-based and other pre-existing engagements. This could be acquired, for example, through mapping exercises to identify issues, controversies, active groups and stakeholders. (See also recommendation 11.)

7. 'Representativeness' in the context of public engagement merits renewed critical scrutiny. This should include careful consideration of the circumstances and senses

in which participating publics can be considered representative (or not) – and of whether and when representativeness is an appropriate aim.

8. Given the complexities of representing diverse publics, those who analyse the data from engagements and present the results should exercise caution in extrapolating findings into assertions about the views of 'the public'. It will often be more meaningful to represent divergent positions and not to go in search of one averaged view.

9. The perspectives of issue publics and other 'minority' groupings should not be dismissed or de-legitimised on the basis of numbers (for example, on the grounds that such views are expressed by 'a small minority'). Rather, these views should be considered within the landscape of concerns around an issue or debate.

10. Defra should aim for greater connectivity and continuity of public engagements within (and where appropriate, across) its policy domains, setting individual exercises in a wider context. There should be oversight of engagement plans at policy level, looking several years ahead.

11. Those planning public engagements, should devote more effort to working with pre-existing initiatives rather than always embarking afresh on engagement exercises. Linkages should be clearly justified and the overall engagement plan should ensure that a plurality of perspectives is included (see recommendation 5).

12. Unequal power relations should be recognised as an intrinsic aspect of public engagement, requiring awareness and mitigation. Those conducting and documenting engagement exercises should pay attention to who gets to speak in different settings, whose voices are heard and whose are marginalised or ignored. In data analysis, power inequalities should be kept in the foreground, to aid understanding of the perspectives from which different views are expressed.

13. Those commissioning engagement exercises should reflect upon, and be open about, their (sometimes mixed) motivations for doing so. Questions to ask include: Are we doing this because 'we have to'; 'because public perspectives on this issue will make for better policy'; 'because we hope to persuade people that what we plan to do anyway is a good idea'?

14. While clarity about process is crucial, the remit of dialogues and other events should not be overly constraining in terms of questions that can be raised, issues discussed or recommendations made. Where there are genuine constraints relating to policies, programmes or legislation, those commissioning engagement exercises should be honest about these (and why they exist), so that participants are aware of constraints from the outset.

15. When consensus is not a realistic or even an appropriate objective of stakeholder and public engagement, differences (and their roots) should be reported, analysed and acknowledged, and other ways of taking matters forward sought. This might, for example, involve spatially differentiated solutions, conflict management or compensation for those whose interests are adversely affected.

16. Existing social scientific expertise in analysis of qualitative data from public engagement exercises should be used more consistently and effectively, with appropriate training if necessary.

17. To demonstrate a robust commitment to public engagement, organisations like Defra should make sufficient resources available or modify their ambitions. Importantly, budgets should include resources for the training of government personnel and others involved in commissioning, analysis, and interpretation and application of findings. Engagement plans as outlined above (recommendation 10) should contribute to resource efficiency by specifying an exacting procurement process and prioritising high quality, connected and continuous engagements over more frequent, routinised exercises.

18. Defra should consider development of an in-house Public Engagement Unit. With support from the Defra SAC/ SSEG, such a Unit could be a useful cross-department investment to help ensure that commissioning, procurement and delivery processes are cost-effective and fit for purpose.

19. Concerted efforts should be made to ensure that information and lessons from particular exercises, and from wider experience with public engagement, are not lost. This requires maintenance of 'paper trails' for individual exercises as well as co-ordination within (and across) policy domains to build an evidence base that allows for considered, long-term evaluation of impacts and outcomes.

20. Where engagement processes have material effects on policy, this impact should be explicitly acknowledged, with evidence, in any subsequent policy documentation and where possible in feedback to participants. This is important for generating confidence and buy-in to engagement processes.

Part I – Concepts, Experience and Prospects

Chapter 1: Introduction – Conduct and key themes of the Review

1.1   Background

The engagement of citizens is constitutive of democracies, most fundamentally through the ballot box but also in a myriad of other ways. People engage with a wide variety of issues, actively or more passively, through elected representatives, civil society groups, community initiatives, and other means such as protest or legal action. They might also do so by expressing their values as citizens through their choices as consumers, or by closely following issues and controversies in which they have a particular interest.

In recent decades, however, there has been increasing recourse to formally organised public engagement 'exercises', commissioned by governments at all levels, arms-length bodies, industry and NGOs. In part reflecting a quest for legitimacy in modern democracies,[1] such exercises have been seen as a means of understanding (and sometimes anticipating) public perspectives and concerns, and of informing decisions, policies and practices. It is in this formal sense that the term 'public engagement' has most often been understood. In some fields, such as land use planning, opportunities for engagement are well established and institutionalised;[2] in others, such as developments in science and technology, experience has been more recent.

Some now feel that public engagement has come of age.[3] It is broadly accepted, for example, that effective policy-making should involve the active participation of key stakeholders; draw on the knowledge and expertise of particular, sometimes specialist, constituencies (including those with place-based or professional insights); and understand and reflect people's experiences, reasoning and shared values.[4] Engagement may be seen as especially valuable (but also challenging) when contested social interests and conflicting evidence are in play, and when transitions, such as those involving new policy directions or novel technologies, demand trade-offs or are otherwise difficult and contentious.[5]

This Review was initiated because of a sense among Defra stakeholders, as well as industry and third sector partners, that after several decades of experience with public engagement the time was right for an overview of the 'state of the art' and an assessment of what has worked, when, why and for whom. Early in 2020, the Defra Chief Scientific Advisor and the Science Advisory Council (SAC) agreed to sponsor a scoping exercise, led by the Social Science Expert Group (SSEG),[6] for a project that would combine a rapid review of key academic and other literatures on public engagement with attention to the more practical question of 'what works?'. A proposal for this project, drawn up by a group of SAC and SSEG members,[7] was approved in principle by the Defra SAC in the summer of 2020 and a Public Engagement Task Group was established to conduct the Review, with input from a Defra Reference Group (see Appendix 1).[8]

While the Review is aimed primarily at policy and analysis teams in Defra, we hope that its findings will have wider application across government departments and other organisations, wherever public engagement is being considered or planned. There are messages for Ministers thinking of the benefits and potential pitfalls of public engagement; for policy teams considering how best to incorporate public perspectives and to balance external input and internal expertise; and for natural and social scientists looking to frame questions and interpret findings in meaningful ways. Our conclusions and recommendations have particular relevance at a time of significant change, including fragmentation of publics, rapidly developing digital technologies (accelerated by the COVID-19 pandemic), and complex food, energy and environmental systems that increasingly challenge compartmentalised thinking. At the same time, expectations of public engagement sit uneasily with scepticism about certain practices, among critics who see them as disempowering and among publics who feel that their input makes no difference. Further, while effective engagement can be costly, resources are tight and are likely to remain so for some time.

The broad aim of the Review was to deliver initial findings on public engagement and identify areas for more detailed exploration. Its remit was concerned primarily with engagement exercises organised or commissioned by government and other bodies, in which publics (defined in various ways) are invited to participate. Key objectives identified in the original scoping paper were to help policy makers and analysts in Defra to:

i. articulate clearly the purpose and requirements of public engagement exercises
ii. make informed decisions about the most suitable engagement method(s) in the context of particular policy areas, recognising the variety of purposes, participants, issues and timescales that might be involved
iii. interpret the findings from public engagement exercises and relate them to other evidence
iv. manage the expectations of all parties – including participants and commissioners – about the scope and outcomes of the engagement
v. represent and manage the tensions that engagement can sometimes uncover.

1.2 Methodology

The Task Group began its work in September 2020 by refining the scope and remit of the review ([Appendix 2](#)). It met on ten occasions (including four meetings with the Defra Reference Group)[9] and drew on three main sources of evidence: the published literature; expert elicitation; and case studies of public engagement in diverse areas of interest to Defra.

1.2.1 Literature Review

A rapid review of the literature, commissioned in December 2020, was carried out by Dr Lara Mani, Research Associate at the Centre for the Study of Existential Risk, University of Cambridge. The remit was to conduct a literature review with a well-defined methodology and which would be as rigorous and systematic as possible given the relatively short time available. To make the search manageable within a potentially vast field, the rapid review

focused primarily (but not exclusively) on material published within the past decade and relevant to Defra's responsibilities for environment, food and rural affairs in England. The methodology for the literature review is described in Appendix 3.

1.2.2 Expert Elicitation

Structured conversations involving all Task Group members and invited experts on public engagement were held on 25 February and 2 March 2021. The aim of these sessions, each lasting for two hours, was to help the Task Group identify directions of travel and new ideas in the field of engagement, including those that might not yet be fully reflected in the published literature. 'Experts' were defined for the purpose as individuals working on the theory and/or practice of public engagement and those participating (25 in all, including early career researchers) were drawn from academia, heritage institutions and professional organisations. Invitees were suggested by Task Group members, drawing on their varied experience and networks; in addition, several individuals approached Defra to ask to be included in one of the sessions.

Brief background information and questions to help structure the conversations were circulated in advance to participants. The lively and informative discussions, held under 'Chatham House' rules, were captured by recording and transcription. Transcripts were circulated to participants for checking and closely read by Task Group members to draw out key points and different perspectives. Many of those who attended also sent details of relevant publications afterwards.

Further information on participants and issues discussed in the expert elicitation sessions can be found in Appendix 4.

1.2.3 Case Studies

The case studies consider a range of different approaches to public engagement in relation to diverse issues within Defra's field of interest. They make no claim to be comprehensive in coverage. Rather, they provide accounts of particular experiences with engagement in terms of motivation and purpose, the publics involved, methodologies, outputs and outcomes (the distinction is discussed below), and lessons learnt. Cases were selected, as far as possible, to achieve diversity in terms of the nature of the topic, the approach to engagement and the profile of the issue (for example, whether contentious or not). The availability of material (including published reports and evaluations) and connection with the expertise and experience of Task Group members were pragmatic considerations. The full case studies are presented in Part II of this report. Briefly, they cover the following topics:

- **Air pollution and public engagement**, considering several citizen science initiatives in London that have involved the active engagement of publics in data collection and policy formation.
- **Defra bovine TB (bTB) citizen dialogue**, focusing on an engagement exercise that included both face-to-face and digital dialogues on problems and policies associated with the already polarised issue of bTB.

- **Public engagements relating to food**, in the contexts of the *Independent Review of the Food System* and the Royal Society's *Living Landscapes* initiative, paying particular attention to the switch from face-to-face to virtual engagement necessitated by COVID-19.[10]
- **Stakeholder engagement in site selection for Marine Conservation Zones** (MCZs), focusing on a two-year stakeholder-led site selection process for MCZs (2009–11) and subsequent developments.
- **Public engagement with nanotechnologies**, looking at three of the four 'nanodialogues' (experiments in 'upstream' public engagement) managed by Demos in 2005–6 and a Defra-commissioned public dialogue in 2015.

Two further points are worth emphasising here. First, while the case studies embrace a range of different approaches, they broadly reflect the increasing prevalence of dialogue-style engagements in the first two decades of the twenty-first century, superseding an earlier emphasis on 'informing the public'. Deliberative processes now feature alongside the widely used, and sometimes mandated, approach of public consultation. Second, it was not always easy to make a clear distinction between 'outputs' and 'outcomes'. Generally, we have treated products like data and reports emerging from engagement exercises as 'outputs', while the *effects* of an engagement (for example, on policies, practices or participants) are seen as 'outcomes'. The recommendations that emerged from the case studies span these categories, being both *outcomes* of discussions and an *output* of the engagement exercise, which may be carried forward. Our evidence suggests that the longer-term *outcomes* of public engagement are particularly difficult to trace and evaluate.

1.2.4 Synthesis

As the review progressed, the Task Group drew together and sought to make sense of the rich data collected in the various stages outlined above. Initially, the rapid review of the literature identified important themes and engagement practices, while the expert elicitation sessions that followed were particularly valuable in drawing out contemporary concerns and critiques. The five case studies, completed later, reinforced many points from the literature review and expert discussions but also highlighted specific issues, such as the importance of transparency about the purpose of engagement, the need to accept that consensus is not always an appropriate objective, and the short-termism of much evaluation. The synthesis enabled us identify the key contributions from each element of the methodology and to triangulate between them to develop our findings and recommendations.

In seeking to address the questions set out in the original scoping paper (Appendix 2), we took account of past and contemporary experience and future possibilities, as well as established and emergent critiques of prevailing practice. As the review progressed, we became increasingly convinced that what was needed was a step back from detailed questions about good practice and 'what works?' to consider the wider context for public engagement, including the numerous ways in which citizens become involved in modern democracies, and the changing political, technological and organisational settings within which engagement takes place. Rather than adding to the many existing guides to good practice (see examples in Appendix 5, A5.3), we decided that the review should focus

primarily on these wider contextual issues and identify key questions that all who seek to 'engage the public' should consider carefully before embarking on any particular course of action.

1.3   Themes and questions in a wider context

A number of key issues for investigation were identified in the original scoping paper (Appendix 2). These were concerned with:

  i.   the rationales for public engagement
 ii.   the nature of the publics who become involved (or not)
iii.   established and novel forms of engagement, their strengths and weaknesses and the data and evidence that they produce
 iv.   the effectiveness (or otherwise) of different approaches, including scrutiny of what it means for engagement to be 'effective'
  v.   recruitment methods and expectations (of all involved)
 vi.   resource requirements.

As outlined above, the Task Group sought to locate these themes within a wider context of democratic engagement, and on the basis of the literature and expert discussions identified a number of important recurring themes and trends. These are introduced briefly below and developed in more detail in the remainder of Part I of this report. The case studies in Part II illustrate these issues and trends in a range of different circumstances, and enrich the lessons that can be drawn from this review

1.3.1 Motivations and rationales

Numerous reasons have been advanced in theory and practice for seeking public engagement. Three of the most familiar are that it is right for people to be involved in decisions that affect their lives; that a plurality of views offers more robust knowledge and leads to better policies and decisions; and that timely engagement can pre-empt controversy and engender trust. In one familiar categorisation, such rationales have been described as 'normative' (it is right), 'substantive' (it leads to better policies) and 'instrumental' (it serves particular ends).[11] A further significant rationale is that of procedural compliance, since in some cases public engagement (or at least consultation) is mandatory. This has long been the case in parts of the planning process and is also exemplified in our case study of Marine Conservation Zones, where public consultation was required in advance of designation. Such legal requirements often themselves originate in more fundamental rationales.

These categories are neither exclusive nor exhaustive. All of the above rationales can be justified, and in practice they often co-exist. Problems can arise, however, when stated objectives differ from underlying motivations. For example, if the publicised purpose of an engagement exercise is to seek diverse views to help shape policy, but the 'real' agenda is to achieve public acquiescence for a pre-determined policy direction, disillusion is a likely outcome. We suggest ways in which such outcomes might be avoided, emphasising the

need for framing to include a breadth of perspective and, when options might genuinely be limited, the importance of honesty and transparency about purpose.

1.3.2 Publics

Questions about how 'the public' is conceptualised and which publics are recruited to participate in particular engagements are highly significant. One important lesson, partly but not fully absorbed over the past few decades, is that there is no singular public. Rather, there are many different groupings, including (but not restricted to) stakeholders, communities (local and otherwise), representative mini-publics,[12] and publics 'ignited' by particular issues, sometimes called 'issue publics'.[13] Many analysts of public engagement have been critical of the assumption that 'an external "public" exist[s] in a natural state waiting to be discovered and mobilised by participatory techniques and procedures'.[14] Rather, they see publics as 'actively brought into being' through matters of concern or, indeed, through the methods of formally organised engagements.[15] They argue that more attention should be paid to groups who self-organise in different contexts and over varying timescales, as well as to passive or silent publics (who might nevertheless be engaged) and to the disengaged, who might be sending an important message by not participating or getting involved. It is worth noting here that publics as conceived in these different ways may be in tension with, and in certain circumstances may be played against, one another.[16]

A distinction is usually made between 'publics' and 'stakeholders', with stakeholders seen as groups having a particular interest in the issue at hand. We acknowledge the distinction, whilst also recognising that stakeholders frequently participate in public engagement exercises, sometimes with wider publics, sometimes in dedicated events. We comment further on the terminology in Chapter 2.

1.3.3 Engagement practices

Engagement has (for the most part) moved beyond simplistic conceptions of informing or 'educating' the public, grounded in a 'deficit' model of public knowledge and understanding,[17] to embrace a wider range of approaches. These vary in purpose and practice and produce different kinds of data, evidence and outcomes. While methods such as opinion polls, calls for evidence and consultations (sometimes legally required) are still widely used, recent decades have seen substantially increased use of dialogue and deliberation, variants of which have now become familiar modes of institution-led public engagement. A further important development involves co-productive and 'generative' forms of engagement, sometimes experimental, in which citizens, working with governments and other organisations, become actively involved in the generation of data, materials, strategies or environments. In the now widespread practice of 'citizen science', for example, participants contribute to data collection and research on diverse phenomena such as air quality or species diversity, might co-operate in the production of monitoring devices and communication materials, and can help shape environments such as low emission neighbourhoods. Other initiatives include co-design of strategies or projects, with publics, practitioners and decision-makers working together in areas such as flood risk reduction, traffic management or biodiversity conservation.[18] All approaches to

engagement, from consultation to co-production, have their own advantages and drawbacks.

Ironically, as public engagement has 'come of age' there has been growing ambivalence about its format and effects. It is considered problematic, for example, that public dialogues and similar modes of engagement tend to be discrete, highly orchestrated exercises addressing specific topics and ultimately reaching relatively few people (even if those involved find them fulfilling).[19] For this reason, many critics have called for more systemic approaches, in the sense of covering a broader field (not just specific issues within a wider system) and engaging a more extensive range of publics, including those who are already active. An interesting example of such an approach has been developed in research on engagement with low-carbon energy transitions. A mapping of system-wide engagements in the UK, conducted as part of a UK Energy Research Centre (ERC) project,[20] identified a diversity of participation across energy systems, including consultations, deliberative processes, co-design of technologies, community energy groups, artistic endeavours and many more.[21] The mapping of existing activities then enabled experimentation with new forms of engagement in the context of energy system futures. These were undertaken not only with recruited lay citizen and specialist groups (as is established practice) but also with three very different pre-existing groups, identified in the systemic mapping exercise.[22]

It should, of course, be acknowledged that different contexts require different methods. So-called 'upstream' public engagement,[23] for example, intended to help shape the development of emergent technologies, demands different approaches to those that are appropriate for engaging publics with tangible, immediate projects such as creation of a nature reserve. While the need for such diversity is widely recognised, we also noted criticism that insufficient attention is paid to conflicting objectives, and that 'public participation discourse is preoccupied with methods, techniques and procedures at the expense of ends, purposes, politics and power'.[24] It is in this latter sense that we identified a tension between the question of 'what works?' and wider concerns about the democratic credentials of public engagement.

1.3.4 Power and public engagement

Connecting with these wider concerns, questions about power have long been posed in the context of public engagement, and emerged frequently in the review. While the participation of citizens is meant to empower them, some critics fear that the opposite might be true in many engagement practices. Such views are reflected in the critical literature, were evident in several of our case studies, and were forcefully expressed by some of those who joined our expert sessions.

The urge to change people's views by 'informing' and 'educating' them, and ritualistic public consultations, have long been criticised for adopting a 'top down' approach that can disempower the publics involved. But the more active and deliberative styles of engagement that have recently grown in popularity do not themselves escape criticism. All forms of engagement raise questions about inclusion and exclusion (and therefore about recruitment and facilitation) and about motivations on the part of those who commission

the various exercises.[25] Power can be exercised, sometimes in subtle ways, in process design (including the questions asked), in the provision of information and in analysis of the data produced. Participants, too, can exert varying degrees of influence during meetings, discussions and presentation of findings.

The fundamental structuring and framing of engagement exercises have also been matters for attention, particularly (but not exclusively) in the context of techno-scientific developments. Here a key question is whether the objective is to clear the way for decisions by 'closing down' complex issues or to 'open up' such issues, and the ways in which they are defined, to wide-ranging critical scrutiny.[26] It has been argued that closing down is an undesirable effect of many engagement exercises, especially when questions are narrowly framed (for example, around impacts or risks rather than the social purpose and control of technologies) and when there is a presumption that consensual positions can be reached.[27] Indeed, the quest for consensus has itself been criticised for depoliticising issues that are, in fact, intrinsically political. In this view, a genuinely empowering role for engagement would be to open up 'a healthy, mature, accountable democratic politics of technology choice', [28] encouraging deliberation about a wide range of issues without erasing diverse views and values.

Even this, however, is far from straightforward. Not only are there long-acknowledged difficulties in giving equal weight to different perspectives, but often 'powerful interests with large financial resources … try to skew the outcomes of policy debates and decision-making processes in their [own] direction'.[29] Moreover, much that is done in science and technology lies beyond the control of individual states, let alone of 'mini-publics' convened in time-limited exercises to discuss specific issues. As the Royal Commission on Environmental Pollution (RCEP) observed in the context of nanotechnologies: 'Genuine "upstream engagement", the outputs of which influence science and technology policy at an early stage … is particularly challenging under conditions of ubiquity when world views vary widely across countries and cultures'.[30] These issues are exemplified in the case study of nanotechnologies in Part II.

Imbalances of power are often structural and may not easily be resolved by procedural adjustments. But as power can be exercised differently in different contexts, a better balance might at least be facilitated by blended approaches to public engagement, which, for example, might draw together different communities of practice[31] to debate an issue – as with the Global Citizens' Assembly on Genome Editing discussed in Chapter 2.

1.4   Structure of this report

The remainder of Part I of this report is structured as follows.

In Chapter 2, key issues concerning public engagement are explored and set within the wider context of theory and practice as they have evolved over several decades – and continue to evolve in response to changing circumstances and technologies. We enlarge on rationales, publics, and practices (including diverse approaches, data analysis,

evaluation, and resource requirements), and on questions about public engagement, power and democracy.

Chapter 3 turns to questions about the future of public engagement, considering how lessons learnt to date might be applied. Particular attention is paid to the 'infrastructures of engagement' (the physical and technical facilities or structures through which engagement occurs), including novel and emergent approaches. Issues concerning the data produced by different forms of engagement are also considered: how, for example, might rich, qualitative findings best be captured and how can capacities for analysis of such data within government and other institutions be improved?

Chapter 4 draws together key conclusions and recommendations concerning the current status of public engagement; the plurality of publics and the question of 'representativeness'; diverse practices and critiques; and the evaluation and longer term impacts of engagement. We identify issues that should always be carefully considered before any exercise is initiated.

Part II comprises the five Case Studies.

Appendices 1–4 provide background information about the remit and conduct of the Public Engagement Review. In Appendix 5, 'Further Reading', there is a full bibliography (intended as a resource); a selected list of 'Twenty Readings on Public Engagement'; and a list of Guides and Overviews.

Chapter 2: Key themes and critical perspectives

2.1 Introduction

This chapter develops key themes that have been outlined in Chapter 1. We consider, first, the rationales for public engagement (Section 2.2) and then what is meant by 'the public' or 'publics' (Section 2.3). In Section 2.4, we elaborate on processes of engagement, discussing in turn the diversity of approaches and formats; data analysis and the issue of 'representativeness'; questions about effectiveness and evaluation; and resource requirements. In a final section (2.5), we address issues of public engagement, power and democracy which have arisen frequently during the review. Throughout, we draw on the literature, expert elicitation and case studies to document key issues, important trends and critical perspectives.

2.2 Rationales: what is public engagement for?

Public engagement is often advocated as a process that will lead to more democratic and accountable governance. In reality, engagement is driven by a broad range of rationales and motivations, and there have been shifts in purpose and practice over time. While work in this area in the 1990s might have focused on disseminating information to 'the public',[32] or consulting on pre-defined problems and policies, in the intervening decades academics and engagement practitioners have become increasingly attentive to process, experimentation and power dynamics.[33] Nevertheless, we encountered a sense of unease that, despite significant innovation, public engagement was becoming standardised and reliant on a relatively narrow set of methods;[34] it could therefore seem tokenistic or perfunctory.

As outlined in Chapter 1, rationales for public engagement have often been categorised as normative (it is a democratic right), substantive (it improves outcomes) and instrumental (it serves specific ends[35]). All of these broad rationales were reflected in the evidence that we considered. More specifically, the rapid review of the literature found the following to be frequently cited objectives for engagement exercises:

- Improving knowledge and understanding of issues and policies among publics and stakeholders
- Providing opportunities for public dialogue and representation within the policy-making process
- Gaining insights into public perspectives, which can lead to policies that are better informed and/or more likely to be accepted (thereby potentially averting conflict)
- Engendering trust through more open and transparent policy processes (including public trust in governance and trust between different groups, as well as the trust of policy-makers and experts in the ability of publics to make a constructive contribution).

In the five case studies (Part II), stated rationales included enhancing democratic decision-making; improving public understanding of, and engagement with, particular issues;

exploring public attitudes, values and aspirations; and informing the development of policies, strategies and regulatory mechanisms. Building trust was important, especially in contested domains, and some engagements were framed as experiments with new approaches (such as citizen participation in environmental mapping and monitoring, or public dialogue at the very early stages of techno-scientific development). In several cases, facilitating change and averting conflict were also motivational factors.

Both the literature and the expert discussions raised questions about what counts as genuine engagement and what types of contribution are more or less recognised or valued. One expert argued that public engagement was for 'putting forward issues, framings and practices that are not currently taken into account or supported', with a genuine commitment to shape policy outcomes. Another suggested that engagement was 'at its best and least cynical' when it was about 'learning what the good questions are and how to pose problems well'. In these perspectives, public engagement becomes a way of broadening the frame, helping policy-makers to see problems and possible solutions from multiple perspectives.

Conversely, experts presented a sustained critique of what they saw as scripted or tokenistic ('tick-box') exercises, designed to placate publics rather than empower them. Engagement might be 'seen to be done' but if there is little intention of listening to the publics involved or acting on the basis of their input, it is hardly conducive to participatory democracy. In this context, experts commented that people were 'fed up with being consulted and not seeing anything change', and that such experience resulted in 'scepticism [about] the engagement process' and 'deficiencies in trust'. These effects were associated, in particular, with standardised, one-off, issue-specific approaches,[36] and pose a particular risk when engagement is mandated but policy outcomes are largely pre-determined. The purpose of engagement then appears to be one of 'smoothing a policy through', rather than creating genuine opportunities for citizens to define issues and shape outcomes. Concern was also expressed about the potential for devaluation of well-intentioned engagements; one expert cited the example of citizens' juries being co-opted and reduced to two-hour meetings, warning: 'You need to protect your approach.'

The literature review, expert discussions and case studies all identified a need for transparency about the purpose, scope and possible outcomes of public engagements. Clear communication and discussion of these issues with participants are advocated as ways of managing expectations and alleviating feelings of scepticism, futility and loss of trust. There are different views, however, about the pros and cons of delimiting the scope of engagement exercises and working towards defined outcomes as opposed to more open-ended dialogue and flexibility about possible ways forward. An apparent tension between the slow-burn process of generating a 'listening culture' and the imperative of getting things done (and connecting engagement to decision-making) might also need to be managed. We return to these issues in Section 2.4 in the context of engagement processes, and in considering relations between engagement and democracy in Section 2.5.

Interestingly, while motivations on the part of those who commission engagement exercises have received significant attention, the literature review found relatively little understanding of what motivates citizens to get involved. Some people undoubtedly feel that it would be rewarding to learn more and engage in discussion about important issues. Participants in a dialogue on nanotechnologies (Part II), for example, thought it a 'privilege'

to have been involved.[37] Some might be attracted by remuneration for their time (as suggested in the air pollution case study). Motivations for engagement in citizen science, including, for example, expressing environmental values and contributing to knowledge, have been found to vary with the type of project.[38]

In addition, we might reasonably expect citizens to be motivated by the hope of tangible outcomes, such as impacts on policy, especially if these have been held out as a prospect.[39] It is when such expectations are not realised that participants can become disillusioned and less inclined to get involved in future.[40] Conversely, if people enter a process in a sceptical frame of mind, as seems to have been the case with some participants in the bovine TB dialogues, the outcome may only increase their initial scepticism. These effects emphasise the importance of transparency about purpose, scope and possible outcomes, as discussed above. Generally, the review suggested that participant motivations and expectations are relatively under-studied areas that warrant further research.

2.3   What is meant by 'the public' or 'publics'?

It is important to ask 'who are the public?' as part of any engagement process. Rather than seeing 'the public' as a pre-formed entity, ready to be engaged, experts in the field often prefer to speak of multiple publics in-the-making.[41] As one insisted in discussion: 'Publics emerge. They are not engaged'. The pluralisation of 'publics' is more than a recognition of diversity. It also acknowledges that different kinds of publics exist, some of whom are invited to participate in engagement exercises while others are uninvited or excluded.[42]

Some publics are members of already-existing communities of practice, such as farmer groups, who share certain professional practices or occupational expertise. Others, known as 'issue publics', emerge through shared experience, interests or concerns, for example about flooding, air pollution or achieving net zero. As noted in Chapter 1, a wide variety of citizen- or community-led groups engage actively in many different ways, and in some cases, formerly silent (or silenced) voices are 'ignited' by events or controversies (such as those over bovine TB or GMOs).[43] Publics can also be brought into being by the processes of institution-led engagement.[44]

It is appropriate at this point to distinguish between two traditions in conceptualising public engagement. The first, a *discursive tradition*, suggests that people come together to engage in formal, rational debate as part of a democratic process in which they form a public. The second is less exclusive and stems from what has been called a *materialist tradition*.[45] Here 'a public' signals a particular collective of people (who may not always be 'citizens' but could, for example, include future generations), and their relations with each other and with a host of other bodies and matters, from genes to atmospheric processes. In both cases, instead of 'the public' being out there, already constituted and passively waiting to be informed or engaged, publics are actively and collaboratively brought into being.[46]

The importance of this distinction can be seen, for example, in the intense debate about GM crops that took place in 1990s and early 2000s. The outcomes of the elaborate *GM Nation* process (which indicated a general ambivalence towards GM crops and lack of trust in corporate and other regulatory bodies) were dismissed in some quarters as 'unrepresentative', in effect setting the views of interested groups that had actively participated in (or, as some saw it, 'hijacked') the process against the presumed views (or disinterest) of a wider, national 'public'. According to the House of Commons Environment, Food and Rural Affairs Committee, for example, it was 'profoundly regrettable that the open part of the process, far from being a "public debate", instead became a dialogue mainly restricted to people of a particular social and academic background…'.[47] But if we understand *GM Nation* as having allowed a public to form and grow around the issue, such disqualification of the results might not be legitimate.

The challenge, then, is to distinguish between engagements that are not 'representative' of a wider public (in the conventional sense of that term) because they have been 'hijacked' and those that reveal public interest in an issue as social media and related campaigns form around it. This is essentially a judgement call on which it is difficult to provide unequivocal evidence-based guidance. A key message is that the legitimacy of different perspectives should not be judged solely according to claims about the 'representativeness' (or otherwise) of publics that hold and articulate them. We return to this point in Section 2.4.

Despite the maturing of public engagement, our evidence revealed concerns that certain publics are disenfranchised and participation is unstable and declining in many (geographical and policy) areas. There was broad agreement in the expert discussions that current approaches to engagement tend to reinforce the exclusion of those who participate least in the political process, even when recruitment methods strive to convene a (demographically) representative sample of the population.[48] The issue of 'people who aren't heard', and what this might tell us, was a significant theme, with one expert commenting that 'non-participation is an act and the retraction of engagement is a statement'. Reluctance to engage (at least in matters of public policy[49]) may provide valuable evidence about the issue being investigated or the proposed method of engagement.

The experts we consulted emphasised questions of justice, power and democracy, and above all were insistent that public engagement is a political process. They stressed the need (as one put it) 'to connect engagement back to democracy' – a critical issue, not least because the relationship between participatory processes and the wider system of representative democracy has often been vague or absent (and for that reason has been described elsewhere as 'the missing link'[50]). We return to this question in Section 2.5.

By recognising the changeable and pluralistic qualities of publics, policymakers could be better placed to create engagement spaces that are most suited to different publics and issues. Public engagement might then be thought of less in terms of standard methods to be applied than as set of practices and dialogues developed in relation to distinct participants, concerns and locations.

2.4   Processes of public engagement

This section is in four interrelated parts. The first reflects on different approaches to public engagement, which (despite the concerns about standardisation noted in Section 2.2) have grown in variety over the past few decades. The second discusses analysis of the various kinds of data produced in engagement exercises together with the related issue of 'representativeness'. The third addresses questions of evaluation and how the effectiveness of engagement might be judged, and the fourth considers resource requirements.

2.4.1 Diverse approaches

Besides the long-established approaches of consultation, calls for evidence, opinion polls and public events, engagement can take many forms involving diverse people and communities. Organised (in the sense of institution-led) engagements include citizens' assemblies and juries, public dialogues, focus groups, deliberative polls and workshops, and citizen science. Some of these have used digital platforms (as well as, or in place of, face-to-face engagement) and there are other, emergent forms of digital participation, considered in more detail in Chapter 3. In parallel, there are many citizen- or community-led, 'self-organised' activities, as well as other ways of engaging such as popular protest and political activism.

According to the National Coordinating Centre for Public Engagement (NATCEN), public engagement can be described as 'a two-way process, involving interaction and listening, with the goal of generating mutual benefit'.[51] However, differences in context, participants, information flows (which might be multi-directional) and outcomes point towards a more variable and complex set of processes. Table 2.1 provides basic information about institution-led forms of engagement that have come into frequent use in recent decades. The table is non-exhaustive, and other forms and variants are documented in the sources listed in Appendix 5.3.

Table 2.1: An overview of some frequently used public engagement methods. This table was adapted from a table compiled by Lara Mani based on various sources.[52]

Method	Number of participants	Indicative cost	Duration	Recruitment methods	Defra domains
Citizens' Juries	12–24	£16,000 to £30,000	2-4 days	Random stratified sampling	Climate change, air & water pollution & management
Citizens' Assemblies, Sortition	50–200	£100,000+	Weeks to months	Random stratified sampling	Climate change, air pollution
Deliberative polls	100–500	£200,000+	1-2 days	Random stratified sampling	Most Defra domains

Method	Number of participants	Indicative cost	Duration	Recruitment methods	Defra domains
Public dialogues	30–300	£100,000 to £300,000+	Weeks to months	Random stratified sampling & Snowball sampling	Climate change, air & water pollution & management, food security, landscapes, nanotechnology, bovine TB
Focus groups	6–12	Low to moderate (£10,000+)	Hours	Random stratified sampling, & snowball sampling & Targeted sampling	Most Defra domains
Citizen Science	No limit	Dependent on budget	One-off events to decades	Snowball sampling & targeted sampling	Biodiversity, biosecurity, environmental monitoring
Digital participation	10–100	Low to moderate	Hours to days	Random stratified sampling	Most Defra domains

While the range of approaches to public engagement has expanded, the long-established methods mentioned above (such as consultations and opinion polls) remain in regular use; in some cases (for example, when a legal requirement to consult must be fulfilled) they may be the easiest forms of engagement to reach for. They furnish useful information while having recognised drawbacks. Opinion polls, based on representative samples of wider publics, present a snapshot of views at a particular moment, and can be helpful in identifying longer-term trends when broadly comparable polls are conducted over time. They are not designed to produce a deep understanding of how people form their views and values. (See also Box 2.1)

Consultations and calls for evidence can be effective ways of identifying the nature and range of perspectives held by interested individuals and groups and can highlight issues that might not previously have been considered. Respondents are self-selected (even if strenuous efforts are made to reach a wide range of publics). These approaches sometimes produce a very high volume of responses (more than 44,000, for example, in Defra's 'Future Farming' consultation in 2018[53]), which presents challenges for analysis, especially of qualitative data, and for adequately summarising the findings.

The framing and format of the questions asked in polls, consultations and calls for evidence are of considerable importance in shaping the outputs. None of these methods provides much opportunity for dialogue or deliberation (except within and between organisations in the preparation of responses) and nor is there much beyond summaries in the way of feedback to participants.

Deliberative forms of engagement have the advantage that participants' views and values are not simply 'revealed' but can be formed, challenged and reconsidered in the light of

information and discussion.[54] Examples include public dialogues as well as citizens' assemblies, panels and juries, referred to collectively by the Organisation for Economic Co-operation and Development (OECD) as 'representative deliberative processes' involving 'randomly selected citizens, making up a microcosm of a community'.[55] Typically framed around a policy issue and/or specific topic, these processes require professional facilitation and involve experts to provide information and answer questions. Dialogues, sometimes bringing together citizens and stakeholders,[56] have been widely used across Defra's domains and in other areas; the case studies in Part II of this report consider the achievements and limitations of this approach in a range of different contexts.[57] Juries tend to be structured to hear evidence and reach a 'verdict', while citizens' assemblies (described by the OECD as 'the most robust and elaborate model of representative deliberative processes'[58]) are more substantial undertakings, meeting over longer timescales. An interesting UK example of the latter is the Citizens' Assembly on Climate Change, which reported in 2020.[59] Focus groups – smaller-scale facilitated discussions aimed at drawing out public attitudes and views – are often employed to test the political temperature on particular topics, and can help identify areas of contention in the early stages of policy development.

Digital participation methods such as online deliberative workshops have increasingly been adopted as sounding boards on a range of public policy issues, taking advantage of the relatively low costs of using a virtual environment – a trend that has been accelerated by the COVID-19 pandemic. Public dialogues discussed in the case studies on bovine TB and food are interesting in this respect because both involved a mix of face-to-face and virtual formats. These and emerging forms of digital engagement such as elicitation methods using digital platforms and other novel technologies are discussed in more detail in Chapter 3 and in the air pollution case study.

