

## COMMENTARY

# Negotiating structural barriers to environmental collaborations in doctoral programmes

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## Funding information

Joshua Lait is funded through an Engineering and Physical Sciences Research Council (EPSRC) award to the University of Exeter Doctoral Training Partnership. Hannah Hayes is funded by the Economic and Social Research Council (ESRC) through a South West Doctoral Training Partnership (SWDTP) PhD scholarship. Sylvia Hayes is funded through an Economic and Social Research Council (ESRC) South West Doctoral Training Partnership (SWDTP) PhD scholarship. Roger Auster received no funding towards this commentary. Ellie Fox is funded through an Engineering and Physical Sciences Research Council (EPSRC) award to the University of Exeter EPSRC Centre for Doctoral Training (CDT) in Environmental Intelligence. Madeleine Timmins is funded by a Natural Environment Research Council award to the University of Exeter for a studentship. Augustin Bauchot is funded through the QUEx PhD studentship program.

## Abstract

This commentary reflects on the experiences of a cohort of human and physical geographers in enacting environmental collaborations during their doctoral studies. The authors identify three key structural barriers encountered whilst attempting a collaborative approach: (1) doctoral funding priorities, (2) doctoral resourcing and (3) assessing doctoral collaboration. The authors discuss how the negotiation of these encounters came to frame their understanding of collaborative approaches to environmental knowledge creation. Competitive application processes for doctoral studentships can encourage the overpromising of the impact of planned environmental collaboration, potentially co-opting the voices of partners/communities to satisfy doctoral funding requirements. Given insufficient funding of collaborations, the authors argue that this overpromising of doctoral research's impact can later result in difficult trade-offs between undertaking additional commitments at the expense of the career progression of the doctoral student, contributing to educational inequalities and scaling-back the initial plans at the cost of collaborators encountering environmental crises. The trade-off is further problematised by institutional assessment procedures that do not adequately recognise the more nuanced contributions of environmental collaborations and a prevailing culture promoting peer-review publishing. Overall, the commentary argues that these barriers help to reproduce inequalities in the distribution of voice in environmental scholarship, undermining efforts to democratise environmental knowledge creation in doctoral research. The authors call for specific structural reforms of doctoral programmes to help address these challenges and support a broader resistance to the inadequate resourcing and evaluation of environmental collaborative research in UK higher education.

## KEYWORDS

collaboration, co-production, environmental geography, impact, postgraduate, small-scale

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## 1 | INTRODUCTION

Collaborative environmental research involves working with research users to design, conduct and disseminate the findings of a study. It aims to challenge traditional models of academic enquiry and develop more impactful forms of outputs by engaging non-academic research users as *collaborators* in the knowledge creation process. Collaboration within environmental scholarship is of particular importance given that adopting collaborative approaches engages meaningfully with people experiencing direct impacts of a changing climate (Whitman et al., 2015). Meaningful involvement in research can disrupt systemic injustices in responses to environmental issues and give voice to important local experiences, knowledge and perspectives (Grimwood et al., 2012; Schlosberg, 2012). However, working collaboratively is not straightforward and can put additional pressures on scholars in practice, such as the need to meet early on and frequently during the collaboration, negotiate priority conflicts with collaborators and produce timely results for both non-academic and academic audiences. Whilst the undertaking of these additional requirements is often vital to ensure a successful partnership, the added commitments of environmental collaborations are not well recognised within current forms of UK higher education policy and research culture (Sandover, 2020). In this commentary, the authors seek to add to this important conversation by reflecting on our experiences as postgraduate researchers and of how we negotiate three key structural barriers to undertaking environmental collaborations in human and physical geography doctoral programmes: (1) funding priorities; (2) resourcing; and (3) assessment procedures. The authors argue that these barriers help to reproduce inequalities in the distribution of voice in environmental scholarship, undermining efforts to democratise socio-ecological knowledge creation in doctoral research.

