Section A		
Institution: The University of Manchester		
Unit of Assessment: 30 (Philosophy)		
Title of case study: *ClimateJust*: Mapping Climate Disadvantage		
Period when the underpinning research was undertaken: 2008 – 2016		
Details of staff conducting the underpinning research from the submitting unit:		
Name: John O'Neill	**Role(s) (e.g. job title):** Hallsworth Chair in Political Economy	**Period(s) employed by submitting HEI:** 2005 – present
Period when the claimed impact occurred: 2015 – 2020		
Is this case study continued from a case study submitted in 2014? No		

Section B

1. Summary of the impact

ClimateJust (www.climatejust.org.uk) is a web-based mapping tool that facilitates socially-aware decision-making by showing how, where and to what extent exposure to risk and social vulnerabilities intersect to produce 'climate disadvantage'. Both the mapping tool and the key concept of climate disadvantage that underpins it have been widely used by a variety of policymakers and other public bodies both nationally and internationally, helping them to understand how climate change disproportionately affects vulnerable groups and informing planning decisions, adaptation strategies and practitioner guidance. Users include the UK government, the Town and Country Planning Association, Friends of the Earth, and public bodies in Liverpool, Hull, Glasgow, Staffordshire and Helsinki.

2. Underpinning research

ClimateJust (hereafter 'CJ') was conceived as a result of research conducted for an interdisciplinary project, *Justice, Vulnerability & Climate Change: An Integrated Framework*, funded by the Joseph Rowntree Foundation (JRF, 2010-11). The project was led by O'Neill in collaboration with several co-investigators and postdocs from three disciplines: philosophy, geography and planning. The website and online mapping tool were developed during a second project, *ClimateJust* (on which O'Neill was a CI), supported by the JRF and the Environment Agency (Midlands region) and launched in 2015, with a subsequent relaunch with modifications in 2018.

The CJ mapping tool combines specific dimensions of 'climate vulnerability' – explained below – with exposure to physical risk (primarily flooding and heatwaves). This allows users to assess the levels of – and contributors to – 'climate disadvantage' present in specific areas of the UK at different levels of granularity, in a similar way to Google Maps. The intellectual framework that underpins CJ derives directly from John O'Neill's work on climate justice, which defines, and defends the importance of, the notions of climate vulnerability and climate disadvantage that are enshrined in CJ's algorithms and user interface.

Climate impacts can affect anyone, but some people are more acutely affected than others. How badly people are affected depends not only on their exposure to events like floods and heatwaves but also on various forms of social vulnerability. **'Climate vulnerability'** denotes the extent to which one would be negatively affected by climate impacts. Factors that contribute to climate vulnerability include income, lack of local knowledge, disability, lack of private transport, lack of community support, and housing characteristics; so, for example, other things being equal low-income households have greater climate vulnerability than high-income households. **Climate disadvantage** combines climate vulnerability with exposure to physical risk. Thus those with the highest level of climate disadvantage are typically those who have a high level of climate vulnerability *and* a high level of exposure to physical risk.

In order to measure climate vulnerability, however, one needs to have a clear idea of what is being measured. Having one's house flood impacts negatively on everyone, but it will

impact more negatively on the wellbeing of unemployed asylum-seekers than it will on a middle-class British home-owning family. A clear conception of 'wellbeing' is required so that negative impacts on it can be identified and measured. O'Neill's work was crucial to this key component of the conceptual framework behind, and the specific factors that are counted as elements of climate vulnerability by, the CJ tool.