Citizen science approaches are designed to engage publics with science through participation in research.[60] Volunteers can be responsible for data collection for purposes such as species counts, tree health assessments, and sampling to assess air, water or soil quality. 'Volunteered' data can come in numerous forms including, for example, volunteer-generated information (such as personal GIS data), collecting otter droppings, user-generated information from apps and platforms, and paid participation in trials or surveys. These practices present a range of opportunities and raise different considerations in terms of quality assurance and control, data processing and ethics. Data collection can also take different forms, from exercises that ask people to collect data to co-operative projects where people engage in the process of data generation, sometimes also co-producing materials (such as monitoring devices) or environments (such as air quality gardens), all exemplified in the air pollution case study. The former (data collection) often manifests as 'passive' top-down service work (though passivity should not be over-stated[61]); the latter as a set of more open processes of generative participatory engagement.

Experimental forms of engagement have also materialised and have considerable potential at times of social change (as required, for example, to meet net zero objectives). Experiments can provide models for exchanging and generating different kinds of

knowledge and for joint working between governments, publics and other organisations to achieve shared understandings and specific material ends. Some applications of citizen science fall into this category (see air pollution case study). Other examples include novel forms of online engagement (see Chapter 3 and bovine TB and food case studies); various exercises in participatory mapping and modelling;[62] and experiments or pilot studies that involve working closely with particular publics, such as communities affected by flood risk[63] or farmers and landowners involved in the Defra landscape recovery pilots.[64] Early attempts at 'upstream' public engagement were also characterised as 'experiments' (see nanotechnologies case study), and looking to the future there have been calls for new ways of working with publics on emergent issues such as geoengineering and hydrogen use in the home.[65]

The approaches to public engagement outlined above offer opportunities for involvement in different degrees and at various stages in data generation, project design and policy formation. All have advantages and drawbacks. Different approaches are sometimes combined – a consultation to gauge the breadth of views from interested individuals and groups, for example, used in conjunction with dialogues involving different publics, as illustrated in several of the case studies. There is potential for greater use of combined approaches (with the requisite skills to analyse different types of data), aiming to maximise the overall benefits of engagement while minimising the drawbacks of specific formats. Using more than one approach is likely to be especially helpful when issues are complex and contentious. At the same time, rather than eliciting every engagement on a clean slate, there is a strong case for greater continuity, so that involving publics in a given policy area might entail not just a 'one-off' exercise (even one that deploys a combination of different formats) but a series of on-going, interconnected activities and feedback.

There are good arguments, too, for building on pre-existing, self-organised initiatives. Some of the experts consulted placed considerable emphasis on the need to value the leadership and organisation that is already in evidence within communities and grassroots projects, and this view is reinforced in the literature. One expert spoke of the need to build 'lateral engagement', asking how Defra could better connect with citizens around a range of environmental issues:

> 'How can Defra better respond to diverse engagements already underway? How to engage with other actions that are relevant in some way – rather than expecting others to step into your framing of the question?'

Participatory mapping of system-wide engagements in the field of net zero transitions, discussed in Chapter 1, provides an example of how this issue might be approached, and the air pollution case study (Part II) further illustrates engagements in which pre-existing groups have been involved. Self-organised initiatives can offer relevant and productive sites from which to engage different publics and could help develop more collaborative, pluralistic and responsive proposals for addressing Defra-related issues. The question then becomes one of how to listen to, and tap into, these ongoing activities, as an entry point for further engagement. Some caution is needed. Decisions about connecting with existing groups require justification, giving appropriate consideration to issues of power

and voice, and ensuring that a range of perspectives is included in subsequent or additional engagements.

Three generic points about approaches to public engagement are worth making or reiterating before moving on to consider questions about analysis and 'representativeness'.

First, terminology is important, though it sometimes becomes confused. The need to distinguish between different publics, and to be cautious about attributing views to 'the public' as a single entity, have already been emphasised. The terminology of process is also important. Experts in our discussions stressed, for example, that 'consultation', 'participation' and 'engagement' are not synonymous, and argued for greater differentiation and terminological precision to facilitate the most effective use of public engagement in policy-making.

Second, a substantial body of evidence identifies power as an intrinsic component of public engagement processes. Asymmetrical power relations within and beyond particular settings can influence the framing of questions, exchanges within dialogues, relationships built, and outputs and outcomes, including feelings of empowerment or disempowerment. Issues of power, democracy and public engagement are drawn together in Section 2.5.

Third, no one model of public engagement can be singled out as 'best practice', since different forms can be more or less suitable for addressing distinct publics, situations, and topics (an important reason behind concerns about standardisation). As argued above, combined formats can help to maximise benefits and minimise drawbacks. There are also calls to move away from one-off, issue-specific exercises towards a more systemic approach connecting institution- and citizen-led engagements within broader policy areas, and towards greater continuity of engagement over time. Identifying effective formats is also hampered by a lack of longer-term evaluation of engagement exercises; we return later in Section 2.4 to issues of effectiveness and evaluation.

2.4.2 Data analysis and 'representativeness'

The literature on participation in public engagement exercises has tended to focus on technical questions such as the most appropriate way to recruit participants and the bias that might be introduced by different methods of recruitment. Attention has been paid to issues of self-selection, exclusion and disengagement, but less to the wider publics affected by an issue and their relationship to those who are formally consulted, though this too is an important consideration. Here we consider two particular ways in which social science perspectives can add value to current engagement practices, particularly in relation to analysis and interpretation.

The first goes beyond technical considerations (such as sampling methods or the role of facilitators) to raise questions about the nature of the evidence collected, recognising that distinct insights and different kinds of knowledge can emerge through different approaches to public engagement. This is illustrated in the food case study where a move from face-to-face to online engagement mid-way through the process (because of COVID-19

restrictions) provided an opportunity to consider the nature and quality of evidence collected in each case. The immediate lesson to be drawn is not that one format – in this case, online or face-to-face – is inherently preferable but that each has its own advantages and disadvantages, producing different kinds of knowledge whose value should be assessed in terms of fitness for purpose rather than by a priori judgement. (See also Chapter 3.) The epistemological point – that different formats produce different kinds of knowledge – extends to comparisons between forms of engagement more generally, and has an important bearing on ways in which the data produced are analysed and interpreted. When advising Ministers on what has been learned from an engagement exercise, for example, the type of knowledge behind any conclusions (their evidential basis) should be as transparent as possible.

The second point concerns how evidence from public dialogues and similar methods of engagement is taken to be representative of the views of a wider public. This issue is illustrated in the bovine TB study (Part II) where a question arose concerning the extent to which the engagement processes could be considered to capture something bigger or wider than the events themselves; could findings emerging from these processes be regarded as representative or indicative of what or how others think and act? In the bovine TB dialogues, the process of recruitment, adopted from more quantitative survey methods, was used to justify an interpretation of elicited responses as indicative of the views of a wider population. This implies that the publics who engaged in the dialogues can be regarded as representative of 'the public' or the wider population (in a quasi-statistical manner). Despite frequent disclaimers about the numbers involved and their lack of statistical representativeness, participants' utterances were nevertheless treated as indicative of what and/or how 'the public' thinks. This kind of slippage is a common feature of the way in which engagement exercises are reported, but one that should not go unchallenged. Key considerations relating to this important issue are set out in Box 2.1.

Box 2.1 Representativeness and analysis of materials

In large surveys or quantitative social science, the ability to represent a wider population can be judged in relation to sample size. Statistical power is measured using various tests that assess the extent to which any relationship may have occurred by chance. In such cases, it may be justifiable to state that 'most people said this, or a majority agreed with the argument', and to draw inferences about a wider population with appropriate caution. It should be noted that such analyses do not 'reveal' what people really think (as if we can open them up and read their true feelings). Rather they indicate preferences and possible positions that are taken up when a question is framed in a particular way. These methods are not designed to understand why people say what they say, or what they hope to achieve by doing so.

For many reasons, deliberative public engagement activities cannot reproduce this form of analysis. Deliberation works best in smaller groups, with greater time given to the development of arguments and opinion. Representation cannot therefore rely on statistical power.

Qualitative analysis can, though, claim to represent wider processes and apply beyond the setting of the particular deliberative forum. But the tools for doing so are different. The key steps in developing a rigorous analytical process can be set out as follows:

1. **Materials and data** – deliberative forums and other engagement events tend to generate a lot of 'talk' but can also be used to produce specific materials like maps, drawings, photographs and videos.

2. **Recording and making a database** – these materials need to be collated and curated into a qualitative database. The process of transforming and storing any materials should be explained (including whether sessions were recorded and transcribed, coded or thematically organised – see point 3). Records of meetings ideally should involve notes of not only what was said but also any relevant contextual issues (marking when things became heated, emotional etc.).

3. **Analysis** – these materials should be read closely and then used to develop a set of summary themes. The themes may be used to produce a set of codes or labels, which can then be used to mark up the materials. In this process, it is common to have a rough schema at the outset (for example starting with a framework like 'knowledge, attitudes and practices', or 'materials, contexts and outcomes'), which is then developed into a coding tree or set of sub-codes that are generated in the analysis. At this stage, the focus may be on describing 'what' people said or produced. This should be followed by attention to 'how' they said it (for example, were common metaphors used to describe something, was there anger or other emotion in the statement?) and whether and how the statement was effective (did people react positively, get behind an argument, disagree and so on?). It may also be useful to think about 'why' they said something (what accounts for that position, or argument?).

4. **Representation** – is judged through an assessment of how an activity, speech or argument is grounded in experience, wider cultural themes and/or the strength of feeling or expression. For example, it may be that participants draw on their working lives or life experiences to state a clear objection to a development or change. They might give their assent to a way of speaking about an issue, using similar metaphors around, say, 'crises', the 'war' on infection or the 'distance' of a government body or authority. They might assume similar histories and narratives that describe social changes ('this problem was caused by…'). These metaphors and narratives can be read as commonly used cultural frames for understanding or problematising an issue (and can be confirmed as such by reference to other cultural materials). Analysts might be equally interested in seemingly marginal or maverick approaches, especially if such views become controversial or start to gain traction during an engagement event. Representation here is about the wider cultural processes that the group tends to adhere to and also about how people present their lives and experiences, sometimes in ways that run counter to dominant views.

5. **Writing up** – it should be clear that in writing up public engagement processes and findings, authors should refrain from the false precision of 'most said this', 'few said that' and similar forms of reporting. While it might be interesting (for example) to identify common themes, it is important not to imply through the use of terms such as 'most' or 'majority' that the utterances of a relatively small group in a particular circumstance tell us anything about the views of a wider public. Not only is this spurious in terms of the form of analysis, it also falsely assumes that the aims of engagement are to represent consensus or that a majority opinion is all that matters. Equally, 'cherry-picking' quotes to add colour to reports of engagement exercises is not the same as rigorous analysis. Reporting needs to be open and transparent concerning the methods used to select data. Transparency is key here in order that reports can be peer-assessed for rigour and significance of findings. Authors should be explicit about the basis for any inference made on the results of the deliberation.

2.4.3 Effectiveness and evaluation

Although questions are often asked about 'what works?' in public engagement, it is far from straightforward to assess the effectiveness of different approaches. As one participant in the expert sessions argued, judging 'effectiveness' is fraught with contradictions, raising definitional and practical issues. Key considerations include what evidence to look for, the timescale over which evaluation takes place, and the criteria against which effectiveness might be judged. Our evidence suggests that criteria should relate to the design, framing and conduct of engagement events, the context-specific objectives of particular exercises (such as eliciting public perspectives or informing policy and practice), and wider contributions to democratic participation. The questions should always be asked, 'effective in what ways, and for whom?' The timing of engagement within a longer period of debate on an issue may also be significant, affecting, for example, whether it taps into existing concerns when a broad consensus already exists, or explores relatively uncharted issues.

Despite these important considerations, the attention given to evaluation of engagement exercises has been variable. The literature review found relatively few studies that had conducted evaluation or impact assessment, and one expert seemed to corroborate this

finding, suggesting that 'it's rare that you have to make the case for whether [engagement] was effective… the burden of evidence is not high'. Nevertheless, as illustrated in our case studies, some form of evaluation has often been sought by those commissioning engagement exercises and built into engagement plans. The issue, perhaps, is less a lack of evaluation *per se* than a tendency to focus on the immediate aftermath of particular exercises, assessing effectiveness against criteria such as numbers attending, the conduct of the exercise, participant satisfaction (based on exit surveys or interviews), and whether any findings 'fed into' policy. While these aspects are important, short-term assessment tells us little about lasting influence on policy or practice, or on the publics involved in engagement exercises. Independent assessments have sometimes addressed wider considerations (as in the nanotechnologies case study) but these too have typically been conducted soon after completion of an exercise.

Evidence from the literature, case studies and expert discussions identifies significant elements of successful (and less successful) engagement practices. For example, engagement exercises should be well planned, organised and facilitated, objectives should be clearly defined and transparent, sufficient time should be allocated, and participants should know what to expect, during and after the events themselves.[66] Emphasising these points, experts argued that 'interest in participation is lost when it is not clear what the purpose of participation is', and that 'if people know that engagement is the route to their views being acted upon, then they will want to constructively engage'. There are some tensions, however. While achieving an appropriate balance can be challenging for government, articulating anticipated procedures and outcomes should not prevent fresh insights emerging from genuinely open engagement; much depends, therefore, on the framing of objectives and questions. Further, it should be acknowledged that consensus is not always possible, and in some circumstances may not be an appropriate objective. Even if engagement can be well embedded in policy and practice, not everyone's views can be 'acted upon'.

As discussed earlier in this chapter (Section 2.2), a distinction is often drawn between narrowly defined engagements with standardised formats and more open, generative and exploratory approaches, which afford participants more agency while acknowledging the power relations that are in play during any kind of engagement exercise.[67] There are related concerns (expressed in the literature and reflected in our expert sessions) about whose voices are heard and whose are silenced or ignored (noting a caution expressed in one session that the idea of 'giving voice' can in itself be patronising). As noted in Chapter 1, some experts were further concerned that a narrow interest in 'what works' can conceal a form of instrumentalism (for example, a desire to depoliticise contentious issues) that is in itself disempowering.[68] These issues have an important bearing on the concept of effectiveness. For some critics of contemporary approaches, effective engagement would entail moving away from one-off exercises on specific issues towards a broader and more systemic approach. This could involve, for example, building a picture of engagements (and exclusions) across a policy system, as well as greater continuity of engagement over time.[69]

The general absence of thoroughgoing, critical and long-term evaluation, discussed above, is also relevant in the context of effectiveness. The resulting lack of evidence adds to the difficulties of pronouncing one form of engagement more effective than another, or more appropriate for this or that set of circumstances. It also restricts the potential to learn from previous experience. There is a strong case for developing more systematic and longer-term evaluation, with the aim of building an accessible repository of knowledge and a greater sense of institutional memory.[70]

Finally, any discussion of the impact or effectiveness of engagement raises wider considerations of empowerment. Rather than working with abstract or arbitrary measures of success, it would be productive to create a common narrative about what success might look like. Ideally, this should be developed as an integral part of the engagement process, enabling participants themselves to ask for whom and in what ways the engagement is likely to be effective, and what the desirable and feasible outcomes might be. Effectiveness could then develop as part of the engagement conversation, as a set of agreed-upon indicators of knowledge development, change and accountability.[71]

2.4.4 Resource requirements

While public engagement is increasingly required at all levels of governance, views expressed in our expert sessions suggested that carefully planned and well executed engagement is resource intensive – a perspective confirmed in the literature review and in guides to engagement practice (Appendix 5.3). At the same time, there was a feeling that resources and support for engagement have in general been declining. Some estimates of costings are given in Table 2.1 above and actual (non-adjusted) costs of the public dialogues considered in our case studies include, for example, £75,000 for the Environment Agency's 'people's inquiry on nanotechnology and the environment' in 2006; £375,000 for the bovine TB dialogue exercise in 2013; and £105,420 (plus in-kind contributions) for the Defra-commissioned public dialogues on nanotechnology applications in 2014–15 (see Bovine TB and Nanotechnologies case studies). Guidance emerging from the Defra-funded *Citizen Engagement on the Environment* project (published in 2021) suggests costs of participation ranging 'from £10,000 to £500,000 and up'.[72] The UK Citizens' Assembly on Climate Change[73] cost £560,000. One interesting detail to emerge from the nanotechnologies case study (Part II) is that the costs of providing an appropriate diversity of expertise within deliberative exercises should not be underestimated.

While cost estimates vary, it is clear that a robust approach to public engagement requires adequate resources to build infrastructures of and for citizens. Such infrastructures are multi-fold and extend beyond the resources needed for planning, conducting and analysing the dialogues (and similar events) themselves. They should include institutional buy-in, connections with research communities, expertise, and appropriate methods. Importantly, our evidence also points to a need for better training, so that government officials and others are able to engage more effectively with different publics; one expert felt, for example, that 'policy communities need better instruction on what public engagement is for and what they might get from it'. Participants in the expert discussions also stressed the

importance of learning how to listen and analysing what might lie behind what people say. There are particular skills in 'listening to what's being said behind the words being used' and 'being attentive to what people bring to the process – emotions, energy [and] labour'.[74] Another expert warned that without this more thorough approach engagement could become a public relations exercise undertaken by communications or marketing teams within government, rather than being integrated with processes of policy formation. It was acknowledged, however, that it can be difficult to embed the necessary training within organisations when staff turnover is high and institutional memories are short.

A further point made in the expert sessions was that institutional commitment to public engagement, and associated resource implications, should be clarified. This would involve addressing some fundamental questions. What can a government department or other body realistically achieve? What are the capabilities of the institutions involved in the process? To what extent are these bodies or departments able to respond to the challenges about which they are seeking to engage with publics? And if they are not able to realise change, then what other institutional actors might need to become involved to build trust and achieve more effective public engagement?

Connections with research communities (as forged, for example, in one of the dialogues considered in the nanotechnologies case study in Part II) are also an important part of the resources and infrastructure for making public engagement more effective. As argued above, social scientific techniques and methodologies have a key role in analysis of qualitative data, but do not sufficiently inform the reporting of public engagement exercises, where references to a specific analytical approach or theoretical framework are often lacking. Box 2.1 has outlined key points to consider both at the design stage of public engagements and during analysis of the evidence generated. Clearly, there are resource implications in ensuring that social scientific methods are consistently and rigorously applied. A question might legitimately be asked as to whether the standards of rigour demanded in academic research are necessarily appropriate in every public engagement exercise. This will have to be judged pragmatically, on a case-by-case basis but awareness of quality standards applied in the best academic social science provides a baseline against which such decisions can be made.

Accumulated expertise on public engagement plays an important role in developing appropriate practices. However, different views were expressed in the expert discussions about professionalisation in this field. Some saw it as a positive development, acknowledging that specialist skills and experience are required: '[Engagement] is a professional practice – it needs resource to do it well and it needs to be recognised as such'. One expert expressed concern that 'knowledge on how to commission and manage public engagement work has been lost in public bodies', emphasising the importance of professional engagement bodies, while another stressed the need for consistent and well-developed skills: 'how we go about engaging and the ways people's perspectives are framed and understood really matter and inform the policy outcomes that come as a result'.

A counter-concern is that professionalisation is associated with a trend towards standardisation in public engagement, though it might be argued that any such shift is as much a matter of resources and the types of engagement that are commissioned. Some involved in the delivery of engagement exercises felt that their expertise was undervalued, and challenged any thought that 'public engagement doesn't need much money to be able to operate and do well'. These arguments relate to concerns already mentioned that engagement is being done on a reduced budget, out-sourced to communications and marketing teams, and driven by funding constraints and narrowly-defined tendering requirements. Contrasting the current situation with that in the 1990s, one practitioner observed: 'we rarely get commissioned to do our best work' and 'now we never have £100,000 for public engagement activities. Budgets are down on what they were [and] invitations to tender very often tie our hands on what we can do'.

It is possible to address at least some of some of the criticisms advanced against contemporary engagement practices by attending to the resources required not only for engagement events themselves but also for training, building institutional capacity, forging research connections, and providing the expertise and time needed to undertake the full process well. Under-resourced engagements are more likely to become perfunctory, while engagement those that are well resourced can contribute to more meaningful and equitable exchanges with participants who offer their time and energy to discuss issues that may be central to their lives. Higher quality engagement would in turn enhance the prospects for building trust, advancing good governance and ensuring democratic accountability. Overall, it is clear that adequate resourcing for public engagement is crucial. But since resources are likely to remain limited, a key question to emerge for Defra is whether in future it should invest in fewer public engagement projects in order to generate higher quality results.

2.5   Public engagement, power and democracy

A fundamental rationale for public engagement is that it is a vital element of democracy – at least as seen by advocates of participatory and deliberative forms of democracy as opposed to more minimalist versions.[75] Questions then arise about how the democratic potential of public engagement might best be realised, in terms of institutional arrangements, empowerment of citizens, ways of thinking about and practising engagement, and connections between participatory and representative democracy. In conclusion to Chapter 2, we draw together key points on these issues arising from the literature, our expert discussions and the case studies.

Recognising that engaging citizens can strengthen democracy, the OECD (in its 2020 report focusing on 'representative deliberative processes' around the world) argues that public engagement should be institutionalised in the positive sense of becoming an embedded, sometimes legally required, component of governance.[76] Having identified a 'deliberative wave' building over several decades, the OECD sees this as 'the start of a period of transformation to adapt the architecture of representative democracy'.[77] Some bodies have also looked at public engagement through the lens of human rights,[78] seeking

to acknowledge and respect the rights of those who participate in or are excluded from such processes.[79] In the UK, as noted in Chapter 1, public engagement has become an expectation in many circumstances and is legally mandated in some. The 1998 Aarhus Convention, which includes public rights to participation in environmental decision making, was ratified by the UK in 2005.[80] Nevertheless, as discussed in this chapter, there remain substantive critiques of public engagement as currently conceived and practised. Problems identified range from asymmetries of power in specific processes through to broader concerns about the framing and conduct of engagement exercises and about their potential to enrich democratic debate and decision making.

All forms of engagement raise questions about inclusion and exclusion. As discussed in Section 2.3, it has long been recognised that some groups rarely if ever participate in institution-led engagements (or in wider public or political affairs), and concerns were also expressed during the review that participation is unstable and declining in some areas. Despite much attention, and ongoing attempts to include a wide range of social groups (and different geographical areas) in recruitment for engagement exercises, these issues remain stubbornly difficult to resolve. It is important to understand and learn from disengagement, recognising, as one expert put it, that 'non-participation is an act and the retraction of engagement is a statement'.

In a wider sense, power is recognised as an intrinsic component of public engagement, with asymmetrical power relations existing within and beyond particular engagement settings. It is well known that participants themselves exert varying degrees of influence during meetings, deliberation, and presentation of findings and proposals, inequalities that can be moderated by skilful facilitation and by using different approaches to engagement in combination. Power asymmetries can also be manifest in subtle ways and at various stages of the engagement process: in framing questions and setting agendas; in recruiting participants and experts; in analysing and interpreting findings; and in decisions about whether and how any findings should be acted upon. Such dynamics influence the quality and impact of engagement and can contribute to feelings of empowerment or disempowerment.

As discussed in Section 2.2, particular criticism has been levelled at what have variously been labelled tokenistic, perfunctory or 'tick box' exercises, whether consultative or deliberative, which seem to have little tangible effect. Such exercises can leave people feeling that, despite their participation, they have not been empowered, and that the process has been *un*democratic.

Even when engagements genuinely seek people's views to inform policy, participants can ultimately feel disappointed. This might be because divergent perspectives remain unreconciled and/or because genuine political or legal constraints on outcomes have not been transparent. These issues underline the importance of exploring and acknowledging disagreements (not always seeking consensus) and of transparency and honesty from the outset about the scope and possible outcomes of an engagement exercise. Disillusion cannot be always avoided but might be mitigated by early clarification of the ways in which

engagement processes will connect to wider systems of policy- and decision-making. Tracing such impacts, and providing feedback, can contribute to feelings of agency.

Some critics identify deeper democratic deficits within the overall approach to public engagement. A criticism frequently encountered in this review was that engagement is too fragmented, organised into a series of one-off, institution-led exercises focusing on specific issues. Such exercises, even if valuable in themselves, are not integrated into a bigger picture of engagement within a policy domain, and do not always (or obviously) make tangible, lasting contributions to democratic decision-making. Such objectives, it is argued, would be better served by adopting a systemic approach, with better connected, more continuous engagements within broad policy areas, building where appropriate on pre-existing, citizen-led initiatives.

A further criticism, arising particularly (but not only) in the context of science–policy issues, is that, contrary to the expectation that engagement will empower citizens, some engagement exercises have the opposite effect in depoliticising issues that are intrinsically political. A related concern is that engagements 'can be used subtly to build support for existing policies by not challenging dominant framings'.[81] Such views are reflected in the literature, were evident in several of our case studies, and were forcefully expressed by some participants in our expert discussions. One expert, for example, insisting on the 'deep and pervasive political nature' of public engagement, saw current practices as complicit in the erosion of democracy:

> 'Extant discourses, practices and institutions surrounding 'public engagement' are – whatever claims to the contrary might be made – quite fundamentally about providing a resource for those with an interest in politics-denial.'

In this view, despite the potential for public deliberation to contribute to the 'vital integration of science and society',[82] science–policy engagements in particular are too narrowly circumscribed in terms of issues that are deemed to lie within the frame, and fail fully to explore and acknowledge deep differences in values and worldviews. Such problems may not easily be resolvable if, as some have argued, powerful interests set the terms of the debate, and the direction of change in technological innovation is difficult even for individual states to control, let alone 'mini-publics' convened in time-limited exercises.[83]

Deliberative experiments relating to issues that transcend national boundaries are interesting in this context. For example, a Global Citizens' Assembly on Genome Editing, taking place in 2021–22, brought together 100 participants from different countries for a five-day deliberation on the global governance of genome editing, in which participants were able to ask questions of leading researchers, ethicists and genome editing stakeholders. The Assembly will report to the Secretary General of the United Nations and the Directors-General of the World Health Organisation and the Food and Agriculture Organisation.[84] (See also Chapter 3.)

Despite some of the difficulties discussed above, ways of building on positive experience and alleviating shortfalls in existing practices can be identified.[85] In deliberative processes, overly narrow definition of issues should be avoided and dominant framings should be

open to challenge; diverse views and values should be explored and different forms of reasoning allowed; and for all engagements, strong connections between participatory and wider democratic institutions should be forged and demonstrated, with honesty about the tensions and constraints that can arise in these relationships.[86]

The challenges presented by asymmetries of power in public engagement, by the requirement in some cases to involve transnational publics, and by the need 'to connect engagement back to democracy' may not be fully resolvable. They should, nevertheless, be acknowledged, continuously negotiated, and met as far as possible through a combination of well tested and more novel and experimental approaches, some of which have been outlined in this Chapter.

Chapter 3: Future prospects

3.1   Introduction

This chapter identifies (in Section 3.2) the changing context for public engagement, noting how populations have diversified; forms of communication and engagement have shifted with the advent of social media; and the issues on which people engage have tended to grow in scientific and social complexity. Section 3.3 focuses on changing infrastructures of engagement (the physical and technical facilities or structures through which engagement and participation occur). Comparisons of face-to-face and online engagement are followed with a discussion of possibilities for planning activities that make use of web-based media (moving all activities online; using pre-existing online data; augmented digital engagement). The concluding section (3.4) summarises reservations surrounding online engagement. Where issues are characterised by public division, or are complex and require sustained engagement, blending online and face to face approaches may facilitate wider engagement while offsetting the tendency to reduce that engagement to circumscribed transactions that fail to deal adequately with the issues at hand.

3.2   The changing context for public engagement

Public participation and engagement activities should be mindful of three current and interrelated trends:

1. A diversifying and increasingly fragmented 'public'.
2. Changing infrastructures for participation and engagement including a rapidly shifting digital and media environment.
3. A proliferation of environmental and other public issues that are multi-locational and/or trans-boundary, require rapid action, and are often characterised by far-reaching and permanent forms of uncertainty.

In relation to the first point, the UK is populated by a wide range of social and lifestyle groupings, with notable differences based on location (metropolitan, micropolitan, urban and rural), national identity, income disparities, access to economic assets, stages in the life course, cultures, religions, and structural and racial inequalities. As is typical in higher income countries, there is a range of categories and interest groups that transcend or intersect with socio-economic classes. Groupings can develop around specific issues (environmental quality, access to amenities, local hazards, affordable services, consumption-related and so on), occupational conditions, forms of injustice, gender, race and livelihoods. A recurring theme in this report is that there are numerous publics, with particular interests and diverse social, emotional and physical commitments, for example to places, histories and ways of life as well as to relationships with other people and environments.

Second, the last 15 years have seen an expansion and (albeit uneven) growth in access to interactive, digital and social media. In many cases this has started to change the ways in which people interact with one another and with government bodies. Potential effects include:

- An ability (for many if not all) to engage with and/or participate in online platforms and communities.
- An enhanced capability to contribute to and co-produce data and other information.
- Increased communication opportunities and potential exposure to issues that may be of local, translocal or global interest.
- An ability to voice opinions, to engage in discussion and to approve or disapprove viewpoints.
- An enhanced capacity to find like-minded people online, and a tendency for resulting groups or networks to generate content and mutual support of views and positions.
- A proclivity in some circumstances for views and positions to become strengthened and solidify within self-similar or relatively homogeneous online cultures.
- The ability of commercial and other bodies to access publicly shared views and data and in some cases to foment and or manipulate those groupings.[87]

This social media and digital landscape is continuously changing as a result of commercial as well as social drivers. Platforms cater for and are adopted by different groups and demographics. As a result, it may make less sense to talk about a single media environment, or one form of popular culture (or a single public sphere). There is instead a variety of media cultures, with people accessing various platforms with a wide range of motives and capacities (and with varying degrees of success and accessibility).

Third, many environmental and other public issues have causes and consequences that are translocal (connecting people in many places, and/or across time), with associated costs and benefits unevenly distributed. These issues, which include transboundary pollution, nuclear waste disposal, flood management, and responses to climate challenges and biotechnological innovations, are also likely to be characterised by a wide range of scientific and other forms of knowledge and opinion, conforming to 'post-normal science' issues.[88] The latter tend to involve issue-driven knowledge production, conducted in a context of political and social pressure, with disputed values, high decision stakes, and significant uncertainty in terms of the knowledge produced and the ethical consequences of action.

The combined result will be that a relevant public may incorporate a variety of communities, sometimes involving international and inter-generational groupings or ones that cover a range of sometimes conflictual standpoints. As noted in earlier chapters, public participation may, as a result, demand different approaches. Agreements and consensus are unlikely to be achieved through appeal to a single source, to 'the' science, or other 'external arbiters' (economic cost, ethical norms, conventional wisdom). And, given the time pressures within emergency or other pressing situations, it may be unrealistic to expect such agreements to form. In these cases, participatory processes may more profitably be turned to identifying issues where there is little agreement, where there is value in outlining dissensus rather than consensus, or where areas of compromise can be identified as the bases for generating solutions rather than seeking to achieve absolute agreement on a definitive answer. The processes involved in designating marine

areas for protection (discussed in the marine case study in [Part II]) involve some of these characteristics.

The emergence of diverse publics, various forms of digital engagement, the unevenly distributed capacity to voice concerns and opinions, as well as the post-normal and translocal complexion of many social and environmental issues, raise fundamental questions concerning the future of public engagement and participation. In the following section we explore how engagement practices can develop with these trends in mind. We focus on the role of digital forms of engagement and participation in part because these present some partial solutions as well as potential warnings concerning the issues that have been identified.

3.3 Changing infrastructures of engagement

In this section we focus primarily on the implications of a shift towards greater use of digital technologies, beginning with a comparison of face-to-face and digital formats.

The benefits as well as some of the challenges of face-to-face engagement exercises and participatory processes are summarised below.

Benefits of face-to-face engagement

- Useful to build trust
- Develops familiarity between attendees
- Enables facilitators to put people at ease
- Reduces pre-conceived ideas about experts or policy makers
- Encourages a dialogue that enables new questions to emerge
- Allows people the time and opportunity to listen and to change their minds.

Challenges of face-to-face engagement

- Can be exclusionary and inaccessible (meetings often occur in the evening, involve travel, require release from employed or care work, and the format assumes a degree of confidence to attend and speak in public)
- People with disabilities are frequently unable to attend or contribute within the conventional discussion format
- There can be a form of normalisation (and, to an extent, professionalisation) of participation, in that the same people or sectors of the population tend to participate
- The products of this participation or data might also be difficult to capture, particularly in large meetings
- The total number of attendees is often limited by the physical setting as well as the form of engagement.

The COVID-19 pandemic has accelerated a shift of many areas of life (from social gatherings and medical consultations to work meetings) to online formats. Benefits and challenges associated with online formats are summarised below.

Benefits of online engagement

- People no longer need to be co-located, or to travel to be part of engagement activities
- The activities can be both synchronous and asynchronous
- Information and data can be shared easily and co-manipulated by attendees
- Output data can easily be captured
- Numbers of participants are no longer limited by physical setting
- Participation may be wider in terms of location and demography, with enhanced peer to peer connectivity
- Assistive technologies can be used to enable those with disabilities to access materials and produce inputs.

Challenges of online engagement

- There is systematic exclusion of those who are not connected or where connections to broadband or stable and secure networks are not available
- There may be a relative lack of 'real' personal or collective investment in engagement (half-hearted, or less attentive engagement)
- There can be a tendency to re-produce or re-perform already established positions in a public debate without much censure
- There may be little opportunity to build bridges or generate trust as people tend to remain in their 'echo chambers', coalescing around particular worldviews (a tendency augmented by algorithms and platform architectures)[89]
- Relative anonymity compared to face-to-face participation may lead to 'crowd' behaviours (a feature of less self-conscious online behaviour that is apparent in issues of trolling, for example)
- Issues of security and data privacy may hamper engagement.

With these advantages and challenges in mind, we review four possibilities for increasing online engagement – moving conventional participation from offline to an analogous online format; using established online issue publics to generate participatory engagement; developing digital participation platforms and engagement activities; and using digital participation in translocal and postnormal science-in-society settings.

3.3.1 Moving offline public engagement to online

The COVID-19 pandemic resulted in many planned engagement activities moving to online formats (see Part II for case studies). Prior to this, there had already been some experimentation with online engagement. The general intention has been to substitute off-line processes with online equivalents. Experience of these online analogues (with bespoke software, or utilising communication platforms like Zoom) has been patchy to date, with some crucial lessons learnt.

The experience of trialing online participation in the Sciencewise-led[90] bovine tuberculosis public dialogue was somewhat unsatisfactory (see bTB case study, Part II). Participants were not networked with each other, and were asked to respond as individuals to pre-vetted materials. Their responses tended to be cursory, lacking in both sufficient detail and texture to enable proper social analysis. While this process could be scaled up to produce

the numbers of respondents that would allow for quantitative analysis of results, the effect and method was closer to a survey than a deliberative process. The latter would ideally be characterised as peer-to-peer debate and development of collective insights or clear areas of agreement or disagreement.

The pandemic-enforced shift to online participation within the National Food Strategy involved the contractor working to maintain engagement with participants between the phases of the engagement process, using the Recollective[91] platform to encourage members to stay in touch and to participate in online discussion forums. Over 70% of participants were retained in each location. Online discussion (on Zoom) used small breakout groups and allowed more time for reflection in order to allow for the change of format. The organisers ensured that all participants had access to a laptop, tablet or mobile phone, holding technology try-out sessions to help those who were unfamiliar with the online tools (Zoom, Mentimeter, Recollective) and checking for any camera, audio or broadband issues. A hard copy of stimulus material was also circulated in addition to online versions. (See food case study for further detail.)

In this analogous version of offline participation, ensuring reasonable parity of experience involved making sure the infrastructure was accessible and reliable. Even so, familiar stumbling blocks included questions of confidence in voicing an opinion, differences of positionality (by gender, age etc.), the difficulty in reading and use of visual as well as verbal cues, the process of turn-taking, and the analysis of body language and eye contact – all of which varied between online and face-to-face methods of engagement. Nevertheless, some participants reported that they preferred working online for a variety of reasons including more flexibility over childcare issues and greater confidence in contributing to break-out conversations.

3.3.2 Using pre-existing online data and facilitating lateral engagement

Online publics may be well-established around specific issues (issue publics) or may be more ephemeral and conform to 'ad hoc publics'.[92] The latter can form around temporary concerns or events, using 'hashtags' or other data tag, often in relation to a specific matter, campaign or public alarm. These emergent and pre-existing online groupings allow researchers and other engagement practitioners to characterise, review and engage with a grouping though participating in established networks.

Examples of this work include researching positions on bovine TB and cull policies, using social media posts (made up of many thousands of postings) as a dataset to characterise public groupings through a form of cluster analysis, and to analytically identify those areas (or points of coalescence) where seemingly opposed groupings might develop working agreements.[93] Similar treatments have been undertaken on food choices[94] and on the role of social media influencers within the digital foodscape.[95] Other researchers have used these initial characterisations of online publics to identify key actors (influencers, moderators, gate keepers and so on) who can then be approached offline.[96] This is an example of purposive sampling using already well-established networks. Ad hoc publics may be particularly important during crises or emergency events (for example flooding, disease outbreaks or food scares) and can be utilised as a means to gauge public

sentiment,[97] identify key actors or information hubs and initiate communications. Lateral engagement, or the process through which people and groups engage with one another on an issue or topic, may be enhanced in online fora.

There are substantial ethical debates concerning the utilisation of data that is publicly posted, but which has not involved any informed consent regarding follow up contacts or indeed utilisation in any research or policy reports. Government or researcher involvement in any process in which social media data is used to engage in debate or is seen to be targeting behaviours is clearly problematic (an example would be the use of social media profiles without consent to orchestrate political advertising[98]). The centralisation of unaccountable data accumulation, abstraction and behavioural manipulation require state regulation rather than active encouragement.[99] Nevertheless, if the aim of an exercise is to engage issue-publics (already formed groupings around a specific issue, be it a local risk like flooding or poor air quality, or a national controversy like an epizootic disease), then overt engagement with online groups is a potential first step in developing participatory activities.

3.3.3 Augmented digital engagement

A key area, particularly within urban planning, involves embracing the affordances of digital participatory platforms and digital, often geo-located, tools of engagement. These enable, it is often argued, enhanced G2C (Government to Citizen) and C2G (Citizen to Government) Collaboration. Examples include cloud-based platforms for deliberation, the production and curation of citizen generated data and alternative, people-centered, mapping of local environments.