### 1.1 | Establishing ‘Best Practice’ in UK Higher Education

The problem of how to integrate additional forms of academic ‘best practice’ (such as working collaboratively across disciplines or with external partners) into the policies, procedures and teaching practices of UK Higher Education (HE) is not new (Bhakta et al., 2015; Harris et al., 2009; Macmillan & Scott, 2003). There has been significant criticism in the geography literature of the neoliberal institutional conditions in which these new ways of researching are practiced and the consequences of this for our ethical responsibilities to external partners and the framing of knowledge creation (Mistry et al., 2009; Pusey, 2017; Wainwright et al., 2014; Zielke et al., 2023). Here, the authors use the term ‘neoliberal university’ to refer to the policies of competition and choice that have resulted in a quasi-market, where academic institutions that resemble businesses compete for research funding and students act as consumers (Ball, 2012). Despite these concerns, there is a burgeoning emphasis placed on working with scholars in other disciplines or external partners in the UK Research Excellence Framework (REF), which is a system of expert review that assesses the quality, impact and environment of research in UK universities and helps to inform funding allocations (UKRI: UK Research and Innovation, 2023). Notably, there is an increased weighting for ‘engagement and impact’ in the upcoming 2029 REF (UKRI: UK Research and Innovation, 2023). This signals the growing significance of collaborations in UK HE and provokes deeper questioning about how accountability tools, such as the REF, help to produce a particular conception of working collaboratively in environmental scholarship.

In this commentary, the authors aim to contribute to this deeper conversation by discussing how the evaluation of doctoral research through awarding criteria, resourcing and assessment can shape environmental collaborations in ways that limit the inclusion of non-academic voices and exacerbate educational inequality. Whilst previous research has reflected on the experiences of geography doctoral students in working collaboratively (Fisher, 2011; Hayes & Manktelow, 2023; Marzi, 2022; Pain, 2014), there has been less explicit reflection on the structural barriers they encounter whilst undertaking collaborations in environmental scholarship. As upcoming and emerging scholars, the experiences of doctoral students in environmental geography will shape the future directions of the field, and it is thus essential for those involved in designing or supervising environmental doctoral programmes to have an interest in the experiences of doctoral students. Therefore, this commentary builds on the wealth of prior research in this area by reflecting on our experiences of negotiating structural barriers to conducting environmental collaborations in the neoliberal university and the implications of this for educational and environmental justice.

### 1.2 | Overview

At the time of writing, the authors are a group of six human and physical geography PhD researchers with one Postdoctoral Researcher Associate at the University of Exeter in the UK. Each author set out with the aspiration to conduct meaningful

and engaging collaborative research, and indeed, we have all grown personally from this experience and gained greater empathy for the benefits of working collaboratively. However, the authors have also all found that key barriers in the neoliberalising sector at different stages of our programme undermined those aims, leaving us feeling as though we could not enact our collaboration plans in a way that necessarily supported the inclusion of the less well heard voices of communities/external partners in the research process. With this in mind, the authors address two core questions in this commentary:

1. In our experience, what were the key structural barriers we faced during our collaborative PhD research projects?
2. How can we structurally reform doctoral programmes to address these barriers?

The commentary will discuss three key structural barriers we encountered during our research: (1) doctoral funding criteria; (2) limited resourcing; (3) assessment criteria recognition. The authors will discuss throughout how the research culture of the neoliberal university intersects with these barriers, reflecting on the implications of these intersections for the inclusion of non-academic voices in environmental research and the framing of socio-ecological knowledge creation. These reflections will also speak directly to the contrast between ideals of participation and realities of the impact agenda in UK higher education (Rogers et al., 2015). The commentary will make differences in positionality relating to the authors' reflections clear where relevant in section 3. As an overarching distinction, our personal reflections are referred to using the signifier 'we'; whereas points of general commentary are referred to using the signifier 'the authors'. Overall, the authors argue that the structural challenges faced by doctoral students produce a form of policy incoherence between the aim to promote environmental collaborations and the level of support provided to doctoral students to actually enact plans with collaborators. The authors recognise that this is symptomatic of the wider difficulties faced by more senior scholars in the sector. Building on this, the commentary calls for urgent systematic change of doctoral programmes to establish the important aims of collaborative research in a way that does not further exacerbate education inequalities and prevent new voices participating meaningfully in environmental research.

## 2 | ENVIRONMENTAL COLLABORATIONS IN DOCTORAL RESEARCH

In recent decades, collaboration in HE has emerged as an increasingly popular response to traditional research approaches to avoid scholars working in disciplinary silos, the separation of researcher and the people and places being researched, closed objectives and unequal power dynamics within knowledge production (Burgess, 2005; Dey et al., 2020; Lane et al., 2011). Collaboration can avoid these difficulties by adopting open and cocreated research, addressing issues of exclusion (Barr & Woodley, 2019; Fox, 2003; Siddiqui et al., 2021) and producing outputs which are seen as more actionable and usable (Darby, 2017; Dilling & Lemos, 2011). Despite these ideals, authors have drawn attention to different dilemmas concerning the enactment of collaborative ideals and practices in Geographic doctoral research programmes. For example, the integration of 'knowledge transfer' as a priority in a UK studentship programme (Demeritt & Lees, 2005), evaluating the impact agenda and the neoliberal university using insights from radical participatory methodologies (Darby, 2017; Pusey, 2017), and how encounters with different collaborating organisations can result in significant practical, ethical and epistemological 'dilemmas' and uneven power relations that inexperienced doctoral researchers must negotiate (Fisher, 2011; Hayes & Manktelow, 2023; Macmillan & Scott, 2003). This commentary seeks to add to this body of work by tracing how structural barriers in the neoliberal HE sector impact socio-ecological collaborative research at different stages of doctoral studies.

