



ACCESS

What is Environmental Social Science?

ACCESS interview report

Birgitta Gatersleben¹, George W. Warren¹,
Valentine Seymour¹, Harry Marshall², Gerardo
A. Torres Contreras³

¹ University of Surrey, ² Forest Research, ³ University of Sussex

January 2024

The work of ACCESS is funded by the Economic and Social Research Council [Grant: ES/W00805X/1]

Introduction

Advancing Capacity for Climate and Environment Social Science (ACCESS) is an Economic and Social Research Council (ESRC) funded project, led by researchers at the University of Exeter, the University of Surrey and an extensive partner network, including the University of Sussex, University of Leeds, Natural England, Natural Resources Wales, NatureScot, Natural England, Environment Agency and Forest Research. The project aims to establish an interdisciplinary environmental social science leadership team in the UK over the next five years to champion and coordinate social science research, to build capacity and promote and enhance the value of environmental social science in research and practice. It also aims to address key environmental challenges spanning biodiversity, sustainability, and decarbonisation.

In order to achieve these goals, it is important to gain a clear understanding of what we mean by Environmental Social Science (ESS). As part of this challenge, current understandings of the concept were explored through analyses of data from a short open-ended survey (n = 14) and interview study (n = 18) with different academic and non-academic stakeholders within and outside of ACCESS.

The growth of ESS research is evident within UK research¹, training²³ and policy programmes, and is becoming more widespread within the global south context (Bailey, 2011; Bennett et al., 2017; Massarella et al., 2021). However, the role of social sciences is still not always clearly understood or valued (Devine-Wright et al., 2022).

Several definitions of ESS exist, but these are varied and often quite broad or complex, partly because the field is vast and complex. Many existing definitions refer, in some way, to the adoption of social science research methods, models and theories to understanding people-environment interactions. For instance, the journal *Nature* defines ESS as “the application of social science – broadly the study of the relationship between individuals in their context within society – and its application to our understanding of environmental issues. Moran (2010) refers to it as “the integrative science that can address the biophysical and social dimensions of human-environment interactions” (p. 9). However, understandings of what ESS is or includes are not always consistent. Several debates have emerged regarding specific aspects of ESS. This includes discussions around the social science disciplines that are and should be included (Bailey, 2011; Morris et al., 2022), and around the value and emphasis placed on individual behaviour change versus more societal level approaches (Sippel et al. 2020). The perceived value and impact of ESS may be limited in part due to a lack of clarity of its objectives and value (Bennett et al., 2017).

¹ <https://www.ukri.org/news/social-sciences-to-play-vital-role-in-meeting-uks-net-zero-goals>, retrieved 5 July 2023

² <https://www.uea.ac.uk/about/school-of-environmental-sciences/research/environmental-social-sciences>, retrieved 5 July 2023

³ <https://www.kent.ac.uk/courses/postgraduate/14>, retrieved 5 July 2023.

Gathering different (expert) perspectives

To gather different academic and non-academic perspectives of Environmental Social Science, we drew on data from a survey and interview study. These were designed to collate perceptions on the meaning, value, and purpose of ESS and to examine perspectives of the factors that support and hamper successful integration of ESS in interdisciplinary research, policy and practice. The survey and interviews both began by asking participants to define ESS. Answers to that question will be analysed here, while other findings from the survey and interview study will be reported elsewhere, including Warren et al. (2024).

Survey

The survey was sent to ACCESS network members in March 2023. After participants had read the information sheet about the project and survey and provided informed consent, they were asked the first question: “Can you summarise what the term Environmental Social Science means to you? (Please summarise your response in one or two lines in the box below). The project received ethical approval from the Research Integrity and Governance Office at the University of Surrey (Ref: FHMS 22-23 013 EGA).

Sample

A total of 14 people completed the survey. It should be noted that this is a relatively small sample from the vast network. However, in combination with the interview data described below, the survey responses provided valuable insights that reflected a range of different perspectives. Of the 14 people who completed the survey, two did not provide a definition of Environmental Social Science and are therefore excluded from the analysis. Of those 12 people who provided a definition, eight identified as researchers based in academic institutions, three identified as working in Government (local, national or regional), and one did not answer the question. Nine participants identified as social scientists, one identified as a health scientist and one as an interdisciplinary scientist. One participant did not answer the question.