Table 3.1 A select list of digital participatory platforms of varying design and intended utility

Digital participatory platform	Intended function
Accela	Promoting access to governments and engagement with services Access Accela
Bang the Table Engagement HQ	Community engagement software and platform Access Bang the Table
Block by Block	A gamified approach to building community planning approaches Access Block by Block
CitizenLab	A community e-democracy platform used by local government to engage citizens Access CitizenLab
CollaborativeMap, Free-Map, Zeemap	Allow users to update maps with information and data Access Zeemaps
Commonplace	Building community insights through a dashboard approach Access Commonplace
Crowdbrite	Planning engagement tool Access Crowdbite

Digital participatory platform	Intended function
Crowdgauge	An open-source visual means to rank projects) [Access Crowdgauge](#)
Dialogue Apps – e.g., Delib	An app for 'building online consensus' [Access Delib](#)
Platforma Digjtale	Digital platform based on municipalities and residential location [Access Platform Digitale](#)
Urban Interactive Studio	Planning tool for engagement with planning activities [Access Urban Interactive Studio](#)

Note: These examples have been drawn from the literature review and expert sessions, and should not be read as a list of recommended providers.

It is worth noting that many of these have in-built assumptions about the role and practice of engagement and participation. This may include the assumption that the aim is to generate consensus (Delib) or that participation is based upon particular traits or inclusion qualifiers (being a local resident or property owner). Other platforms can be more open in both design and function, and so lend themselves to bespoke projects, but they will in turn require more resource in terms of training and upskilling for users. The platforms share many of the same technological features that are the basis for citizen engagement and collaboration.[100] They include:

- Collection and sharing of ideas, solutions, and local knowledge
- Discussion and collaboration through opinion maps, surveys, commenting on posts, discussion fora
- Simulation tools (examples include budget allocations and 3-D design)
- Voting and ranking of ideas
- Dashboards that can be used to summarise and analyse comments, votes and general user activity on the platform.

Digital platforms may feature geo-located inputs for participatory mapping (e.g. comments, pins, and other geographical features),[101] presenting numerous opportunities for location-specific applications associated with smart cities and communities. Citizen science activities associated with generating air quality data through sensing devices are a case in point. Engaging citizens as data generators, using geo-located data-loggers, as well as the subsequent engagement of community groups with the data that they helped to generate, offer important ways in which blended or hybrid public fora can develop in this area (see air pollution case study in [Part II](#) and discussion of blended approaches below).

3.3.4 Online tools for translocal and postnormal issues

The extent to which online tools can be used to further engagement with transnational and translocal issues, and on issues that are characterised as 'postnormal', offers some promise in terms of linking groups across physical space and in terms of bringing together communities of practice (sharing interests, practices and experience) in virtual space. In

the climate emergency case, participatory engagement has tended to focus upon local efforts to improve services, to develop public licence to alter infrastructure and to discuss other forms of climate adaptation and net zero aims. The potential to co-develop strategies across international supply chains, or between urban centres, may be a future possibility. Engagement with biodiversity goals within the European Union has to date mostly followed a digital and deliberative analogue version of science cafes.[102] Meanwhile, the Global Citizens' Assembly on Genome Editing (discussed in [Chapter 2](#)), and the Global Citizens' Assembly for the United Nations CoP26 Conference[103] have both been facilitated through digital formats. These may help to demonstrate the capability to generate broader public engagement with the translocal aspects of contemporary science-in-society policy issues and environmental challenges. Nevertheless, there remains the fear that 'online processes could push people into more linear and binary thinking through voting tools, rather than seeking a nuanced understanding of other people's reasoning and values'.[104]

Barriers to further roll-out include internet accessibility, digital illiteracy, resistance to online formats and the digital divide. In addition, access for those with disabilities,[105] privacy, data security, data management, and institutional and departmental capacities to handle the volume of engagement activity and data are key concerns.[106] The temptation in online participation is to expand numbers (simply because physical constraints on numbers of participants have disappeared). Yet, there is a risk that increasing participant numbers merely serves to reduce the quality of and investment in participation and constrains responses to difficult issues. A surfeit of participants can very quickly lead to feelings of alienation and exclusion even when participants are ostensibly included. It may be that the personal and institutional capacity to engage in participation, data handing and the increased staff time associated with digital and online tools prove to be the most intractable of challenges to digital participatory platform use in future.

3.4 Concluding points: Blended approaches

Public participation and engagement have arguably moved from a concern with deficits of information and a lack of participation to a surfeit of public voices and information. A key question is how to generate genuinely meaningful forms of engagement in what is an already crowded public sphere, with limited scope for prolonged and undivided attention. Part of the problem and possibly some elements of a solution reside in the proliferation of opportunities or techniques for new forms of engagement.

Given this proliferation of voices and social 'non-coherence',[107] there is arguably an even greater need for slower forms of engagement, with more time for deliberation and genuine listening (and changing of minds) than was previously the case. These unhurried forms of engagement may be particularly difficult to produce in on-line formats.

The growth in capability for data capture (for example through digital traces or posts) from individuals and communities as they go about their daily lives – shopping, browsing, visiting sites and perhaps a myriad more interactions in 'smart cities' – poses a serious risk that public bodies and governments become too focused on transactional rather than

deliberative forms of citizenship. It is the latter, richer 'forms of contributions and engagement' that 'are fundamental to ensuring that new government projects and investments are accountable and responsive to citizens' needs and aspirations'.[108] The point here is that attempts to measure preference, or reduce social issues to a set of individual data points, takes us away from the necessary forms of consideration and debate, and the development of social knowledge. In a similar way, if online engagement becomes too 'transactional' it risks missing the key components of the normative, substantive and instrumental rationales introduced in Chapter 1.

It is unlikely that digital platforms will replace the higher-level role of and rationales for engagement, but it is likely that the affordances of enhanced digital engagement can produce 'blended' approaches in future. Designing these approaches, and attending to issues associated with access and capacities to handle and analyse data, will become a key part of public engagement practice. In all cases of blended or more digitally oriented practice it is important to emphasise that informed analysis of materials produced (data, conversations, other products) and the role of uneven power relations in setting the context for engagement and its content, are key but often overlooked. The latter may be particularly prominent in areas where people feel that state bodies are no longer the key gatekeepers or responsible bodies for an issue.

The digital domain does not offer access to a frictionless, conceptually unbiased, or 'theory-free' version of social data or knowledge (a common assumption in areas where access to large and wide data sets seems to reduce the need for deductive reasoning[109]). It requires careful handling and ideally needs to proceed in conjunction with conventional norms of participatory deliberation. The process of facilitating an independent co-generation of insights and concerns on pressing issues, in ways that do not systematically exclude and that involve a commitment to respond on behalf of those enabled to do so, remain key descriptors of good engagement practice. A guideline is that to realise the benefits of engagement and participation there is a need to engage not only with what people say, but what their expressions mean, why they say what they say and how it can change the ways in which policy is formulated. These are tall orders for any engagement activity, and the changing infrastructures of engagement require them to be kept at the forefront of any design strategy.

Chapter 4: Conclusions and Recommendations

4.1   Introduction

This chapter draws together the main findings of the Review and makes 20 recommendations. Our objective throughout is to highlight key considerations for those seeking to engage stakeholders and wider publics. We identify practices that should be enhanced or modified and areas requiring further attention and research. While aimed primarily at analysts, policy-makers and those seeking to organise public engagement within Defra, many of our conclusions and recommendations have a wider relevance beyond this particular context.

The chapter is organised in four sections, beginning (in section 4.2) with an overview of where we are now with public engagement, after decades of experience. We then summarise in turn our findings on diverse publics and representativeness (4.3) and on engagement practices and critiques (4.4). The final section (4.5) sets out key points about the processes that take place (not always sufficiently) after the public-facing elements of engagement exercises, including impact (and feedback to participants), evaluation and learning. Recommendations are grouped together after the findings to which they most closely relate. A single list of all 20 recommendations can be found in the Executive Summary.

4.2   Public engagement – where are we now?

The potential benefits of public engagement are widely recognised and there is often genuine interest among policy-makers in gaining insights from stakeholders and wider publics. Experience has shown that citizens are capable of addressing complex issues at different levels of governance.

Public engagement exercises organised or commissioned by governments and other institutions have become a familiar feature of the public policy landscape and much valuable experience has been gained in design, conduct and facilitation. We found evidence that well-conceived and skilfully conducted exercises can produce useful outputs and positive outcomes. They can also provide fulfilling experiences for participants and opportunities to contribute important and diverse perspectives to policy processes.

Although the term 'public engagement' is often understood in the sense of institution-led, invited engagements, it is important to acknowledge – and learn from – the multiple ways in which citizens choose to engage (or not) in democratic societies.

The nature of institution-led engagements varies widely. Since the late twentieth century there has been a partial shift from the 'top down' provision of information and (relatively limited) consultation towards approaches involving dialogue and deliberation. Long-established methods such as opinion polls, calls for evidence and consultations remain in frequent use, while deliberative approaches, such as focus groups, public dialogues and citizens' assemblies, have become increasingly familiar within the broad area of

engagement. Further important developments include involvement of citizens in the active co-production of knowledges, materials, strategies and environments; increasingly, for example, there are opportunities for people to generate, add to or engage with environmental data.

Each engagement format has advantages and drawbacks, often well documented. There are benefits to be gained from using different approaches in combination (with appropriate analysis and synthesis), depending upon the particular project.

Public dialogues and other deliberative forms of engagement have traditionally taken place in physical settings but developments in digital platforms and technologies have been rapid, and significantly accelerated by COVID-19. Purely digital engagement has advantages and disadvantages in comparison to face-to-face approaches. Hybrid (or blended) formats – with some activities in-person, some online – have increasingly been adopted and might turn out to be the most productive.

There is now extensive expertise on public engagement, reflected in a voluminous and growing academic literature and a significant degree of professionalisation. Our evidence suggests that the latter trend is seen as double-edged. On the one hand, professionalisation reflects the enduring significance of public engagement, attracts resources and skilled practitioners, and contributes substantially to the building of experience and expertise. The importance of skilful professional facilitation, for example, is widely cited and emerges clearly in our case studies. On the other hand, some critics associate professionalisation with standardisation of engagement practices and adoption of a relatively narrow range of methods. However, declining resources and tightly defined tendering processes might also be implicated in such trends.

Developments affecting public engagement have not been restricted to the theory and practice of engagement itself. At least as important have been changes over the past few decades in the social and knowledge landscapes that policy-makers face. These include fragmenting publics and social formations; the growing complexity of issues and associated knowledge controversies; challenges to the authority of experts; and a proliferation of means for people to connect with each other and with public authorities and private bodies.

Changing social, political and technological contexts, together with critiques of current practice, suggest that public engagement is in need of critical scrutiny and something of a shake-up if its considerable promise is to be fulfilled. Tightening resources serve only to emphasise this requirement.

4.2.1 Recommendations

1. Defra should reflect on, and reconsider, the nature, purpose and practices of public engagement. This re-think should involve a system-wide process across Defra's remit, with high-level oversight.

2. Greater effort should be made by those commissioning and designing public engagement exercises to work across and combine different formats and methods (with appropriate analysis and synthesis) in order to find the most suitable overall approaches for distinct publics and topics.
3. New infrastructures of engagement, including digital formats, offer considerable opportunities but need careful assessment and should not be treated as unproblematic, cheaper alternatives to in-person events. Ethical implications, including data privacy, merit serious consideration. Hybrid formats, combining in-person and online engagements, are promising and should be the subject of further attention and experimentation.
4. Those commissioning engagement exercises should ensure that agendas and tendering processes are not too narrowly defined, and allow scope for tailored approaches.

4.3 A plurality of publics and questions about 'representativeness'

It is unhelpful to conceptualise, approach or attribute views to 'the public' as a single entity. A considerable body of work shows that there is no singular public 'out there' waiting to be engaged. Rather, there are multiple publics, based, for example, around shared interests, practices or localities. New publics can emerge when 'ignited' by particular controversies and some are constructed in the process of engagement. Some publics are passive, or even disengaged.

Many publics – extending beyond groups that are typically recognised as stakeholders – are actively involved in self-organised (citizen-led) initiatives. Often these already work as effective engagement spaces which can have considerable momentum. There is much to be gained by mapping such engagements and forging links with existing groups in appropriate circumstances (see also Section 4.4).

Important questions arise about 'representativeness' – whether and in what sense publics who are engaged in various ways can be claimed to be representative of a wider population. This would be the aim in an opinion poll when canvassing a statistically representative sample of a particular population. Often, however, participating publics are not representative. Respondents to consultations and calls for evidence, even if numerous, are self-selecting. In deliberative exercises, numbers are necessarily small, participation is ultimately voluntary, and even carefully recruited mini-publics (which aim to be representative in various ways) may be rendered less representative by the experiences of learning and deliberation in the engagement process. Publics that coalesce around particular interests or issues (who may also be active in responding to consultations and calls for evidence) are unlikely to be representative of a wider public but nevertheless can be considered as key informants and/or spokespeople for a particular and possibly highly relevant set of concerns.

In short, diverse publics are not easy to represent. It is difficult to have sufficiently large numbers and at the same time explore issues with the depth and quality of analysis that are needed. If pursued and interpreted uncritically, 'representativeness' can be over-emphasised in engagement at the expense of interrogation of the issues involved and in-depth analysis of qualitative data.

4.3.1 Recommendations

5. Those designing, organising and recruiting for public engagements should work to ensure equitable and pluralistic approaches to participation. Care should be taken to address the diversity of publics, including groups that might be under-represented or excluded. Choices should be justified in the engagement plan.

6. There is a need for greater awareness of community-based and other pre-existing engagements. This could be acquired, for example, through mapping exercises to identify issues, controversies, active groups and stakeholders. (See also recommendation 11.)

7. 'Representativeness' in the context of public engagement merits renewed critical scrutiny. This should include careful consideration of the circumstances and senses in which participating publics can be considered representative (or not) – and of whether and when representativeness is an appropriate aim.

8. Given the complexities of representing diverse publics, those who analyse the data from engagements and present the results should exercise caution in extrapolating findings into assertions about the views of 'the public'. It will often be more meaningful to represent divergent positions and not to go in search of one averaged view.

9. The perspectives of issue publics and other 'minority' groupings should not be dismissed or de-legitimised on the basis of numbers (for example, on the grounds that such views are expressed by 'a small minority'). Rather, these views should be considered within the landscape of concerns around an issue or debate.

4.4   Practices and critiques

While the practice of public engagement has in many ways evolved and matured, there remain substantial critiques of the ways in which engagement exercises are conceptualised and conducted. Lessons from past experience have not always been taken on board, nor is it clear that successes have systematically been built upon. Shortcomings in contemporary approaches, and in some cases deeper structural flaws, have been identified in the literature and were reflected in our expert discussions.

As noted above, different formats for public engagement have their own specific advantages and shortcomings. More generally, critics have argued that public engagement too often involves one-off, routinised exercises, focusing on specific issues within a given policy area. Our evidence points to a strong case for a more systemic approach, involving a broader perspective on engagements within (and even across) policy domains, connectivity between different exercises, and greater continuity over time. It would also entail working with and building upon pre-existing, citizen-led engagements, (while being mindful of the need to justify specific links and the importance of understanding a range of different perspectives). One benefit of connecting with existing groups is that they might be well placed to sustain initiatives after specific engagement exercises have concluded.

A further concern is that some forms of engagement have become perfunctory – routinely conducted but having little tangible effect – and are therefore seen as 'tick-box exercises' or 'talking shops'. An associated risk, given the new possibilities of digital platforms, sensors and other interactions, is that governments and public bodies become too focused

on transactional engagements with citizens, where the emphasis is on exchange of information (or, increasingly, personal data), rather than deliberation. Opportunities for deep engagement with the issues at hand might be lost, with diminished prospects for generating shared meanings and understanding differences. This could lead to low levels of investment in, or ownership of, a given issue, and would be a particular loss when engagement is sought to help achieve longer term social change (for example, in relation to food systems or net zero objectives).

Some critics argue that even well organised exercises fail to empower people to participate meaningfully in policy- and decision-making. In part this is because the role of such processes within the wider system of representative democracy is not always clear. It is also a function of unequal power relations, which are inherent in processes of public engagement. They can be present, for example, in the framing of engagement exercises, in the selection of experts and information, and in processes of recruitment, facilitation and interpretation of findings.

As has long been recognised, there are also imbalances of power between individuals and groups who participate. The loudest voices can often dominate, and what people say (and don't say) may relate to the internal dynamics of the setting and to relationships between key actors or stakeholders within and beyond meetings. Some views may be suppressed, and a diversity of perspectives lost as a result. Imbalances of power can be mitigated by skilful design and facilitation, but not eliminated entirely, so it is important to be aware of and where possible account for their implications.

The representativeness of publics involved in engagement has been discussed in Section 4.2. There are also important questions about the representativeness of process. These concern, for example, the extent to which deliberation within a particular engagement corresponds to the ways in which the issues might be discussed and made sense of in wider settings, and how far participants bring widely held cultural meanings to the events and meetings. These issues need careful thought, in particular when analysing data and interpreting the findings of an engagement process.

4.4.1 Recommendations

10. Defra should aim for greater connectivity and continuity of public engagements within (and where appropriate, across) its policy domains, setting individual exercises in a wider context. There should be oversight of engagement plans at policy level, looking several years ahead.
11. Those planning public engagements, should devote more effort to working with pre-existing initiatives rather than always embarking afresh on engagement exercises. Linkages should be clearly justified and the overall engagement plan should ensure that a plurality of perspectives is included (see recommendation 5).
12. Unequal power relations should be recognised as an intrinsic aspect of public engagement, requiring awareness and mitigation. Those conducting and documenting engagement exercises should pay attention to who gets to speak in different settings, whose voices are heard and whose are marginalised or ignored. In data analysis, power inequalities should

be kept in the foreground, to aid understanding of the perspectives from which different views are expressed.

Public engagement can be counterproductive when it is tokenistic or motivated by rationales that differ from those that are openly stated. Getting these things wrong can lead to cynicism and disillusion, and can undermine public trust in a lasting way. Transparency and clarity about rationales and processes (whether consultative, deliberative or actively co-productive) are crucial. Participants need to know why they are being engaged, what to expect during the engagement process, and what might happen afterwards in terms of analysis, findings, outputs and the kinds of *outcomes* that might, or might not, be possible. This helps to clarify the connection between participatory and representative democracy.

What lies within or outside the frame in an engagement exercise significantly affects its meaning. While there is a need for clarity about purpose and process, as argued above, circumscribing the scope and potential outcomes of engagements too narrowly is seen by some as a serious failing (and indeed as a particularly potent way in which power can be exercised). This might include, for example, focusing on the downstream impacts of an emergent technology rather than on wider social and ethical issues raised by its possible development.

Another key question concerns the extent to which it is feasible or desirable to reach consensus. It is important to draw out, and understand the basis for, divergent perspectives as well as exploring any possible common ground. In fields where participants are highly vocal and the issues have already been articulated in public, the ambitions of citizen dialogue need to be more than simply 'giving voice'. In a space saturated by social media, the need is rather for more exacting social analysis and generative engagement or conflict process management.

An important message to emerge from our evidence on processes of public engagement is that an emphasis on the quality of engagement, with approaches carefully considered in relation to the purpose of the exercise and the nature of the issue, is preferable to the pursuit of disparate engagement efforts that might have little lasting effect. Public engagement should never be treated as a perfunctory task. Instead, projects should invest in genuine and robust exchanges with diverse publics, with the overall aim of strengthening participatory democratic governance.

4.4.2 Recommendations

13. Those commissioning engagement exercises should reflect upon, and be open about, their (sometimes mixed) motivations for doing so. Questions to ask include: Are we doing this because 'we have to'; 'because public perspectives on this issue will make for better policy'; 'because we hope to persuade people that what we plan to do anyway is a good idea'?
14. While clarity about process is crucial, the remit of dialogues and other events should not be overly constraining in terms of questions that can be raised, issues discussed or recommendations made. Where there are genuine constraints relating to policies, programmes or legislation, those commissioning engagement exercises should be honest

about these (and why they exist), so that participants are aware of constraints from the outset.

15. When consensus is not a realistic or even an appropriate objective of stakeholder and public engagement, differences (and their roots) should be reported, analysed and acknowledged, and other ways of taking matters forward sought. This might, for example, involve spatially differentiated solutions, conflict management or compensation for those whose interests are adversely affected.

Analysis of qualitative data (including texts, images and other outputs of the kind produced in public dialogue and deliberation) demands a particular set of analytical skills. Requirements include, for example: i) the art of listening – and *hearing* what is being said beyond specific utterances, as well as interpreting silences; ii) greater transparency about recording, transcribing and coding (for example, are all conversations and other outputs transcribed and available?); and iii) avoiding quasi-statistical inference about wider publics. Although well developed in the social sciences, such skills have not always been deployed to the full in public engagement exercises, undermining the authority of the analysis. Reporting of public dialogues, for example, has often been descriptive with a leaning towards quantification ('most participants felt this', 'a minority expressed concern that …') rather than based on close attention to what was said, how it was said, and which arguments were influential or marginalised – all of which are important considerations in interpretation of the findings.

The institutional compulsion to demand scientific and representative norms, and to quantify responses as a means to achieve these, might, in some circumstances, produce work of limited value and use. There is a cross-departmental need to understand the quality and values of rigorous qualitative work and analysis, and to develop means to incorporate this work into policy processes without assuming that it violates principles of fairness and political neutrality. This might require something of a cultural shift and initiation of informed discussions across the organisation.

Sufficient resources and staffing for sustained engagement and for links with policy and practice are essential. Public engagement is often resource intensive, as evidenced in the literature, case studies and expert discussions, though costs may still be modest in the context of overall project budgets. Some experts expressed concern that resources for engagement exercises have been diminishing. Other issues identified were finite capacities for commissioning and analysis, and potential 'engagement fatigue' on the part of citizens.

4.4.3 Recommendations

16. Existing social scientific expertise in analysis of qualitative data from public engagement exercises should be used more consistently and effectively, with appropriate training if necessary.
17. To demonstrate a robust commitment to public engagement, organisations like Defra should make sufficient resources available or modify their ambitions. Importantly, budgets should include resources for the training of government personnel and others involved in

commissioning, analysis, and interpretation and application of findings. Engagement plans as outlined above (recommendation 10) should contribute to resource efficiency by specifying an exacting procurement process and prioritising high quality, connected and continuous engagements over more frequent, routinised exercises.

18. Defra should consider development of an in-house Public Engagement Unit. With support from the Defra SAC/ SSEG, such a Unit could be a useful cross-department investment to help ensure that commissioning, procurement and delivery processes are cost-effective and fit for purpose.

4.5   Impact, evaluation and learning

In shaping engagement practices, the processes that follow specific exercises deserve as much attention as 'front end' activities (such as design and recruitment) and the conduct of events themselves. These later processes certainly merit more attention than they currently receive. They include the application of findings, identification of impacts, feedback to participants and longer-term evaluation and learning.

Insufficient attention has been paid to those on the receiving end of the outputs of public engagements, including policy-makers, regulators and other institutions. The analytical and 'listening' capabilities of those who need to interpret what emerges (who may also have commissioned or organised the exercises) have received relatively little scrutiny, as has the scope for organisations to take account of and act upon the findings (a point that relates to the 'missing link' between participatory and representative democracy discussed in Chapter 2). The rise of digital forms of engagement, and more open access to engagement exercises, will present further challenges. One implication is that there will be more demands on resources; another that clear boundaries will need to be agreed prior to launching a programme of public engagement.

Engagement exercises have been extensively studied and some have been formally evaluated. Such analyses, especially in the case of evaluation, have typically taken place in the immediate aftermath or within a year or two of the events themselves. The emphasis in evaluation has tended to be on functional questions (important in themselves) such as numbers involved, outputs produced and whether commissioners and participants found the exercise useful. Less attention has been paid to wider, longer-term issues such as the lasting effects on participants or incorporation of findings into working practices, departmental approaches and policy formation. Indeed, there is little ongoing, longer-term evaluation of engagement exercises, whether individually or as a whole (across a department or policy domain, for example). When combined with rapid organisational change and limited institutional memory, this short-termism makes it difficult to retain and take on board valuable information already generated and to evaluate public engagement efforts. Until there is a culture of monitoring and recording impacts (as is routinely required of universities for research assessment exercises), opportunities to learn from and build upon past experience will continue to be missed.

Partly because of the limitations of evaluation, it is difficult to trace and assess the *outcomes* of public engagements beyond any immediate and tangible (but not necessarily durable) effects. Important but diffuse outcomes, such as changes in what is 'thinkable', are especially elusive, and 'upstream' engagement (intended to influence strategies and policies at an early stage) presents particular challenges. It is legitimate to ask what has been (or might be) achieved by upstream engagement in the context of 'ubiquitous' techno-scientific developments – those that are taking place widely and rapidly across different countries and cultures. Advances in digital engagement may offer interesting possibilities in such cases, as with the Global Citizens' Assembly on Genome Editing in 2021–22. These issues have implications for engagement practice and also for research agendas.

4.5.1 Recommendations

19. Concerted efforts should be made to ensure that information and lessons from particular exercises, and from wider experience with public engagement, are not lost. This requires maintenance of 'paper trails' for individual exercises as well as co-ordination within (and across) policy domains to build an evidence base that allows for considered, long-term evaluation of impacts and outcomes.
20. Where engagement processes have material effects on policy, this impact should be explicitly acknowledged, with evidence, in any subsequent policy documentation and where possible in feedback to participants. This is important for generating confidence and buy-in to engagement processes.

PART II – Case Studies

5. Air Pollution and Public Engagement

5.1   Introduction

Air pollution is a significant environmental problem that is attracting growing public interest and concern. In the UK, estimates of deaths due to air pollution range from 28,000 to 40,000 every year.[110] Many more people experience negative and chronic health effects, ranging from asthma to stroke. In December 2020, the London Inner South Coroner's Court concluded that the nine-year-old girl, Ella Roberta Adoo Kissi-Debrah, died of acute respiratory failure, severe asthma and air pollution exposure. This landmark decision concluded through a second inquest means that air pollution can now be recorded as a cause of death.[111] Air pollution is increasingly understood to have deleterious effects on health for many people in the UK and beyond, with the *Lancet* noting that air pollution causes the deaths of many millions of people worldwide.[112]

5.2   Rationale(s) for public engagement

Within this broader context, citizen initiatives have emerged that involve monitoring air quality, proposing environmental interventions to curb emissions, and developing reports and policy to guide medium- to longer-term actions in this area.[113] These forms of engagement can identify pollution in overlooked areas, create more democratic solutions to pollution, and co-create principles for addressing pollution over longer time spans. This case study looks at three London-based examples of public engagement in air pollution, including the Citizens' Assembly on Air Quality in the Royal Borough of Kingston upon Thames (RBK); the Citizen Sense research group in Southeast London; and the Mapping for Change social enterprise in the City of London.[114] Air pollution is a significant problem in London, with 8,000 to 10,000 of annual attributable deaths due to air pollution being in the capital.[115] However, air pollution is an issue that affects cities throughout the UK, with many cities (including, for example, Leeds, Manchester, Sheffield and York) having annual average levels of pollution that are worse than those in London.[116] Industrial areas and ports (such as Port Talbot and Southampton) also suffer from poor air quality. In other words, while some 25 per cent of attributable deaths due to air pollution are in London, 75 per cent are in other areas of the UK, clearly demonstrating that air pollution is an environmental threat that is not only specific to London.

This study focuses on case studies in London as there is a concentration of public engagement activity focused on air pollution there, but these approaches to public engagement could readily be adopted and adapted to other regions in the UK. These are also case studies with which one of the authors of this report[117] has familiarity due to her involvement in the form of expert contributions (RBK Citizens' Assembly), leading a study (Citizen Sense), and holding ongoing dialogue with aligned studies (Mapping for Change). With each of these three public engagement exercises, the momentum for public engagement came from different actors. The RBK citizens' assembly was a council-led

initiative conducted with Involve, a UK public-participation charity active since 2003 in a wide range of governmental, academic and third sector projects to improve democratic decision-making.[118] The Sortition Foundation further contributed to the organisation of the citizens' assembly through the use of sortition, or random selection, with the aim that participants would be representative of the Kingston upon Thames community. During Kingston's Environment and Sustainable Transport Committee meeting held on 25 June 2019, the council agreed to declare a climate emergency. The borough has a goal to become climate neutral by 2038, and has developed a number of projects — including improving transport and planting trees — to meet these targets. The Citizens' Assembly on Air Quality was then part of this broader remit to improve Kingston's environment, which informed the aims and objectives of the public engagement exercise.

By contrast, the Citizen Sense research group based at Goldsmiths, University of London (and now the University of Cambridge), developed as an academic research initiative to investigate how digital technologies such as air quality sensors can contribute to more or less participatory engagements with environmental problems. Citizen Sense initiated the public engagement exercise, but then undertook collaborative and open-ended research with residents of Deptford and New Cross in Southeast London to monitor air quality with digital sensors. The research group first identified communities involved in monitoring environments and met with them to discuss and document their existing practices and environmental concerns, and then developed workshops and walking events to deploy sensors, collect data, and meet with communities to establish how to use and interpret data in relation to their ongoing projects. The focus of the research was to establish a grassroots approach to monitoring air quality in the area that could support ongoing initiatives. While there has been some speculation about the relative accuracy of air quality sensors, these devices have developed rapidly to become much more accurate and pervasive. International conferences, governmental initiatives, and environmental justice campaigns study, develop and use low-cost environmental sensors to establish where and when pollution is occurring.[119] Most notably, these sensors have become crucial for mapping pollution from wildfires and urban pollution. This is especially evident with PurpleAir and IQAir – sensors that are available for around £200 per unit and that provide an accessible data infrastructure for users to view and interpret data collected without the need for expert input.[120]

In a related but different register, the Mapping for Change social enterprise based at University College London (UCL) operates as a citizen-science initiative, with the stated remit of measuring and mapping environments with publics, often by working within programmes funded by local governments. Mapping for Change has undertaken multiple projects in this way, but one notable example is 'Science in the City', an air-quality monitoring project commissioned by the City of London and in collaboration with participants from the Barbican Association. Mapping for Change initially developed this air-quality monitoring study primarily using diffusion tubes (an analogue monitoring technology) over the course of a year in 2014. Mapping for Change was again commissioned by the City of London in February 2021 to run a follow-up study of air quality that involved collaborating with residents at the Barbican and Golden Lane Estates.[121] These residents' associations are highly active in organising environment-

related initiatives. Given the relatively higher levels of pollution in this area, the City of London is very engaged with developing measures for addressing air quality issues. The City of London has also been successful in obtaining Low Emission Neighbourhood (LEN) funding, a scheme co-organised by Transport for London (TFL), the Greater London Authority (GLA), and London boroughs to improve air quality and promote sustainable living.[122] However, the LEN required match funding from boroughs and the private sector, so one initial criticism of this scheme was that it was at the time generally only viable for wealthier areas such as the City of London.

RBK Citizens' Assembly on Air Quality, 2019. Source: [The Royal Borough of Kingston upon Thames and Involve 2020, Kingston Citizens Assembly on Air Quality, Full Report](#).

5.3 Characterisation of 'public(s)' involved

Publics involved in these three different air quality actions ranged from representative samples of wider publics to civil society groups, place-based communities and issue-generated publics. The RBK Citizens' Assembly comprised a group of 38 randomly selected citizens, who were meant to broadly reflect the population of the borough. The Sortition Foundation originally ran a civic lottery that involved sending invitations to 7,000 households in the RBK. Households could register their interest in participating, with the Sortition Foundation then recruiting 40 members for the assembly. Thirty-eight members between the ages of 17 to 79 eventually took part in the entire event, which lasted two weekends. Assembly participants were given a £300 gift voucher and were paid for travel expenses. The demographic makeup of the assembly members skewed older (by over 9%), toward C2DE socioeconomic groups (by 3.6%), and toward groups that walk and cycle (by 4.6%), suggesting that participants may have been somewhat self-selecting

publics interested in the issue of air quality, or in some cases might have been attracted by the gift voucher.

By contrast, the Citizen Sense research group worked with place-based communities, civil society groups and publics concerned about air pollution as indicative of broader problems in the urban environment in Deptford and New Cross. This area in Southeast London has higher levels of C2DE and BAME residents, with over 46% of the population consisting of BAME groups. However, BAME groups are not necessarily the primary groups involved in environmental monitoring, even though they may be most affected by it due to the spatial disparity of where pollution sources are located in relation to housing, community centres, and work places. Multiple communities were already monitoring environments as part of larger initiatives, with groups monitoring air pollution using diffusion tubes to protest the Thames Tideway 'super sewer'; heritage groups counting traffic to address rat running in historic areas; communities monitoring noise near construction sites; and parks and amenities groups mapping green space and biodiversity to bid for further resources in the area. Residents also expressed concern about potential pollution from the nearby SELCHP incinerator, the major A2 thoroughfare that connects to the Channel Tunnel, and the ongoing densification of the area through new construction primarily for high-rise housing. Citizen Sense researchers (who included a member of the Task Group for this Review as Principal Investigator of the project) initially met with, interviewed, and learned from these groups, and then used snowballing techniques to meet additional residents. Through a workshop and walk, Citizen Sense introduced digital air pollution sensors for residents to install and test. Approximately 40 residents and participants were engaged with through this process, and 20 air-quality sensors were installed in locations across Southeast London. Additional stakeholders became involved in the process, including Lewisham Councillors and Environment and Health Protection Officers, Ward and Local Assembly organisers, atmospheric scientists, and Assembly Members from the GLA. There was some 'expert' contribution from two atmospheric scientists to develop methods for interpreting citizen data, as well as the likely sources of air pollution. However, the remit of the Citizen Sense project was to research to what extent low-cost sensors could be readily used by citizen groups for understanding and acting on environmental problems.

During its 'Science in the City' project, Mapping for Change primarily worked with the Barbican Association, a highly active place-based community which engages with environmental issues ranging from biodiversity to transport and air pollution. Residents at the Barbican are generally from more advantaged socioeconomic groups, and can have higher levels of educational attainment and experience of working in managerial professions. While the 'Science in the City' report does not provide exact data on numbers of people involved with the monitoring study, diffusion tubes were installed at 69 sites across the Barbican.[123] The initial setup of the study and eventual findings were communicated to residents' association meetings. A few key organisers from the residents' association played key roles in organising and motivating participants.

With these different forms of public engagement, participants can become more or less involved in environmental topics in an ongoing way. Because of the random but representative composition of publics that characterise the citizen assembly format, it is

difficult to gauge the extent to which publics become engaged in air quality beyond the assembly event. While the assembly members put forward an extensive and rich range of proposals for how to improve air quality in the borough, their potential involvement in these ongoing and longer-term activities is not clear, and could be limited to the two weekends. This suggests that the assembly method could usefully be combined with other engagement formats if longer-term participation is required.

In a different format, the Citizen Sense approach worked with community groups and residents already engaged in environmental monitoring, where inevitably their self-directed activities continued beyond the research collaboration. In some cases, the citizen data that participants collected supported community initiatives through providing additional evidence for reports and funding bids. In other cases, residents used the data to support campaigns to preserve green space, which were not always successful. Similarly, Mapping for Change worked with a pre-existing residents' association that is highly active in engaging with the local environment. Some members of this group continued to engage in different and new air quality initiatives in the Square Mile, including a City in Bloom air quality gardens project. These air quality gardens provided demonstrations of plants that are particularly effective at capturing and absorbing air pollutants, thereby providing some bioremediation of air pollution.

While a broad cross-section of publics and stakeholders have contributed to these three different initiatives, industry stakeholders are generally less present in the engagement activities. Air-quality experts presented material to the RBK citizens' assembly, but very few of these presenters were based in industry and nor did they typically present solutions from an industry perspective. Citizen Sense did reach out to construction companies in the Deptford and New Cross areas to inquire about their participation in the monitoring study but the research group received no replies or expressions of interest. At a later date, Citizen Sense engaged with the Cross River Partnership (CRP), a non-profit initiative to join up industry with local government to find solutions for addressing air pollution.[124] However, this exchange between Citizen Sense and the CRP did not involve interaction with publics. The 'Science in the City' report from Mapping for Change does not provide an indication of how or whether relevant industries were involved in the study, or whether they changed their practices on the basis of the citizen monitoring findings. However, the Barbican Association has been active in engaging with construction companies undertaking major works on the perimeter of the estate.

**Citizen Sense. Deptford workshop with air quality sensors (the Dustbox), 2016–2017. Source: Citizen Sense**

5.4 Approach / methodology

Given the variety of public engagement formats, the methods of these three examples present different approaches to participation. In addition to the sortition method described above, the RBK undertook a process of wider stakeholder engagement prior to the citizens' assembly. The council collected ideas for improving air quality in the area through an Air Quality Forum, a Let's Talk engagement portal, and 'ideas trees' located in community spaces. In addition, for one month from September to October 2019 the council held an open call for evidence and suggestions on air quality, which informed which experts and topics were included in the assembly. The citizens' assembly event was held as an intensive face-to-face workshop on two weekends in November and December 2019. Groups of approximately 7 to 9 people were clustered at different tables and set up with writing materials and flip charts. Various staff members from the council, Involve and Sortition contributed to chairing the event, and technical staff assisted with recording the expert videos for posting online. Experts presented material relevant to air quality for the assembly members to consider, and members asked questions of experts to query or clarify points. A member of the Task Group for this Review was among the experts who presented information about air quality and urban space. Assembly members then worked together on the basis of the information heard to put together proposals for how to improve air quality in the borough, which were voted upon and captured in the final report published on the RBK website and adopted by the council.