The authors are a cohort of researchers based in the same department at a UK university, and comprise of four physical geographers and three human geographers, all of whom are engaged in inter-disciplinary environmental or climate change research. Our research focuses on a range of issues, including flood risk, climate change communication, energy demand governance, engagement in coastal adaptation and landscape change, mountain glaciers and society, freshwater peatlands response to sea-level rise and climate adaptation in the Pacific Islands.

The cohort includes students who work exclusively with an external partner(s) responding to environmental change, a community experiencing and/or resisting the effects of environmental crises, or with both. There is no single common approach to collaboration adopted within the cohort; therefore, the authors draw attention to Arnstein's (1969) 'ladder of participation' (see Figure 1) as one approach to illustrate the forms of diversity and variations involved in our approaches to collaborative research. Given our diversity in approaches, the authors have decided to use a broad definition of collaboration rather than try to reflect on more specific conversations relating to co-production or participatory action research.

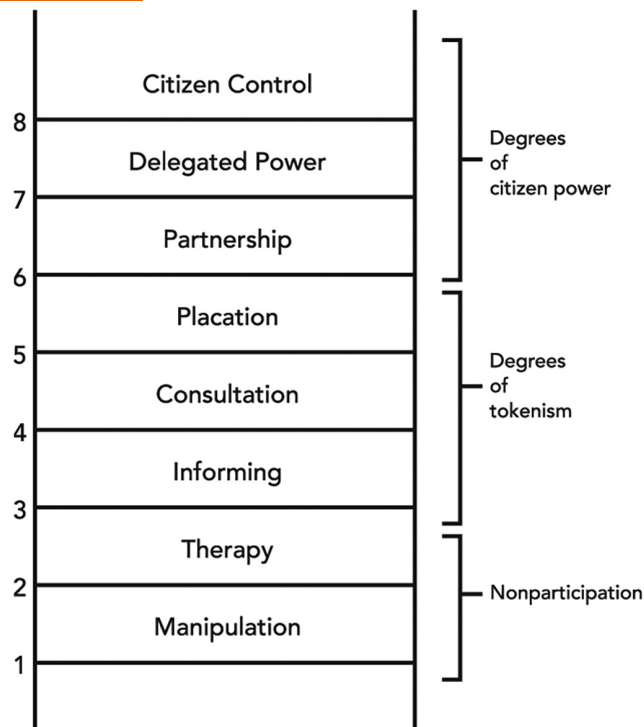


FIGURE 1 Arnstein's ladder of citizen participation (Gaber, 2019).

To this end, collaboration is understood in this commentary as a broad term that involves research in which community groups, members of the public, stakeholders, organisations or any other non-academic stakeholders are included in the knowledge production in any capacity.

### 3 | STRUCTURAL BARRIERS TO WORKING COLLABORATIVELY

#### 3.1 | The impact agenda and doctoral funding priorities

In geography, there has been much critical debate over the instrumentalised conception of impact in the REF, which is an accountability tool used to assess the research culture, quality and impact of universities and is used to inform government funding for higher education research (Askins & Mason, 2015; Khazragui & Hudson, 2015; MacDonald, 2017; Rogers et al., 2015; Slater, 2012; Watermeyer, 2014). This section highlights how current doctoral funding regimes promote particular conceptions of engagement and impact, by reflecting on how prospective environmental geography PhD funding applications are assessed in terms of 'impact' and the ethical problem of overpromising actionable impact. It also reflects on how a lack of prerequisite training in collaborative methodological practice prior to application intersects with this problem, posing key implications for our first encounters with collaborative approaches to socio-ecological knowledge creation.