Results

Twelve different definitions were provided by participants. The definitions can be found in Table 1. The definitions are simultaneously consistent and varied. All definitions refer in some way to the application of social science knowledge, thinking, and methods to understanding and tackling human-environment relationships. They are varied in their precision, detail and in their focus on specific aspects. Although participants were asked to summarise their answer in a couple of sentences, some definitions were very short and concise while others were long and detailed.

Several definitions show many similarities with the way the concept is defined in the literature. For instance, participant 6 (PP6) provides an almost textbook example of an ESS definition. Several definitions make explicit reference to mutual relationships between people and the physical or natural environment. Some definitions refer more to understanding human-environment relationships (participants 2, 3, 4, 7, 8, 10), whereas others are more instrumental focusing on helping to find solutions (participants 1, 3, 9 and 11). Several definitions make clear references to the range of subdisciplines and perspectives that can be captured within ESS (participants 6, 9 and 11). Two participants (1 and 3) specifically refer to interdisciplinarity, but for PP1 interdisciplinarity is central, noting that ““*Environmental social science*” (like other disciplinary terms) is problematic”, and that there is a need to “*get away from such disciplinary mindsets - they are part of the problem and will almost always contribute to making things worse*”.

Table 1. Eleven definitions of Environmental Social Science provided by survey respondents.

Participant number	Definition of Environmental Social Science
1	One element of the wider analysis needed to address the integrated challenges facing humanity today. As with all such elements 'environmental social science' is likely to exacerbate those challenges if used in isolation. However, if appropriately integrated with the natural, physical, economic and other elements of an adequate understanding of those challenges it can provide a vital element of the solution
2	A body of thought involved in understanding knowledge and insights of people and nature.
3	The application of social scientific theory, methods and approaches to understanding and addressing environmental issues. This could be done from a disciplinary or interdisciplinary perspective.
4	Social scientific theories, methods and data applied to understanding the environment as experienced by people.
5	Research at intersect between behaviour, people and policy.
6	A field of study that examines the interactions between humans and the environment. It draws on a variety of disciplines, including anthropology, sociology, political science, economics, and geography. Environmental social scientists study a wide range of topics, including environmental policy, environmental justice, environmental health, and environmental sustainability.
7	Study of how the environment (and sustainability) relates to, is shaped by and impacts on society, and how society relates to, is shaped by and impacts on the environment (and sustainability).
8	Exploration and analysis of the impact of social factors (including political factors) on the environment and vice versa. This is done through social sciences research theories and methods.
9	The social science of human impacts on the environment and of political, social, psychological and cultural responses to environmental change and problems. Applied ESS: using theories, concepts, methods and tools from social sciences in order to inform and influence policymaking, and to improve design and evaluation of policies.
10	Examining people-environment relationships.
11	The breadth of social science disciplines engaged in understanding and providing solutions for the environmental problems of our time.
12	Social science applied to environmental issues.

Summary

The 12 definitions largely reflect perspectives highlighted in the literature. Some definitions were more descriptive of human-environment relationships, whereas others were more problem-focused. Using social science methods and models to understand human-environment relationships or solve relevant problems was central to most definitions. Several definitions make specific reference to the importance of social dimensions of environmental issues. The variety of different subdisciplines that are included was noted by several participants and the importance of working with and across disciplines was frequently referred to, although it was clearly more important for some than others. Most definitions are quite broad and may not be useful or usable to communicate the field and its value to those working outside of the field.

Expert interviews

The overarching aim of the interviews was to explore participants' past and current experiences within climate and environment training, research, and policy programmes where social science has been integrated. At the start of the interviews, participants were asked what Environmental Social Science means to them. The answers to this question are analysed here.

Sample and procedure

In total, 18 participants were included in these exploratory interviews held between December 2022 and May 2023, with a range of participants from academic, non-governmental and governmental sectors recruited. The project received ethical approval from the Research Integrity and Governance Office at the University of Surrey (Ref: FHMS 22-23 013 EGA). The interviews were conducted by two social scientists: one working in academia, and the other in policy and practice.

Participants were recruited directly by the interviewers through existing contacts and the ACCESS network. We aimed to represent a range of perspectives from different disciplines (different social sciences and non-social scientists) and from those working within and outside of academia (in government roles, advisory bodies and charities). To ensure we captured a range of viewpoints, several additional participants outside of the ACCESS network were also asked to share their perspectives. All participants were specifically recruited due to their expertise in their field of work.