O'Neill [1,2] has criticised subjective state and preference satisfaction accounts of wellbeing, arguing that they cannot capture the full range of dimensions of well-being put at risk by climate change. He has instead [3,4] defended a version of the 'objective-state' account, endorsing a needs-based account and – most significantly – developing that account in the context of vulnerability to climate hazards, thus delivering the concept of climate vulnerability. O'Neill argues that needs-based approach, as opposed to a capabilities approach, is justified in that certain achieved functionings (as opposed to capabilities) – 'fertile functionings' – are a condition of the very possibility of exercising capabilities. For example, being housed is a fertile functioning: people displaced by floods lose the ability to engage in long-term planning, which undermines their ability to exercise various capabilities, which in turn puts other central functionings at risk, for example concerning livelihood or children's education. A practical advantage of this approach is that these functionings and their loss are measurable in a way that capabilities are not.

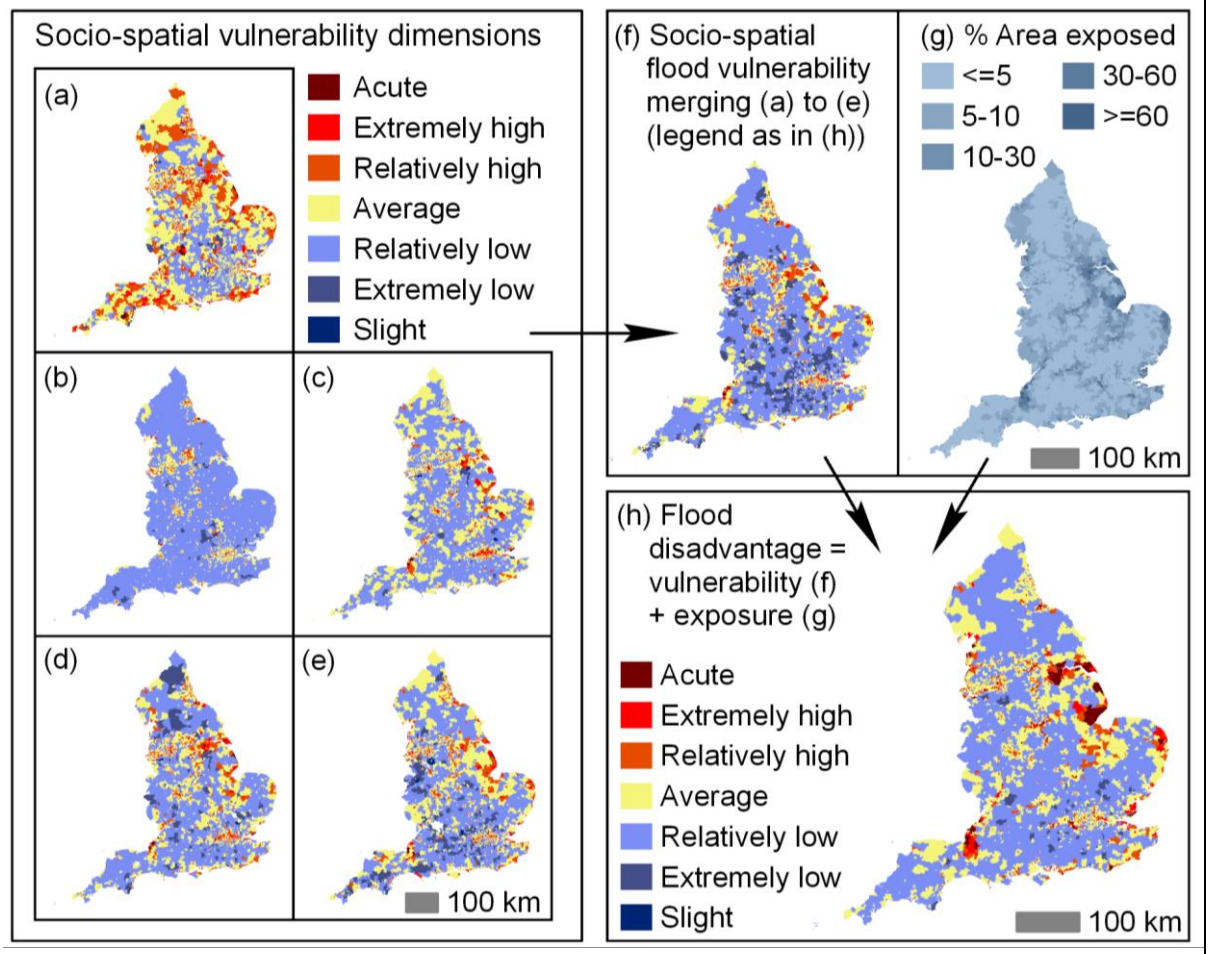

Figure 1: Examples of datasets produced through the underpinning research for climatejust.org.uk. Notes: (a) Sensitivity (b) Enhanced Exposure (c) Inability to Prepare (d) Inability to Respond (e) Inability to Recover (g) Environment Agency moderate or significant flood zones. Contains Ordnance Survey and Office for National Statistics data under the Open Government Licence © Crown copyright and database right 2012 and Environment Agency data.

The research for CJ specifically [5,6] developed a particular account of climate vulnerability that was used to create empirically informed measures of the factors that

affect the degree to which different groups would be affected by climate hazards such as heat waves and floods, under five broad headings: *sensitivity, enhanced exposure, ability to prepare, ability to respond,* and *ability to recover*. These were incorporated into the CJ mapping tool as dimensions of socio-spatial vulnerability to climate hazards (that is, climate vulnerability), which, together with risk exposure, combine to produce an overall measure of climate disadvantage. (Fig. 1 shows this for England in the case of flooding.)