A student's encounter with a doctoral studentship application represents their first major encounter with a neoliberal research evaluation tool. All of the funding bodies that support the authors' environmental research projects include collaboration and impact criteria in their strategic priorities for the awarding of doctoral studentships, or had specific impact outcomes as a requirement of the funding partners. Here, the discussion focuses on the South West Doctoral Training Partnership (SWDTP) awarding body as an example, which awarded funds on behalf of Economic and Social Research Council (ESRC) to two of the authors. The SWDTP incorporates collaborative, impact and engagement elements explicitly in its proposal assessment criteria (see Figure 2), meaning there is a specific application category which promotes projects that match collaborative criteria. Further, there is a target of awarding 30% collaborative studentships for every cohort of applicants across all ESRC funded doctoral training partnerships and centres for doctoral training in the UK, which results in 62.6% of collaborative research being delivered by this doctoral funding stream (Tazzyman et al., 2021,



**Collaborative, Impact and Engagement Elements\*** - important factors include relevant external partner identified, collaboration plan (with partner), impact, and awareness of opportunities and challenges those external collaborations bring. Various relevant ESRC links include:

- Collaboration and knowledge exchange  
<https://esrc.ukri.org/collaboration/>
- Impact <https://esrc.ukri.org/research/impact-toolkit/>

Evaluation and Impact [*\*NOTE: The ESRC continue to emphasise the importance of collaboration with non-academic public, private and/or civil-society sector organisations. Applications should highlight any relevant forms of knowledge exchange and collaborative working with an external (non-academic) organisation e.g., Co-funding, Internships, Placements or Contribution in terms of time, resources required such as equipment or assays, access to data, etc. Collaboration must include substantive knowledge exchange and not just one-way engagement (e.g., data collection)*]

**FIGURE 2** Excerpt from the SWDTP guidance for applicants to the collaborative, impact and engagement funding stream 2022–2023 (South West Doctoral Training Partnership, 2023).

p. 17). This marks it out as an important case for thinking about the structural significance of including collaborative criteria to evaluate the relative value of different funding applications.

The SWDTP applicant guidance in Figure 2 places emphasis on the need to identify a non-academic partner, produce a collaboration plan (with the partner) and identify potential challenges and opportunities in advance. However, the advice to produce a collaboration plan together in advance is more problematic as in our experience for many applicants (and potentially partners) the PhD is their first experience of working together collaboratively, which potentially means that the doctoral applicant is unable to produce a feasible plan. Not only does this mean a significant amount of time and work prior to even being awarded funding, but this need to produce an impressive collaboration plan during the application stage can result in an overpromising of impact. This overpromising of impact is especially detrimental for partners in which this is their first experience of collaborating with a university, and for those living with environmental crises with expectations that the planned activities may help improve their situation.

We did find our supervisors instrumental in helping us to navigate the requirements of the impact agenda during our application for studentship funding. They suggested ideas for the types of activities to include, such as letters of support from collaborators, network building activities, or plans for a wider dissemination of research findings to larger non-academic audiences. Whilst their advice helped us to successfully navigate our first interaction with a tool of the impact agenda, it also made clear to us how the design of environmental collaboration plans represent a significant arena for competition between candidates. Unfortunately, this early experience of competitive collaboration and the tendency to overpromise impact ran counter to the ideals of fully participatory research, which we came to learn more about after the funding process during our studies. As such, the authors are concerned that current funding arrangements create conditions that co-opt collaborators' involvement in environmental research projects to enact impact funding requirements rather than supporting a more meaningful incorporation of their voices, which is essential for advancing the democratisation of environmental scholarship.

Further, the authors contend that this structural problem is compounded by a lack of prerequisite training in collaborative research methodologies in foundational degrees. This lack of training is significant because it makes applicants more reliant on the guidance of their supervisors to help negotiate their first interaction with what credible impact resembles (Turner, 2014). An additional confounding factor is that whilst debates have highlighted the specific difficulties

for PhD researchers in conducting ‘impactful’ or collaborative research (see Klocker, 2012; Murray, 2019; Turner, 2014), the literature on collaborative research is dominated by the experiences of large-scale multinational projects (e.g. Sattler et al., 2022). This makes it difficult for us as aspiring doctoral students, conducting research often independently and on much smaller projects and budgets, to adequately plan environmental collaborations that meaningfully incorporate collaborators’ perspectives.

In our own experiences, whilst there may be a desire to support the aims and ideals of the collaboration research trend, individual applicants or supervisors without prior experience or existing knowledge, may not necessarily be equipped to design effective collaborations. Therefore, there can be a lack of ability to engage in meaningful conversations about research design with potential supervisors and external partners. This can lead to the inclusion of research activities that, although secure the funding and align with the impact agenda, are later exposed as unfeasible and revised during the PhD project. A rowing back on commitments is particularly detrimental in cases where the privileged doctoral researcher is designing activities with marginalised communities, like our three authors working with publics experiencing the effects of glacial retreat, coastal and river flooding.