The Citizen Sense research project undertook its recruitment by first contacting people and community groups that were active in environmental monitoring. The interview and fieldwork process then followed with workshops and walks, as well as interactions with

local institutions including the Deptford Lounge library, where air quality monitoring toolkits were available for checkout. The modes of engagement were hybrid, and involved face-to-face events and meetings, the use of digital platforms and toolkits for collecting and communicating data, emails, social media, and online meetings. Altogether, the research and public engagement took place over the span of 18 months, with the core monitoring activity concentrated in 10 months. Repeated workshops were held throughout the public engagement to ensure a robust co-design process. However, once air quality monitors were in place, the participation was ongoing but relatively low level, with occasional visits or emails to check in on the status of devices. Interim workshops were held to assess findings from the citizen data, and a pre-launch event was held to finalise the data stories in which citizen data was collected and communicated. Using a software package, 'openair', developed by atmospheric scientists, the Citizen Sense team was able to build a data analysis toolkit that allowed citizens to establish whether air pollution events were regional or local, and whether they could be due to high humidity or other weather events. Analysis of the public engagement was also varied and iterative, and included analysing monitoring activities, workshop formats, stakeholder connections, citizen data findings, and possibilities for communicating findings to regulators and policymakers. In many ways, these forms of public engagement took place within more experimental registers, as mentioned in Chapter 2. Particular approaches to participation unfolded in response to distinct issues and findings in a contingent way that could adapt to community interests and concerns.[125]

Mapping for Change developed its 'Science in the City' project with the City of London and the pre-existing Barbican Association. Recruitment took place through the association meetings, newsletters, and word-of-mouth exchanges within the Barbican Estate. Exercises involved face-to-face meetings and installation of monitoring kit, and circulation of findings through online exchanges and documentation. The installation of diffusion tubes, and parallel monitoring of particulate matter with the use of a Sidepak during select walking activities, formed the central engagement activities. In this sense, the public engagement consisted of a defined citizen science project, organised and overseen by Mapping for Change, together with several key organisers in the residents' association. The monitoring was ongoing but typically low-level participation over nearly one year, which involved installing and collecting diffusion tubes for analysis. Publics contributed primarily as data gatherers, who then received the results of their monitoring through laboratory analysis of the diffusion tube samples, and a final report that collated findings across the monitoring area. The engagement exercise was designed and led by Mapping for Change, who provided communities with the means to undertake air quality measurements, but with expert analysis and final reporting provided by the social enterprise.
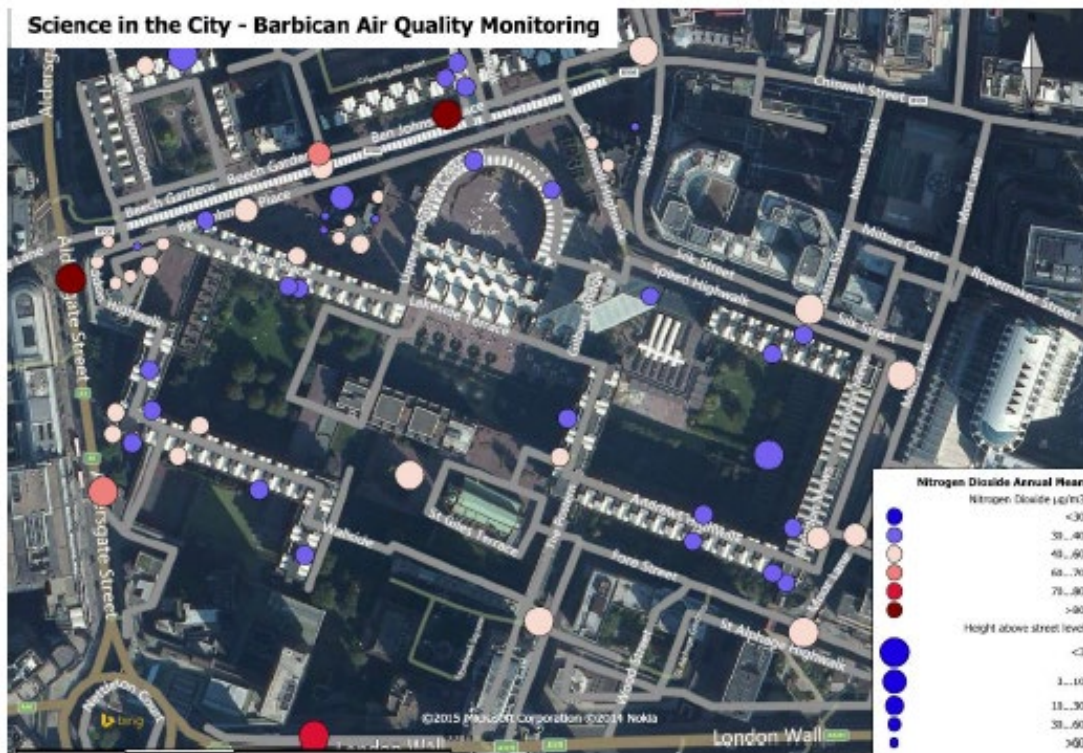
Mapping for Change. NO$_2$ levels from air quality monitoring, 2014-2015. Source: Francis, L. and Stockwell, H. 2015, Science in the city: Monitoring air quality in the Barbican, Final Report, London: Mapping for Change.

5.5   Outputs and outcomes

Outputs across the three examples compared here took the form of reports, films, data, data stories, policy recommendations, peer-reviewed articles, digital sensors, toolkits, community-led funding proposals and air-quality gardens, some of which are described in more detail below. The primary outputs from the RBK citizens' assembly consisted of a report and recommendations for improving air quality in the borough. The report, along with videos from the expert presentations during the assembly, are available on the council's website and on its YouTube channel.[126] The report and citizens' assembly processes were overseen by an advisory board of atmospheric scientists, air quality practitioners and experts, which was responsible for ensuring the accuracy of the expert materials. The advisory group met three times, and commented on assembly materials and draft speaker lists through remote correspondence. The materials from the citizens' assembly were published after the event as a finalised document, rather than as an ongoing text to which further recommendations could be made. The report from the RBK citizens' assembly clearly provided a set of recommendations that could inform policy framing, but it is perhaps too early to determine the extent to which these recommendations could shift policy for the medium and long term. The citizens' assembly recommendations could prove to be more or less feasible, and the broader infrastructures, investment and support needed to realise these recommendations would be crucial to consider. This raises the question of what mechanisms would need to be in place to

ensure citizens' assembly proposals are adopted, and what proposal formats can be most readily or effectively implemented. The report notes that assembly members recommended measures for continuing engagement with a broad range of stakeholders. However, it is unclear whether there are plans to develop more sustained public engagement measures that link with the recommendations from the assembly.

Citizen Sense developed somewhat more iterative and open-ended materials to which publics were continually contributing. The digital sensors deployed by the research group contributed to growing data sets, which became the basis for Deptford Data Stories.[127] These Data Stories, available online and in print form, documented the findings from the citizen monitoring activities, and put forward community-led proposals for how to act on citizen data. The research group authored multiple publications, including peer-reviewed articles documenting findings from the public engagement exercise.[128] Presentations of the public engagement exercise were also made in academic, cultural and civic, as well as governmental settings, including to local assembly meetings, community groups and council summer fairs. Participants took up the findings from the Data Stories to support successful funding bids, including to the TFL Liveable Neighbourhoods scheme (led by Deptford Folk in collaboration with Sustrans).[129] They also used the findings to support protests and (unsuccessful) attempts to save green space in the area. The outputs contributed to further funding bids by Citizen Sense, including for an AirKit proof-of-concept toolkit, which has been launched as a freely available citizen-sensing infrastructure.[130] The Deptford and New Cross public engagement exercise was also included in the Museum of London's City Now, City Future exhibition, which attracted nearly a million international visitors. This exchange led to a collaboration with the Museum of London and the City of London to monitor air quality in the Square Mile and develop a toolkit for air quality gardens, the Phyto-Sensor Toolkit. Lewisham Council introduced several air pollution measures after the launch of the findings from the Citizen Sense study in 2017, including no-idling schemes at schools, a transport study on Evelyn Road, and additional indicative and regulatory monitoring in the area. The second inquest into the death of Ella Roberta Adoo Kissi-Debrah was granted in 2019, and the decision by the Coroner in December 2020 is likely to contribute to further efforts to address air pollution in London, in tandem with the Mayor of London and TFL's expansion of the low emission zones (LEZ and ULEZ). Citizen Sense sought to work with existing citizen initiatives to investigate how or whether air quality sensors could contribute to community campaigns to improve urban infrastructure. As advocated by some authors and experts on public engagement (see Chapters 1 and 2, Part I), this approach does not start from zero but seeks to connect with community efforts to help ensure the longevity and integration of the initiatives.

Outputs from the Mapping for Change 'Science in the City' project with the City of London and Barbican Association consisted primarily of a report summarising the citizen science study and findings. The report includes the identification of air quality and urban environment issues to which city actions correspond. Mapping for Change also produced a video documenting the process of setting up monitors and collecting data. The report and findings were referred to by members of the residents' association in multiple follow-on projects, including for their City in Bloom air quality garden initiative developed in 2017.

The City of London has noted that several residents' recommendations from the project were implemented, including electric vehicle charging points, green infrastructure, and a zero emission street pilot. Given that the City of London has again commissioned Mapping for Change to undertake a follow-up air quality monitoring study in 2021 onwards, there is evidence of enduring interest in the topic of air quality, and continued attempts to engage existing and new publics in finding solutions to air pollution in the area. In a similar way to Citizen Sense, Mapping for Change has sought to integrate with existing community initiatives to help ensure the sustainability and feasibility of air pollution improvement efforts.

5.6   Lessons learnt from the public engagement

Each of the public engagement exercises described in this case study involved advantages and disadvantages for engaging citizens with air pollution. A summary of some of the highlights is presented in Table 5.1 below.

Table 5.1 Advantages and disadvantages of three public engagement exercises in the air pollution case study.

	Advantages	Disadvantages
RBK Citizens' Assembly	Good council involvement	Council-led engagement could be more scripted and less participatory
RBK Citizens' Assembly	Broad cross-section of participants	Less follow-through with participants after event
Citizen Sense: digital sensors and co-design	Good community involvement	Uneven engagement from council and local government stakeholders
Citizen Sense: digital sensors and co-design	Good applicability of engagement and findings to ongoing initiatives	Some technology skills required for participation
Mapping for Change: citizen science study	Good community and council involvement	Expert-led research design could be less flexible in adapting to participants' needs and interests
Mapping for Change: citizen science study	Multiple monitoring locations	Focus on measurement could lead to awareness-raising rather than actions

As noted in the table, the citizens' assembly has the advantage of being council-led, but this could also make it a less participatory format. At the same time, the broad cross-section of participants could notionally be more representative, but given the time commitment of the two full-weekend workshops, this could in practice be a more self-selecting group. There might also be less ongoing engagement with communities, given that the somewhat scripted characteristics of the assembly event do not engage with existing community initiatives. The expert-led contribution of knowledge is less collaborative and in part based on a deficit model of public engagement. However, in some cases citizens could require more information to contribute to public engagement and policy-making. This more participatory approach to information could contrast with

approaches to fact-led engagement that emphasise behaviour change – an approach that can be less democratic and more paternalistic. Taken together, these aspects of the assembly format could mean there is less momentum to implement recommendations.

The Citizen Sense research project presents a more collaborative co-design format that works with community groups and residents within their existing initiatives. This has the advantage of building capacity and contributing to initiatives that can continue to be self-sustaining, where participants can use their air pollution data and proposals in ways that matter to them. However, the presence of local government and related stakeholders was somewhat uneven in the public engagement exercise, in part due to some participants expressly using data to support campaigns to protest developments and the destruction of green space. Here, less advantaged groups are potentially not as well connected to policymakers; and might also have adversarial relationships with or perceptions of them. A grassroots approach to monitoring can be empowering for communities, but might not lead to council-led policy reports or recommendations. On another level, the digital-sensor technology provided multiple novel ways of documenting environmental conditions and communicating findings. However, these technologies did present a potentially more-or-less steep learning curve for some participants, some of whom found it easier to use the technology than others.

Mapping for Change had the advantage of being commissioned by the City of London to work in collaboration with the Barbican Association. However, these are relatively less diverse and more privileged participants, who also have a record of active engagement (with a high numbers of retired professionals).[131] These activities were potentially less inclusive of contributions from less advantaged groups, and potentially less accommodating of dissenting approaches about what to monitor, how to act on data, and whether to challenge developments in the Square Mile. The public engagement exercise was led more directly by Mapping for Change according to a citizen science measurement design, and while participation rates were good, the design of the exercise itself could be seen to be less co-creative.

What these different initiatives demonstrate is how, ideally, governments, stakeholders, and a diverse range of publics could work together to define environmental problems of concern, propose actions and solutions, consider connections to ongoing initiatives, find ways to build capacity so as to ensure the ongoing viability of actions, and develop mechanisms to assess and change approaches over time. However, different public engagement exercises are more or less well suited to diverse communities and concerns, and should be adapted to distinct situations in dialogue with participants. The case study also shows how, in practice, engagement initiatives in a broadly similar policy area can proceed independently of one another without necessarily being brought together to pool experience. This suggests an organisation such as Defra could contribute to joining up and communicating diverse engagement approaches and findings.

6. Defra bovine TB Citizen Dialogue

6.1   Introduction

Bovine tuberculosis is a disease that is currently estimated to cost the UK Treasury over £100m per year, and is responsible for severe hardship within the dairy and beef sectors in England, Wales and Northern Ireland. It is a disease of cattle requiring affected animals to be slaughtered. It can infect other domestic animals (for example, goats and camelids) and humans too. It is also present in wildlife (notably badgers). The disease is most prominent in the south and west of England and Wales and in Northern Ireland but has been spreading north and east in Great Britain over the last decade. Managing the disease is difficult and contested. There have been varied scientific reports in support of and at times questioning the effectiveness of wildlife and cattle movement management. Control of wildlife disease reservoirs and vectors is controversial for some, while the economic and social costs of living and dealing with the disease within a struggling farming sector are also clear. With the announcement in 2011 of a pilot badger cull policy in England, the issue became public once again, with wildlife groups and farmers seemingly at either end of a public dispute.

6.2   Rationale(s) for public engagement

Defra commissioned OPM Group (Office for Public Management and Dialogue by Design) to produce 'citizen dialogue' on the future strategic direction of bovine TB policy, and specifically on Defra's 2013 draft *Strategy for Achieving Officially Bovine Tuberculosis-Free (OTF) Status for England*. The citizen dialogue was funded by Sciencewise-ERC[132] in response to the Animal Health and Welfare Board's 2012 call for views on strengthening England's bovine TB eradication programme, and to find 'new ways of working'. Funding was £375K with Sciencewise contributing just short of £200K. The dialogue comprised three strands: stakeholder workshops, public workshops where members reconvened over a period of several weeks, and online public engagement. Prior to these activities there was a public consultation (accessed online or via written submission), the details of which are not available.

The overall stated objectives of the citizen dialogue were, first, to engage publics in 'understanding, deliberating and contributing to an area of strategic development' which was acknowledged to be wide ranging in terms of issues and effects. Second, this process would 'inform' policy development (in the form of the comprehensive 25-year bovine TB eradication policy and strategy). Third, the process would enhance and build trust within an otherwise highly contested domain. Each engagement strand had a specific set of objectives which were reported in relation to the publics they assembled, and their specific methodologies.

These broad objectives map onto normative, substantive and instrumental rationales for engagement, as discussed in Chapter 1. Explicit statements concerning the intrinsic value of deliberation (normative), the value of generating insights that might inform re-drafting of

the policy (substantive) and the need for re-building trust and legitimacy (instrumental) were made throughout the reports. The broad Sciencewise approach was also explicitly policy-oriented and raised the expectation that participants could materially affect future policy direction:

> 'It [dialogue] must take place far enough ahead of policy being made to be able to have some influence over the eventual policy decisions. A key requisite of public dialogue as developed by Sciencewise-ERC is that it must have a 'policy hook' with a clear understanding of who will be listening to the outcomes.'[133]

The issue of trust was particularly pertinent at a time of increasing frustration within the farming community concerning a growing disease problem. There was a sense that disease management had been delayed by inconclusive scientific studies and by government indecision. There were those within the farming sector who felt that they had been left to bear the brunt of an economically and socially devastating disease situation. At the same time, conflicts over what some thought to be an unsubstantiated decision to sanction the culling of a protected and iconic species as a means to protect the farming industry were reaching their peak in 2013.

Box 6.1 Uncertainty, conflict and culture

Uncertainty, conflict and culture

A key driver for engagement was the existence of a highly contested, seemingly intractable, public issue. Bovine TB strategy was being developed against a backdrop of decades of rising socially and economically costly breakdowns in cattle. Badgers, a protected species and a charismatic and iconic animal within British culture,[134] were widely regarded as key hosts and vectors for the disease. The scientific evidence for the efficacy of badger population controls or culls was contested (with high profile scientific disagreement over the interpretation of randomised control trial field studies). The issue had seen farmer groups pitched against wildlife and badger groups. The latter had a high public profile, with notable celebrities backing alternative strategies including restrictions on farming practices (cattle movements) and vaccinations. The case could be characterised as an extension of (and precursor to) the culture wars drawn between country and city (metropolitan versus working countryside). As a contest, it echoed 1990s debates and direct actions around fox hunting bans. Dialogues were explicitly framed as an opportunity to develop understanding on both 'sides', to reduce tensions and to find possible compromises.

While the aim was to debate widely, the timing of the engagement coincided with the initiation of pilot badger culls in Somerset and Gloucestershire. The pilots were designed to act as road tests for a policy that would be rolled out across the country. The culls attracted saboteur groups, public marches, and wide media attention, with a high social media profile.[135] As the main report concedes, 'while the aim of the dialogue was to focus on the Strategy as a whole (and the workshops were facilitated to ensure this wider discussion), participants' focus often turned to the efficacy and ethics of this form of badger control'.[136]

6.3   Characterisation of 'public(s)' involved

Two publics were convened – stakeholders (those with direct material and market links to the disease – farmers, landowners, wildlife groups, veterinarians, retailers) and 'publics'

(understood as diverse groupings without a direct stake in the issue). In all cases, engagement was led by the project team and attended by Defra and Animal Health Veterinary Laboratories Agency (AHVLA, now Animal and Plant Health Agency, APHA) staff, as well as academic experts on bovine TB.

Table 6.1 Recruitment of stakeholders and wider 'public'

Publics	Recruitment
Stakeholders (those already engaged with the issue)	• Meetings were face-to-face, deliberative events, with around 30 people attending each of 10 meetings • Recruitment was via advertisement and snowballing, with participants ultimately self-selecting • The meetings were numerically dominated by cattle farmers and veterinarians
The 'public' (those not directly engaged before or after the deliberation process in bovine TB issues)	• Face-to-face as well as on-line formats were used • Participants were recruited to be broadly representative in terms of gender, location, socio-economic, ethnicity and attitudinal markers.

6.3.1 Stakeholder Workshops

Comprised of ten one-off meetings with roughly 30 people at each, in epidemiologically defined risk regions (High, Edge, Low), a total of 258 participants included: 'farmers and farming organisations, vets and veterinary organisations, livestock auctioneers, wildlife and environment organisations, local authorities, supply chain representatives and academics.'[137] Participants were self-selecting, responding to advertisements and recruitment efforts that were made in an attempt to 'recruit representatives from organisations across the spectrum of opinion.'[138] Groups varied – in Launceston (Devon) the group mainly consisted of farmers and vets, but in Frome 'a diverse mix' attended.[139] In general, there was a reported failure to engage wildlife groups, with the authors speculating that these groups may have felt excluded and/or unlikely to be listened to, or did not have the resources to spend the time, at short notice, on the deliberations. For all groups, the authors noted a level of general scepticism and low trust resulting in low expectations for the exercises.

6.3.2 Public dialogue

Three groups were convened in Exeter, Birmingham and Newcastle – areas that mapped onto the High, Edge and Low Risk disease zones. The Birmingham group was purposively recruited within a tight postcode area within the city, whereas the Exeter group was drawn from surrounding rural towns and districts. The idea was to make sure that any urban/rural differences were represented in the process of deliberation. In total, 111 people were recruited to broadly represent the populations of those locations – gender, age, ethnicity, socio-economic and attitudinal markers were used to 'balance' the groups, with exclusion of those who were directly involved in the issues. In this sense, the public was constructed

as a representative subset of the population, and not as an issue public (one that arises around an issue).[140]

6.3.3 Online

Recruitment mirrored the lay public workshops, with 65 people recruited. The participants were purposively recruited 'to ensure a spread of gender, ethnicity, age, socioeconomic grouping, and employment'[141] in addition to a spread of attitudinal and postcode variables.

6.4   Approach/ methodology

6.4.1 Methods

Recruitment was self-selecting for stakeholders, and purposive for the lay and online publics.

Engagement was through face-to-face workshops (for stakeholders) and reconvened workshops for lay publics (with a two-week lag for the lay members to consider and respond to meeting 1). The online group used a research tool called *Vizzata*.

In all cases, discussions followed pre-scripted prompts and responded to presentations or information. Groups were supplied with materials (statements from the draft strategy, factsheets, animations, films, presentations) and then asked to discuss at their allocated tables, or, for those online, to post questions and respond to pre-set prompts. There were presentations from experts (for example a case study on New Zealand's successful eradication process). In face-to-face meetings, responses to these materials were discussed at tables with facilitators, relayed to the group, and augmented with bulletin boards where attendees could raise questions and make observations.

Online participants were able to view materials and then ask specific questions which were answered by moderators, vetted by veterinary and social science bovine TB experts, and returned to individuals and later all participants. Once they had received responses, online participants were asked what else they needed to know in order to recommend changes to the strategy (and evaluate the process). This 'dialogic' approach was built into the online package (developed by social psychologists at Bath University), and ideally followed the pattern in Figure A2.1. The package allowed contact between the organisers and the participants but did not facilitate contact between participants. As the report concedes:

> 'The online method cannot be described as enabling dialogue, which necessitates the cross-fertilisation of ideas, opinions and attitudes amongst a group of people, but it did provide participants with the time and information needed to enable them to deliberate on the topics being addressed and to call for the additional information they need to allow them to deliberate more fully.'[142]

In this sense, it might be said to mirror the social process of iterative opinion formation, though clearly offers less scope for exploring that process analytically (i.e., participant

submissions are not accompanied by any other narrative or evidence regarding the nuances of those submissions or the process of reaching conclusions).

Figure 6.1: Infographic on the dialogic format of the Vizzata online tool. Source: White October website.
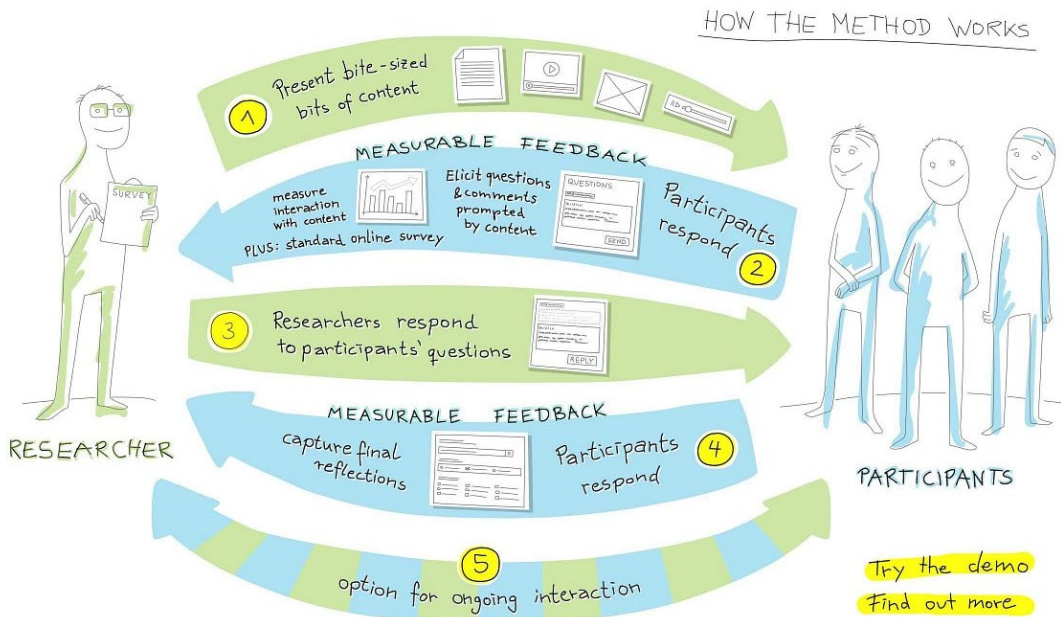
The non-stakeholder sessions were reconvened (workshops) or ran over a set period (online) in order to generate reflections. In the reconvened public workshop, as well as deliberations, participants produced a media/ news item that not only captured their learning over the two workshops but also presented a relative ranking of what they thought to be the key communication issues. See Figure 6.2.

Figure 6.2: Example of participant-led news item produced with the reconvened public workshops. Source: [Defra (2014c) Defra bovine TB citizen dialogue: Public dialogue workshops](#).
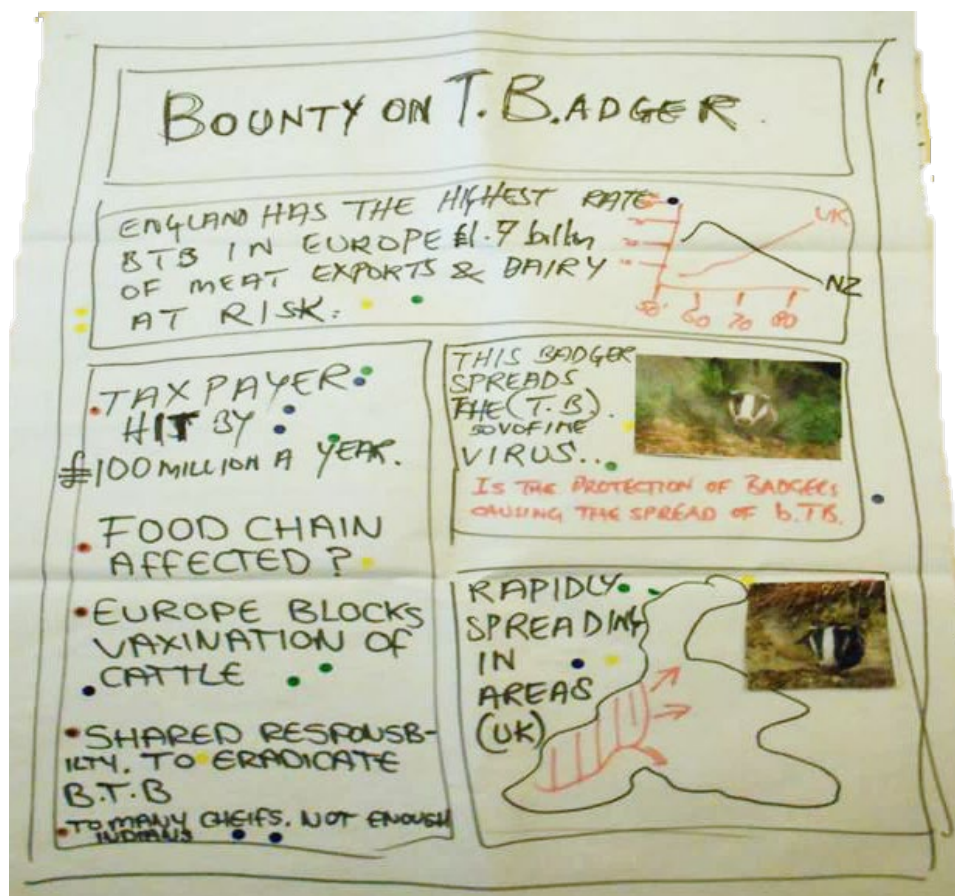
6.4.2 Framing and structuring

In all cases, discussions were framed as part of a **didactic narrative** or process. Participants were:

1. Presented with the scientific expertise
2. Asked to work through the relevant facts and remaining questions
3. Tasked with generating policy approaches, or the bases for policy decisions, in light of that learning.

This was not an exercise in challenging the science, or necessarily exploring uncertainties. This was science-led deliberation. In both public assemblies, authors repeatedly signaled their interest in the 'journeys' that participants took in finding out more about the issue. But those journeys were arguably highly circumscribed. For example, the bovine TB situation was framed throughout as a problem that required a process of disease eradication (bovine TB free), and eradication as a problem to be solved. The question of whether eradication was a worthwhile goal, and the consequences of pursuing eradication (in terms of costs to farmers, to the Treasury and to wildlife) were largely side-lined.

6.4.3 Analyses

Workshop outputs were presented in the final reports in purely descriptive and summary terms. There was no explicit description of an analytical approach (nor any explicit method for handling the 'data' produced – for example, there was no sense of whether discussions were recorded, transcribed, coded, thematically organised). Extracted utterances from participants were used sparingly in the reports, but mainly to add colour and legitimacy to the descriptions of outcomes.

In the face-to-face workshops, the reported discussion was limited. This may have been a function of reporting style and approach (tables or subgroups reported their discussion to the main facilitator). In this sense, the reports tend to be summaries of summaries, with no details of discussion and deliberation. So, for example, there was no detail on the anger and frustration that some in the stakeholder workshops were said to have expressed. This is an example of the reporting style:

> 'There was least consensus on the best approach to controlling the risk from wildlife. Whilst there was strong support from many participants across all risk areas for the wider roll out of the pilot badger culls, there was keen opposition to this point from some stakeholders, particularly those representing wildlife groups.'[143]

This form of reportage may be effective in giving a sense of the issues over which there was (predictable) disagreement, but it provides no opportunity for developing understanding of the drivers of or contours that characterise this and other points of contention.

The online materials were somewhat slight, comprising single line responses to questions. As such, the outputs contained little descriptive or narrative content from which to derive meaningful analysis. The online process is reported as individualised with no facilitator to confirm meaning or intent, with the effect that the results are somewhat 'ambiguous'.

Box 6.2 Analysis and interpretation

Analysis and representation

A key analytical issue for public engagement is the extent to which the processes can be considered to capture something bigger or wider than the events themselves. In other words, can these processes be regarded as representative or somehow indicative of what or how others think and act? To a large extent this question is treated as implicit, and somewhat fudged. The process of recruitment (balancing demographic characteristics), adopted from more quantitative and survey methods, is used to justify a legibility of elicited responses as indicative of wider populations. This implies that the public of a public dialogue is conceptualised as 'the public' or the population. This means that despite disclaimers about the unrepresentative numbers involved ('These findings are qualitative and are not intended to be representative'[144]), utterances are nevertheless regarded as somehow representative or indicative of what and/or how 'the public' thinks.

Reports tend to revert to an implicit form of 'majority' opinion ('most people agreed this, some thought that' and so on). In effect, evidence from the workshops is treated as self-evident (based on typical people), and analysis is thus regarded as surplus to requirement. The key is that we are

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asked to believe the report, but the basis for that belief is not interrogated (it is continually asserted, then denied, then re-performed as a function of being present and being part of a 'most').

A significant question is the extent to which these forms of engagement practice require more explicit and thoroughgoing social analyses of qualitative data in order to be of value. The risk at present is that the reports lack depth, and can be easily dismissed as unrepresentative. There is no basis to actively engage with the process of generating authority of the report's findings. Conversely, there is an open question as to whether the tools of social analysis which have been developed for extended and intense research programmes could be used effectively and deliver the results needed by decision-makers.

6.5   Outputs and outcomes

Each strand has an individual report, with a summary report. The Sciencewise host site has a summary sheet and a favourable independent evaluation of the process conducted by 3KQ (Three Key questions).[145] The evaluation noted the following:

'Overall, the dialogue project was ambitious and successful.

The dialogue met its overall project objectives. It is more difficult to assess the extent to which the project met the objective to 'appraise opportunities for building trust', but it was clear from an early stage that this objective was less of a priority for the Oversight Group. The face-to-face stakeholder and public strands of engagement met their objectives well. The online engagement strand met its objectives less well, mainly because the objectives did not seem to have been adapted for the online methodology where significantly less deliberation was possible.'[146]

The process and reports, as well as prior and subsequent consultation exercises, were used by Defra to develop a cross cutting summary[147] wherein key messages around public approval of various components of a strategy for developing official TB free status were described. It is important in this sense to view the Citizens' Dialogue exercises as part of a process of consultation, dialogue and subsequent consultation, which effectively generate a broad (and often difficult to subsequently identify) contribution to the policy environment.

The consultation process and engagement were gratefully acknowledged in the Secretary of State's foreword to the 2014 Bovine Tuberculosis Strategy, the latter making reference to extensive engagement and consultation processes.[148] Within the subsequent strategy, it nevertheless remains difficult to identify concrete exemplars where findings of the engagement process made material contributions or differences.

A key lesson may be that if consultation and engagement processes have material effects on policy, then it is important for any subsequent policy documentation to make sure that this process is explicitly acknowledged and evidenced. The latter could be a key component for generating confidence and buy in to the engagement processes.

The reports are also acknowledged in a Defra-commissioned independent review of the bovine TB strategy in 2018, but again there is no explicit reference to any material effects upon the strategy. In addition, in this independent review, the authors had a more negative summary of the engagement and consultation process:

'… we believe that the current frequency and granularity of consultation is cumbersome and counter-productive. Concern over 'consultation fatigue' was expressed to us by many stakeholders.'[149]

Others involved were more positive concerning the consultations, engagement process and subsequent public consultation over the specific strategy recommendations. For example, the following was cited: a key benefit of the [dialogue] exercise was bringing together policy makers and grassroots stakeholders with divergent opinion in workshops and having open and honest discussions about future strategy and building relationships. Another was demonstrating how the views of a sample of members of the public can shift as they understand more about the issue.

Arguably, and for others, the challenge remains of converting this process-based and normative view of engagement (where engagement is intrinsically worthwhile) into something more substantive (where there are demonstrable effects on thinking and policy). Likewise, more legalistic views of consultation (wherein engagement and consultation are a means to remove subsequent threat of legal challenge) might be enhanced with a more robust and evidenced approach to developing process, analysis and mapping findings into policy.

In addition, and given the nature of the topic with an already well-known and documented understanding of the issues from the key protagonists, it may be that the dialogues themselves needed to be more ambitious. In fields where participants are already highly vocal and where the issues have been articulated in public, then the ambitions of citizen dialogue need to be more than simply giving voice. In a social media-saturated space, the need is for more exacting social analyses and generative engagement or conflict process management rather than collecting 'voices'.

6.6   Lessons learnt from the public engagement

For those involved in the bTB policy team, the engagement and consultation process contributed to the following:

- Development of high-level Strategy with more detailed background documentation
- Taking account of comments on detailed options presented in the consultation
- Promotion of badger vaccination in the Edge Area
- Increased focus on local risk assessment and management
- Providing a real opportunity for engagement and communication
- Developing a foundation for ongoing collaboration on policy development

Key lessons from this case study have been to identify the following needs:

1. Full and robust social analysis of data generated during the consultation and engagement processes.
2. Explicit mapping across of the outputs of engagement and consultation and a well-evidenced paper trail to show where the process materially impacted subsequent policy and strategy.
3. A shift of emphasis from 'giving voice' to generating collective approaches or possible solutions in situations where there is already a highly publicised conflict.

In general, the sense is that this engagement process was something that was thought important to happen at that time (and as a result of a number of issues coming together, including a change of government and new energy on the bovine TB issue) but its framing, timing (with pilot culls being rolled out) and the method of engagement (as a scripted exercise without the tools of research or analysis) produced an outcome that became difficult to map into subsequent policy. While the exercises were evidently well-designed, the policy frame and the social science expertise necessary for the analysis of the material generated would both benefit from greater attention.

The online component was disappointing, and clearly contains lessons for the nature of online engagement which needs to depart from the individual written call-and-response model utilised in this platform.

A related concern is that the tools of social science and the generative possibilities afforded by engagement practices are tending to be operationalised and reduced to the fostering of better communication (and engagement becomes a set of didactic prompts and measurement of responses) as well as legal requirements. In other words, there is a danger that public engagement is reduced to a means of generating better cognitive tools for communication (this is somewhat in-built into platforms like *Vizzata*). In this sense, publics are treated as targets of communication, rather than as issue-assemblies around which protagonists gather.

7. Public Engagements Relating to Food

7.1   Introduction

This case study reports on the experience of different forms of public engagement in two food-related initiatives: The Independent Review of the Food System led by Henry Dimbleby (commonly known as the National Food Strategy) and the Living Landscapes project. The **Independent Review of the Food System** used a series of public dialogues to seek input from members of the public in formulating its recommendations.[150] The **Living Landscapes** project was commissioned by the Royal Society and was designed to inform agriculture and environment policy following Britain's exit from the EU.[151] A series of public dialogues was used to assess the multiple benefits and trade-offs associated with different land uses.

7.2   Rationale(s) for public engagement

In 2019, the Government commissioned Henry Dimbleby to lead an **Independent Review** of the food system in England. The stated intention for the public dialogues was to engage a cross-section of a wider public to deliberate on the priorities and outcomes of the proposed National Food Strategy as well as shaping the strategy by providing evidence of public attitudes and opinions.

Led by the Royal Society, the **Living Landscapes** programme aimed to inform a long-term vision for how the UK manages its land, in a way that combines agricultural productivity with sound environmental stewardship. The Living Landscapes project sought to uncover how people value different land use types; the benefits and services provided; and what influences their views. More specifically, it asked about: what people value in terms of land-use for recreation, nature conservation, flood prevention and food production; their narrative framings; the trade-offs they were prepared to make (for example, in terms of access for leisure vs better wildlife habitats); and the role of science/evidence in shaping their views.

7.3   Characterisation of the 'public(s)' involved

The **Living Landscapes** project aimed to recruit a demographically representative sample of the UK population, weighted to include land users, owners and managers. Despite the issues being of concern to all citizens, the project recruited a higher proportion of rural than urban participants compared to the population at large.

The **Independent Review** of the food system sought to recruit a diverse and inclusive sample of the population, with a focus on England but with the hope that its findings might be taken up across the UK.[152] The recruitment strategy for the public dialogues was place-based, aiming to avoid a metropolitan bias and to encourage participation from a range of locations including smaller cities and surrounding rural areas. The Independent Review also had an Advisory Group which included representatives from agriculture, industry,

government and NGOs, as well as academics and experts (see Independent Review 2020 'Acknowledgements' and 'What we have Read').