3. References to the research

1. **O'Neill, J**. 2006. 'Citizenship, Well-Being and Sustainability: Epicurus or Aristotle?' *Analyse & Kritik* 28, 158-72
2. **O'Neill, J.**, Holland, A. and Light, A. 2008. *Environmental Values* (London: Routledge)
3. **O'Neill, J.** 2006. 'Need, Humiliation and Independence' in S. Reader, ed., *The Philosophy of Need: Royal Institute of Philosophy Supplement, 57*
4. **O'Neill, J.** 2010 'The Overshadowing of Need' in Felix Rauschmayer, Ines Omann, Johannes Frühmann, eds., *Sustainable Development: Capabilities, Needs, and Well-Being* (London: Routledge)
5. Lindley, S, **O'Neill, J.**, Kandeh, J., Lawson, N., Christian, R. and O'Neill, M. 2011. Report: *Climate Change, Justice & Vulnerability* (York: Joseph Rowntree Foundation)
6. **O'Neill, J.** 2016 'Dimensions of Climate Disadvantage', in Walsh, A., Hormio, S. and Purves, D., eds., *The Ethical Underpinnings of Climate Economics* (London: Routledge)

The quality of the underpinning research is evidenced by several peer-reviewed outputs including a monograph.

4. Details of the impact

Beneficiaries: CJ's primary beneficiaries have been public bodies, policymakers, and professional, voluntary and community organisations with a role in supporting adaptation to climate change in the UK – and, to some extent, overseas.

Pathways to impact: Since CJ's launch in 2015, members of the project team have led or contributed to over 30 events, with a combined audience of over 600 people, designed to explain the benefits and potential uses of the mapping tool to – and to train – potential users. These included a series of five training events for local authority elected members and planning officers run by the Town and Country Planning Association, three training workshops in Cumbria, supported by the Big Lottery and run by Cumbria Action for Sustainability, following local flood incidents; and two further events run separately by the National Flood Forum supporting local application of the CJ website as part of stakeholder engagement on flood risk management. The CJ team's 2018 Scottish training event was oversubscribed resulting in an additional, independently resourced Adaptation Scotland event. Support by external agencies and cascading of ideas through academic, policy and practice networks have been pivotal in achieving the range and depth of influence seen to date.