In summary, doctoral students conducting collaborative research are not explicitly included in the REF process, but their research activities and experiences are shaped by a neoliberal research culture of individualisation, competition and accountability in UK HE institutions governed by the priorities of mechanisms like the REF. Moreover, the main funding bodies of doctoral programmes in the UK have increasingly integrated markers of collaboration, engagement, outreach and impact into their awarding criteria, further instituting the significance of these activities in the culture of doctoral research in the UK. Such instrumentalisation of impact has been critiqued by geographers on different bases, including its targeting of certain scales or types of impact (Campbell & Vanderhoven, 2016), such as ‘linear, top-down’ impact (Darby, 2017, p. 230), rather than ‘impact-in-process’ (Marzi, 2022). Hence, a focus on metrics of impact can help to reinforce existing unequal power hierarchies in knowledge production (Pain, 2014). The authors contribute to these critiques by arguing that the instrumentalisation of impact in doctoral funding strategies can tacitly encourage a form of application performativity, whereby naïve and/or strategic doctoral candidates are incentivised to propose overly ambitious collaborative and engagement activities that capture the imagination of awarding panels but may be undeliverable in practice. The overpromising of doctoral impact is an especially serious concern in projects that seek to tackle urgent environmental challenges, with pressing consequences for partners (like high energy costs) and communities (like risk of glacial retreat). The direction of environmental research will often need to change post-award in response to the refinement of objectives, which makes communicating and negotiating iterative changes in research plans to collaborators an essential activity. However, there is a difference between negotiating the iterative character of environmental research post-award and using external voices to develop overly ambitious collaboration plans. As such, the authors argue that the present funding process tacitly encourages a form of procedural injustice as collaborators’ voices are co-opted or worse potentially manipulated as a functional means of satisfying doctoral funding criteria, undermining the broader aim of engaging a wider range of voices in environmental research.

### 3.2 | Participation and doctoral resourcing

Since the early 2000s, there has been an advancing focus in environmental geographic enquiry on participation and deliberation (Chilvers, 2009; Sieber & Haklay, 2015), assisting the democratisation of knowledge production by redefining the power relations inherent to top-down scientific approaches (Jagannathan et al., 2020; Mistry et al., 2009). Often, ECRs or PhD researchers are at the forefront of participatory or collaborative research (e.g. Peck, 2021), conducting transformative research, for example with marginalised groups (see e.g. Holt et al., 2019 special issue). Adding to these important contributions, this section reflects on how a lack of additional financial resourcing for collaborative research activities in doctoral programmes can press student researchers, particularly social scientists, to make substantial trade-offs between being an excellent collaborator and/or a doctoral candidate who is successful in the prevailing publishing culture of the neoliberal university. The authors argue that the negotiation of this trade-off has the potential to compound forms of educational and environmental inequality.

In our experience, there can be additional costs involved with collaborative research, for example travelling to meetings with collaborators or hiring venues for engagement workshops. For instance, one author brought home-baked cakes to community workshops, in a successful effort to build positive relationships. This may at first seem

like a small gesture, but showed the community that the researchers had a personal interest in the work and was well received.

Activities such as baking cakes for community groups may appear uncstly in isolation, but researchers often need to meet with their collaborators frequently, and the costings for these events, including travel, accommodation, room/venue hire and additional efforts can easily mount. Table 1 illustrates how the cost of collaborative research requirements builds on other costs encountered by all doctoral candidates. The additional costs of environmental collaborations are important because they can worsen educational inequality between students as personal funds are used to cover these research costs, which is especially detrimental to students from disadvantaged backgrounds. Such pressure on personal funds speaks to the result of a recent Nature survey on postgraduate satisfaction where 57% of students from different countries identified 'the overall cost of living' as the most important concern during their studies (Woolston, 2022, p. 807).

Whilst these additional requirements are reminiscent of the pressures faced by more senior academics undertaking more large-scale collaborative research projects on environmental challenges, the authors argue that it is also important to foreground how the structural funding for studentships helps to reproduce this resourcing challenge at the doctoral level. Despite the additional costs, research councils do not make additional funding available through the Research Training Support Grant (RTSG) for students undertaking collaborative projects. This lack of funding necessitates a trade-off between the allocation of funds for collaborative activities – which enhance the research – and more traditional costs (such as attending conferences, workshops and summer schools) – which enhance the academic career of the postgraduate researcher. The result, the authors have found, is that the cost burden for collaborative research is shifted from funding bodies (who demand these collaborations), onto the individual doctoral candidate who is trying to develop a career at the neoliberal university. Whilst this is also an issue for more senior academics, these additional expenses pose increased burden on the precarious personal finances of doctoral candidates reliant upon a stipend for personal living costs, or self-funding. This is particularly detrimental for students from a more disadvantaged socio-economic background who do not have an adequate financial safety net and for whom the financial costs of pursuing a doctoral degree are seen as barrier to entry (Pásztor & Wakeling, 2018; Wakeling, 2017).