7.4 Approach/ Methodology

The **Independent Review** public dialogues were delivered by Hopkins van Mil (HvM) with input from Sciencewise.[153] Preliminary work included the collection of 'vox pop' videos with members of the public and interviews with a wide range of experts. Phase 1 of the public dialogues involved a series of day-long, face-to-face meetings in February-March 2020 with diverse groups of people in Grimsby, Kendal, Bristol, Norwich and Lewisham (and surrounding areas). Each meeting involved c.40 members of the public (c.200 participants in total). The meetings were structured into multiple tasks and activities, using trained facilitators to maximise participation. A small group of invited experts were on hand to provide guidance and clarification without leading the discussion.

The findings of Phase 1 focused on the importance of cost (affordability and access to food), links between diet and health, and questions of 'choice' (among a variety of foods). Phase 1 also sought to address the complexity of the food system (including the range of actors and institutions that shape what consumers buy and eat). Many participants found thinking in terms of a 'food system' quite challenging and struggled to articulate their understanding of the trade-offs between different policy objectives (rather than interventions that focus on a single issue).[154]

Phase 2 was scheduled to take place soon after Phase 1, involving the same participants in the same places, but was delayed until October 2020 following the onset of the COVID-19 pandemic and associated restrictions. As a result, the Phase 2 public dialogues were delivered entirely online. HvM worked hard to maintain engagement with participants between Phases 1 and 2, using the Recollective platform to encourage members to stay in touch and to participate in online discussion forums. They were largely successful and retained over 70% of participants in each location between Rounds 1 and 2.

Despite the change in mode of delivery, HvM aimed to ensure that the quality of dialogue remained as high on Zoom as it would be in person, using smaller online breakout groups in Phase 2 and allowing more time for reflection. They ensured that all participants had access to a laptop, tablet or mobile phone, holding tech try-out sessions to help those who were unfamiliar with the online tools being used (Zoom, Mentimeter, Recollective) and checking for any camera, audio or broadband issues. A hard-copy of stimulus material was also circulated in addition to online versions.

A final phase of the public dialogues involved a **Citizen Summit**, a one-day (two-hour) virtual event.[155] The Summit included 60 citizens, drawn from participants in the earlier dialogues, and a further 20 stakeholders, academics, government officials and facilitators. At the Summit, Henry Dimbleby outlined his plans for the second report, including discussion of the 'junk food cycle' and the 'invisibility of nature'. Henrietta Hopkins from HvM summarised the two phases of the dialogues emphasising the appetite for change

among participants, including their desire to prioritise the environment and to encourage a food system that manages obesity and reduces waste. The dialogues also supported the delivery of a sense of community around food, enabling citizens to make choices that reflect their values. There were presentations from three of the public participants, break-out discussion groups and closing statements from three stakeholders, plus a lively conversation throughout the event using the Chat function on Zoom.

The shift from face-to-face to online delivery was a key issue for the public dialogues, highlighting how the nature of evidence varies according to the method of engagement. Online engagement may be no less valid that face-to-face participation. But it is hard to make direct comparisons between the findings from the two phases because of a range of methodological issues. These include questions of confidence in voicing an opinion, differences of positionality (by gender, age etc.), the use of visual as well as verbal cues, the process of turn-taking, and the analysis of body language and eye contact – all of which vary between online and face-to-face methods of engagement.[156]

While on-line delivery raised questions about the potential exclusion of those who are unfamiliar with the use of digital technologies, there is also the potential that digital methods can empower those who are reluctant to 'speak out' in face-to-face settings. Indeed, some participants reported that they preferred working online for a variety of reasons including more flexibility over childcare issues and greater confidence in contributing to break-out conversations.

In both phases of the public dialogues, academic experts were used to provide background information and answer questions. This raised issues about the selection of experts, the impartiality and balance of the material presented and whether, once such information has been provided, participants can still be regarded as fully representative of the general public who do not have access to such expert knowledge.

The onset of COVID-19 between Phases 1 and 2 of the public dialogues also involved a change in the social and political context in which the dialogues were delivered. The pandemic led to significant changes in people's dietary attitudes and behaviours (as captured in the FSA's tracker data).[157] There was more public consciousness of potential food shortages, temporary disruptions to supermarket supply chains, reports of 'panic buying' by some consumers and rising numbers of people using foodbanks and other forms of emergency food aid.[158] The hospitality sector experienced major challenges with operational restrictions (in some cases amounting to complete lockdown) on bars and restaurants, while consumers made more use of online food delivery. All of these changes are likely to have influenced participants' views as expressed in the public dialogues.

The public dialogues also illustrate a number of issues that are common to other forms of public engagement. They include whether the dialogues should focus on specific issues (such as meat reduction) or encourage debate about the wider environmental and health impacts of different dietary choices. There were also questions about how much to prompt the dialogue without over-steering the conversation and how to achieve balance and impartiality in stimulus materials (e.g. from the farming community or the meat industry).

The public dialogues will be subject to independent evaluation (conducted by URSUS Consulting) as part of the review process agreed with Sciencewise.

Chaired by Professor Sir Charles Godfray, the **Living Landscapes** project was commissioned by the Royal Society and delivered by Ipsos-MORI.[159] The programme aimed to inform a long-term vision for how the UK manages its land, combining agricultural productivity with sound environmental stewardship. The project had several components including a series of evidence syntheses, a review of the key trends and issues in UK rural land use (published in August 2020) and a series of public dialogues, designed to understand people's priorities for future rural land use in a rapidly changing political context (following Brexit).[160]

Ipsos-MORI planned to organise a series of reconvened workshops, using participatory, face-to-face methods, delivered over two days (a weekend evening and a full Saturday one week later). However, because of COVID restrictions, the workshops were conducted virtually on Zoom. Each had 24–28 people (divided into small groups of 6, plus a moderator and an expert). Some one-to-one phone calls were also held to ensure that the views of those without reliable internet access were included. The dialogues took place in four locations: South-West England, East Anglia and the Fens, the Western Highlands of Scotland, and North Wales. The geographical reach was therefore broader than that of the Independent Review of the food system, which focused on England.

Tenderers were presented with a conceptual framework for the project including the context of multiple land uses; a synthesis of available evidence; the role of public discussion; mechanisms for decision-making; and the overall objective. They were encouraged to use scenarios, together with relevant evidence on climate change, agriculture and food, landscapes, biodiversity and ecosystems.

As the successful contractor, Ipsos-MORI developed several scenarios (based on a literature review and interviews with 'future thinkers' and sector experts). The scenarios were described as:

1. Follow the Market (with hill walks priced at £20; a farm shop etc.)
2. Climate Co-ordination (with no entry to wildlife protection zones; veg*n stores etc.)
3. Home Front (with farm stays, pick-your-own fruit and veg, lab-grown meat etc.).

Participants also discussed a range of actors and a series of themes (hazard protection, food production, improved biodiversity); and the role of taxpayers, citizens and other individuals and organisations. In each case, they addressed the working question: 'What do we, as a society, want to prioritise for our landscape in future?' [161]

Workshop participants were asked to consider the 'uncertain environment' post-Brexit and the Agriculture Bill's proposal to pay farmers for public goods. Each workshop adopted a similar 'What happens now?', 'What happens next?' and 'Some choices for the future' approach to a range of themes including biodiversity; climate change; reducing flooding and other hazards; culture and heritage, recreation and leisure; and clean air and water. A final session on 'Priorities' considered the interplay among six themes: producing food;

improving biodiversity; reducing carbon emissions; leisure, culture and tourism; high quality air and water; and protection from hazards.

7.5   Outputs

The **Living Landscapes** project published an initial report on the public dialogues in March 2021, accompanied by a blog, co-authored by Jamie Upton and the Ipsos-MORI project lead.[162] Publication of the full report, following peer review, is expected in 2022 (after submission of this Review of Public Engagement).

The Independent Review of the food system reported in two parts. Part 1 was published in July 2020.[163] It focused on the needs of 'our most disadvantaged children' (including recommendations on the extension of entitlement to free school meals) and on 'sovereignty, standards and scrutiny' in the context of post-Brexit trade negotiations. Part 2 was published in July 2021 and focused on the wider food system. As Henry Dimbleby wrote in the Introduction to Part 2, the report aimed to:

> 'take a close look at how the food system really works, the damage it is doing to our bodies and our ecosystem, and the interventions we could make to prevent these harms. We will consider the characteristics of complex systems and the mechanisms that cause system failures. And we will set out a strategy for the future, based not just on rigorous science but on the needs and wishes of ordinary citizens.'[164]

The report included a separate volume of evidence, covering nature and climate, health, inequality and trade.[165]

7.6   Outcomes

It is too early to assess the long-term outcomes of these projects, both of which were incomplete at the time of writing.[166] In the short term, the **Independent Review** (Part 1) recommendations on free school meals became the subject of public debate, with initial reluctance from Government being over-turned following a campaign led by the footballer, Marcus Rashford.[167] In response to the Independent Review, a Policy Paper setting out the government's food strategy[168] was published in June 2022, as this Public Engagement Review was being finalised.

 The high-level preliminary outcomes of the **Living Landscapes** project were summarised in terms of two themes: decision-making and communication. Under decision-making, the project reported:

- A low level of awareness and agency felt by much of the public when it comes to land use and decision making
- General comfort with letting experts lead in an area of low salience, with national and global systems at work

- A tension between the knowledge of experts and understanding of the local area.

In terms of communication, the Living Landscapes project concluded that:

- The public want to be better informed on this topic, especially areas like food, biodiversity and climate change
- Helping people change their behaviours isn't just about giving them evidence
- There is the need for a 'positive story' about the countryside's future

7.7   Lessons learnt from the public engagement

The main lessons learnt from these two projects include issues surrounding the design and methodologies, such as the adaptations made in moving from face-to-face to online delivery. Building a degree of flexibility into the design process might allow future projects to adapt more readily to changing circumstances.

As in other public engagement work, the ability of skilled facilitators was key to the successful delivery of these projects, ensuring maximum engagement from participants without over-steering them. Similarly, the role of experts in providing balanced information to participants was a crucial aspect of the dialogues, enabling the public to grapple with unfamiliar concepts, such as 'food systems' thinking, without leading them to a particular view.

Both projects encouraged participants to move from a single-issue perspective to consider the trade-offs and compromises they were prepared to accept in order to achieve the outcomes they desired. This is one of the strengths of the public dialogue method and it relies on the building of trust among participants and facilitators, which takes time to develop.

A key issue for both projects was how to manage expectations among the participants. The prospect that participants' views might shape future policy was important in encouraging people to participate in the dialogues, without over-promising in terms of how each individual's opinions may or may not feature in the final report or in terms of the shaping of future policy. This issue was also central to a report to the Scottish Government on rural land use and land management in 2016. Based on interviews and online surveys, the authors distinguished between community engagement and empowerment where the power to influence change (either at the planning or policy implementation stage) was key.[169]

Important ethical issues also arise throughout the public dialogue process, such as the need to balance a commitment to archiving public engagement data for future use while ensuring participant confidentiality. This is particularly challenging for certain kinds of data (such as when public dialogues are video-recorded).

8. Stakeholder Engagement in Site Selection for Marine Conservation Zones

8.1   Background

The marine environment occupies an increasingly prominent place on national and international policy agendas. Once largely unseen, marine ecosystems (and the harms being done to them) have been rendered 'visible' through new technologies, the efforts of marine conservationists and popular documentaries such as the *Blue Planet* series. As concern about human impacts has grown, new commitments have been made and legislation has been enacted at all levels. In the UK, the *Marine and Coastal Access Act 2009* introduced a system of marine spatial planning, provided for the designation of Marine Conservation Zones (MCZs), and recognised that MCZs needed to be part of a wider network of Marine Protected Areas (MPAs).[170] In addition, the UK Government's 25-Year Environment Plan makes commitments to increasing the proportion of protected and well-managed seas, and to better management of existing protected sites.

The seas around the UK also support multiple activities of importance to the national economy and to local communities. These include offshore oil, gas and renewables, aggregates extraction, transport, telecommunications, fishing, aquaculture, and many forms of recreation. Not surprisingly, therefore, the use and conservation of the marine environment are of concern to a wide range of stakeholders and publics, with a similarly wide range of interests, priorities and values.[171] Given this complexity, marine management represents not only an increasingly important context for public engagement but also a particularly challenging one.

This case study focuses primarily on an intensive programme of stakeholder engagement (2009–11) in the selection of MCZs and highly protected 'Reference Areas', aspects of which came to be seen by some as problematic despite considerable effort, expense and commitment. What follows is not an analysis of the engagement activities *per se* but rather of the effects of the stakeholder-led MCZ selection process on participants and on subsequent policy developments. There is not a separate section on how publics were characterised, since the phase considered in detail involved stakeholders – groups with specific interests in the issue – rather than wider publics (who were able to participate in subsequent public consultations). In a sense, stakeholders were the publics involved in this case.

The case study also considers lessons that might be learnt from the experience of involving stakeholders in site selection. It draws in particular on two Parliamentary Select Committee reports and two academic analyses of the site selection process,[172] which involved semi-structured interviews with participants, reviews of extensive documentation and, in the latter study (which concentrated on one of four Regional Projects), also drew on direct observation of meetings. The Benyon Review into Highly Protected Marine Areas,[173] published in 2020, is also discussed in the context of lessons learnt.

8.2   Rationale for and approach to stakeholder engagement

The UK's network of MPAs has developed over many years in line with international, regional and national commitments.[174] Following the *Marine and Coastal Access Act* of 2009, a stakeholder-led site selection process for MCZs took place in the period 2009 to 2011, managed by the Statutory Nature Conservation Bodies (SNCBs) – Natural England and the Joint Nature Conservation Committee (JNCC).[175] The process was organised through four Regional Projects, overseen by a Project Board:[176] *Finding Sanctuary* (southwest), *Balanced Seas* (southeast), *Net Gain* (North Sea), and *Irish Seas Conservation Zones*. Regional Stakeholder Groups (RSGs) were charged with developing initial recommendations for MCZs, according to guidelines from the SNCBs. All groups included a wide range of stakeholders involved with the marine environment (fishing interests, NGOs, various industries, public bodies, international organisations and others). In preparation for the exercise, the SNCBs commissioned a report on good practice in relation to the stakeholder engagement.[177]

The broad rationale for the stakeholder engagement was that the establishment of MCZs would be facilitated if the knowledges, perspectives and concerns of interested and affected groups were integrated into the process; and that the MCZ policy might fail if they were not. Going well beyond the formal consultation requirements of the *Marine and Coastal Access Act 2009*, the setting up of the RSGs seemed to reflect a genuine desire to achieve key conservation objectives while keeping stakeholders on board.[178]

The RSGs proceeded through collaborative working, involving more than 2500 meetings over the two years and 'an intensive process of negotiation and compromise'.[179] During the negotiations, a 'multitude of complex and conflicting opinions'[180] were manifest. In the *Finding Sanctuary* Project, for example, Lieberknecht and Jones identified a 'triangle' of conflict between offshore renewable interests, offshore fishers, and conservationists, with the resulting trade-offs affecting the shape of the emergent MCZ network at regional scale.[181] In addition, they observed more spatially confined clashes of interest, for example between conservationists and port industries, and between recreational fishers and those advocating MCZs.[182] The two Parliamentary Committees similarly recorded divisions and tensions between different interests both during and after the initial site selection process.[183]

8.3   Outputs and outcomes

Despite the challenges encountered, the RSGs made recommendations in 2011 for 127 MCZs and 67 Reference Areas.[184] After completing their work, the RSGs were disbanded, and so had no formal ongoing role in subsequent discussions and decisions, though there were formal public consultations on sites later proposed for designation and these were preceded by informal pre-consultations with those stakeholders who had previously been engaged.[185] The recommendations were reviewed by an independent (Defra-appointed) Science Advisory Panel against ecological network guidelines.[186] The Panel accepted that

the work of the RSGs had provided 'a strong basis from which an ecologically coherent network of MPAs [could] be delivered' but raised some concerns about the adequacy of the scientific evidence and identified deficiencies in the proposed Reference Areas network, which it referred to the SNCBs and Defra for further attention.[187] The SNCBs published their own advice on designation in 2012, supporting designation of all 127 MCZs.[188]

The recommendations for MCZs and Reference Areas are an interesting example of a product that can be seen both an *outcome* of the intensive negotiations that took place and an *output* of the Regional Projects, which fed into further stages in the overall process. Other outputs, for example, in the form of documentation covering more specific aspects of the stakeholder engagement are not considered here.

A number of positive achievements can be seen as products of the stakeholder engagement process. Shared understandings were arrived at and 'compromise solutions … reached through trade-offs and negotiations'.[189] All RSGs were able to reach broad agreement on recommendations,[190] which were independently judged to provide a strong basis for an MPA network. This in itself was 'triumph', according to the Marine Conservation Society.[191] The Commons Science and Technology Committee commended the 'significant investment of time and energy' by all involved,[192] and the independent Science Advisory Panel, in its scrutiny of the recommendations, similarly expressed appreciation for 'the huge amount of skilful, constructive work' that had gone into preparing the recommendations and 'huge admiration for the efforts of all concerned'.[193] Two other points are noteworthy: first, a wide range of stakeholders remained engaged throughout the initial site selection process, implying that they found the discussions worthwhile,[194] or at least felt it essential to be there; and second, the three formal consultations before designation, together with informal stakeholder pre-consultations, amounted to one of the most extensive stakeholder engagement processes ever undertaken by Defra.[195]

Lasting effects and impacts are more difficult to identify, though it should be noted that the academic and Parliamentary investigations drawn upon in this case study were published relatively soon (two to five years) after completion of the stakeholder engagement process. In November 2011, Defra announced that because of concern about 'gaps and limitations' in the evidence base, designation of MCZs would be delayed and that implementation would take place in several tranches, with the best-evidenced sites being designated first.[196] In addition, Defra committed to further seabed and habitat surveys, along with an in-depth review.

There were, eventually, three tranches of designation (2013, 2016 and 2019), each preceded by a (legally mandated) public consultation, eliciting more than 100,000 responses in total.[197] But five years after the RSGs had finished their work, only 28 MCZs and no Reference Areas had been designated – an outcome that dismayed many stakeholders.[198] The delays attracted wider concern, and were criticised by the House of Commons Science and Technology and Environmental Audit Committees.[199] The former expressed concern that MCZs had 'become increasingly controversial' and noted 'extensive frustration among … stakeholders over the delays …, which have created

uncertainty and allowed sensitive environments to be further degraded'.[200] Another effect noted by the Committee was increased anxiety, particularly among local stakeholders 'who hear scare stories about draconian future management measures'.[201] De Santo recorded the anger and disillusion of many participants who had 'invested considerable time and effort'[202] in the site selection process – a process that Lieberknecht and Jones thought had 'arguably … produced no winners (except for the environmental consultancies contracted to support evidence gathering and reviews)'.[203] As discussed in the following section, the disillusion felt by participants was in some cases itself an enduring outcome.

Despite the misgivings outlined above, criticism of the MCZ process was not universal and some practices and outcomes have been welcomed.[204] By 2020, 91 MCZs had been designated in Secretary of State Waters[205] and had been broadly well received by a range of stakeholders, with no significant challenges to designations. With hindsight, therefore, the MCZ process as a whole can be seen in a more favourable light, even if progress has been slower than some would like and the MPA network (including MCZs) has been criticised for providing insufficient protection in practice.[206] Further, although the ambition to designate highly protected areas remains unfulfilled at the time of writing, this looks set to change, given the Government's acceptance in 2021 of most of the recommendations of the Benyon Review.

8.4   Lessons learnt

While it is important to recognise achievements, lessons can undoubtedly be learnt from the earlier MCZ designation process. The disillusion felt by many stakeholders in the aftermath of the Regional Projects and engagement process in 2009–11 has been attributed by various observers to a range of structural, procedural and external factors.

8.4.1 An abrupt shift

In terms of structure, both De Santo and Lieberknecht and Jones attribute problems to the marked shift of emphasis from the 'bottom-up' nature of the stakeholder-led site selection process (albeit using the SNCB's ecological network guidelines) to 'top down' decision-making when it came to implementation and management; both found that this change had contributed to the alienation of some stakeholders.[207] In 2011, when the RSGs were disbanded, '[o]pportunities for formal participation abruptly went from collaborative to non-existent', which 'incentivised campaigning and lobbying for sector-specific positions, perpetuating and intensifying conflicts rather than addressing or resolving them'.[208] Trust and communication between stakeholders declined, with many suspecting that lobbying was happening 'behind closed doors' and a range of different stakeholders feeling that those who disagreed with them were wielding greater influence.[209] Some (particularly the conservation groups) were disappointed by Defra's adoption of the tranche approach and saw the apparent abandonment of plans to designate Reference Areas as a major failing.

Government was always going to be the ultimate arbiter on designation, not bound by the recommendations of the Regional Projects or SNCBs, and MCZ management decisions were intended from the outset to *follow* designation (one effect of which was that stakeholders didn't know exactly what they were signing up to when making their

recommendations). It was always planned that the RSGs would be wound up after submitting their recommendations, without further formal input (except for the consultations, as noted above). Important questions, therefore, are whether the 'rules of the game' were sufficiently well communicated to stakeholders and whether there were structural shortcomings in the site selection and designation process. A large volume of information (much of it web-based) was, in fact, provided for participants, but, as De Santo observes, 'a process can err too much on the side of communication, if stakeholders are not provided with guidance on how to sift through massive amounts of information, or how to navigate websites with dozens of documents'.[210] Her research also points to confusion over who would determine how decisions were made and over the importance of socio-economic criteria during site selection.

8.4.2 Clarity and communication

Overall, De Santo suggests that problems were caused by 'a lack of clear communication' on the part of the SNCBs and Defra, as well as 'a lack of transparency and an inability to manage expectations appropriately'.[211] The Science and Technology Committee was also concerned about lack of clarity, especially on the management of MCZs.[212] Responses to the Call for Evidence during the HPMAs Review suggest that disillusion can sometimes be long lasting. One respondent, for example, recalled 'much local/public misunderstanding [in the MCZ process] ... and the lack of any guidance/clarity meant that the whole thing was designed to fail. This has led to much negative feeling … [about] possible MCZs and highly protect[ed] areas in coastal communities ... and everything now is an uphill battle'.[213]

8.4.3 Science and Politics

As often happens in environmental controversies, the nature of the evidence itself became a matter of dispute. In 2010, the Government made a commitment to designating MCZs on the basis of the 'best available' evidence[214] and Defra guidance stipulated that 'lack of full scientific certainty should not be a reason for postponing proportionate decisions on site selection'.[215] The RSGs' recommendations were made on that basis. Later, however, ministers determined that designation of MCZs would require 'adequate' or 'adequately robust' (i.e. a higher standard of) evidence.[216] Defending this position in evidence to the Science and Technology Committee, the then Fisheries Minister emphasised Defra's commitment to MCZs but maintained that in some instances the best available evidence was 'not sufficient to proceed with designation', or might be based on 'anecdotal reports'.[217] He argued that adequate evidence (based on advice from Natural England and the JNCC) was necessary 'to support decisions that may have socio-economic impacts and effects on people's livelihoods and result in enforcement and monitoring costs that fall on the tax payer',[218] even if a more precautionary approach (accepting the standard of 'best available' evidence) might be taken for sites that were deemed to be at high risk.

Defra's requirement for a higher standard of evidence was supported by some stakeholders (including, for example, the National Federation of Fishermen's Organisations [NFFO]) and opposed by others. While conservationists and some marine scientists saw it as 'shifting the goalposts',[219] and indeed as unrealistic in a complex and

dynamic marine environment, others insisted that a high threshold was essential when livelihoods were at stake.[220] Neither of the Parliamentary Committees was entirely convinced by the latter argument. For the Environmental Audit Committee, the slow pace of designation suggested a 'lack of Government commitment' and ambition;[221] it felt that the Government should follow a precautionary approach and designate on the basis of the 'best available' data. The Science and Technology Committee noted that fear of legal challenge might have played a part and found it 'questionable' that further evidence would make the MCZ process less contentious.[222]

8.4.4 Other pressures

There were concerns, too, that the timescale for the Regional Projects was too tight[223] and that participation was challenging and time-consuming for some stakeholders, especially those with limited resources, or lacking representative bodies, who struggled to represent their constituencies despite the support of dedicated Regional Project staff.[224]

One further possible reason for perceived problems, suggested by De Santo, is that despite what was seen in many ways as good participation, 'the actual process of integrating stakeholder data was challenging, there was a range in quality of information, which had to be standardised across the four projects'.[225] This emphasises the importance of skills in interpretation of qualitative data, as discussed in Part I of this Review.

8.4.5 Learning lessons: The Benyon Review 2020

Finally, it is worth reflecting on ways in which the Benyon Review, which considered whether and how Highly Protected Marine Areas (HPMAs) should be introduced in Secretary of State waters,[226] reflected the lessons learnt from the experience outlined above. The Panel found the case for HPMAs to be compelling and recommended that government should proceed rapidly to designate pilot sites, drawing from a list of 47 possibilities suggested by respondents to the Review's Call for Evidence.[227] The Government's response, accepting the majority of the Panel's recommendations, was published on 8 June 2021.[228]

It is interesting to consider how the HPMAs Review Panel sought stakeholder and public views during its year-long deliberations, as well its recommendations about engagement in eventual site selection and designation processes. The Panel was keenly aware of previous experience, particularly the failure to include Reference Areas within MCZs. In the period 2010–13 the Panel Chair had been the Fisheries Minister with responsibility for MCZ designation. He attributed the earlier failures to the problem that 'the people affected … felt excluded from the process',[229] a sentiment also expressed in responses to the Call for Evidence, as noted above. The Panel recognised that '[w]ithout meaningful engagement, identifying and designating sites [for HPMAs] could produce conflict' and that attempts to do so could fail as a result.[230] More positively, it was persuaded by its own evidence gathering that 'good [public and stakeholder] engagement would aid the delivery of HPMAs by helping to secure support for management measures, increased compliance and collaboration on monitoring'.[231] These arguments are not unlike the original rationale for stakeholder engagement in the site selection process for MCZs.

The Review Panel engaged (in meetings, roundtables and site visits) with around 50 stakeholder groups, including fishing, recreational, conservation and other sea user interests. A dedicated meeting was also held with marine social scientists, focusing on engagement strategies. The Call for Evidence elicited almost 400 responses, as well as 8000 responses from email campaigns organised by the Wildlife Trusts and the Marine Conservation Society.[232] Responses indicated a continuing high level of interest in, and support for, marine conservation (although, as the Panel emphasised in its report, respondents were self-selected and not a representative sample of a wider public).

A message that emerged consistently during the HPMAs Review was that clarity about the aims and management of HPMAs 'would be key to ensuring that interested groups, wider publics and affected industries are on board'.[233] Referring to the feeling of exclusion among some stakeholders in the MCZ process, the Panel rejected a model for future HPMAs in which government and regulators would inform stakeholders of management measures *after* designation: 'This approach might seem to be more efficient, but evidence suggests that it risks alienating stakeholders and potentially reducing compliance'.[234] Nevertheless, recognising resource constraints and 'the difficulty of pleasing everyone', the Panel concluded that 'authorities should improve the quality, rather than quantity, of engagement during the designation process'.[235] It proposed three main principles on which such engagement should be based, derived from evidence gathered during the review, including the public consultation, site visits and stakeholder roundtables.

The first principle, explicitly drawing on the experience of the MCZ process, was 'clarity and transparency'. The Panel felt that it should be easier to provide a clear definition of HPMAs than it had been for Reference Areas during the MCZ process, and made its own proposals in this regard. It stressed, though, that government would also have to clarify the scope of the engagement process itself: 'This means setting out how it will use any information gathered, and what is (and is not) open to discussion. … identifying the scope of, and constraints on, engagement and decision-making processes will help to build trust and avoid disappointment'.[236] It is relevant in this respect that the Review firmly advocated a hierarchy of criteria for HPMAs. Designation should be based primarily on ecological principles and, where these were met (which the Panel thought likely for a relatively large number of sites), social and economic criteria would be a further filter in the process. Noting that for MCZs raising the bar to require a higher standard of evidence had 'moved the burden of proof onto government [and] slowed the … designation process', the Panel recommended that designation of HPMAs should be based on the 'best available' evidence and that 'the need for "perfect" evidence should not be used as a delaying tactic'.[237]

On the second principle, 'representation and diversity of views', the report argued that the engagement approach should be 'innovative and creative for the best chance of including the hard-to-reach and under-represented voices. It is important for engagement to occur at national and local levels. Taking the time to map out who should be engaged and the most effective approaches to reach them is crucial'.[238]

The third principle was 'early and continuous engagement'. Here the Review emphasised

that sufficient time and resources were prerequisites, referring to time pressures that some had complained of in the MCZ site selection process: 'this experience should not be repeated for HPMAs'.[239] Explicitly seeking to avoid the shift from 'bottom up' to 'top down' identified as a source of disillusion in the case of MCZs, the Panel argued that engagement should continue beyond site selection through to designation and implementation. It recommended co-management of designated HPMAs where possible, emphasising that stakeholder partnerships would again require allocation of sufficient time and resources.

Clearly, then, the HPMAs Review sought to apply lessons learnt from the earlier MCZ process. It remains to be seen whether this will prove effective in the designation process for pilot HPMAs, to which the Government has now committed on an ambitious timescale,[240] and beyond.

8.4.6 Reflections on learning

In the context of learning from past experience, further questions should be asked. Have procedural shortcomings been blamed for what is an inherently political phenomenon, inevitably involving winners and losers? Were the well-documented problems of the original MCZ process in fact a reflection of 'intractable controversy',[241] meaning that designation, especially of Reference Areas, was always bound to be difficult? Certainly, observers of the MCZ process identified complex and conflicting interests and perspectives. As argued in Part I of this Review, consensus is not always an appropriate objective of public engagement. If it is indeed 'impossible to please everybody', differences need to be acknowledged and approaches that are not consensus-dependent (involving, for example, spatially-based solutions and forms of compensation for displacement) need to be explored. What seems most likely in this particular case is that conflicts inherent in competition for marine space became intertwined with identifiable procedural problems (relating to clarity, communication and expectation management) to produce outcomes that left some participants disappointed, at least in the short term. As the above discussion has also shown, perspectives can change over time, so that a final lesson might be that it is important when assessing outcomes to take a sufficiently long-term view.

9. Public Engagement with Nanotechnologies

9.1 Introduction

The term 'nanotechnologies' refers to the manipulation of matter, and the design and application of materials and devices, at very small scale. The Royal Commission on Environmental Pollution adopted as a working definition of a 'nanomaterial' one that is between 1 and 100 nm (nanometres, or billionths of a metre) in at least one dimension and which exhibits novel properties.[242] Interestingly, the very definition of a nanomaterial, which might have regulatory implications, is not uncontentious.

Nanomaterials exist in nature (milk, for example, is a nanoscale colloid) and some applications of nanotechnologies (like computer chips) are well established. But over the past few decades there have been rapid (ongoing) developments in the ability to manipulate and create new materials at the nanoscale, and in novel applications of nanomaterials. At the nanoscale, even familiar materials can display quite different (not always predictable) properties from those associated with their bulk form. Gold, for example, is thought of as an inert substance but nano-gold is highly reactive. There is a multitude of possible nanomaterials, variants and applications, for example in medical tools, foods, packaging, fabrics, cleaning materials, cosmetics and sunscreen.

This case study considers a series of public dialogues that have taken place over the past fifteen years. It covers three of the four exercises within the programme *The Nanodialogues: Four Experiments in Upstream Public Engagement*, initiated and funded by the then Office of Science and Innovation (OSI) and organised by Demos (an independent think tank) and the University of Lancaster with various partners in the period 2006–08. The three experiments of most relevance in a Defra context (referred to in this case study as *The Nanodialogues I, II and III*), were those involving i) the Environment Agency, on nanoparticles and environmental remediation; ii) the Biotechnology and Biological Sciences Research Council (BBSRC) and the Engineering and Physical Sciences Research Council (EPSRC), on research at the convergence of bio- and nanotechnologies; iii) Unilever, on corporate research and innovation.[243] Also covered in this composite case study is a later public dialogue commissioned by Defra, framed around four specific nanotechnology applications, which ran in 2014–15. All of the exercises were supported by Sciencewise.[244]

Public engagement in this field has been relatively well documented. Information on exercises in the UK other than those covered here can be found, with further references, in the final report of the Nanotechnology Engagement Group.[245]

9.2 Rationales for public engagement

As with many emergent technologies, substantial potential benefits for society, economy and environment have been promised for nanotechnologies in fields such as medicine, AI, food, environmental remediation and many others. But potential harms have also been documented or deemed plausible[246] and there is broader concern about as-yet-unknown risks to human health and the environment. The adequacy of regulations not drafted with

nanomaterials in mind has been called into question, and wider concerns have been raised about social control and governance: this is a field in which we find all dimensions of 'incertitude', extending well beyond known or predictable 'impacts'.[247] The RCEP saw the burgeoning development of nanotechnologies as an example of Collingridge's 'technology control dilemma':[248] when technologies are new, too little is known about them to enable effective social control and regulation; but by the time there is more knowledge, the technologies have often become embedded so that it can be difficult and disruptive to introduce effective controls.

These issues were examined in a report by the Royal Society and Royal Academy of Engineering,[249] often credited with presenting the first major call in the UK for 'upstream' public engagement[250] on nanotechnologies. The field was seen as an important opportunity for public engagement at an early stage, to raise issues of concern, enrich the debate and help set the agenda for research and innovation. The RS and RAE recommended more research into public attitudes and initiation by government of public dialogue on nanotechnologies. The government responded by setting up a Nanotechnology Engagement Group (NEG) to oversee such exercises,[251] and OSI initiated and funded a three-year project, *The NanoDialogues*, which ran four exercises in 2005–6 to evaluate the role and potential benefits of upstream engagement. More specifically, the programme was intended to:

i. Experiment in a theoretically informed way with new methods of upstream public dialogue in societal debates about nanotechnologies
ii. Ensure that the dialogue experiments were framed in a way that could inform processes of institutional decision-making and priority-setting
iii. Generate intellectual and practical resources for enriched public, policy, and scientific debate about the social implications of nanotechnologies
iv. Identify wider lessons and insights that can inform the policy and practice of public engagement in science and technology.[252]

The RCEP's report on nanotechnology and the environment similarly urged meaningful engagement at an early stage of development, and recommended 'mov[ing] beyond one-off … "projects" to recognise the importance of continual "social intelligence" gathering and the provision of ongoing opportunities for public and expert reflection and debate'.[253] The Commission noted, however, that genuine 'upstream' engagement had proved elusive, and made the following observation:

'… [e]nthusiasm to be seen to engage has sometimes run ahead of any real commitment or institutional capacity … to support the activities adequately [and] to make intelligent and transparent use of the findings, especially if the latter raise fundamental questions about the direction and development of innovation.'[254]

The early advocates of public engagement on nanotechnologies expressed rationales that were both normative and substantive, as outlined in Chapter 1 of this report. An instrumental rationale was in evidence as well. Government and industry were anxious to ensure that nanotechnologies would not face controversy and protest. They were therefore keen to overcome the 'crisis of trust' in science,[255] which was attributed in some quarters to the (mis)handling of the BSE and Foot and Mouth crises and to an inadequate,

'downstream' public consultation on genetically modified crops.[256] Indeed, one motivation for timely and meaningful public engagement in the field of nanotechnologies might well be characterised as 'not wanting another GM'. The government's response to the RS/RAE report, for example, agreed that 'properly targeted and sufficiently resourced public dialogue [would] be crucial in *securing a future for* nanotechnologies'.[257]

The Defra-sponsored dialogue in 2015 was inspired by a similar mix of rationales. It sought in particular to contribute 'context-relevant and application-specific findings to the body of previous upstream research',[258] though in practice some of the earlier dialogues, for example that with the Environment Agency, had also focused on particular applications. In summary, the specific objectives of the 2015 dialogue were:

    i.   to enable exploration of public attitudes in order to develop appropriate regulatory and governance mechanisms
    ii.   to understand public aspirations for nanotechnology
    iii.   to explore public views on communication about nanotechnology
    iv.   to ensure insightful discussion can take place between the public and Government, industry and academia.[259]

Overall, then, the rationale for public engagement in this field, reflected in the dialogues considered here, could be said to be mixed; some might see it as confused but others as simply reflecting the co-existence of different objectives.

9.3 Characterisation of 'public(s)' involved

'Publics' were characterised in the dialogues in various ways. *The Nanodialogues* of 2005–06 mostly engaged groups with selected characteristics and/or from particular places, who had little or no prior knowledge about nanotechnologies. These were not 'issue publics', nor were they representative mini-publics; rather, they were specially selected groups who participated in 'collective exploration' with external experts and the partner organisations. Not having already formed views on nanotechnologies, they exemplify 'innocent' publics, as described by Irwin.[260]

The Environment Agency dialogue (*Nanodialogues I*) engaged thirteen people from East London, 'an area … which has received more industrialisation, remediation and regeneration than most'.[261] The group, consisting of two teachers, two nurses, a recruitment consultant, a web developer and a full-time mother, was united by 'some form of participation in local community life' and was presented as 'a group of interested people' living in an area in which the application to be discussed was seen as especially relevant.[262]

The Research Council dialogue (*Nanodialogues II*) involved fourteen participants in two groups, one consisting of full-time mothers with school-age children and one of professionals aged 18–30 with a declared interest in technology.[263] The majority came from Swindon. Similarly, the dialogue with Unilever (*Nanodialogues III*) involved twenty-eight members of the public in four focus groups – 'working mothers', 'metrosexuals', 'aspirational women', and 'organic men' – the first two drawn from Newcastle and the last

two from London.[264] In neither case is it clear why these particular sub-groups were chosen.