ACCESS is primarily focused on policy and practice, and therefore the majority of participants came from these fields. No participants from business or commercial bodies were interviewed in this study. Table 2 shows an overview of the participants and their affiliation (academic, policy/practice, NGO, local authority, charity) as well as their disciplinary background (social, natural/engineering, mixed) and gender (male, female). Most participants identified as social scientists, and several noted they had received both social science and natural science training (mixed). A majority of participants did not currently work in an academic institution, although several had done so in the past.

Interviews were conducted and recorded online using Microsoft Teams. Transcriptions were analysed using thematic methods as outlined by Braun and Clark (2006), identifying key themes and codes (inductive and deductive) relevant to the study’s aim.

Table 2. Characteristics of interview participants

Participant number	Affiliation	Discipline	Gender
1	Academia	Social	Female
2	Policy/Practice	Social	Female
3	Academia	Mixed	Female
4	NGO	Natural Science	Male
5	Charity, Policy/Practice	Social	Female
6	Academia	Social	Male
7	Policy/practice	Social	Female
8	Policy/practice	Mixed	Male
9	Policy/practice	Social	Male
10	Policy/practice	Social	Female
11	Policy/Practice	Social	Female
12	Academia	Engineering	Male
13	Policy/Practice	Social	Female
14	Policy/Practice	Mixed	Female
15	NGO	Mixed	Female
16	Local Council/Policy/Practice	Mixed	Female
17	Policy/Practice	Mixed	Female
18	Local Council/NGO	Social	Male

Results

Few participants provide a clear definition of ESS, and when they did so it is often done in broad terms. For example, PP13 defines it as “*Social science, which focuses on the environment as a thematic area*”. Most participants refer to some form of interaction between social and environmental aspects. However, understandings and conceptualisations of the social aspects, the environmental aspects, and the nature of how they were perceived to interact with one another varied.

Five key themes emerged from the analysis, reflecting discussions on: 1) what is meant by social science, 2) the people or social groups that are studied; 3) the environments or environmental issues under investigation, 4) the focus or goal of research on understanding problems or finding solutions and 5) the complexity of the field. Each of these themes will be discussed below.

1. What social science(s)?

Several participants pulled the concept apart. For instance, PP11 asks “*What is social scientists?*”. Most participants who did so then provided their perspective of what social science is and what can and should be included (or not). Those who did so often concluded that it includes a broad range of different social science subdisciplines.

For PP3, ESS “breaks down into different pieces and I start with the social science piece”. They go on to ask “what does social science include? Because that’s always really tricky”. They then note that “I personally include economics within that social science remit, but I know a lot of people might not”.

When talking about different social science sub-disciplines, PP6 refers to “What I consider some of the real biggies. And that would be like political science, geography, human geography, sociology, psychology”. But recognising that actually it’s broad, maybe with social anthropology and media studies and law and urban studies and all [subjects like] this”.

PP1 notes the importance of a broad range of different disciplinary perspectives. “From my perspective, it would be approaching social sciences as a broad interdisciplinary spectrum, if you like, [...] I think for me, the ability for each and every school and department of discipline to be able to contribute within that spectrum, it’s incredibly important”.

Other participants did not discuss specific subdisciplines, instead referring to ESS as the application of social science or social science research methods more broadly to the “environment”. For instance, PP6 suggests environmental social science is “the kinds of knowledge and insight and data that they [social scientists] produce, which can then be used to understand environmental problems”. PP3 considers what ESS is by considering what ESS is not. “What I don’t think of social science as, like, somebody without any training, just asking social science questions”. They then go on to conclude that “for me then, environmental social science is where you take those methodologies and theoretical groundings and apply them to an environmental situation”.

2. Which people or social groups?

Most participants referred to “people” when they discuss the concept of ESS, without going into detail as to what this means. However, a couple of participants do consider what is meant by people, making specific reference to the target group or audience that is the focus of the “social” dimension of the concept. PP7, for instance, notes that “I guess the social bit means that there are there are people [...] not just an individual level, so there’s a society”. PP2 provides a short definition in which several “audiences” are mentioned: “to me it means the study of society, individuals, organisations, our communities in relation to the natural environment”. Along similar lines, PP17 thinks of the concept in “quite a broad way of looking at things in the whole, particularly with a focus on people and society and humans and societal interactions with other things, which might well include nature”.