The approach by research councils both reinforces educational inequalities between the physical and social sciences, and between postgraduates of different socio-economic backgrounds who are disproportionately impacted by using personal resources for research. Yet, those doctoral candidates that resist this neoliberalising drive to individualise the responsibility for enacting environmental collaborations by scaling-back their proposed plans are in danger of renegeing on

**TABLE 1** Example of a costed budget revealing use of Research Training Support Grant (RTSG) for traditional and collaborative research activities.

	Activity		Cost	Total (cumulative)
Traditional costs	Summer school	Fee	400	400
		Travel	150	550
	Methodology training course		100	650
	Society membership		165	815
	Interviews	Travel	500	1315
		Dictaphone	15	1330
		Consumables	50	1380
	Domestic conference	Fee	200	1580
		Accommodation	300	1880
		Consumables	120	2000
Additional collaborative costs	Stakeholder meetings	Travel	360	2360
		Consumables	90	2450
	Collaborative outputs	Publishing reports/summaries	80	2530
		Dissemination events (including room hire)	600	3130
	Stakeholder workshops	Travel	150	3280
		Consumables	130	3410

Note: (1) Figures in red reveal costs that exceed the ESRC allocation for RTSG. (2) Reported costs based on reasonable estimates from authors' expenditure.

their ethical responsibilities to research partners for the delivery of agreed activities. Thus, the structural problem creates 'unrealistic expectations' whereby the authors undertake additional tasks at personal expense and/or 'fail' by scaling-back their environmental collaboration plans, compromising the inclusion of their collaborators' voices in the knowledge creation process (Davies et al., 2021).

In summary, there has been much discussion on how environmental geography research can make a discernible contribution to society, or 'impact', with tangible benefits for research users. Collaborative research has been seen as an important vehicle for producing 'actionable knowledge' (Vincent, 2022, p. 1), which is suggested to improve the quality of academic research by encouraging knowledge sharing, aiding access to data and supporting deeper analytical insights (Demeritt & Lees, 2005; Jagannathan et al., 2020; Schmidt et al., 2020). However, in our experience, the potential contribution of collaborative environmental PhD projects is being undermined by a lack of resourcing, evidenced here for ESRC funded students as an example, and the other resource pressures students face in the atomised and competitive neoliberal research landscape in UK HE.

The individualisation of responsibility for the costs of collaborations runs counter to the aims of the participatory turn and the impact agenda in environmental research. A need to prioritise the use of limited funds can result in a perception that undertaking collaborative activities are an additional and potentially optional burden. This both contributes to educational inequalities and diminishes the capacity of this methodological approach to deepen doctoral students' understandings of knowledge creation and the ideals of developing more inclusive forms of environmental research. Moreover, it also frames collaborative approaches to knowledge creation as an activity to be negotiated, potentially limiting the scope and ambition of such approaches to help reach out beyond the university to develop more inclusive environmental understandings and just responses to pressing socio-ecological crises. This again produces the conditions for a form of collaborative performativity, whereby collaboration represents a buzzword or trend rather than a serious engagement with democratising environmental scholarship (Gilchrist et al., 2015).

### 3.3 | Assessing doctoral collaboration in the neoliberal university

There has been much criticism of how the goals of participation and collaboration have been integrated in practice into the neoliberal university through evaluations tools that instrumentalise impact and render it secondary to peer-review publishing (Campbell & Vanderhoven, 2016; Darby, 2017; Marzi, 2022), and the funding of short-term, precarious projects that can necessitate abruptly abandoning communities, potentially resulting in shallow and extractive collaborations (Zielke et al., 2023). This section builds on longstanding critical debates on how the value of research is evaluated in the sector by reflecting on the structural challenge of assessing collaborative environmental research in current doctoral awarding procedures. This highlights how a lack of recognition for collaborative outputs can result in a trade-off between completing the thesis and delivering the environmental collaboration by producing engaging outputs and supporting continuation.

We all set out with the lofty ideal to work with our collaborators to produce a range of more accessible research outputs (such as a collaborator's sustainability plan or a community map) that help to bring the results of environmental and climate research to a wider public. It is during this stage of the collaborative process that the PhD researcher can learn how to disseminate their findings in a way that is helpful to both research users and the wider public. For example, one author created a booklet to help communicate research findings in an accessible and visual way. By producing these more accessible outputs, the author learnt valuable skills that are in-keeping with the ideal and ethical values of realising collaborative research methodologies and are beneficial for those seeking to pursue a subsequent practice career.