The 2014–15 Defra/OPM public dialogue involved, first, a stakeholder consultation with 36 participants from industry, government, regulators, research funders and civil society (identified using an online stakeholder mapping tool, Debategraph) and second, a public dialogue.[265] In the latter, three sessions were attended by members of the public drawn from Birmingham and surrounding rural areas. An independently recruited 'mini-public' of around 40 reflected socio-demographic characteristics of the Birmingham area, [266] a location deemed 'likely to be reflective of urban and rural populations across England'.[267]

Beyond formal, 'invited' exercises, other 'publics' have become engaged on the subject of nanotechnologies, though probably to a lesser extent in the UK than in a number of other countries (in France, for example, nanotechnologies became a subject of protest[268]). In the UK, the issue has not, to date, become one in which publics have been 'ignited'[269] by particular controversies. Industry has played a central role in discussion of policy and regulation, and has been closely involved with some of the public engagement exercises, for example the Chemical Industries Association (CIA) was a collaborator in the Defra-commissioned dialogue in 2014–15 and Unilever was a partner in *The Nanodialogues III*.

9.4   Approaches and methodologies

A range of different approaches and methods were adopted in the dialogues, most of which focused on specific issues and applications. This was considered to be an effective way to facilitate engagement in relation to technologies that were unknown to many participants, though some drawbacks (discussed later) have also been noted.

9.4.1 The Nanodialogues I

This exercise, which took place in 2006, was characterised as 'a people's inquiry on nanotechnology and the environment'; it focused primarily on the use of nanoparticles in land remediation. The motivation for the Environment Agency was 'to establish a meaningful dialogue with members of the public, to explore how trust is developed and to generate "social intelligence"' to guide policy discussions on remediation and nanotechnology.[270] Meetings were held on three Saturdays in January and February, with free weekends in between. The method, chosen by a project steering group, was similar to that of a citizen's jury but with no specific 'charge' or requirement to reach a 'verdict'. The cost, including staff time and associated expenses, was £75K.

Thirteen members of the public from East London, with little prior knowledge of nanotechnologies, were brought together to talk to 11 experts, undertake research (such as internet searches), reflect on what they had learned, and arrive at conclusions. They were engaged in a discussion about new technology in general before turning to nanotechnology and the specific application. Key themes to emerge included uncertainty, the need for openness, and the risks associated with new technologies. Twelve recommendations, broadly around the question 'how should we regulate the release of

nanoparticles for land remediation', were endorsed by all participants.

All members of the public had signed up to be involved with exercises similar to the one planned; during recruitment they were told only that they would be discussing technology and the environment. They were paid a modest sum for their time. Experts were drawn from a range of organisations in an effort to cover different perspectives, but all with a focus on environmental remediation. Demos facilitated the inquiry.

A response to the recommendations was prepared by the Environment Agency and Defra[271] and the exercise was independently evaluated.[272]

9.4.2 The Nanodialogues II

The exercise with BBSRC and EPSRC, which ran over three sessions in the summer of 2006, was a deliberative dialogue involving members of the public, scientists and research council staff. It was framed around two broad issues, the first concerning what sorts of questions were likely to determine public responses to nanoscience and nanotechnologies; and the second considering what public engagement with early-stage research should look like and how research councils could build public value into their work. Stimulus material and scientific perspectives focused on nanotechnology and the role of BBSRC and EPSRC in supporting and funding nanotechnology research.

As noted above, the process engaged with samples of two particular groups – 'non-working mothers' and 'young professionals'. The rationale for this approach, was outlined by Demos as follows:

> 'In a departure from the standard Citizens' Jury model, in which a group is brought together from as wide a range of backgrounds as possible, we wanted to build upon focus group methodology in order to develop deep discussions of issues. The purpose of the focus groups was to encourage discussion of potential issues arising for nanotechnology, within a framework set by participants.' [273]

Each group met twice, with a gap of two weeks between sessions, and a third session was organised as a final workshop in which the two groups could develop shared conclusions and recommendations.

Discussions in the initial sessions began with people's perspectives on science and technology before being narrowed down, using stimulus materials, to nanoscience, nanotechnology and the role of public funding for science. In the second session, the groups (some of whom had by then searched for information on the internet) were brought together. After time for reflection, there was an opportunity to discuss the issues with, and ask questions of, visiting scientists and other experts. One group took part in a discussion about 'downstream' impacts of nanotechnology, in computing and medicine; the other looked at questions about basic science, the nature of uncertainty, and the responsibilities of scientists as citizens. In a mixed session, the groups then discussed the role of the research councils, allocation of funding, and how researchers are asked to consider the social and ethical dimensions of their science.

There was poor attendance at the final session, though those present engaged in a 'deep discussion'[274] and reflected on how their thoughts had developed over the course of the exercise. Participants were shown a BBSRC organogram and asked where and how public engagement should fit in. Four recommendations were developed, providing participants 'with some sense of consensus to leave with'.[275]

9.4.3 The Nanodialogues III

This experiment, with Unilever, conducted by Demos in late 2006 and early 2007, involved focus groups in Newcastle and London followed by reconvened workshop in Liverpool and London. The objective was to assess the potential for upstream public engagement in corporate science and innovation. The 28 members of the public, in four differently selected groups as outlined above, interacted with ten scientists. Discussions (which 'hardly needed encouragement'[276]) on the use of nanotechnologies in hair products, oral care and food were prompted by 'nano-scenarios' constructed by Demos after interviews with Unilever scientists in Port Sunlight. Groups were asked to produce two-part collages in the form of visualisations of an imagined nano-future and an alternative future. In a final stage, participants' views of corporate R&D were taken back to the scientists at Port Sunlight.

9.4.4 The 2015 Public Dialogue

This dialogue, sponsored by Defra and delivered by OPM, was steered by an advisory group with representation from Defra, CIA, The Department for Business, Innovation and Skills (BIS, as it then was), the food and drink sector, academia and NGOs. As outlined above, it involved a stakeholder consultation event and three dialogue sessions with a 'representative' sample of around 40 members of the public.[277] The dialogue took place over three sessions on alternate weekends in February and March 2015.

Participants examined four applications of nanotechnologies – in paints and coatings, fuel additives, land remediation and sunscreen – aided by a range of resources (PowerPoint, print, audio, video and role play). Experts from industry, academia, government, regulators and NGOs provided opinions in person or by video and Defra staff attended all three sessions to observe and answer questions. The total value of the contract was £105,420 and there was an in-kind contribution of £3000 from the CIA as well as contributions of at least 120 days by the Advisory Group and Defra project management team. The initially six-month timescale was seen as too tight and was extended to allow for a longer scoping stage.

9.5   Outputs and outcomes

As noted in Chapter 1, it is not always straightforward to distinguish 'outputs' from 'outcomes'. In particular, when findings, recommendations and reports have 'fed into' particular processes or organisations, this could be regarded as a form of output or as an outcome of learning processes and discussions. As presented below, therefore, outputs and outcomes are not mutually exclusive.

9.5.1 Outputs

The dialogues produced numerous and voluminous outputs, including data (on processes and participants' perspectives on nanotechnologies and wider issues), recommendations (which might equally be seen as outcomes of the process), published reports and evaluations. These offer valuable insights into public engagement in general and engagement with nanotechnologies in particular.

The participants in *Nanodialogues I* agreed on twelve recommendations. A full report was published by the Environment Agency,[278] and the experiment was discussed in a Demos report on *The Nanodialogues*[279] and in the final report of the NEG.[280] The independent evaluation[281] provides further analysis. In a different kind of output (or outcome), four participants later met members of Defra's nanotechnology team and two made a presentation to Defra's Nanotechnologies Stakeholder Forum (NSF).

Outputs from *Nanodialogues II* with BBSRC and EPSRC (in which there was poor attendance at the final session) included four recommendations, a report by Demos[282] and a joint response to the project from the two research councils.[283] The exercise was discussed in the wider-ranging reports by Demos[284] and NEG[285] and was independently evaluated.[286]

Nanodialogues III (with Unilever) was written up as a case study by Demos[287] and was among the exercises considered in the NEG report.[288] It has not been possible to find further substantial documentation on this dialogue.

The 2014–15 Defra-sponsored exercise in stakeholder consultation and public dialogue was the subject of a report to Defra from OPM[289] and an independent evaluation.[290] The public dialogue produced important insights into the ways in which people made sense of nanotechnologies in general as well as their use (or potential use) in the specific applications considered.

9.5.2 Outcomes

The Nanodialogues of 2005–06 were described as 'experiments in upstream public engagement', using nanotechnologies as a test case. In this context, they were judged by the organisers, partners involved and independent evaluators to have been broadly successful in meeting their objectives and having useful outcomes.

The experiments demonstrated that it was possible 'to deliver mutually educative dialogue between scientists and members of the public on complex, upstream scientific topics'; they furnished information about attitudes to nanotechnologies drawn from a range of different publics; they improved understandings of how such dialogues could be conducted; and they offered insights into the aspirations and concerns that might arise as wider publics became more aware of nanotechnologies and their implications.[291] The feeling of 'pride and privilege' expressed by several participants in the People's Inquiry is also an interesting outcome.[292]

In addition, *The Nanodialogues* were considered to have influenced the policies of the Environment Agency, EPSRC and BBSRC. The EA changed how it regulated nanoparticles in the environment as a result of recommendations from the People's Inquiry, while outputs from the Research Council dialogue fed directly into the EPSRC Ideas Factory (2007), which considered priorities for £1.5 million research funding, and helped shape priorities for research council funding of later research.[293] Results from the experiments were also considered by the Nanotechnology Issues Dialogue Group (NIDG).[294] Interestingly, however, the NEG report[295] played down the importance of establishing clear links between project outputs and subsequent decisions or policy documentation – the 'direct hits' of the policy world.[296] Rather, they argued that public engagement was more likely to influence policy and decision-making through 'subtle and indirect avenues', for example by challenging participants' perspectives and helping to effect gradual change in the priorities of researchers or decision-makers.[297]

The main output of the 2015 Defra-sponsored dialogue, which focused on four specific applications of nanotechnologies, seems to have been a reassurance that such applications were unlikely to encounter strong public opposition. While public participants were less concerned about the use of nanomaterials in paints and fuel additives than in sunscreen or land remediation,[298] the overall message to emerge was that they were not in principle opposed to such applications, and could see benefits, provided that there was effective regulation and monitoring.[299] URSUS, the independent evaluators, expected the results to feed into European Commission proposals on REACH[300] and the newly established Nanotechnology Environment and Health Industry Group, though it has not been possible to establish the extent of any lasting influence as a result.

Several important points about outcomes merit consideration. First, the exercises considered here were not, in fact, particularly 'upstream', in that they tended to focus on specific issues or applications of nanotechnologies, some already well developed.[301] Second, as Chilvers argues, 'the effectiveness of upstream engagement will ultimately be judged by its impact on shaping future developments in nanotechnology and its influence on the processes and cultures of institutions that govern (publicly funded) science'.[302] There is limited evidence of such outcomes in this composite case study, though it is possible that they could be uncovered in more detailed, longitudinal research. A third, and related, point is that formal evaluation, while extremely useful, took place very soon after completion of the engagements, so was unable to comment on lasting impacts or longer-term effects. Fourth, no ongoing contact seems to have been maintained beyond the short term with the publics involved, despite the desire of some participants (in the Research Council exercise, for example) 'to receive feedback on the outcomes of the experiment and how it has been used in decision-making'.[303]

9.6   Lessons Learnt

Valuable lessons were undoubtedly learnt from the exercises, including the following:

   i.   Public dialogue on complex issues of science and technology is possible and

under the right conditions can be constructive and productive
ii. Working in partnership with the various organisations involved was helpful
iii. Access needs to be provided to broad and balanced expert voices; ideally, the publics engaged might have some say in which experts should be invited. The resource implications of effectively engaging a range of experts should not be underestimated
iv. Without predetermining outcomes, clarity is needed from the outset about the purpose and structure of the exercise – why are particular publics being engaged? Otherwise there is a risk of confusion, and possibly of disillusion. Poor attendance at the third session of the Research Council dialogue was attributed to the recruitment stage, when participants had not been sufficiently informed about their option to take part.[304] Lack of clarity can also lead to scepticism; in the exercise with the EA, for example, one participant worried that the topic had been chosen because the government was 'gearing up' to allow the technology to be used on brownfield sites during preparations for the London Olympics[305].
v. 'Evidence-based' policy making can struggle to deal with qualitative outputs. As a result, '[t]here has been a mismatch between the format of public engagement outputs, and the disposition and expectations of some civil servants who are expected to respond to them'.[306]
vi. Providing focus to 'ground' the issues (as in deliberating specific applications of nanotechnologies) is to some extent at odds with the more abstract requirements of genuinely 'upstream' public engagement
vii. Perhaps the most important lesson is that 'upstream' public engagement is hard, especially if there is any intention of moving beyond 'one-off' exercises. It requires commitment, substantial resources and a well-developed absorptive capacity on the part of researchers and decision makers.

9.7 Acknowledgements

Appendices

Appendix 1: Membership of SSEG Public Engagement Task Group and Defra Reference Group

A 1.1 SSEG Task Group

Professor Susan Owens OBE, FBA (Chair)

> Professor of Environment and Policy (Emerita), University of Cambridge; SSEG member (Chair from October 2021); Defra SAC member from July 2021; member of Hazardous Substances Advisory Committee (to March 2022)

Professor Jennifer Gabrys

> Professor, Department of Sociology, University of Cambridge; Director, Planetary Praxis Research Group; Principal Investigator, 'Citizen Sense'; Co-opted member of Task Group

Professor Stephen Hinchliffe FAcSS

> Professor of Human Geography, University of Exeter; SSEG member; Member of Defra's Scientific Advisory Committee on Exotic Diseases

Professor Peter Jackson FBA

> Professor of Human Geography and co-Director of the Institute for Sustainable Food, University of Sheffield; SSEG member

Professor Dame Sarah Whatmore, FBA

> Professor of Environment and Public Policy, University of Oxford; observer with Task Group in capacity as Defra SAC member and Chair of SSEG to June 2021

Secretariat

> Rachel Hunt   Senior Social Researcher, Environment Analysis Unit, Defra

> Dr Carole White Senior Social Researcher, Marine and Fisheries, Defra

A 1.2 Defra Reference Group

Dr Charlotte Allen   Head of Central Social Science Programme, Defra

Hannah Baker   Social Researcher, Insight and Evaluation Team, Future Farming Analysis and Evidence, Defra

Dr Robert

Bradburne   Deputy Chief Scientific Advisor, Defra

Emily Cattell   Head of Profession Social Research, Deputy Director of Analysis and
                     Insight Directorate, Defra

Dr Ross Gillard   Principal Social Researcher, Chemicals Analysis, Defra

Lindsey Harris   Senior Social Researcher, Analysis and Insight Directorate, Defra

Dr Edward
Hind-Ozan   Head of Fisheries Social Science, Defra

Dr Daisy Payne   Senior Social Researcher, Environment Analysis Unit, Defra

Appendix 2: Scoping Paper for Review of Public Engagement and Policy Interface

Note: This is the original scoping paper as prepared by a group of SAC and SSEG members – Professor Stephen Hinchliffe (SSEG), Professor Peter Jackson (SSEG), Professor Henrietta Moore (SAC), Professor Susan Owens (SSEG) and Professor Dame Sarah Whatmore (SAC, SSEG Chair) – in 2020.

A 2.1 Context

Public engagement is increasingly popular amongst policy-makers as a set of mechanisms for informing policy design and implementation. Across a range of Defra stakeholders, as well as industry and third sector partners, there is now a perceived need for a rapid review of the state of the art with regard to the many different forms of public engagement, and an initial assessment of what works, when and why.

A 2.2 Purpose and Need

A number of distinct rationales for public engagement and participation have been identified: for example, people have a right to be involved in decisions that affect their lives; a plurality of views provides better empirical knowledge to inform the policy process; inclusive participation helps build support for policies and improves the efficacy of implementation (Dahl 2000, Fischer 2000, Pellizzoni 2001, Stirling 1999 and 2008).[i] Certainly, there is a perception among government, civil society organisations and citizens that 21st century democracy needs greater public legitimacy (Chilvers and Kearns 2019; Felt and Fochler 2010). In this context, effective policy-making should involve the active participation of key stakeholders; draw on the knowledge and expertise of particular, sometimes specialist, constituencies (for example, with specific place-based or professional insights); and understand and reflect people's experiences, reasoning and shared values (Nascimento et al. 2018; RCEP 1998, 2008). Engaging citizens and communities may be especially valuable where contested social interests and conflicting evidence are in play, and when transitions (including those concerning new technologies and risks), involve trade-offs or are otherwise difficult and contentious (Pritchard and Gabrys, 2016; Waterton and Tsouvalis 2016; Whatmore and Landström 2011). Many, if not all, areas of Defra's work – from landscape and marine management to flooding, food and hazardous substances – have at least some of these characteristics.

A wide range of approaches to 'public engagement' has been developed, including surveys, consultations, public dialogues, focus groups, citizen assemblies, deliberative mapping, citizen science, communities of practice and social innovation, and many

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[i] Stirling (1999) refers to these rationales as 'normative', 'substantive' and 'instrumental' respectively; Pellizzoni (2001: 66) relates them to 'democratic', 'cognitive' and 'governance virtue'.

variants (Rowe and Frewer 2005, Van Oudheusden and Laurent 2013). These forms of engagement vary substantially in purpose and practice and produce different kinds of data, evidence and outcomes. Over the last 25 years, for example, GMOs, nanotechnologies and climate change have been the subject of a large number of public engagement exercises (Irwin and Wynne 1996, Lezaun and Soneryd 2007, Macnaughten et al. 2015), some of which have had tangible impacts on policy-making.

The Review will draw on peer-reviewed and other published literature, experience and best practice to identify rationales for public engagement and the types of policy impact that have resulted from particular engagement methods. It will assess the strengths and weaknesses of different methods in relation to a variety of purposes and participants. The core target audience will be policy and analysis teams in Defra, with a focus on helping policy makers and analysts to:

i. articulate clearly the purpose and requirements of public engagement exercises
ii. make informed decisions about the most suitable engagement method(s) in the context of particular policy areas, recognising the variety of:
    - *Purposes*: including communication, social research, evidence gathering, building trust or 'buy-in', consultation, dialogue, deliberation, collaborative working, co-design
    - *Participants*: including different publics, stakeholders, experienced consultation respondents, hard to reach groups, critics and those who are hostile to particular interventions
    - *Focal points*: for example, whether the emphasis is on big issues, such as 'environment' as a whole, or on policy-specific questions
    - *Timescales*: in particular, whether the intention is a 'one-off' exercise or a form of engagement that could be sustained in the medium to long term

iii. interpret the findings from public engagement exercises and relate them to other evidence
iv. manage the expectations of all parties – including participants and commissioners – about the scope and outcomes of the engagement
v.   represent and manage the tensions that engagement can sometimes uncover.

A 2.3 Scope

The Review will consist of an initial literature review covering the rationales for and specific purposes of public engagement, and the value and effectiveness of different approaches for policy analysis, formulation and implementation. It will consider different kinds of 'publics', including the public at large and those generated by shared experience of a particular hazard or situation, and different forms of engagement. The validity and robustness of the data and evidence produced by the various engagement methods, and the resulting impacts on policy (an under-studied area), will be explored. Illustrative case studies of areas of Defra analysis and policy will be developed, to help assess how public engagement can be used to inform policy-making in the most effective way.

A 2.4 Purpose and methods of engagement

The purpose of different engagement methodologies requires sustained consideration. For example, public participation in research may focus on how to gain insight, whereas other exploratory activities involve citizens working in collaboration with research and/or policy actors. In such contexts, the presentation of evidence and data are key to successful participation. Surveys are often used to supply quantitative data and to inform the design of public dialogues or other types of data collection. Focus groups can be useful to gain initial thoughts or test public perceptions, values, understandings or views. Deliberative and experimental groups can provide models for exchanging different kinds of knowledge, working towards a shared understanding of an issue, and achieving a consensus on policy options or a clear understanding of ongoing disagreement. In-depth interviews, community mapping, public dialogue, citizen science and a variety of forms of facilitation may be used. Facilitation and design are often key to outcomes. Evaluation of design, methods and facilitation is therefore important, but is rarely linked to ongoing conversations and sustained public engagement beyond the initial activities.

Methods of recruitment for public engagement also vary widely. Some exercises use pre-existing panels recruited by market research firms, others solicit participation in public settings or through face-to-face encounters. Participants may be recruited individually or as groups, and may be paid or unpaid. Recruitment strategies (or 'sortation' issues) are not merely a technical matter, but connect to wider concerns (on the part of both policy makers and citizens) about who does and does not get to participate. This bears not only on the question of evidence, but also on matters of validity, representation and legitimacy. Thought should also be given to who is best-placed to select and recruit participants; for example, market research firms can often respond rapidly but may not have the subject knowledge to provide the most insightful analysis, while academics may be less agile in responding to specific calls for evidence.

Important considerations for those intending to conduct public engagement exercises include:

- *Types of recruitment and mediation* – e.g. random sortation or active recruitment of stakeholders. Mediation can involve civil society organisations acting on behalf of a public group
- *Inclusions, exclusions and interference* – What is the rationale for who is to be engaged and in what ways, and how is the quality of their engagement to be measured? Who might be excluded, and what kinds of interferences might those outside and inside the process seek to bring to bear?
- *Modes of engagement* – is the intention primarily an exercise in consultation, information gathering, or generation of new evidence and ideas (or more than one of these)? Does the method fit the purpose?

A 2.5 Key questions for the Review

The review of public engagement will follow four key themes that address 1) the forms of public engagement; 2) criteria for determining effectiveness; 3) participants and

recruitment methods; and 4) resource requirements for undertaking public engagement. The questions focus on what works in public engagement, how to undertake more participatory policy making, and how to implement public engagement processes.

A 2.5.1 Forms of public engagement

- What are the main forms of public engagement and what are their known/potential strengths and weaknesses?
- What kinds of evidence are produced by different approaches to public engagement and when and how can such evidence be relied upon?
- What novel forms of engagement are emerging or on the horizon (including digital techniques)?

A 2.5.2 Effectiveness

- How strong is the evidence concerning the effectiveness of public engagement (and how should 'effectiveness' be judged)?
- How do insights from different forms of public engagement feed into policy analysis, formulation and implementation? How are these insights shared? Could these processes be more effective?
- What types of engagement have proved most valuable for specific policy purposes and applications? What considerations are involved in determining suitability?
- When and how might the various forms of public engagement be detrimental to good policy formulation and implementation?

A 2.5.3 Participants and expectations

- What are the expectations of those involved in public engagement (both commissioners and participants), in terms, for example, of the conduct, framing, outcomes and impacts of various exercises? How should expectations be managed?
- What are the merits and shortcomings of different approaches to recruitment into public engagement exercises (including mediation)? What types of recruitment and mediation are most effective?
- How do different forms of engagement and recruitment affect who is included or excluded? In what ways have traditionally hard-to-reach groups been engaged most effectively?
- How can short-term engagement be transformed into sustained conversation?

A 2.5.4 Resource requirements

- What are the resources, skills and procurement requirements of different public engagement methods?
- When methods require sustained input from participants, how can this burden be recognised and/or reduced?

A 2.6 Potential Case Studies

Defra:

- 25 Year Environment Plan public engagement (including Nat Cen blogs) [current]
- National Food Strategy public dialogues [current]
- ELM Collaborative Design [past]
- Future Farming diary methods [current]
- BEIS/ Defra: public engagement on Net Zero [future]
- Citizen Dialogue on bTB (Sciencewise co-funded project, 2014) [past]. Reports on the workshops etc. are [here]
- Games, simulation and visualisation for greater public engagement in plant health [current] ([here]) due to finish 2020)
- Marine Conservation Zones (MCZs) [past] and current engagement in implementation of Highly Protected Marine Areas (HPMAs) [current]
- Engagement with stakeholders with goal of informing support strategies various sectors (e.g. fishing, farming, etc.) in wake of Covid-19 impacts [current]
- Hazardous substances [future]
- Public Value Framework/ Spending Review

External:

- Royal Society public engagement on land use
- University of Sheffield: hard to reach farmers

A 2.7 Process

The literature review will provide an overview of sources, following a process of keyword identification. Social science and science databases will be explored to include qualitative and quantitative studies. While it will not be practicable to undertake a full systematic review, a rigorous process of database searches and evaluations will be conducted along the lines of an RER. The aims will be to learn from recent experience, identify key methodologies and outcomes, and provide case study evaluations from existing best practice. This may include work by consultancies and private providers, for example, INVOLVE, OPENFIELD, and WHICH. Existing sources of expertise, such as Sciencewise and the National Centre for Social Research, will also be consulted.

Existing practice in UK government (mainly Defra) will be the focus for case studies and a review of evidence and methodology. Of particular interest will be the exploration of standing panels, digital platforms and innovative data collection methods. Where appropriate, international comparators will be used to illustrate alternative uses of public engagement methodologies by government bodies. An annotated bibliography of academic articles will be compiled on the effectiveness of different methods for different purposes.

The Review is expected to be complete by March 2021.

A 2.8 Proposed products

1. Literature review as outlined above.
2. Guidance to support analysts and policy makers to articulate, and choose the best methods for, their public engagement requirements. (May include decision-tree.)
3. One Director-level workshop (of at least one hour), early 2021, to promote and gain buy-in for the guidance and highlight the role of social research to support public engagement.
4. Possible additional analysis-focused event and/or specific workshop to work through 'live' public engagement task early 2021.
5. Review published initially (subject to necessary approvals) on Defra SAC website.

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Appendix 3: Methodology for Rapid Review of the Literature

A 3.1 Introduction

The specification for the rapid review of the literature (carried out by Dr Lara Mani of the Centre for the Study of Existential Risk, University of Cambridge) required that it should:

- adopt as systematic an approach as possible within the short time frame available (130 hours)
- focus primarily on English language literature relevant in the context of Defra's responsibilities for environment, food and rural affairs in England
- concentrate mainly on literature published in the period 2010–2020 inclusive.

The above were not intended to be rigid constraints but rather to make the work manageable within a potentially very large body of literature. The specification included the broad research questions from the Scoping Paper for the Public Engagement Review (See Appendix 2).

This appendix details the methodology used for the literature review, based on the text provided by Dr Mani.

A 3.2 Gathering literature

A database search was conducted for relevant peer-reviewed publications using the SCOPUS database – a search platform for academic literature from a range of journal publications and sources. The search was conducted using a Boolean search string developed based on a list of indicative search criteria in the specification (further information below). Additional specific searches to supplement the literature pool were also conducted of relevant academic journals including SAGE journals 'Science Communication' and 'Public Understanding of Science', utilising the search terms encompassing public engagement methodologies and 'what works' terminologies.

Grey literature (N=24) was retrieved through a range of websites and directories including the UK Government and Defra's website, Sciencewise, Participedia, National Co-ordinating Centre for Public Engagement (NCCPE) and Involve UK. A list of the websites and directories search for grey literature is provided below. A number of contributions to the literature recommended by members of the Task Group or previously known by the author were also considered (N=12).

A 3.3 Stage one screening: Title and abstract review

The initial SCOPUS database search returned 1,399 records, which were imported into CADIMA[ii] – an online tool that enables screening of literature of evidence reviews. An automatic duplicate removal was completed before each record was then screened by title and abstract, against the inclusion criteria (N=1382) outlined above:

The screening process excluded any records where a 'No' was marked against any inclusion criteria. Any contributions whose relevance to the inclusion criteria was not certain were marked as 'unclear'. Records that matched all four inclusion criteria were passed for critical appraisal. All grey literature and recommendation were automatically passed for critical appraisal. A flow diagram depicting the screening process can be found below.

A 3.4 Critical appraisal

After title and abstract screening, 326 records from the database search, 24 items of 'grey' literature and 12 'other literature' records underwent a full-text appraisal for potential inclusion in the literature review. Records were ranked by relevance 'High', 'Moderate' or 'Low', based on the author's judgement of their significance to the research questions, quality of writing and strength of methodology.

All items in the 'High' category, and some from the 'Moderate' category, were included in the literature review. Papers in the 'Low' category were not included. Due to the large number of records relating to citizen science (N=113), only those published in 2020 and 2021 were assessed for relevance. Additionally, the top three records according to citation counts for citizen science were automatically assigned 'High' relevance and included in the review.

In total, 40 records from the database search (32 of 'High' relevance and 8 of 'Moderate' relevance), 16 'grey' literature items and 8 items from 'other literature' were included in the review.

The methodology is summarised in diagrammatic form at the end of this appendix.

A 3.5 Limitations

The methodology adopted was designed to efficiently identify and synthesise the most relevant literature within the limited timeframe for the literature review. Due to the large quantity of relevant literature identified in preliminary searches, the Boolean strings were tightened to as close to the inclusion criteria as could be achieved. As a result, it is likely that the review does not encompass all relevant literature and each subject area covered

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is limited to a few relevant records. Additionally, due to time constraints, only one database (SCOPUS) was searched, where the use of an additional database would have provided extra rigour. Based on the above points, the literature review is not comprehensive but designed to present an up-to-date and relevant synthesis on the subject of public engagement.

A 3.6 Search terms

Table 3.1: Indicative terms suggested in specification

Methods of /approaches to public engagement	Defra-relevant domains	Terms relating to 'what works'
citizen assemblies citizen science citizen juries civic engagement civic media co-creation (of research, policy, practice) co-design co-production community engagement digital participation facilitation methods (e.g. facilitated discussion) focus groups opinion polls public dialogue public engagement public information public participation public surveys risk mapping stakeholder forums stakeholder mapping	agriculture air pollution biosecurity Bovine TB, foot-and-mouth disease (FMD) chemicals/ hazardous substances climate coasts conservation nature conservation countryside ecosystems/ ecosystem protection farming flooding food forestry fisheries habitats/habitat protection marine protected areas nanotechnologies Nanodialogues protected species protected areas rivers water pollution environment pollution*	effectiveness evaluation Key Performance Indicators (KPIs) policy intervention policy impact impact* outcome*

*terms added to initial Defra list for completeness.

A 3.7 SCOPUS Boolean Search strings

Method of/approaches to public engagement and Defra domains (N=2859)

TITLE-ABS-KEY(("*citizen assembl*" OR "citizen science" OR "*citizen jur*" OR "civic engagement" OR "civic media" OR "co-creation" OR "co-design" OR "co-production" OR "community engagement" OR "digital participation" OR "facilitated discussion*" OR "focus group*" OR "deliberative poll*" OR "public dialogue*" OR "public engagement" OR "public information" OR "public participation" OR "public survey*" OR "risk mapping" OR "stakeholder forum*" OR "stakeholder mapping")) AND TITLE-ABS-KEY(("agriculture" OR "air pollution" OR "biosecurity" OR "bovine TB" OR "FMD" OR "foot-and-mouth" OR "chemical*" OR "hazardous substance*" OR "climate*" OR "coast*" OR "conservation*" OR "countryside" OR "ecosystem*" OR "farming" OR "flood*" OR "food*" OR "forest*" OR "fisheries" OR "habitat*" OR "marine protected area*" OR "nanotech*" OR "nanodialogue*" OR "protected species" OR "protected area*" OR "river*" OR "water pollution" OR "environment*" OR "pollution")) AND ALL(("united Kingdom" OR "UK" OR "England"))

Search terms tightened to remove focus groups and medical studies (N=1399)

(TITLE-ABS-KEY ("*citizen assembl*" OR "citizen science" OR "*citizen jur*" OR "civic engagement" OR "civic media" OR "co-creation" OR "co-design" OR "co-production" OR "community engagement" OR "digital participation" OR "facilitated discussion*" OR "deliberative poll*" OR "public dialogue*" OR "public engagement" OR "public information" OR "public participation" OR "public survey*" OR "risk mapping" OR "stakeholder forum*" OR "stakeholder mapping") AND TITLE-ABS-KEY ("agriculture" OR "air pollution" OR "biosecurity" OR "bovine TB" OR "FMD" OR "foot-and-mouth" OR "chemical*" OR "hazardous substance*" OR "climate*" OR "coast*" OR "conservation*" OR "countryside" OR "ecosystem*" OR "farming" OR "flood*" OR "food*" OR "forest*" OR "fisheries" OR "habitat*" OR "marine protected area*" OR "nanotech*" OR "nanodialogue*" OR "protected species" OR "protected area*" OR "river*" OR "water pollution" OR "environment*" OR "pollution") AND TITLE-ABS-KEY ("England" OR "united kingdom" OR "UK")) AND PUBYEAR > 2009

A 3.8 Independent sources search for grey literature

- UK government and Defra website (https://www.gov.uk/)
- Involve UK (https://www.involve.org.uk/)
- Participedia (https://participedia.net/)
- Sciencewise (https://sciencewise.org.uk/)
- National co-ordinating centre for public engagement - https://www.publicengagement.ac.uk/resources

A 3.9 Summary of methodology adopted for rapid review of the literature

Database search
1399 records

↓

Removal of duplicates
1382 records

↓

Title and abstract screening
1382 records

↓

Grey literature appraisal
24 records

Full-text appraisal
326 records

'Other literature' appraisal
12 records

↓

Grey literature
16 records

Shortlisted records
40 records
(32 High, 8 Med.)

'Other literature'
8 records

↓

Included in review
64 records
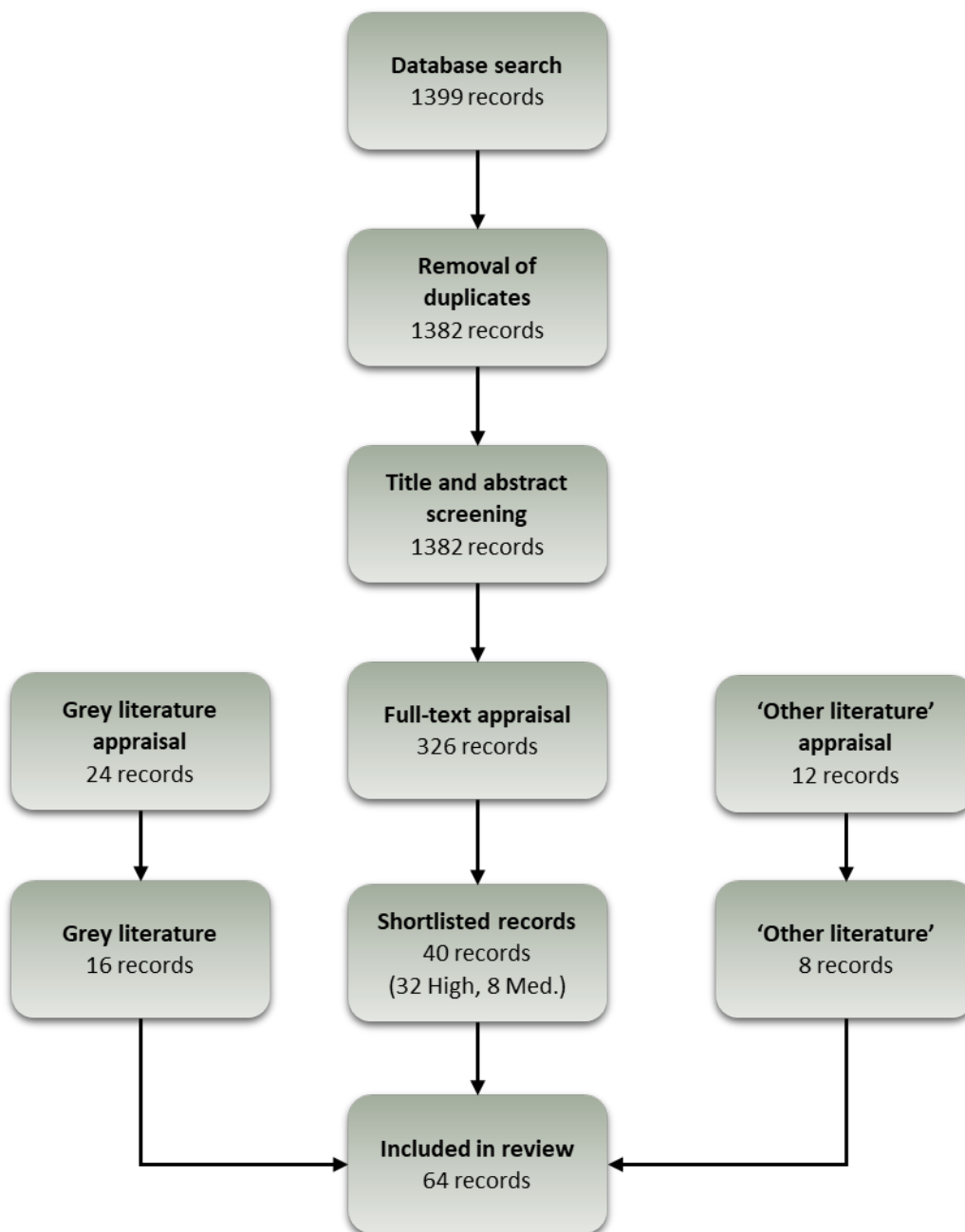
Appendix 4: Structured Conversations with Public Engagement Experts

A 4.1 Introduction

'Structured conversations' with invited experts were held on 25 February and 2 March 2021. Eleven experts participated in the first session (with one contributing in writing) and thirteen in the second. The sessions each lasted for two hours and were held remotely under 'Chatham House' rules (i.e. the discussion could be drawn upon but contributions would not be attributed to identifiable individuals). Sessions were recorded for writing up purposes and notes subsequently sent to participants for checking.

A 4.2 Briefing circulated in advance of discussions

A one-page briefing note was circulated to all participants in advance of each session. This provided background information on the Defra SAC/SSEG Review of Public Engagement and questions to help structure the conversation, as set out below:

A 4.3 Background

Defra's Social Science Expert Group (SSEG), a sub-group of the Defra Science Advisory Council, is undertaking a six-month review of public engagement, with particular reference to Defra's remit for environment, food and rural affairs. The work is grounded in a recognition that policy-making should involve the participation of key stakeholders; draw on the expertise of particular, sometimes specialist, constituencies; and understand and reflect people's experiences, reasoning and shared values.

The review, which is expected to be complete by the end of April 2021, seeks to draw on relevant literatures, experience and practices to identify key rationales for public engagement, and the effectiveness of different approaches in a policy context. It aims to assess the strengths, weaknesses and policy impacts of a range of different methods, while relating to a variety of purposes and publics. As well as learning from the past, it will look forward to future developments. The core target audience for the review will be policy and analysis teams in Defra.