3. What environment?

Some participants used the term “environment”, whereas others referred to more specific terms such as “the natural environment” (PP2). Indeed, several participants specifically mentioned that environments to them referred to natural environments. For instance, PP17 noted that “to me it [the environment] encompasses wildlife and biodiversity and weather and climate, geology and you know, lots and lots of things, whereas perhaps to some it’s more tailored to things around, caring for the environment, [...] pollution and things like that”. For PP3, ESS is about applying social science knowledge and methods to

the environment which *“to me means natural environment. So I'm thinking about green and blue spaces”*. PP5 reflects on *“the interaction of environment and people's place in society. Place in community”*. For PP5, it is important to consider environments at different scales, from the immediate local to the global: *“environmental is here, my little spot, through to global really, depending on what you are looking at?”*.

4. Problem-focused, or not?

Whereas some participants described ESS in terms of understanding people-environmental interactions more broadly, most interviewees referred to these interactions in terms of helping to tackle environmental problems. Some described the field very specifically as one that focuses on behaviour change.

Some refer to understanding human-environment interactions more broadly or problems associated with it. For instance, for PP10 it is to do with *“how society interacts with environment and uses resources”*. PP11 suggests ESS is about *“people's experiences, engagement with and impact on and impact of the environment.”* These perspectives appear to focus on understanding the mutual relationships between people (individuals and groups) and their (natural) environment.

Some participants spoke more specifically about understanding and tackling environmental problems. For PP14 *“Environmental social science is bringing together people and nature. For nature recovery, essentially”*. PP6 suggests ESS is about *“the kinds of knowledge and insight and data that they produce, which can then be used to understand environmental problems”*. For PP4, ESS *“is focused at the intersect[ion] between a range of issues around environmental harm and mitigation, adaptation and restoration, and I guess what it's trying to do is understand the causality and motivation of actors within that space”*.

Many participants refer to a specific focus on the need to change behaviours or behavioural decisions of individuals or groups. For instance, for PP18 ESS is about *“studying how we could get people to take on more pro-environmental behaviours through various methods of looking at behaviour change”*. PP16 has a similar perspective, noting *“the fact that people kind of knew what the issues were broadly and knew what to do about them”*. It is interesting to note that PP12 observes that social scientists often focus too much on commenting *“how things have happened”* rather than *“implement change, which involves finding knowledge that moves forwards”*.

Some participants reflect on different types of methodological or interdisciplinary approaches to understanding and tackling people-environment challenges. For instance, PP8 suggests that ESS is *“the social science perspective on environmental issues, and particularly in terms of how people's behaviours and attitudes and lifestyles shape and influence environmental issues”*. They then go on to reflect on the value of existing approaches to change individual consumer behaviours by remarking that *“most of the practice on that has been really around the kind of nudge agenda [...] that sort of soft end [...] rather than more systemic change”*.

PP15 reflects on two different ways to think about people-environment interactions: one is problem-focused, and the other is about positive people-environment interactions. They discuss both the *“negative environmental impacts and looking at the social science to do with, you know, pollution”* as well as

the positive sides such as the “*health and well-being benefits of being out in nature as an ecosystem service*”. They also note that it can be “*a sales job about which one you prioritise to which audience*”.

5. Complex and unclear

Several participants specifically mentioned the complexity of ESS. Some participants were somewhat overwhelmed even by the question, and their first responses were “*crikey*” (PP2) or “*Umm gosh*” (PP8).

The broad complexity of the idea was well-described by PP7, who defined it as “*any kind of social science that relates to the environment*” and then went on to note “*Recognising, though, that the environment itself is a vast array of different specific problems. So that’s very complicated, and also even just clarifying the social sciences is tricky enough*”. PP17 noted that “*it means so many different things to me, and I think this is why I was so interested in it*”.

The problems that might be associated with the perceived complexity of the concept were highlighted by PP12 who, when asked what environmental social science means to them, responded by saying “*I associate them [academics working in the area of ESS] [...] with commentating on why it’s difficult and not coming up with any solutions*”. This comment highlights the need to further clarify the purpose and value of ESS is within the larger environmental agenda, especially to those who are not social scientists themselves.

Conclusion

When a range of experts were asked what Environmental Social Science means to them, their responses were mixed. Where many had some idea (most likely because they are working in the field or with people who do) some found the question difficult. Most participants discussed the complexity of the concept, referring to the range of different approaches and perspectives in the field.