Impacts of the research:

CJ has generated impact with national significance and reach, which has extended into mainland Europe. CJ is described in a European Environment Agency Technical Paper [A] as *"a flagship example of a knowledge hub focused on social justice in the climate change context"* (p.25). The CJ website and mapping tool are free to use and have so far reached over 38,000 users. Since a (free) user registration scheme was launched in June 2018, 1432 users have registered, 26% of whom are local government staff, with other users including consultancies, charities and community organisations. Both **the mapping tool** and **the key concept of climate disadvantage** that underpins it have helped embed the idea that not only physical risk but also social vulnerability is crucial to decision-making; below are listed some of the various ways in which a wide variety of users have benefited.

National impact:

UK Climate Change Risk Assessment 2017 Evidence Report: Under the 2008 Climate Change Act, the UK government is required to provide a UK-wide climate change risk assessment every 5 years. The 2017 assessment was carried out by the Adaptation Sub-

committee of the Committee for Climate Change at the request of Defra. 'Climate disadvantage' – the core conceptual innovation of CJ that combines risk of exposure and climate vulnerability – plays a central role in Chapter 8 of the report ('Cross-Cutting Issues', [B]). The chapter states that there is *"strong evidence that climate risks will affect people differently, depending on their social, economic and cultural environment"*, listing this as one of the three main cross-cutting issues relating to the risks of climate change (p.4). 'Climate disadvantage' appears in the list (on p.5) of common concepts used in the chapter and the concept is used throughout the analysis, along with the more specific concepts of flood and heat disadvantage. The CJ mapping tool was used to generate maps showing how social vulnerability to flooding and flood risk in the UK combine to create flood disadvantage (p.20).

Town and Country Planning Association/Royal Town Planning Institute: The 2018 TCPA/RTPI report, *Rising to the Climate Crisis: A Guide for Local Authorities on Planning for Climate Change* [C] is *"designed to inform the preparation of strategic and local development plans being prepared by local and combined authorities in England"* (p.4). Hugh Ellis, Director of Policy at the TCPA notes that previous *"guidance on climate change adaptation issued to planning professionals ... made no reference to the concept of climate justice"* [D]; by contrast, the 2018 report introduces climate justice at the outset (Section 1.1 *Climate Justice*) and specifically recommends CJ: *"Fairness and justice should be at the heart of planning for climate change, based on an acknowledgement that climate change affects those on the lowest incomes the worst. The ClimateJust resource provides a powerful way of mapping the relationship between social exclusion and the impacts of climate change, offering the opportunity to tailor policy to meet the needs of those likely to be most vulnerable to climate change"* [C, p.6]. CJ is also recommended in Section 4.2, 'The evidence base for plan-making' [C, p.24].

Friends of the Earth's (FoE) *Climate Action* website: CJ provides one of the datasets used by FoE in its ratings of local authorities – available via postcode search on its *Climate Action* website (takeclimateaction.uk/climate-action/how-climate-friendly-your-area) – on a range of issues related to climate change [E].

Regional impact:

Hull City Council (HCC): HCC's Environment and Climate Change Strategic Advisor notes that HCC *"were able to use the ClimateJust maps and resources in our internal discussions with different services as part of our strategy development to help identify vulnerable communities and consider service responses. We were also able to use presentation material developed by the Climate Just team to highlight the risks to senior managers in the Council's Health and Wellbeing Board, and to develop greater engagement with the social care sector on the future risks posed by higher temperatures and overheating. This helped to inform plans for a new care home scheme in the city including ensuring design was future proofed as well as increasing the Extra Care provider's understanding of the impacts of climate change on vulnerable groups and the wider community resource the centre could provide in extreme weather events"* [F].

Climate Ready Clyde (CRC) is an initiative supported by the Scottish Government to create a shared vision, strategy and action plan for adapting Glasgow City Region. Kit England of CRC reports: *"The ClimateJust mapping tool enables us to understand social vulnerability to climate change ... we have been able to integrate data used in the ClimateJust mapping tool within our own Geographic Information System, and particularly into the Climate Ready Clyde Climate Risk and Opportunity Assessment, which has in turn formed our Adaptation Strategy and Action Plan. The tool has informed other adaptation strategies in Scotland, such as the Aberdeen Adaptation Strategy (by Aberdeen Adapts), recognising that socially vulnerable neighbourhoods are over-represented in areas prone to flooding"* [G].