A wide range of (formal) approaches to public engagement has been developed over a lengthy period, including surveys, public dialogues, focus groups, citizen assemblies, citizen science, and many others. Newer and experimental approaches have emerged more recently or are on the horizon. Some ways of engaging are not formally solicited (or recognised). These different forms of engagement vary in purpose and practice and produce different kinds of data, evidence, outcomes, and 'publics'.

In conversation with experts working on public engagement in a variety of fields (not only Defra-related), we hope to draw conceptual and practical lessons from research and experience to date, and to consider potential avenues for development.

A 4.4 Questions

The questions below are intended as starting points to structure and stimulate discussion:

1. What is public engagement for?
2. How should the 'effectiveness' of public engagement be judged?
3. What key lessons have been learned over the past few decades?
4. How have expectations of public engagement exercises changed?
5. How might relations between public engagement and policy formation be improved?
6. What approaches are most effective for engaging with people and publics who tend not to have a voice in policy-making?
7. What do you see as the most fruitful directions for public engagement in future?
8. *To bear in mind as we address questions 1–7*: what other questions should we be asking?

A 4.5 Participants in Session of 25 February 2021

Public Engagement Task Group members

- Professor Susan Owens (Chair)
- Professor Jennifer Gabrys
- Professor Stephen Hinchliffe
- Professor Peter Jackson

Invited experts

- Professor Jason Chilvers – School of Environmental Sciences, University of East Anglia; Co-Director, UK Energy Research Centre
- Professor Rod Dacombe – Director, Centre for British Politics and Government, Kings College London
- Professor David Farrell MRIA – Head of the School of Politics and International Relations, University College Dublin
- Caitlin Hafferty – PhD Researcher, Countryside and Community Research Institute (CCRI), University of Gloucestershire
- Professor Rosemary Hails – Director of Nature and Science, The National Trust
- Henrietta Hopkins – Director, Hopkins Van Mil
- Professor Gavin Parker – Professor of Planning Studies, Henley Business School, University of Reading
- Diana Pound – Director, Dialogue Matters
- Tom Saunders – Head of Public Engagement, UKRI
- Professor Andrew Stirling, Professor of Science and Technology Policy, University of Sussex (by correspondence)
- Professor Gordon Walker – Lancaster Environment Centre, Lancaster University

- Dr Juliette Young – French National Research Institute for Agriculture, Food and the Environment (INRAE)

Defra Group officials

- Dr Charlotte Allen, Head of Central Social Science Programme, Defra
- Dr Edward Hind-Ozan, Head of Fisheries Social Science, Defra

A 4.6 Participants in Session of 2 March 2021

Public Engagement Task Group members

- Professor Susan Owens (Chair)
- Professor Jennifer Gabrys
- Professor Stephen Hinchliffe
- Professor Peter Jackson

Invited experts

- Diane Beddoes – Sciencewise
- Professor Sue Brownill – Reader in Urban Policy and Governance, Oxford Brookes University
- Professor Patrick Devine-Wright – Professor in Human Geography, University of Exeter
- Lauren Hyams – Head of Urban Nature Activities, Natural History Museum
- Professor Alan Irwin – Professor in the Department of Organisation, Copenhagen Business School
- Professor Noortje Marres – Director, Centre for Interdisciplinary Methodologies, Warwick University
- Dr Clare Matterson CBE – Executive Director of Engagement, Natural History Museum
- Professor Mike Michael – Anthropology and Sociology, University of Exeter
- Dr Erinma Ochu – Senior Lecturer in Digital Media and Communications, Manchester Metropolitan University; Interim Director of NERC supported Community for Engaging Environments initiative
- Dr Helen Pallett – Lecturer in Human Geography of the Environment, School of Environmental Sciences, University of East Anglia
- Dr Martin Savransky – Senior Lecturer, Director of the Unit of Play, Goldsmith's College
- Dr John Tweddle – Head of Angela Marmot Centre for UK Biodiversity, Natural History Museum
- Professor Claire Waterton – Professor in Environment and Culture, Department of Sociology, Lancaster University

Defra Group officials

- Dr Beth Brockett, Principal Specialist – Social Science, Chief Scientist Directorate, Natural England
- Rachel Hunt, Environment Analysis Unit, Defra

Appendix 5: Further Reading

This appendix is in three parts:

A 5.1 is a full bibliography, intended as a general resource and including: references cited in Parts I and II of this report; sources covered in the rapid review of the literature; suggested readings from participants in the two expert discussions; references included in A 5.2 and A 5.3 below; and additional material drawn to the attention of the Task Group.

A 5.2, a selected list of 'Twenty readings on public engagement'.

A 5.3, a selected list of overviews and guides to good practice.

A 5.1 Full bibliography

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A 5.2 Twenty Readings on Public Engagement

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/954977/op0001-principles-co-production-guidance-covid-19.pdf https://doi.org/10.1177/016224390002500101

On the role of public creativity and changing practices

Born, G. and Barry, A. (2010) 'ART-SCIENCE: From public understanding to public experiment' *Journal of Cultural Economy* 3: 103–19.

On key developments in the theory and practice of public engagement

Braun, K. and Könninger, S. (2018) 'From experiments to ecosystems? Reviewing public participation, scientific government and the systemic turn', *Public Understanding of Science* 27 (6): 674–89.

On the differences between public education, consultation and cooperation – and a clear account of issues with representation

Callon, M. (1999) 'The role of lay people in the production and dissemination of scientific knowledge', *Science, Technology and Society* 4: 81–94.

On critiques of current practices and a framework for 'remaking participation' in more experimental, reflexive, anticipatory and responsible ways

Chilvers, J. and Kearnes, M. (2019) 'Remaking participation in science and democracy', *Science, Technology and Human Values*: https://doi.org/10.1177/0162243919850885
See also Chilvers and Kearnes' 2016 edited volume, details in reference to Wynne below.

On a more systemic approach to public engagement, participatory mapping, and working with pre-existing 'publics'

Chilvers, J., Bellamy, R., Pallett, H. and Hargreaves, T. (2021) 'A systemic approach to mapping participation with low-carbon energy transitions', *Nature Energy* 6: 250–9. https://doi.org/10.1038/s41560-020-00762-w

Examines how public engagement exercises frame particular types of publics, and details how publics can resist and transform the roles and identities assigned to them

Felt, U. and Fochler, M. (2010) 'Machineries for making publics: inscribing and de-scribing publics in public engagement', *Minerva* 48 (3): 219-238   https://doi.org/10.1007/s11024-010-9155-x

Case study of communities sensing air quality in Southeast London; considers how planetary health and participation can provide a way to rethink health through people's lived experiences of trying to improve their environments.

Gabrys, J. (2020) 'Planetary health in practice: sensing air pollution and transforming urban environments', *Humanities and Social Sciences Communications* 7 (1): 1–11. https://doi.org/10.1057/s41599-020-00534-7

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Holifield, R., Porter, M., and Walker, G. (2009) 'Introduction: Spaces of environmental justice: frameworks for critical engagement', *Antipode* 41: 591-612. https://doi.org/10.1111/j.1467-8330.2009.00690.x

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Irwin, A (2015) 'Citizen science and scientific citizenship: same words, different meanings?', in B. Schiele, J. L. Marec and P. Baranger (eds.) *Science Communication Today*, Nancy, France: Presses Universitaires de Nancy, 29–38.

On the critical dialogue around public engagement and the implications for engagement practice

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On the opportunities and challenges of stakeholder engagement in a contested domain

Lieberknecht, L. and Jones, P. (2016) 'From stormy seas to the doldrums: The challenges of navigating towards an ecologically coherent marine protected area network through England's Marine Conservation Zone process', *Marine Policy* 71: 275–84, http://dx.doi.org/10.1016/j.marpol.2016.05.023

On responsible innovation

Owen, R., Stilgoe, J., MacNaghten, P., Gorman, M., Fisher, E. and Guston, D. (2013) 'A framework for responsible innovation', in R. Owen, J. Beasant, and M. Heintz (eds.) *Responsible Innovation*, Chichester, Sussex, UK: John Wiley: 27–50

On top-down information, the 'deficit model' and some challenges of deliberative democracy

Owens, S. (2000) 'Engaging the public: information and deliberation in environmental policy', *Environment and Planning A*, 32: 1141–8, p. 1141.

On learning processes related to engagement in science and environmental governance, focusing on Sciencewise and related organisations. Shows how informal social networks can promote transformative social learning and reflexivity.

Pallett, H. and Chilvers, J. (2013) 'A decade of learning about publics, participation, and climate change: institutionalising reflexivity?', *Environment and Planning A: Economy and Space* 45(5): 1162–83: https://doi.org/10.1068/a45252

Questions some of the presumptions of deliberative democracy

Pellizzoni, L. (2001) 'The myth of best argument: power, deliberation and reason', *British Journal of Sociology*, 52, 1: 59–86.

On evaluation of a range of public participation methods (including acceptance and process criteria)

Rowe, G. and Frewer, L. J. (2000) 'Public participation methods: A framework for evaluation', *Science, Technology and Human Values* 25 (1): 3–29.

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Stirling, A., (2008) '"Opening up" and "closing down" power, participation, and pluralism in the social appraisal of technology', *Science, Technology, & Human Values*, 33 (2): 262–94: https://doi.org/10.1177/0162243907311265

On science, policy and democracy, and the construction of 'imagined publics'; with examples from contemporary issues involving science and technology.

Wynne, B. (2016) 'Ghosts of the machine: publics, meanings and social science in a time of expert dogma and denial', in J. Chilvers and M. Kearnes, *Remaking Participation: Science, Environment and Emergent Publics*, Abingdon UK and New York: Routledge, 99–120.

A 5.3 Overviews and Guides

Chilvers, J., Pallett, H. and Hargreaves, T. (2017) *Public engagement with energy: broadening evidence, policy and practice*, Briefing Note, London: UK Energy Research Centre (UKERC).

D'Angelo, C., Deshpande, A. Ryen Gloinson, E., Francombe, J. Stevenson, C., Virdee, M. and Gunashekar, S. (RAND Europe) (2021) *The Use of Public Engagement for Technological Innovation: Literature Review and Case Studies*, BEIS Research Paper Number 2021/003, London: Department for Business, Energy and Industrial Strategy. https://www.gov.uk/government/publications/the-use-of-public-engagement-for-technological-innovation-literature-review-and-case-studies

Datta, A. (2011) *Lessons from Deliberative Public Engagement Work: A Scoping Study*, London: ODI

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Farrell, D., Curato, N., Dryzek, J. et al. (2019) *Deliberative Mini-Publics: Core Design Features*, Centre for Deliberative Democracy and Global Governance Working Paper 2019/5.

McCabe, R. (Involve) (2021) *A Guide to Engaging Citizens in Environmental Policy*, A Resource Produced in Partnership from the Defra funded Citizen Engagement on the Environment Project, Defra.

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Nuffield Council on Bioethics (2012) *Emerging biotechnologies: technology, choice and the public good*, esp. Ch 5, 'Public Perspectives': https://www.nuffieldbioethics.org/publications/emerging-biotechnologies

OECD (2012) *Planning Guide for Public Engagement and Outreach in Nanotechnology*, Paris: OECD. http://www.oecd.org/sti/emerging-tech/49961768.pdf

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Pallett, H., Chilvers, J. and Hargreaves, T. (2017) *Mapping energy participation: A systematic review of diverse practices of participation in UK energy transitions*, 2010–2015, UK Energy Research Centre.

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Pound, D., Reed, M., Armitage, L., Pound, J. (Dialogue Matters) (2016) *Engaging and Empowering Communities and Stakeholders in Rural Land Use and Land Management in Scotland*, Edinburgh: Scottish Government. https://www.gov.scot/publications/engaging-empowering-communities-stakeholders-rural-land-use-land-management-scotland/

Reynolds, C., Oakden, L., West, S., Pateman, R. and Elliott, C. (2020) *Citizen Science and Food: A Review*, London: Food Standards Agency.

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Endnote

Chapter 1

1. Chilvers, J. and Kearnes, M. 'Remaking participation in science and democracy', *Science, Technology & Human Values* 2019, 45 (3): 1–34; Felt U. and Fochler M. 'Machineries for making publics: Inscribing and de-scribing publics in public engagement', *Minerva* 2010, 48 (3): 219–38.

2. In strategic planning and development control, as well as in appraisal procedures such as Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA); see, for example, Lawson, V. et al. Public participation in planning in the UK, A review of the literature, 2022 <https://housingevidence.ac.uk/wp-content/uploads/2022/04/220406-Publicparticipation-in-planning-in-the-UK_v3.pdf>; Innes, J.E. and Booher, D.F. 'Reframing public participation: strategies for the 21st century', *Planning Theory and Practice* 2007, 5(4): 419–36; Owens, S., Rayner, T. and Bina, O. 'New agendas for appraisal: reflections on theory, practice and research', *Environment and Planning A* 2004, 36 (11): 1943–59.

3. Braun, K. and Könninger, S. 'From experiments to ecosystems? Reviewing public participation, scientific government and the systemic turn', *Public Understanding of Science* 2018, 27 (6): 674–89.

4. Nascimento, S. *et al.* 'Citizen Science for policy formulation and implementation', in S. Hecker *et al. Citizen Science: Innovation in Open Science, Society and Policy*, London: UCL Press, 2018; RCEP (Royal Commission on Environmental Pollution) *Setting Environmental Standards*, Twenty-first Report, Cm 4053, London: The Stationery Office, 1998. It should be acknowledged, however, that not all political theorists have considered participatory democracy to be viable or desirable, with some seeing it as incompatible with good governance and arguing instead for a minimalist form of democracy in which participation is largely restricted to the election of representatives (for example, Schumpeter, J. A. *Capitalism, Socialism, and Democracy*, New York: Harper and Row, 1976 [1942]). For an overview of different perspectives on democracy and participation, see Dacombe, R. *Rethinking Civic Participation in Democratic Theory and Practice*, London: Palgrave Macmillan, 2018.

5. Pritchard, H. and Gabrys, J. 'From citizen sensing to collective monitoring: working through the perceptive and affective problematics of environmental pollution', *GeoHumanities* 2016, 2 (2): 354–371; Waterton, C., and Tsouvalis, J. 'An "Experiment with Intensities": Village Hall Reconfigurings of the World within a New Participatory Collective', in J. Chilvers and M. Kearnes (eds) *Remaking Participation: Science, Environment and Emergent Publics*, Abingdon, UK: Routledge, 2016: 201–17; Whatmore, S. and Landström, C. (2011) 'Flood apprentices: An exercise in making things public', *Economy and Society* 40 (4): 582–610.

6. SSEG is formally a sub-group of the Defra SAC. It is chaired by a SAC member and other members are co-opted.

7. Professors Stephen Hinchliffe (SSEG), Peter Jackson (SSEG), Henrietta Moore (SAC), Susan Owens (SSEG) and Sarah Whatmore (SAC; SSEG Chair).

8. As well as SSEG members, one additional member was co-opted to the Public Engagement Task Group (see Appendix 1 for details).

9. As the review was conducted within the constrained circumstances of COVID-19, all meetings were virtual.

10. Both projects were ongoing at the time of analysis for this Review.

11. See, for example, Stirling, A. '"Opening up" and "Closing down": Power, participation and pluralism in the social appraisal of technology', *Science, Technology and Human Values* 2008, 33 (2): 262–94; Dahl, R. *On Democracy*, New Haven, CT: Yale University Press, 2000; Fiorino, D. 'Environmental risk and democratic process: A critical review', *Columbia Journal of Environmental Law* 1989, 14: 501–47; Fischer, F. *Citizens, Experts and the Environment*, Durham, NC: Duke University Press, 2000; Pellizzoni, L. 'The myth of best argument: power, deliberation and reason', *British Journal of Sociology* 2001, 52 (1): 59–86.

12. The term 'mini-publics' typically refers to participants in deliberative forums, selected to be representative of some overall population (for example, in demographic terms), who meet to consider information, deliberate and make recommendations on particular issues. See, for example, Geib, J. *Dynamics of Instituting Mini-publics for a More Participatory Democracy,* IYTT (International Youth Think Tank) Working Paper No. 1, Göteborg, Sweden: IYTT, 2021; Goodin, R. E. and Dryzek, J. S. 'Deliberative impacts: The macro-political uptake of mini-publics', *Politics and Society* 2006, 34 (2): 219–44. https://doi.org/10.1177/0032329206288152

13. For the concept of ignition, see Hajer, M. 'A frame in the fields: policymaking and the reinvention of politics', in M. Hajer and H. Wagenaar (eds) *Deliberative Policy Analysis: Understanding Governance in the Network Society*, Cambridge: Cambridge University Press, 2003, 88–110, p. 88; see also Marres, N. 'Issues spark a public into being: a key but often forgotten point of the Lippman-Dewey debate', in B. Latour and P. Weibel (eds.) *Making Things*

Public: Atmospheres of Democracy, Cambridge, MA: MIT Press, 2005: 208–17. In contrast, publics that come to an issue without pre-formed views have been referred to as 'innocent publics'; see Irwin, A. 'The politics of talk: coming to terms with the "new" scientific governance', *Social Studies of Science* 2006, 36 (2): 299–320.

[14] Chilvers, J. and Kearnes, M. 'Science, democracy and emergent publics' in J. Chilvers and M. Kearnes (eds.) *Remaking Participation: Science, Environment and Emergent Publics*, London and New York: Routledge, 2016: p. 11.

[15] Publics coalescing around shared concerns, characteristics or connections are sometimes referred to as 'material publics' (which need not always be 'citizens' but could, for example, include the unborn), and differ from 'discursive publics', which are brought into being by rational debate. This point is discussed further in Chapter 2.

[16] Exemplified by the outcomes of the *GM Nation* process in the early 2000s – see Ch 2 for further detail.

[17] The deficit model assumes that publics lack knowledge or understanding and that attitudes and behaviours can be modified by the provision of information. For further discussion see, for example, Burgess, J., Harrison, C. and Filius, P., 'Environmental communication and the cultural politics of environmental citizenship', *Environment and Planning A* 1998, 30: 1445–60; Owens, S. 'Engaging the public: information and deliberation in environmental policy', *Environment and Planning A*, 2000, 32: 1141–8, p. 1141.

[18] It should be noted that co-production and co-design are complex and sometimes contested approaches, which can gloss over power asymmetries and other challenges.

[19] Braun, K. and Könninger, S. 2018 op. cit.; Chilvers, J. and Kearnes, M. 2016 op. cit.; Stirling, A. (2012) 'Opening up the politics of knowledge and power in bioscience', *PloS Biology* 2012, 10 (1) e1001233. doi:10.1371/journal.pbio.1001233

[20] Chilvers, J., Pallett, H. and Hargreaves, T. 'Public engagement with energy: broadening evidence, policy and practice', Briefing Note, London: UK Energy Research Centre (UKERC), 2017; Pallett, H., Chilvers, J. and Hargreaves, T. *Mapping energy participation: A systematic review of diverse practices of participation in UK energy transitions*, 2010–2015, UKERC, 2017.

[21] Chilvers, J., Bellamy, R., Pallett, H. and Hargreaves, T. 'A systemic approach to mapping participation with low-carbon energy transitions', *Nature Energy* 2021, 6: 250–9. https://doi.org/10.1038/s41560-020-00762-w

[22] Chilvers et al. 2021 ibid. The researchers built on the established participatory method of Deliberative Mapping (DM), involving lay citizen and specialist groups, to open up this format to alternative models of participation identified in the initial systematic mapping of energy participation. They refer to this further development of the DM approach as 'distributed deliberative mapping'. On DM methodology, see also Burgess, J. et al. 'Deliberative mapping: a novel analytic–deliberative methodology to support contested science–policy decisions', *Public Understanding of Science* 2007, 16: 299–322.

[23] Upstream engagement has been advocated most frequently in the context of techno-scientific developments. See, for example, Wilsdon, J. and Willis, R. (2004) *See-through Science: Why Public Engagement Needs to Move Upstream*, London: Demos.

[24] Braun, K. and Könninger, S. 2018 op. cit.: 676–7.

[25] Fischer 2000, op. cit; Flyvbjerg B. *Rationality and Power: Democracy in Practice*, University of Chicago Press: Chicago, IL, 1998.

[26] Stirling, A. 2008, op. cit.

[27] Stirling, A. 'Opening up the politics of knowledge and power in bioscience', *PloS Biology* 2012, 10 (1), p.5: e1001233. doi:10.1371/journal.pbio.1001233

[28] Stirling, A. 2012 op. cit. See also Horst, M. and Irwin, A. (2010) 'Nations at ease with radical knowledge: on consensus, consensing and false consensusness', *Social Studies of Science* 40 (1): 105–26. doi: 10.1177/0306312709341500

[29] Dryzek, J*., The Politics of the Earth,* Oxford: Oxford University Press, 2005.

[30] RCEP, *Novel Materials and the Environment: the Case of Nanotechnology*, Twenty-seventh report, Cm 7468, Norwich: TSO, 2008, para. 4.103. By 'ubiquity', the RCEP meant the forward march of nanotechnologies in many parts of the world.

[31] 'Communities of practice' can be defined as groups of people who share a common interest and a mutual desire to learn from one another through their shared practice and collective experience (as summarised in Wenger, E. *Communities of Practice: Learning, Meaning, and Identity*, Cambridge: Cambridge University Press, 2012).

Chapter 2

[32] House of Lords Select Committee on Science and Technology, *Science and Society, Third Report 1999–2000*, HL 38, London: The Stationery Office Ltd., 2000. This report is often regarded as a watershed moment in addressing the

erosion of public trust in the role of scientific evidence in policy making, following the BSE crisis. https://publications.parliament.uk/pa/ld199900/ldselect/ldsctech/38/3801.htm

33 Horst, M. and Michael, M. 'On the shoulders of idiots: Rethinking science communication as "event"', *Science as Culture* 2011, 20: 283–306; Lezaun, J. and Soneryd, L. 'Consulting citizens: technologies of elicitation and the mobility of publics', *Public Understanding of Science* 2007, 16 (3): 279–97; Devi-Chandler, S. Ward, C. and Ochu, E. 'Who gets to write the future? Reimagining policymaking through an anti-racist and creative practice lens', 2021, https://www.adalovelaceinstitute.org/blog/who-write-future/

34 See, for example, Pallett, H. (2018) 'Situating organisational learning and public participation: stories, spaces and connections', *Transactions of the Institute of British Geographers* 43(2): 215–29.

35 The term 'instrumental' in this context sometimes has negative connotations, as might be the case, for example, when the 'real' motive for engagement is to placate publics or gain their acquiescence for pre-determined decisions. In a sense, however, all motivations have instrumental components, since any engagement will be intended to achieve *something* – and this might be a beneficial end, such as more active, democratic participation or a policy informed by a wide range of perspectives.

36 For further discussion, see Pallett (2018), *op. cit.*

37 Jones, K. E., Irwin, A. and Schulte zu Berge, M. *Independent Evaluator's Report: A people's inquiry on nanotechnology and the environment*, University of Liverpool Management School; Appendix in Environment Agency, *Using science to create a better place: A people's inquiry on nanotechnology and the environment*, Science Report, Bristol: Environment Agency, 2006, p. 55.

38 See, for example, Geoghegan, H., Dyke, A., Pateman, R., West, S. and Everett, G. *Understanding Motivations for Citizen Science*, Final Report on behalf of the UK Environmental Observation Framework, University of Reading, Stockholm Environment Framework and University of West of England, May 2016. This study suggested that motivations vary between types of project, with environmental values being most important for environmental-based citizen science projects, 'contributing to science' for digitally mediated projects, and enhancement or personal gain values for environmental volunteering projects (p. 6).

39 This attention to outcomes can necessarily inform the way that public engagement and research is undertaken to arrive at agreed-upon effects. On this point, see Gabrys, J., Pritchard, H. and Barratt, B. 'Just good enough data: Figuring data citizenships through air pollution sensing and data stories', *Big Data and Society* 2016, 3 (2): 1–14; https://doi.org/10.1177/2053951716679677

40 For example, see Chilvers, M. 'Reflexive engagement? Actors, learning, and reflexivity in public dialogue on science and technology', *Science Communication* 2018, 35: 283–310; and Wynne, B., 'Ghosts of the machine: publics, meanings and social science in a time of expert dogma and denial', in J. Chilvers and M. Kearnes eds., *Remaking Participation: Science, Environment and Emergent Publics*, Abingdon UK and New York: Routledge, 2016: 99–120.

41 See, for example, Chilvers, J. and Kearnes, M. 2016, op. cit.

42 Wehling, P. 'From invited to uninvited participation (and back?): rethinking civil society engagement in technology assessment and development', *Poiesis & Praxis* 2012, 9 (1): 43–60. https://link.springer.com/article/10.1007/s10202-012-0125-2

43 Hajer, M. 2003, op. cit; Marres, N. 2005, op. cit.

44 These ideas have been explored in the context of research on environmental hazards such as flooding. See Whatmore, S.J. and Landström, C. 'Flood apprentices: an exercise in making things public', *Economy and Society* 2011, 40 (4): 582–610.

45 See Rock, M.J. 'Who or what is 'the public' in critical public health? Reflections on posthumanism and anthropological engagements with One Health', *Critical Public Health* 2017, 27 (3): 314–24. https://doi.org/10.1080/09581596.2017.1288287

46 For further discussion, Hinchliffe, S., Jackson, M.A., Wyatt, K. *et al.* 'Healthy publics: enabling cultures and environments for health', *Palgrave Commun* 2018, 4 (57): 1–20 <https://doi.org/10.1057/s41599-018-0113-9>; also Barnett, C. and Mahony, N. 'Marketing practices and the reconfiguration of public action', *Policy and Politics* 2016, 44 (3): 367–82; Rock, M. J. 2017, *ibid.*

47 HC EFRA C'ttee, *Conduct of the GM Public Debate*, Eighteenth Report, Session 2002–3, HC 1220, London: The Stationery Office, 2003, p. 15, cited in Irwin, A. 'The politics of talk: coming to terms with the "new" scientific governance', *Social Studies of Science* 2006, 36 (2): 299–320, p. 311. See also GM Nation Steering Board (Department of Trade and Industry) *GM Nation? The Findings of a Public Debate*, London: HMSO, 2003; Horlick-Jones, T., Walls, T., Rowe, G., Pidgeon, M., Poortinga, W. and O'Riordan, T. 'On evaluating the *GM Nation*? Public debate about the commercialisation of transgenic crops in Britain', *New Genetics and Society: Critical Studies of Contemporary Biosciences* 2006, 25 (3): 265–88   https://doi.org/10.1177/0306312706053350

48 The problem of unequal participation in democracies (including public engagement) has long been recognised. For a discussion, see Smith, G. *Democratic Innovations: Designing Institutions for Citizen Participation*, Cambridge UK: Cambridge University Press, 2009, esp. ch 1.

49 On the 'disengaged', research has shown that some citizens who are disengaged from politics may nevertheless be actively involved in networks and voluntary groups in a particular locality or the workplace; see, for example, Dacombe's in-depth study of the Blackbird Leys Estate in Oxford: Dacombe, R., *Rethinking Civic Participation in Democratic Theory and Practice*, London: Palgrave Macmillan, 2018.

50 See van Eeten, M. 'The challenge ahead for deliberative democracy: In reply to Weale', *Science and Public Policy* 2001, 28 (6): 423–26. For a case study in the waste planning arena, see Driffill, D. *Exploring the Missing Link: The Coupling Between Participatory and Formal Decision-Making Processes in Waste Planning in Wiltshire and Swindon*, PhD Thesis, University of Cambridge, 2008.

51 NCCPE 'What is public engagement?' <https://www.publicengagement.ac.uk/aboutengagement/what-public-engagement> Insisting that public engagement is a two-way process is designed to challenge the deficit model of public understanding where the public are assumed to lack the knowledge or skills to make an informed contribution to political or scientific debate (cf. Pallett, H. and Chilvers, J. 'A decade of learning about publics, participation, and climate change: institutionalising reflexivity?' *Environment and Planning A* 2013, 45 (5): 1162–83: https://doi.org/10.1068/a45252)

52 Table 2.1 draws on a variety of sources, details of which may be found in the full bibliography (Appendix 5): Anderson et al. 2020; Biggs et al. 2015; Bíl et al. 2020; Crow et al. 2020; Devaney et al. 2020; Doubleday & Teubner 2012; Finch et al. 2020*;* Gardiner et al. 2012*;* Gazzard and Baker 2020; Involve UK 2018a&b; Kettel et al. 2021; Massimino et al. 2017; Moolna et al. 2020; Nel et al. 2020; Nolan et al. 2020; Petrovan et al. 2020; Robbins et al. 2020; Roy et al. 2012; Scott et al. 2020; Slawson and Moffat 2020; Smith 2009. See also <https://www.involve.org.uk/resources/knowledge-base/where-do-i-start-digital-engagement/other-resources>; <https://www.involve.org.uk/resources/methods/focus-groups>; <https://sciencewise.org.uk/wp-content/uploads/2018/11/What-is-public-dialogue-FAQ-Report-V6.pdf>; <https://www.climateassembly.uk/detail/budget/index.html>

53 Defra, 'More than 44,000 Responses to Future Farming Consultation' <https://www.gov.uk/government/news/more-than-44000-responses-to-future-farming-consultation>; Defra, *Health and Harmony: the Future for Food, Farming and the Environment in a Green Brexit: Summary of Responses*, Defra, 2018*:* <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/741461/future-farming-consult-sum-resp.pdf>

54 Changes in participants' views on an issue before and after deliberation can be tracked using the 'Deliberative Poll' method developed and patented by James Fishkin at Stanford University in the US in 1988. Such polls have often been conducted as academic experiments, as well as to gauge views on policy questions. See https://cdd.stanford.edu/what-is-deliberative-polling/; OECD, *Innovative Citizen Participation and New Democratic Institutions: Catching the Deliberative Wave*, Paris: OECD, 2020, p. 3. *https://doi.org/10.1787/339306da-en*. Approaches that are similar but do not follow the patented methodology are usually referred to as Deliberative Surveys (see OECD 2020 p. 52).

55 OECD 2020 ibid.

56 The reference to 'stakeholders' raises important terminological questions. It refers to a particular form of governance whereby stakeholders are expected to negotiate, and possibly surrender, their 'stake' in order to reach a solution. This implies a consensual form of politics, based on balancing pre-existing interests. Some authors prefer instead to refer to 'spokespeople', emphasising not so much the convergence on a solution but the potential for stakeholders to use their often unique insights and interests to generate workable outcomes. These issues are discussed in Hinchliffe, S., Levidow, L. and Oreszczyn, S. 'Engaging cooperative research', *Environment and Planning A: Economy and Space* 2014, 46 (9): 2080–94: doi:10.1068/a140061p

57 Other public dialogues within or related to Defra domains (identified in the literature review) have included: Generic Design Assessment (GDA) for new nuclear power stations UK public dialogue 2014 (Environment Agency); Public dialogue on bioenergy 2013 (BBSRC & ERC); Flood risk communication 2013 (Environment Agency); 'Naturally Speaking' public dialogues on the UK National Ecosystem Assessment 2014 (NERC); Food system challenges public dialogue 2014 (Government Office for Science & Which?); Significant water management issues in the UK 2015 (Environment Agency); Cambrian Mountains landscape and ecosystems 2013 (Natural Resources Wales); Living with environmental change 2010-2011 (LWEC Partnership & ESRC).

58 OECD 2020 op. cit., p. 36.

59 See Climate Assembly UK, *The Path to Net Zero*, Full Report, A project by UK House of Commons with Involve, the Sortition Foundation and mySociety, Climate Assembly UK 2020 https://www.climateassembly.uk/report/read/final-report.pdf See also Cherry, C.E., Capstick, S., Demski, C., Mellier, C., Stone, L. & Verfuerth, C., *Citizens' climate assemblies: Understanding public deliberation for climate policy*, Cardiff University: The Centre for Climate Change and Social Transformations, July 2021 https://cast.ac.uk/wp-content/uploads/2021/07/CITIZENS-CLIMATE-ASSEMBLIES-CAST-July-2021.pdf; Elstub, S., Farrell, D., Carrick, J. and Mockler, P., *Evaluation of Climate Assembly UK*, Newcastle: Newcastle University, July 2021 https://www.parliament.uk/get-involved/committees/climate-assembly-uk/news/evaluation-of-climate-assembly-uk/

60 For useful overviews see Parliamentary Office of Science and Technology (POST), *Environmental Citizen Science*, Postnote 476, August 2014; Roy, H., Pocock, M., Preston, C., Roy, D., Savage, J., Tweddle, J. & Robinson, L. *Understanding Citizen Science and Environmental Monitoring*. Final Report on behalf of UK Environmental Observation Framework (UK-EOF). NERC, Centre for Ecology & Hydrology and Natural History Museum, 2012.

61 Data collection can lead to significant findings and some citizen science participants have co-authored academic studies.

62 See, for example, Chilvers, J., Bellamy, R., Pallett, H. and Hargreaves, T. 'A systemic approach to mapping participation with low-carbon energy transitions', *Nature Energy* 2021, 6: 250–9; Landström C., Whatmore S., Lane S., Odoni N., Ward N. and Bradley S. 'Coproducing flood risk knowledge: redistributing expertise in critical "participatory modelling"', *Environment and Planning A* 2011, 43: 1617–33; Yearley, S. 'Bridging the science–policy divide in urban air quality management: evaluating ways to make models more robust through public engagement', *Environment and Planning C: Government and Policy* 2006, 24: 701–14 https://doi.org/10.1038/s41560-020-00762-w

63 For an interesting co-productive experiment relating to flood risk, which resulted in public action, see Lane, S., Odoni, N., Landström, C., Whatmore, S., Ward, N. and Bradley, S. 'Doing flood risk science differently: an experiment in radical scientific method', *Transactions of the Institute of British Geographers* 2011, 36 (1): 15–26. See also Landström et al. *ibid*.

64 https://www.gov.uk/government/publications/landscape-recovery-more-information-on-how-the-scheme-will-work/landscape-recovery-more-information-on-how-the-scheme-will-work

65 See, for example, Bellamy, R. Lezaun, J. and Palmer, J. 'Public perceptions of geoengineering research governance: An experimental deliberative approach', *Global Environmental Change* 45, 2017: 194–202. https://doi.org/10.1016/j.gloenvcha.2017.06.004; Scott, M. and Powells, G. *Blended Hydrogen: the UK Public's Perspective*: Newcastle upon Tyne: Newcastle University, 2019 https://www.ncl.ac.uk/media/wwwnclacuk/geographypoliticsandsociology/files/news/blended-hydrogen-the-uk-publics-perspective.pdf

66 See De Santo, E.M. 'Assessing public "participation" in environmental decision-making: Lessons learned from the UK Marine Conservation Zone (MCZ) site selection process', *Marine Policy* 2016, 64: 91–101: <https://doi.org/10.1016/j.marpol.2015.11.003>; OECD 2020, op. cit. esp. ch 5; Reed, M.S., Stringer, L.C., Fazey, I., Evely, A.C. and Kruijsen, J.H.J. 'Five principles for the practice of knowledge exchange in environmental management', *Journal of Environmental Management* 2014, 146: 337–45 https://doi.org/10.1016/j.jenvman.2014.07.021

67 This distinction is sometimes cast in terms of a contrast between a 'residual realist' imaginary (which assumes that the public pre-exists, ready to be engaged with and external to the practices of participation) and a 'relational co-productionist' perspective (which strives for a less instrumental approach to public engagement and a less pre-determined definition of 'the public'). See, for example, Chilvers, J. and Kearnes, M. 'Remaking participation in science and democracy', *Science, Technology and Human Values* 2020, 45 (3): 347–80. https://doi.org/10.1177/0162243919850885

68 As discussed in Chapter 1, an instrumental rationale is one category (along with normative and substantive rationales) that can be used to characterise modes of public engagement. See also Nuffield Council on Bioethics, *Emerging Biotechnologies: technology, choice and the public good*, 2012: https://www.nuffieldbioethics.org/publications/emerging-biotechnologies

69 See, for example, Pallett, H., Chilvers, J. & Hargreaves, T. (2019) 'Mapping participation: a systematic analysis of diverse public participation in the UK energy system', *Environment and Planning E*, *Nature and Space* 2 (3): 590-616.

70 The requirement by Sciencewise to archive data from previous projects is an example of good practice in this area (noting that the accessibility of any archive is also important). Sciencewise is funded by the Department for Business, Energy and Industrial Strategy (BEIS) and managed by UK Research and Innovation. The Programme aims to improve policy making involving science and technology across Government by increasing the effectiveness with which public dialogue is used, and encouraging its wider use where appropriate to ensure public views are considered as part of the evidence base. It provides a wide range of information, advice, guidance and support services aimed at policy makers and all the different stakeholders involved in science and technology policy making, including the public. It also provides co-funding to Government departments and agencies to develop and commission public dialogue activities. www.sciencewise-erc.org.uk

71 See Reed, M.S., Vella, S., Challies, E., de Vente, J., Frewer, L., Hohenwallner-Ries, D., Huber, T., Neumann, R.K., Oughton, E.A., Sidoli del Ceno, J. and van Delden, H. 'A theory of participation: what makes stakeholder and public engagement in environmental management work?', *Restoration Ecology* 2018, 26: S7–S17: https://doi.org/10.1111/rec.12541; and Rowe, G. and Frewer, L.J. 'Public participation methods: A framework for evaluation', *Science, Technology and Human Values* 2000, 25 (1): 3–29; https://doi.org/10.1177/016224390002500101 . See also Irwin, A., Jensen, T.E. and Jones, K.E. 'The good, the bad and the perfect: criticising engagement practice', *Social Studies of Science* 2013, 43 (1), 119–36.

72 McCabe, R. (Involve), *A Guide to Engaging Citizens in Environmental Policy*, A Resource Produced in Partnership from the Defra funded Citizen Engagement on the Environment Project, Defra, 2021: 4.