Despite their value, the production of these outputs took time and can be challenging to produce, especially as we often lacked formal training in non-academic conventions (such as graphic design) and do not necessarily help to address formal university assessment criteria. For example, although the University of Exeter includes arrangements for non-traditional outputs in certain settings, like a By Practice Thesis, this method of analysis is designed to assess artistic media, such as film, installations and poetry and, as a result, is less well-suited to other forms of practice-base or non-academic output that can stem from environmental collaborations, such as sustainability interventions, flood management plans, or establishing community action networks. Therefore, we found that in practice we were committed to our non-academic environmental collaborations in a way that necessitated us to make difficult trade-offs between the collaborators' interests and completing the thesis. This is problematic because organisations (such as schools) that have set net-zero goals, but lack the necessary institutional capacity, can benefit from the receipt of timely and accessible research findings.



The problem is further compounded by the working conditions of the neoliberal university that can result in a mentality that doctoral students must publish peer-reviewed journal articles, rapidly churn out impactful outputs and submit our thesis in a timely fashion, all of which run counter to the virtues of 'slow' and considered scholarship (Mountz et al., 2015). Ultimately, there is an irony here in that the collaborative aspect of PhD research is encouraged and favoured during the process of applying for funding, but there is little formal recognition of environmental collaborations beyond a traditional thesis. This represents a further way in which the current structural arrangements abet the exclusion of non-academic voices in environmental scholarship.

The continuation of a collaborative research project after the period of funding ends is a significant challenge for all researchers, including doctoral students and is shaped by sectoral precarity and resourcing norms (Zielke et al., 2023). Given the especially precarious position of doctoral students (Butler-Rees & Robinson, 2020), there is often a need to prioritise securing employment, which is potentially unrelated to their environmental collaborations or entirely outside of the academy, as funded programmes come to an end. This anxiety over employment is reminiscent of experiences of doctoral candidates more broadly, as 'finding a permanent job after completing my education' is ranked as the second most important concern in Nature's international postgraduate survey (Woolston, 2022, p. 807). Further, doctoral funding councils and awarding bodies have not devised measures to maintain environmental collaborations across consecutive programmes of doctoral studies, ensuring a project's legacy and developing more responsible partnerships with non-academic partners. This raises an essential ethical concern as present studentship awarding procedures promote collaborative research methodologies, but do not include any procedural or financial provisions for managing the legacy of these projects. Such a concern is especially troubling in cases where students work within environmental controversies or with less privileged communities facing the adverse impacts of climate change and related environmental crises. Thus, the authors suggest that precarious conditions and a lack of institutional responsibility for environmental collaborations at the neoliberal university help to individualise accountability for a project's legacy, shifting responsibility onto the inexperienced doctoral researcher.

Despite the lack of explicit provisioning for continuation in doctoral programmes, importantly, the conclusion of the PhD does not have to mean the end of collaboration. If there is desire among collaborators to continue, the researcher can consider how best to empower collaborators to take the lead and continue with activities themselves. For example, senior researchers Barr and Woodley (2019) led a co-production project that pooled knowledge of flood risk in the town of Crediton (UK). After the project formally finished, the participants continued to act as local knowledge creators and advisors under the auspices of the Crediton Flood Resilience Group. This represents a salient example of how a doctoral researcher could be helped to ensure the legacy of a small-scale collaborative environmental research project. Nevertheless, one must champion cases like this cautiously as they give further credence to the conception that continuation is the sole responsibility of the small-scale researcher.

In summary, doctoral students must negotiate the procedural requirements (such as timing or funding constraints) for completing their degree, perceived cultural requirements (such as peer-review publishing or developing a teaching portfolio) and ensuring our collaborators benefit from engaging in the research process through the production of timely outputs. The negotiation of this priority conflict can result in candidates being expected to prioritise non-collaborative requirements and/or working longer to complete additional tasks with their collaborators. The burden of negotiating this trade-off contributes to educational inequality in doctoral programmes, particularly those from marginalised backgrounds for whom finishing their studies and securing employment is vital. Further, the authors contend that current doctoral funding system individualises the ethical problem for projects' legacies, potentially necessitating inexperienced researchers to undertake additional unpaid activities, apply for impact grants, or abruptly finish the project, or conduct 'parachuting and leaving' research. An abrupt finish to a project can result in a sense that non-academic voices have been co-opted to meet structural funding targets for environmental collaborations in doctoral research. These additional pressures are reminiscent of those faced by our more senior colleagues (Sandover, 2020), which result from the structure of funding arrangements for the sector more broadly (Zielke et al., 2023).