The interviews largely reflected what has been discussed in the literature. Participants considered the range of social sciences that can and should be included in the list, the different social groups that can and should be studied, and the different types of environments and environmental issues that can and should be examined. The interviews also highlighted the range of different goals of research in this area, from understanding complex people-environment interactions to testing the impact of specific behaviour change interventions. Overall, the surveys and interviews confirmed the need to develop a clear definition and description of ESS that can be used to champion the field.

References

- Bailey, P. (2011). *Using Social Science to Regulate People, Business and Technology: A practitioner's handbook*. The Strategic Society. <https://strategicsociety.org.uk/wp-content/uploads/2013/01/Using-Social-Science-to-Regulate-People-Business-and-Technology.pdf>
- Barr, S. (2014). Practicing the cultural green economy: where now for environmental social science? *Geografiska Annaler: Series B, Human Geography*, 96(3), 231-243.
- Bennett, N. J., Roth, R., Klain, S. C., Chan, K., Christie, P., Clark, D. A., Cullman, G., Curran, D., Durbin, T. J., & Epstein, G. (2017). Conservation social science: Understanding and integrating human dimensions to improve conservation. *biological conservation*, 205, 93-108.
- Berkhout, F., Leach, M., & Scoones, I. (2003). Shifting perspectives in environmental social science. *Negotiating Environmental Change: New Perspectives from Social Science*, 1-31.
- Bremer, S., & Meisch, S. (2017). Co-production in climate change research: reviewing different perspectives. *Wiley Interdisciplinary Reviews: Climate Change*, 8(6), e482.
- Castree, N., Adams, W. M., Barry, J., Brockington, D., Büscher, B., Corbera, E., Demeritt, D., Duffy, R., Felt, U., Neves, K., Newell, P., Pellizzoni, L., Rigby, K., Robbins, P., Robin, L., Rose, D. B., Ross, A., Schlosberg, D., Sörlin, S., West, P., Whitehead, M., & Wynne, B. (2014). Changing the intellectual climate. *Nature Climate Change*, 4(9), 763-768. <https://doi.org/10.1038/nclimate2339>
- Charnley, S., Carothers, C., Satterfield, T., Levine, A., Poe, M. R., Norman, K., Donatuto, J., Breslow, S. J., Mascia, M. B., & Levin, P. S. (2017). Evaluating the best available social science for natural resource management decision-making. *Environmental Science & Policy*, 73, 80-88.
- Cox, M. (2015). A basic guide for empirical environmental social science. *Ecology and Society*, 20(1).
- Devine-Wright, P., Whitmarsh, L., Gatersleben, B., O'Neill, S., Hartley, S., Burningham, K., Sovacool, B., Barr, S., & Anable, J. (2022). Placing people at the heart of climate action. *PLOS Climate*, 1(5), e0000035.
- Djenontin, I. N. S., & Meadow, A. M. (2018). The art of co-production of knowledge in environmental sciences and management: lessons from international practice. *Environmental management*, 61(6), 885-903.
- Dobson, A. D., De Lange, E., Keane, A., Ibbett, H., & Milner-Gulland, E. (2019). Integrating models of human behaviour between the individual and population levels to inform conservation interventions. *Philosophical Transactions of the Royal Society B*, 374(1781), 20180053.
- Fisher, E., Brondizio, E., & Boyd, E. (2022). Critical social science perspectives on transformations to sustainability. *Current Opinion in Environmental Sustainability*, 55, 101160.
- Gatersleben, B. (2023). Environmental Psychology. In G. Davey (Ed.), *Applied Psychology* (pp. 617-636). Wiley.
- Hicks, C. C., Levine, A., Agrawal, A., Basurto, X., Breslow, S. J., Carothers, C., Charnley, S., Coulthard, S., Dolsak, N., & Donatuto, J. (2016). Engage key social concepts for sustainability. *Science*, 352(6281), 38-40.
- Holmes, G., Carruthers-Jones, J., Huggan, G., de Smalen, E. R., Ritson, K., & Šimková, P. (2022). Mainstreaming the humanities in conservation. *Conservation Biology*, 36(3).
- Holzer, J. M., Adamescu, C. M., Cazacu, C., Díaz-Delgado, R., Dick, J., Méndez, P. F., Santamaría, L., & Orenstein, D. E. (2019). Evaluating transdisciplinary science to open research-implementation spaces in European social-ecological systems. *biological conservation*, 238, 108228.
- Jackson, T. (2016). *Prosperity without growth: Foundations for the economy of tomorrow*. Taylor & Francis.