73 Climate Assembly UK 2020, op. cit.

74 See Back, L., *The Art of Listening*. Oxford: Berg, 2007.

75 For further discussion, see Dacombe, R. *Rethinking Civic Participation in Democratic Theory and Practice*, London: Palgrave Macmillan, 2018.

76 OECD (2020) op. cit., p. 3.

77 OECD (2020) op. cit., p. 3.

78 Shift (2013) 'Bringing a human rights lens to stakeholder engagement' https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/cri/files/Shift-Workshop-Report-3-Bringing-a-Human-Rights-Lens-to-Stakeholder-Engagement.pdf

79 See also the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, the 'Aarhus Convention' https://unece.org/environment-policy/public-participation/aarhus-convention/introduction; and United Nations Human Rights Council (UNHRC). 'Human Rights and the Environment' A/HRC/RES/37/8. April 9, 2018: https://ap.ohchr.org/documents/dpage_e.aspx?si=A%2FHRC%2FRES%2F37%2F8

80 United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, ibid.

81 Dryzek, J., Nicol, D., Niemeyer, S. et al., 'Global citizen deliberation of genome editing', *Science* 369, issue 6510, 18 September 2020, p. 1437. https://www.science.org/doi/10.1126/science.abb5931

82 Dryzek, J. et al. 2020, ibid., p. 1436.

83 See, for example, Dryzek, J.*, The Politics of the Earth,* Oxford: Oxford University Press, 2005; RCEP *Novel Materials in the Environment: The Case of Nanotechnology*, Twenty-seventh report, Cm 7468, Norwich: TSO, 2008; Stirling, A. '"Opening up" and "Closing down": Power, participation and pluralism in the social appraisal of technology', *Science, Technology and Human Values* 2008, 33 (2): 262–94; Wynne, B., 'Ghosts of the machine: publics, meanings and social science in a time of expert dogma and denial', in J. Chilvers and M. Kearnes eds., *Remaking Participation: Science, Environment and Emergent Publics*, Abingdon UK and New York: Routledge, 2016: 99–120.

84 Convened by the University of Canberra's Centre for Deliberative Democracy and Global Governance, the Global Assembly followed a number of national level deliberations. See https://cspo.org/research/gene-editing/genome-citzens-assembly/
See also Dryzek et al. 2020, op. cit.

85 Dryzek et al. 2020, op. cit., note that deliberative exercises can be 'game-changers' and cite the example of citizens' assemblies in Ireland leading to changes both in the law and in the 'texture of Irish politics' (p. 1345). See also https://www.citizensassembly.ie/en/; Farrell, D., Curato, N., Dryzek, J. et al., *Deliberative Mini-Publics: Core Design Features*, Centre for Deliberative Democracy and Global Governance Working Paper 2019/5; Farrell, D. and Suiter, J. *Reimagining Democracy: Lessons in Deliberative Democracy from the Irish Front Line,* Cornell University Press 2019; OECD 2020 op. cit.

86 Dryzek et al. 2020, op. cit.; Farrell et al. 2019, op. cit.; Horst, M. and Irwin, A. (2010) 'Nations at ease with radical knowledge: on consensus, consensing and false consensusness', *Social Studies of Science* 40 (1): 105–26. doi:

10.1177/0306312709341500; Stirling, A. 2012 op. cit.

Chapter 3

[87]The growth of online influencers and 'bots' may skew or seed conversations and can significantly effect or even manipulate voicings and engagement with an issue. See, for example, Jemielniak, D. 2021. # AstraZeneca vaccine disinformation on Twitter. https://www.medrxiv.org/content/10.1101/2021.04.08.21255107v1.full.pdf

[88]Funtowicz, S. O. and Ravetz, J. R. 'Science for the post-normal age', *Futures* 1993, 24: 739–55

[89] The tendency is also reinforced by members of social media groupings choosing to filter information and people in their social media profiles, with the result that groups tend to form by excluding those with alternative views.

[90] Sciencewise <https://sciencewise.org.uk> is funded by the Department for Business, Energy and Industrial Strategy (BEIS) and managed by UK Research and Innovation. See note 70 for further detail.

[91] https://recollective.com/features

[92] Bruns, Axel and Burgess, Jean (2011) 'The use of Twitter hashtags in the formation of ad hoc publics', in A. Bruns, and P. De Wilde (eds) *Proceedings of the 6th European Consortium for Political Research (ECPR) General Conference 2011.* The European Consortium for Political Research (ECPR), United Kingdom, 2011: 1–9.

[93] Sandover, R., Kinsley, S. and Hinchliffe, S. 'A very public cull – The anatomy of an online issue public', *Geoforum* 2018, 97: 106–18.

[94] Maye, D. Fellenor, J., Potter, C. Urquhart, J. and Barnett, J. 'What's the beef? Debating meat, matters of concern and the emergence of online issue publics', *Journal of Rural Studies* 2021, 84: 134–46.

[95] Goodman, M. K. and Jaworska, S. 'Mapping digital foodscapes: Digital food influencers and the grammars of good food', *Geoforum* 2020, 117: 183–93.

[96] Weller, K., Bruns, A., J. Burgess, J. Mahrt, M. and Puschmann, C. (eds) *Twitter and Society* USA: Peter Lang Publishing, 2014.

[97] Panagiotopoulos, P., Barnett, J., Bigdeli, A. Ziaee and Sams, S. 'Social media in emergency management: Twitter as a tool for communicating risks to the public', *Technological Forecasting and Social Change* 2016, 111: 86–96.

[98] See, for example, Wagner, P. 'Data Privacy – The Ethical, Sociological, and Philosophical Effects of Cambridge Analytica', 9 February 2021, available at SSRN: https://ssrn.com/abstract=3782821 or http://dx.doi.org/10.2139/ssrn.3782821

[99] Zuboff, S. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. London, UK: Profile, 2019.

[100] Falco, E., and Kleinhans, R. 'Digital participatory platforms for co-production in urban development: A systematic review', *International Journal of E-Planning Research (IJEPR)* 2018, 7 (3): 52–79.

[101] Hafferty, C., Berry, R. and Orford, S.. 'Geo-information tools for stakeholder engagement in environmental decision-making: "best practice" recommendations from a UK case study', *GISRUK*, 2021 https://zenodo.org/record/4665809#.YH7X9O5KjIU.

[102] Varumo, L., Paloniemi, R. and Kelemen, E., 'Challenges and solutions in developing legitimate online participation for EU biodiversity and ecosystem services policies', *Science and Public Policy* 2020, 47 (4): 571–80, https://doi.org/10.1093/scipol/scaa036

[103] https://ukcop26.org/events/citizens-from-the-global-assembly-present-their-proposals/

[104] Chwalisz C., 'The pandemic has pushed citizen panels online', *Nature* 2021, 58 (7841): 171   doi: 10.1038/d41586-021-00046-7. PMID: 33437063.

[105] Access through assistive technologies and digital platforms may in fact be enabled compared to offline or other kinds of meeting.

[106] Falco, E. and Kleinhans, R. 'Digital Participatory Platforms for Co-Production in Urban Development: A Systematic Review'*, International Journal of E-Planning Research (IJEPR)* 2018, 7 (3):52–79.

[107] Ruppert, E., Law, J. and Savage, M., 'Reassembling social science methods: the challenge of digital devices', *Theory, Culture and Society* 30 (4): 22–46.

[108] Robinson, P., and Johnson, A. P., 'Pandemic-driven technology adoption: Public decision makers need to tread cautiously, *International Journal of E-Planning Research (IJEPR)* 2021, 10 (2): 59–65, p. 61; Johnson, P., Robinson, P. and Philpot, S. 'Type, tweet, tap, and pass: How smart city trechnology is creating a transactional citizen', *Government Information Quarterly* 2020, 37 (1) https://www.sciencedirect.com/science/article/abs/pii/S0740624X19300516

[109] Harford, T., 'Big Data? Are we making a big mistake?' *Significance* Dec 2014 https://rss.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1740-9713.2014.00778.x

Part 2

Case Study: Air Pollution and Public Engagement

[110] The range of deaths due to air pollution is contested and depends upon which pollutants are accounted for and which methods are used to establish attributable deaths. The independent Royal College of Physicians notes in its 2016 report, 'Each year in the UK, around 40,000 deaths are attributable to exposure to outdoor air pollution, with more linked also to exposure to indoor pollutants', see Royal College of Physicians, *Every Breath We Take: the Lifelong Impact of Air Pollution*, Working Party Report, February 2016 https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution). Meanwhile, the UK Government-linked agency Public Health England (PHE) has noted, 'Air pollution is the biggest environmental threat to health in the UK, with between 28,000 and 36,000 deaths a year attributed to long-term exposure', see Public Health England, *Review of Interventions to Improve Outdoor Air Quality and Public Health*, March 2019 https://www.gov.uk/government/news/public-health-england-publishes-air-pollution-evidence-review.

[111] Blackstone Chambers, 'Inquest into the Death of Ella Adoo-Kissi-Debrah', 17 December 2020. https://www.blackstonechambers.com/news/inquest-death-ella-adoo-kissi-debrah; BBC News 'Ella Adoo-Kissi-Debrah: Air Pollution a Factor in Girl's Death, Inquest Finds', 16 December 2020, https://www.bbc.co.uk/news/uk-england-london-55330945; London Inner South Coroner's Court, 'Inquest Touching the Death of Ella Roberta Adoo Kissi-Debrah' https://www.innersouthlondoncoroner.org.uk/news/2020/nov/inquest-touching-the-death-of-ella-roberta-adoo-kissi-debrah.

[112] Das, P. and Horton, R., 'Pollution, health, and the planet,' *The Lancet* 2017, 391 (10119) 407–8. https://www.sciencedaily.com/releases/2019/03/190312075933.htm.

[113] For example, see Corburn, J. *Street Science: Community Knowledge and Environmental Health Justice*, Cambridge: MIT Press, 2005.

[114] The Royal Borough of Kingston, Citizens' Assembly for Air Quality, https://www.kingston.gov.uk/CitizensAssembly; Citizen Sense, https://citizensense.net; Mapping for Change, Science in the City, https://mappingforchange.org.uk/projects/science-in-the-city.

[115] Walton, H., Dajnak, D., Beevers, S., Williams, M., Watkiss, P. and Hunt, A., *Understanding the Health Impacts of Air Pollution in London*, 14 July 2015, London: King's College, for Transport for London and the Greater London Authority.

[116] BBC News, 'UK's Most Polluted Towns and Cities Revealed', 4 May 2018. https://www.bbc.co.uk/news/health-43964341.

[117] Professor Jennifer Gabrys.

[118] Involve, https://www.involve.org.uk.

[119] Air Sensors International Conference 2021 Virtual Series Session, https://asic.aqrc.ucdavis.edu.

[120] PurpleAir, https://www2.purpleair.com; IQAir (website), https://www.iqair.com.

[121] City of London, 'Citizen Science project helps City residents measure air quality', 2021, https://news.cityoflondon.gov.uk/citizen-science-project-helps-city-residents-measure-air-quality/

[122] Transport for London, 'Low Emission Neighbourhoods', https://tfl.gov.uk/info-for-boroughs-and-communities/low-emission-neighbourhoods

[123] Francis, L., and Stockwell, H., Science in the city: Monitoring air quality in the Barbican, London: Mapping for Change, 2015. https://mappingforchange.org.uk/wp-content/uploads/2015/08/Barbican-Final-Report-draft_12012015_edited.pdf

[124] Cross River Partnership, https://crossriverpartnership.org/

[125] Gabrys, J. *Citizens of Worlds: Open-Air Toolkits for Environmental Struggle*. Minneapolis: University of Minnesota Press, 2022, https://manifold.umn.edu/projects/citizens-of-worlds

[126] The Royal Borough of Kingston upon Thames and Involve, *Kingston Citizens' Assembly on Air Quality*, Full Report, 2020, https://www.kingston.gov.uk/downloads/file/419/rbk-citizens-assembly-on-air-quality-full-report; Kingston Council. Citizens' Assembly. YouTube Channel. https://www.youtube.com/playlist?list=PLFTvX2Jlo3Mj2ljKpGLR0rE0Ux37GeCTn

[127] Citizen Sense, Deptford Data Stories, 2017, https://citizensense.net/data-stories-deptford/

[128] Gabrys, J. 'Planetary health in practice: sensing air pollution and transforming urban environments'' *Humanities and Social Sciences Communications* 2020, 7 (35), https://doi.org/10.1057/s41599-020-00534-7

[129] Deptford Folk. Liveable Neighbourhoods. https://www.deptfordfolk.org/dpln

[130] Citizen Sense. AirKit. https://citizensense.net/projects/airkit/

[131] While the initiative was originally organised primarily with the Barbican Residents' Association, the Golden Lane Estate also contributed to some aspects of the monitoring. Whether this would increase inclusivity is difficult to assess because of the changing demographics of Golden Lane.

Case Study: Defra bovine TB Citizen Dialogue

[132] Sciencewise < www.sciencewise-erc.org.uk > is funded by the Department for Business, Energy and Industrial Strategy (BEIS) and managed by UK Research and Innovation. See note 70 for further detail.

[133] Defra, *Defra bovine TB citizen dialogue: Public dialogue workshops*, Defra 2014c, p. 16. https://sciencewise.org.uk/wp-content/uploads/2020/05/Bovine-TB-Public-Workshops-Report.pdf

[134] Cassidy, A., 'Vermin, victims and disease: UK framings of badgers in and beyond the bovine TB controversy', *Sociologia Ruralis* 2012, 52 (2): 192–214.

[135] Sandover, R., Kinsley, S. and Hinchliffe, S. 'A very public cull – the anatomy of an online issue public', *Geoforum* 2018, 97: 106–18

[136] Defra, *Defra bovine TB citizen dialogue: Cross-cutting summary*, Defra 2014a: 2. https://sciencewise.org.uk/wp-content/uploads/2020/05/Bovine-TB-Defra-Summary.pdf https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300420/pb14154-bovine-tb-citizen-dialogue-summary.pdf

[137] ibid: p. 2.

[138] Defra, *Defra bovine TB citizen dialogue: Stakeholder workshops*, Defra 2014d: 8. https://sciencewise.org.uk/wp-content/uploads/2020/05/Bovine-TB-Stakeholder-report.pdf

[139] ibid: p. 3.

[140] Defra, *Defra bovine TB citizen dialogue: Public dialogue workshops*, Defra 2014c https://sciencewise.org.uk/wp-content/uploads/2020/05/Bovine-TB-Public-Workshops-Report.pdf

[141] Defra, *Defra bovine TB citizen dialogue: Online engagement report*, Defra 2014b, p. 6. https://sciencewise.org.uk/wp-content/uploads/2020/05/Bovine-TB-Online-Engagement-Report.pdf

[142] ibid.: p. 3.

[143] ibid.: p. 10.

[144] Defra 2014a op. cit.: 1

[145] https://sciencewise.org.uk/projects/bovine-tuberculosis-citizen-dialogue/

[146] 3KQ *Evaluation of Public Stakeholder Engagement on Bovine Tuberculosis*, for Defra, 2015: 3. https://webarchive.nationalarchives.gov.uk/ukgwa/20170110134304/http://www.sciencewise-erc.org.uk/cms/assets/Uploads/Evaluation-docs/Bovine-TB-Evaluation-Report.pdf

[147] Defra 2014a op. cit.

[148] Defra, *The Strategy for Achieving Officially Bovine Tuberculosis Free Status for England*, London: Defra, April 2014 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300447/pb14088-bovine-tb-strategy-140328.pdf

[149] Defra *Bovine TB Strategy Review*, London: Defra, October 2018. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/756942/tb-review-final-report-corrected.pdf

Case Study: Public Engagements Relating to Food

[150] For further information on the Independent Review of the food system, see: https://www.nationalfoodstrategy.org/   Professor Peter Jackson, a member of the Task Group for this Public Engagement Review, chaired the Oversight Group for the public dialogue phase of the National Food Strategy.

[151] See: www.royalsociety.org/Living-Landscapes   The 2020 *Review of Key Trends and Issues in UK Rural Land Use* provides useful background on the Living Landscapes programme and there is a stakeholder map in an Appendix: https://royalsociety.org/-/media/policy/Publications/2020/2020-09-18-commissioned-report-history-uk-land-use-decision-making.pdf.   Responses to the Defra consultation *Health and Harmony: the future for food, farming and the environment in a Green Brexit* are also relevant to both projects considered in this case study: https://www.gov.uk/government/consultations/the-future-for-food-farming-and-the-environment

[152] Part I of the Independent Review of the food system included a note on collaboration with Scotland, Wales and Northern Ireland, explaining that 'the food systems of the UK are so tightly interwoven as to be indistinguishable in many ways' and that, throughout the review, Henry Dimbleby had shared his thinking with the teams working on food strategy in the devolved administrations (Independent Review 2020: 8).

[153] HvM describe their approach to public engagement in terms of creating 'safe, impartial and productive spaces' in which to explore and gain an understanding of people's views on issues that matter to them (http://www.hopkinsvanmil.co.uk/about-us). Sciencewise <https://sciencewise.org.uk/> is funded by the

Department for Business, Energy and Industrial Strategy (BEIS) and managed by UK Research and Innovation. See note 70 for further detail.

154 The expert elicitation groups that were convened as part of this Public Engagement review were equivocal about whether members of the public struggle to weigh up multiple issues simultaneously or whether their apparent inability to do so is a deficiency in the way they are asked to engage.

155 A longer, more elaborate, process had been envisaged before the onset of the COVID restrictions.

156 These differences were discussed at an ESRC Festival of Social Science event, organised by the Food Standards Agency and the University of Sheffield in November 2020: https://understandingsociety.sheffield.ac.uk/2020/events/understanding-food-in-a-digital-world/.

157 Available here: https://www.food.gov.uk/research/research-projects/the-covid-19-consumer-research

158 'Coronavirus: Food bank shortage blamed on panic buying', https://www.bbc.co.uk/news/uk-england-london-51837892. The Trussell Trust reported a significant rise in the number of people needing to use a food bank since the onset of the pandemic, with a forecast increase of 61% in the demand for food parcels across the UK in October-December 2020: https://www.trusselltrust.org/2020/09/14/new-report-reveals-how-coronavirus-has-affected-food-bank-use/. According to research reported in The Guardian (21 March 2021), nine out of ten district councils in England had seen a rise in people using food banks during the COVID crisis: https://www.theguardian.com/society/2021/mar/21/nine-in-10-councils-in-england-see-rise-in-people-using-food-banks

159 Ipsos MORI is a market research company, based in London: https://www.ipsos.com/ipsos-mori/en-uk/about-us

160 The evidence syntheses focused on agricultural ammonia emissions, microplastics in freshwater and soil, and soil structure and its benefits: https://royalsociety.org/topics-policy/projects/living-landscapes/evidence-synthesis/. The review is available here: https://royalsociety.org/topics-policy/publications/2020/commissioned-report-history-uk-land-use-decision-making/.

161 The reference to 'we' and 'our' in this question could be criticised for masking the politics of land-use change, obscuring the conflicting values and interests that run deep among those involved in and affected by decisions over future land-use policy.

162 *Living Landscapes*: https://royalsociety.org/-/media/policy/Publications/2021/23-03-21-living-landscapes-full-report.pdf

163 *Independent Review of the Food System* Part 1: https://www.nationalfoodstrategy.org/partone/

164 *Independent Review of the Food System* Part 1, p. 6: https://www.nationalfoodstrategy.org/partone/

165 *Independent Review of the Food System* Part 2 ('The Plan') with supporting Evidence: https://www.nationalfoodstrategy.org/. Supplementary reports (available from the same website) cover the impact of the proposed sugar and salt tax and the consultation with >400 young people ('Your future, your food').

166 This point could be generalised to other evaluations, many of which, as discussed in Part I, take place very soon after completion of the public engagement process and are seen as one-off assessments. Longer-term follow up studies could be useful both in terms of the impact on the publics involved and in terms of impacts on policy and practice.

167 'Marcus Rashford: Government changes decision on free school meals': https://www.bbc.co.uk/newsround/54862230

168 UK Government, *Government Food Strategy*, CP 698, 13 June 2022

https://www.gov.uk/government/publications/government-food-strategy

169 Pound, D., Reed, M., Armitage, L., Pound, J. (Dialogue Matters) *Engaging and Empowering Communities and Stakeholders in Rural Land Use and Land Management in Scotland*, Edinburgh: Scottish Government, 2016 https://www.gov.scot/publications/engaging-empowering-communities-stakeholders-rural-land-use-land-management-scotland/ The report defines 'engagement' as the processes and activities through which people are involved in projects which may or may not provide people with influence on relevant land use and land management decisions. It defines 'empowerment' as when communities and stakeholders have power to function in the following ways: during planning land use or land management they have either strong influence, or they share or make the main decisions, and during implementation of agreed management policies they hold responsibility, capacity and resources to implement particular actions (see p. 2).

Case Study: Stakeholder Engagement in Site Selection for Marine Conservation Zones

170 This Act affected mainly England and Wales. The *Marine (Scotland) Act* 2010 was passed in the following year.

171 UK Marine Monitoring and Assessment Strategy Marine Online Assessment Tool, *Social Value and Public Perceptions of the UK Marine* Environment: https://moat.cefas.co.uk/uses-of-the-marine-environment/ (accessed 8 June 2021).

172 De Santo. E. 'Assessing public "participation" in environmental decision-making: Lessons learnt from the UK Marine Conservation Zone (MCZ) site selection process', *Marine Policy* 2016, 64: 91–101 doi:

http://dx.doi.org/10.1016/j.marpol.2015.11.003; Lieberknecht, L. and Jones, P. 'From stormy seas to the doldrums: The challenges of navigating towards an ecologically coherent marine protected area network through England's Marine Conservation Zone process', *Marine Policy* 2016, 71: 275–84, http://dx.doi.org/10.1016/j.marpol.2016.05.023

[173] The Review, commissioned in June 2019, was conducted by an independent panel chaired by Sir Richard (now Lord) Benyon. Professor Susan Owens, who chaired the Task Group for this Review of Public Engagement, was a member of the HPMAs Review Panel 2019–20. Benyon, R. *Benyon Review into Highly Protected Marine Areas: Final Report*, June 2020. https://www.gov.uk/government/publications/highly-protected-marine-areas-hpmas-review-2019

[174] Ibid.; De Santo 2016, op. cit.

[175] Natural England and the JNCC advise government on marine conservation in inshore and offshore waters respectively. Legal authority for implementation of management measures within MCZs lies mainly with the Marine Management Organisation (MMO) and the Inshore Fisheries and Conservation Authorities (IFCAs).

[176] Defra was initially involved in the Board but withdrew at an early stage, leaving oversight of the stakeholder engagement process to the SNCBs.

[177] Pound, D. *Adopting effective stakeholder engagement processes to deliver regional Marine Protected Area (MPA) network*. Natural England Commissioned Report, Number 008, 2009.

[178] De Santo 2016, op. cit.

[179] House of Commons Select Committee on Science and Technology (HC S&T Committee) *Marine Science*, Ninth Report, Session 2012–13, London: The Stationery Office Ltd., 2013a, p. 14; Lieberknecht and Jones 2016, op. cit. p. 277.

[180] De Santo 2016, op. cit. p. 93

[181] Lieberknecht and Jones 2016, op. cit. p. 278

[182] Lieberknecht and Jones note, however, that such conflicts were often pre-existing, crystallised but not 'caused' by the MCZ process. There were also potential synergies, for example between MCZs and shipping lanes, in which other activities were restricted.

[183] House of Commons Environmental Audit Committee (HC EAC) *Marine Protected Areas*, First Report, Session 2014–15, HC 221, London: The Stationery Office Ltd, 2014; HC S&T Committee 2013a, op. cit.

[184] Nineteen of the proposed Reference Areas were within existing Natura 2000 (European protected) sites and in that sense were not new.

[185] The level of pre-consultation engagement with stakeholders (and whether it was carried out by Defra, the SNCBs or both) varied depending on how contentious a site was likely to be (Defra Marine Team, personal communication, 28 October 2021).

[186] JNCC and Natural England, *Marine Conservation Zone Project – Ecological Network Guidance,* 2010, Peterborough: Natural England. https://data.jncc.gov.uk/data/94f961af-0bfc-4787-92d7-0c3bcf0fd083/MCZ-Ecological-Network-Guidance-2010.pdf

[187] Science Advisory Panel *Assessment of the Marine Conservation Zone Regional Projects Final Recommendations*, Defra, November 2011, p. 2. https://www.gov.uk/government/publications/science-advisory-panel-assessment-of-the-marine-conservation-zone-regional-project-final-recommendations (accessed 20/5/21).

[188] JNCC and Natural England *Marine Conservation Zone Project: Advice to Defra on Recommended Marine Conservation Zones*, Peterborough: Natural England, July 2012. http://publications.naturalengland.org.uk/publication/2030218

[189] Lieberknecht and Jones 2016, op. cit. p. 281.

[190] It should be noted that, in some instances, recommendations were put forward with a note that they had not been agreed by all members.

[191] HC S&T Committee 2013a, op. cit. Ev. p. 140.

[192] ibid. p. 20.

[193] Science Advisory Panel 2011, op. cit. p. 2

[194] Lieberknecht and Jones 2016, op. cit.

[195] Defra MCZ Team, personal communication, 5 August 2021. The *level* of consultation was not, in itself, a matter for criticism.

[196] Defra (2011) *Written Ministerial Statement on Marine Conservation Zones*, 15 November. https://www.gov.uk/government/news/written-ministerial-statement-on-marine-conservation-zones

[197] The number of responses, noted in the Benyon Review (op. cit.), is indicative of the high level of interest and engagement in marine management issues.

[198] De Santo 2016, op. cit. p. 92.

[199] HC S&T Committee 2013a, op. cit.; HC EAC 2014, op. cit.

[200] HC S&T Committee 2013a, op. cit. p.23

[201] HC S&T Committee 2013a, op. cit. p 3

[202] De Santo 2016, op. cit. p. 92

[203] Lieberknecht and Jones 2016, op. cit. p. 283.

[204] For example, referring to the idea of Reference Areas in the MCZ selection process, the Assistant Chief Executive of the NFFO was critical of what he saw as the original 'rushed process of directing stakeholder groups to select such sites' but argued nevertheless that 'their application as part of a wider raft of existing site measures, where they may contribute to site-based adaptive management strategies, has a logical purpose. Here it can involve stakeholder user groups … who have the site-level knowledge and understanding of impacts to inform their best use': NFFO News, 'HPMA selection process rigged to harm fishing communities', July 2021. https://www.nffo.org.uk/hpma-selection-process-rigged-to-harm-fishing-communities/.

[205] Inshore and offshore waters around England and offshore waters around Northern Ireland.

[206] Benyon 2020, op. cit.

[207] De Santo 2016, op. cit., Lieberknecht and Jones 2016, op. cit.

[208] Lieberknecht and Jones 2016, op. cit. p. 282. While, as noted in this case study, there were formal consultations on designations, preceded by informal stakeholder pre-consultations, the more collaborative engagement of the RSGs was missing from these later stages. This is interesting in the context of the relative merits of consultation and more interactive forms of deliberative or collaborative engagement, discussed in Part I of this Review.

[209] ibid.; De Santo 2016, op. cit.

[210] De Santo 2016, op. cit. p. 96.

[211] ibid. p. 97. This is an interesting variant on the deficit model (discussed earlier in this report), the point here being that it was not 'more information' that was needed but better guidance on how to access and process what was already available.

[212] HC S&T Committee 2013a, op. cit.

[213] Individual respondent, sector unknown, cited in Benyon 2020, op. cit., p. 50.

[214] Defra, *The Government's Strategy for Contributing to the Delivery of a UK Network of Marine Protected Areas*, London: Defra, March 2010.

[215] Defra, *Guidance on Selection and Designation of Marine Conservation Zones (Note 1)*, London: Defra, September 2010.

[216] EAC 2014: 15; HC S&T Committee 2013a.

[217] HC S&T C'ttee *Marine Science: Government Response to the Committee's Ninth Report, Session 2012–13*, Second Special Report of Session 2013 –14, HC 443, 2013b, June, p.5.

[218] ibid.

[219] HC S&T Committee 2013a op. cit., EAC 2014.

[220] At the time of designations in the third tranche (2019), the NFFO took the view that the process had 'become more measured in marshalling the evidence base needed to justify site selection', see 'Third tranche of Marine Conservation Zones', *NFFO News*, May 2019. https://www.nffo.org.uk/third-tranche-of-marine-conservation-zones/

[221] EAC 2014 op. cit, p. 16. In this context it is worth noting that there were two changes of government between initiation and implementation of the MCZ project, and that such changes often result in a shifting or reordering of priorities.

[222] HC S&T C'ttee 2013a, op. cit.

[223] De Santo 2016, op. cit.; for example, the NFFO 2021, op. cit., thought the process 'rushed'.

[224] Lieberknecht and Jones 2016, op. cit.

[225] De Santo 2016 op. cit. p. 96

[226] While there are currently 182 Marine Protected Areas (MPAs) in SoS waters (covering 40% of the seas and including MCZs, Special Areas of Conservation and Special Protection Areas), protection applies to designated habitats and species rather than whole ecosystems, and despite (limited) control damaging activities still occur. Three 'No Take Zones', which prohibit fishing but not other activities, are located within larger MPAs but the total area covered by NTZs is only 16.4km^2.

[227] Benyon 2020 op. cit. Because of COVID-19 restrictions on evidence gathering, the Panel did not, as intended in its original remit, identify up to five specific pilot sites.

[228] HM Government, *Government Response to the Highly Protected Marine Areas (HPMAs) Review*, 8 June 2021: https://www.gov.uk/government/publications/government-response-to-the-highly-protected-marine-areas-hpmas-review

229 ibid. p.iv.

230 Ibid. p.49.

231 ibid. p. 13.

232 The Call was published on the government website and was open for four weeks. It was promoted by a press release, a Defra tweet, and an email bulletin to the Defra marine and fisheries stakeholder list, as well as by individual Panel members within their networks.

233 Benyon 2020 op. cit., p. 15.

234 ibid. p. 48.

235 ibid. p.48.

236 ibid. p. 49.

237 ibid. pp. 52–3.

238 ibid. p. 50.

239 ibid.

240 Government response to Benyon Review 2021, op. cit. The Government will consider designating five pilot sites (deemed in the Benyon Review to be the bare minimum needed) as part of a consultation, with the aim of designating sites by 2022.

241 In which protagonists don't even agree on what constitutes the problem, let alone on acceptable solutions; see, for example, Hisschemöller, M. and Hoppe, R. 'Coping with intractable controversies: the case for problem structuring in policy design and analysis', *Knowledge and Policy* 1995, 8: 40–60.

Case Study: Public Engagement with Nanotechnologies

242 Royal Commission on Environmental Pollution (RCEP), *Novel Materials and the Environment: the Case of Nanotechnology*, Twenty-seventh report, Cm 7468, Norwich: TSO, 2008: para 2.25.

243 The fourth experiment, focusing on nanotechnology and development, was run by the NGO Practical Action, in Harare, Zimbabwe: see Stilgoe, J. *Nanodialogues: Experiments in Public Engagement with Science*, London: Demos, 2007, Ch. 3.

244 Sciencewise https://sciencewise.org.uk is funded by the Department for Business, Energy and Industrial Strategy (BEIS) and managed by UK Research and Innovation. See note 70 for further detail.

245 Gavelin, K., Wilson, R. and Doubleday, R. *Democratic Technologies? The final report of the Nanotechnology Engagement Group (NEG)*, London: Involve, 2007.

246 RCEP 2008, op. cit.

247 For further discussion, see Expert Group on Science and Governance, *Taking European Knowledge Seriously*, Report to Science, Economy and Society Directorate, DG Research, European Commission, EUR 22700, Luxembourg: Office for Official Publications of the European Communities, 2007.

248 Collingridge, D. *The Social Control of Technology*, New York: Frances Pinter, 1980.

249 Royal Society and Royal Academy of Engineering, *Nanoscience and Nanotechnologies: Opportunities and Uncertainties*, London: The Royal Society, 2005.

250 Wilsdon, J. and Willis, R. *See-through Science: Why Public Engagement Needs to Move Upstream*, London: Demos, 2004.

251 UK Government, *Response to the Royal Society and Royal Academy of Engineering Report, 'Nanoscience and Nanotechnologies: Opportunities and Uncertainties'*, London: DTI, February 2005.

252 Adapted from Gavelin et al. 2007, op. cit.: 17.

253 RCEP 2008, op. cit.: 82.

254 ibid.: p. 73.

255 House of Lords Science and Technology Committee, *Science and Society*, Third Report Session 1999–2000, HL 38, London: The Stationery Office Ltd, 2000: para 1.1.

256 See, for example, Jones, K. E., Irwin, A. and Schulte zu Berge, M. (2006) *Independent Evaluator's Report: A people's inquiry on nanotechnology and the environment*, University of Liverpool Management School; Appendix in Environment Agency, *Using science to create a better place: A people's inquiry on nanotechnology and the environment*, Science Report, Bristol: Environment Agency, 2006.

257 HM Government 2005, op cit.: 20, emphasis added.

258 OPM Group Dialogue by Design, *Understanding public perceptions of specific applications of nanotechnologies: A public dialogue*, Report to the Department for Environment, Food and Rural Affairs (Defra): London, OPM: 2015: 5.

259 ibid.

260 Irwin, A. 'The politics of talk: coming to terms with the "new" scientific governance', *Social Studies of Science*,

2006, *36* (2): 299–320.

[261] Environment Agency 2006, op. cit.: 8.

[262] ibid.: p. 31.

[263] Stilgoe, J. and Kearnes, M. *Engaging Research Councils: Report of an experiment in public engagement*, Nanodialogues Report, London: Demos, March 2007.

[264] Stilgoe, J. *Nanodialogues: Experiments in Public Engagement with Science*, London: Demos, 2007. Stilgoe (p. 61) describes the groups as follows: 'Working mothers', 30–40 years old, BC1, mothers of at least one pre-teen child (Newcastle); 'Metrosexuals', male/female, 25–30 years old, C1 (Newcastle); 'Aspirational women', 40–55 years old, C1/2, mothers of teenage/post-teenage children (suburban London); 'Organic men', 45–60 years old, BC1, children left home, working full time (London).

[265] OPM Group 2015, op. cit; URSUS *Evaluation of the public dialogue to understand public perceptions of specific nanotechnologies*, Report to Department for Environment, Food and Rural Affairs and Sciencewise, London: URSUS Consulting Ltd, December 2015.

[266] In terms of age, gender, household income, employment status and ethnicity. Quotas were included for people working in sectors such as biotechnology and pharmaceuticals and a maximum quota was set for members of environmental organisations; see OPM Group 2015 and URSUS 2015, ibid.

[267] URSUS 2015, op. cit.: 6.

[268] See, for example, Ehrenstein, V. and Laurent, B., 'State experiments with public participation: French nanotechnology, Congolese deforestation and the search for national publics', in J. Chilvers and M. Kearnes, *Remaking Participation: Science, Environment and Emergent Publics*, London and New York: Routledge, 2016, 123–43.

[269] Hajer, M. 'A frame in the fields: policy-making and the reinvention of politics', in M. Hajer and H. Wagenaar (eds.) *Deliberative Policy Analysis: Understanding Governance in the Network Society*, Cambridge: Cambridge University Press 2008, 88–110, p. 88.

[270] Environment Agency 2006, op. cit.: 10.

[271] ibid.

[272] Jones et al. 2006, op. cit.

[273] Stilgoe and Kearnes 2007, op. cit.: 4

[274] ibid.: p. 7

[275] ibid.

[276] Stilgoe 2007, op. cit.: 62

[277] Actual participation was 44 for the first session, reducing slightly for the second and third.

[278] Environment Agency 2006, op. cit.

[279] Stilgoe 2007, op. cit.

[280] Gavelin et al. 2007, op. cit.

[281] Jones et al., 2006 op. cit.

[282] Stilgoe and Kearnes 2007, op. cit.

[283] BBSRC and EPSRC 2007, op. cit.

[284] Stilgoe 2007, op. cit.

[285] Gavelin et al. 2007, op. cit.

[286] Chilvers 2006, op. cit.

[287] Stilgoe 2007, op. cit.

[288] Gavelin et al. 2007, op. cit.

[289] OPM 2015, op. cit.

[290] URSUS 2015, op. cit.

[291] Gavelin et al. 2007, op. cit., p. 78; Chilvers 2006, op. cit.; Jones et al. 2006, op. cit.

[292] Jones et al. 2006, op. cit., p. 55.

[293] Chilvers 2006, op. cit.; EA 2006 op. cit.; Jones et al. 2006 op. cit.; Sciencewise, *Nanodialogues: A Series of Upstream Dialogue Experiments*, Case Study, 2007: https://sciencewise.org.uk/wp-content/uploads/2021/03/CS-7.pdf

[294] NIDG was a body set up to enable the development of nanotechnologies and co-ordinate action across government departments, agencies and research councils.

[295] Gavelin et al. 2007, op. cit.

[296] Owens, S. *Knowledge, Policy, and Expertise: the UK Royal Commission on Environmental Pollution 1970–2011* Oxford: OUP, 2015, p. 127.

[297] Gavelin et al. 2007, op. cit.: 82.

[298] OPM 2015 op. cit.: 5.

[299] URSUS 2015, op. cit.: ii.

[300] The REACH Regulation (Registration, Evaluation, Authorisation and Restriction of Chemicals) is the framework governing regulation of chemicals in the EU. Initially, REACH did not make special provision for nanomaterials but an Annex with guidance on nanomaterials was published in 2017 (https://www.echa.europa.eu/-/reach-guidance-for-nanomaterials-published). The REACH Regulation was brought into UK law under the *European Union (Withdrawal) Act* 2018 and made operable within a UK context: see https://www.hse.gov.uk/reach/whatisreach.htm

[301] Jones et al. 2006, op. cit.

[302] Chilvers 2006, op. cit. p. 10.

[303] ibid: p. 6.

[304] Chilvers 2006, op. cit.

[305] Jones et al. 2006, op. cit.: 57.

[306] Gavelin et al. 2007, op. cit.: 90.