Staffordshire County Council (SCC): The Manager for Sustainability and Waste Strategy combined CJ maps with internal datasets to identify places to focus resources and engage multiple stakeholders. She notes that *"This activity added the social disadvantage element*

not captured by our original risk assessment on flooding" [H]. One of the areas (Rolleston village) has since received an additional GBP30,000 to help with property protection [H].

Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUHT): CJ played a central role in the RLBUHT's Sustainability Plan for 2016-17 [I]. The RLBUHT's Head of Sustainability notes that the CJ website *"was used in the Trust's Sustainability Plan 2016-17 to engage and influence staff and partners, including senior management and clinical staff ... and also our partners in Liverpool's Knowledge Quarter and across the wider NHS"* [I] and that *"the maps of the Liverpool area surrounding the hospital highlighting social vulnerability and flood disadvantage in relation to surface water flooding were really valuable to us for demonstrating visually where the social impacts may be felt the most. Climate change adaptation is more abstract than mitigation and so being able to highlight the areas of particular concern visually was valuable in engaging key stakeholders"* [I]. The Sustainability Plan was given the highest rating of all English NHS organisations by the NHS Sustainable Development Unit. The Trust's engagement with CJ was highlighted as a 'good practice' case study by the Liverpool City-Region Brussels Office's 2017 report, *Building Climate Resilience* [p.12, I].

International impact:

Helsinki Regional Area: A former staff member at the Helsinki Region Environmental Services Authority (HSY) reports: *"Prior to our use of ClimateJust in 2015, when the first vulnerability mapping was done for Helsinki*, *the issues of climate disadvantage and social vulnerability to climate change had not been considered. Our use of ClimateJust ... confirmed which areas of the city were less well-off ... and showed that the areas which are more well-off were mostly protected from potential flooding ... If we did not have access to the ClimateJust resources, we would not have been able to carry out this type of mapping exercise ... and we would not have been able to build in the vulnerability indicators"* [J].

5. Sources to corroborate the impact

A. *Social Vulnerability to Climate Change in European Cities – State of Play in Policies and Practice*, ETC/CCA Technical Paper, February 2018. http://bit.ly/3pVRTVk
B. *UK Climate Change Risk Assessment Evidence Report 2017, Chapter 8: Crosscutting Issues*. http://bit.ly/3dOTsli
C. TCPA/RTPI, *Rising to the Climate Crisis: A Guide for Local Authorities on Planning for Climate Change,* 2nd edition, December 2018. https://bit.ly/3kqVgSL
D. Testimonial from Director of Policy, TCPA. Received February 2021.
E. List of datasets used by FoE for its local authority ratings: http://bit.ly/2NyDdyl
F. Testimonial & case study from the Environment and Climate Change Strategic Advisor, Hull City Council. Received February 2019.
G. Testimonial from Climate Ready Clyde Manager. Received February 2021.
H. Testimonial & case study from the Manager for Sustainability and Waste Strategy, Staffordshire County Council. Received November 2020.
I. Evidence of impact in Liverpool: (a) *Royal Liverpool and Broadgreen University Hospitals NHS Trust Sustainability Plan 2016-17.* https://bit.ly/2NzfJJq; (b) Testimonial & case study from the Head of Sustainability, Royal Liverpool and Broadgreen University Hospitals NHS Trust. Received February 2019; and (c) *Building Climate Resilience: Good Practice Case Studies in Liverpool City Region,* produced by the Liverpool City Region Brussels Office for the Liverpool City Region Combined Authority, 2017. https://bit.ly/3kqYVQP
J. Testimonial from Climate Adaptation Expert, Urban Environment Division, City of Helsinki. Received January 2021.