- Lövbrand, E., Beck, S., Chilvers, J., Forsyth, T., Hedrén, J., Hulme, M., Lidskog, R., & Vasileiadou, E. (2015). Who speaks for the future of Earth? How critical social science can extend the conversation on the Anthropocene. *Global Environmental Change*, 32, 211-218.
- Marselle, M. R., Hartig, T., Cox, D. T., De Bell, S., Knapp, S., Lindley, S., Triguero-Mas, M., Böhning-Gaese, K., Braubach, M., & Cook, P. A. (2021). Pathways linking biodiversity to human health: A conceptual framework. *Environment international*, 150, 106420.
- Martin, V. Y. (2020). Four common problems in environmental social research undertaken by natural scientists. *BioScience*, 70(1), 13-16.
- Massarella, K., Nygren, A., Fletcher, R., Büscher, B., Kiwango, W. A., Komi, S., Krauss, J. E., Mabele, M. B., McInturff, A., & Sandroni, L. T. (2021). Transformation beyond conservation: how critical social science can contribute to a radical new agenda in biodiversity conservation. *Current Opinion in Environmental Sustainability*, 49, 79-87.
- Moran, E. F. (2010). *Environmental social science: human-environment interactions and sustainability*. John Wiley & Sons.
- Morris, C., Brockett, B. F. T., & Green, S. (2022). *Social Science in the Natural Environment (SSINE): Moving towards interdisciplinarity - integrating social and natural science in UK environmental organisations*. Natural England report JP045.
- Nielsen, K. S., Clayton, S., Stern, P. C., Dietz, T., Capstick, S., & Whitmarsh, L. (2021). How psychology can help limit climate change. *American Psychologist*, 76(1), 130.
- Pearce, R., Dessai, S., & Barr, S. (2013). Re-framing environmental social science research for sustainable water management in a changing climate. *Water resources management*, 27, 959-979.
- Robinson, K. F., Fuller, A. K., Stedman, R. C., Siemer, W. F., & Decker, D. J. (2019). Integration of social and ecological sciences for natural resource decision making: challenges and opportunities. *Environmental management*, 63, 565-573.
- Schipper, E. L. F., Dubash, N. K., & Mulugetta, Y. (2021). Climate change research and the search for solutions: rethinking interdisciplinarity. *Climatic Change*, 168(3-4), 18.
- Schrage, J., Barraclough, A. D., Wilkerson, B., Cusens, J., & Fuller, J. (2023). Developing positional awareness in sustainability science: four archetypes for early career scientists working in an SDG world. *Sustainability Science*, 18(2), 1053-1058.
- Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and planning A*, 42(6), 1273-1285.
- Vaccaro, I., Smith, E. A., & Aswani, S. (2010). *Environmental social sciences: methods and research design*. Cambridge University Press.
- Wallen, K. E., & Landon, A. C. (2020). Systematic map of conservation psychology. *Conservation Biology*, 34(6), 1339-1352.
- Warren, G. W., Gatersleben, B., Seymour, V., Marshall, H., & Torres Contreras, G. A. (2024). *Factors influencing Environmental Social Science inclusion in policy and practice*. ACCESS interview report. ACCESS Project.
- Weber, M. (2017). *Methodology of social sciences*. Routledge.
- Whitmarsh, L., O'Neill, S., & Lorenzoni, I. (2011). Climate change or social change? Debate within, amongst, and beyond disciplines. *Environment and planning A*, 43(2), 258-261.
- Whitmarsh, L., Poortinga, W., & Capstick, S. (2021). Behaviour change to address climate change. *Current Opinion in Psychology*, 42, 76-81.
- Wilkie, S., & Davinson, N. (2021). The impact of nature-based interventions on public health: A review using pathways, mechanisms and behaviour change techniques from environmental social science and health behaviour change. *Journal of the British Academy*, 9, 33-61.

Wilson, C., & Chatterton, T. (2011). Multiple models to inform climate change policy: a pragmatic response to the 'beyond the ABC' debate. *Environment and planning A*, 43(12), 2781-2787.