## 4 | REFORMING DOCTORAL PROGRAMMES TO SUPPORT ENVIRONMENTAL COLLABORATIONS

Given all this, the authors call for substantial structural reforms of the provisioning of doctoral programmes in the United Kingdom, and support the broader effort to resist the competitive culture of the neoliberal university. First, the authors argue for the need to integrate collaborative methodological research as a core component into undergraduate

and Masters' degrees in Geography and other relevant disciplines (see for example Pain et al., 2013). The integration of collaboration as a prerequisite component could be achieved in a similar way to the ESRC's current application requirements, which require applicants to have completed both quantitative and qualitative method classes to become eligible for a funded studentship. The completion of such a prerequisite component could help students to develop deeper understandings of the nature and requirements of different collaborative approaches, reducing the risk of overpromising to collaborators experiencing the effects of environmental challenges and co-opting their inclusion in the project. Further, the authors also call for a reform of doctoral training partnerships whereby applicants are assessed based on their understanding of collaborative approaches to knowledge creation, and the potential of the proposed project to help the student develop as a collaborative researcher. We suggest that reforming the assessment criteria in this way would help to shift the focus away from (over)promising ambitious environmental collaborations to further align funding with the aims and values of the participatory turn.

Second, the authors call for funding bodies to reduce precarity in doctoral collaborations by making more funds available through the RTSG to bridge the additional financial requirements of collaborative projects. This need to address educational inequality is especially pressing for human facing geographers, funded by the ESRC, who are currently in receipt of the smallest budgets for research activities and students from marginalised backgrounds who are disproportionately impacted by inadequate resourcing. Without this additional resourcing, the enactment of additional collaborative activities will remain a burden to doctoral students, potentially encouraging forms of performative, collaborative and engagement research practice that weaken efforts to enact more inclusive models of environmental scholarship. Third, the authors suggest an additional thesis assessment category is needed to support deeper engagement with collaborative methodological practice by recognising the more nuanced ways candidates work with collaborators to produce knowledge, disseminate findings and engage target users: a thesis by collaboration. For example, the RGS Energy Geography Research Group recently proposed a portfolio of impact as a new mechanism to help assess the impact of doctoral students' energy-related collaborations (2023). We argue that such a reform will begin to address the priority conflict experienced by a doctoral student between completing the thesis, publishing peer-reviewed articles and/or producing timely non-academic outputs.

## 5 | CONCLUDING REMARKS

The central contribution of the commentary is to draw attention to the structural barriers (such as funding criteria, resourcing and assessment) a cohort of doctoral students face whilst conducting environmental research in collaboration with external partners and communities. It shows how these structural barriers can contribute to educational inequalities and the uneven distribution of voice in environmental scholarship. In doing so, it builds on previous discussion in this space, pertaining to collaborative doctoral research (Darby, 2017; Demeritt & Lees, 2005; Hayes & Manktelow, 2023) and broader debates on the participatory turn and the impact agenda, by reflecting on how doctoral candidates must negotiate a form of neoliberal policy incoherence whereby (overly)ambitious environmental collaborations are promoted using funding mechanisms, but undermined, in practice, by inadequate resourcing, university assessment practice, precarity and a perception that peer-review publishing is pivotal to career progression. In response, the authors call for urgent structural reforms of the provisioning of doctoral programmes in the UK HE as a means to support a deeper engagement with the ideals and objectives of learning to conduct environmental research collaboratively. Thus, the authors support the broader call to resist and reform current processes for resourcing and evaluating environmental collaborations, including at the doctoral level, by confronting precarity and developing frameworks that recognise the diverse and more nuanced contributions these more inclusive research practices can produce.

## ACKNOWLEDGEMENTS

We would like to thank all our supervisors for their support, and to deeply thank our collaborators, without whom all our research projects would not be possible. We would also like to thank Professor Karen Bickerstaff and Dr Rebecca Sandover for their support and feedback on early ideas for this commentary, and Karen for her thoughtful comments on a draft manuscript. We would also like to thank the geography PhD students in the audience at the RGS Mid-Term 2023 conference for their helpful and thoughtful comments on our presentation of ideas from the commentary.

## DATA AVAILABILITY STATEMENT

No data was drawn on.

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**How to cite this article:** Lait, J., Hayes, H., Hayes, S., Auster, R., Fox, E., Timmins, M. et al. (2024) Negotiating structural barriers to environmental collaborations in doctoral programmes. *Geo: Geography and Environment*, 11, e00133. Available from: <https://doi.org/10.1002/geo2.133>