Collaborative working across disciplines and sectors: Case study report

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ACCESS is a 5-year ESRC funded (ES/W00805X/1) knowledge-exchange project which champions the role of social science in tackling environmental problems. The Institution of Environmental Sciences (IES) is the professional body for environmental scientists and professionals. It supports and unites a dynamic network of members who work to accelerate the transition to a sustainable future.

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Introduction

Tackling and understanding environmental challenges requires input from many different disciplines and stakeholders as they tend to be complex and deeply interconnected issues. Collaborative working to address these challenges is therefore key. Collaborative working involves bringing together different people, forms of knowledge, skills and perspectives to understand problems and develop solutions that would be difficult, or impossible, to achieve from a single viewpoint.

Environmental science is often described as an interdisciplinary field. However, many definitions and descriptions do not recognise explicitly the role of the social sciences, even though environmental and social challenges are interconnected. Significant social change is required to transition to a more sustainable future. A key rationale for this project was to explore what collaboration looks like within the environmental sciences across disciplines and sectors, including research, policy and practice.

In 2025, ACCESS provided funding for a collaborative project with the Institution of Environmental Sciences (IES) to develop resources that support collaborative working across disciplines and sectors within the environmental and social sciences. This project represents a timely and strategic opportunity to:

- Highlight environmental social science as a crucial part of the wider environmental sciences.
- Strengthen collaborative working between natural sciences and social sciences in environmental research, policy and practice.
- Equip researchers, practitioners and professionals with practical tools and insights to work more effectively together on urgent environmental issues.

Alongside this report, we have created a co-produced toolkit and accompanying resources on the BRIDGES framework for collaborative working across sectors and disciplines. This framework was developed over the course of the project with input from over 40 environmental scientists, researchers and practitioners working across the social sciences, natural sciences, and engineering. It is designed to support more integrated, inclusive and impactful approaches to complex environmental and social challenges by providing a structured

framework for planning, implementing and reflecting on collaborative working in real-world contexts.

To complement the toolkit and ground its principles in lived experience, a survey was distributed to environmental researchers and practitioners to gather examples of collaborative working across research, policy, and practice. The survey invited respondents to share both successful and unsuccessful collaborations, focusing on how projects were designed, who was involved, what forms of knowledge were brought together, and how collaboration influenced outcomes. It also explored perceived barriers and enablers of successful collaboration, including organisational cultures, funding structures, skills, motivations, and the practical realities of working across disciplines and sectors.

This case study report has been developed from the survey findings to illustrate how and where collaborative working is currently taking place, and to reflect on what it looks like in practice. The report is divided into two parts:

Part one introduces the BRIDGES framework, the conceptual foundation of the toolkit, which outlines the key principles for effective collaborative working across disciplines and sectors. The findings from the survey are presented to highlight and explore the barriers and enablers to collaborative working within the environmental sciences.

Part two is a series of case studies that show how the BRIDGES principles can be applied and adapted in different settings. The collection of case studies is as varied and diverse as the ACCESS and IES community, with projects ranging in size, budget, disciplines and sectors. They are presented as follows:

- *Sustainable management of coastal lagoons in West Africa*, by Sian Davies-Vollum, University of Leeds and Chair of IES Marine & Coastal Science Community
- *Rural water security in Dewas region, Madhya Pradesh, India*, by Mark Everard, UWE, Baerlocher and Vice President at IES
- *Gas NetNew project,* by Chris Jones, University of Portsmouth
- *Collaborative horizon scanning for post-Brexit policymaking*, by Gary Kass, Imperial College London and Vice President at IES
- *The EPIC Guidance on Integrating Action on Air Quality and Climate Change*, by Alaric Lester, Tech Writing Hub and Sarah Legge, Vice Chair EPIC
- *Developing, delivering and evaluating the Preventing and Tackling Mental Ill Health Through Green Social Prescribing Test and Learn programme*, by Rebecca Lovell and Harriet Hunt, University of Exeter
- *Clean Air Gas Engine / Defra–DESNZ Red Diesel Replacement Project*, by Daniel Marsh, The Centre for Low Emission Construction, Imperial College London and Committee member of IAQM
- *From compliance to collaborative ownership: Interdisciplinary resource efficiency and sustainability transformation in Pakistan's textile sector*, by Mudassar Adil, GIZ GmbH

- *SocEnv Soils and Stones project*, by Sarah Ridgeon, MCIPR and Martin Ballard, CEnv CMgr FISEP, Society for the Environment (SocEnv)
- *Cross-sectoral collaborations for the EU's low carbon transition*, by Melanie Rohse, Ami Crowther and Rosie Robson, Anglian Ruskin University
- *"Culture Nature" – a series of interdisciplinary collaborative partnership projects led by Natural England and Libraries Connected*, by Cordelia Spalding, Natural England and Sarah Mears, Libraries Connected
- *Developing an integrated, cross-domain, and sector-agnostic Sustainability Hierarchy Framework (SHF) to break decision-making silos*, Melissa Wang, Greenpeace Research Laboratories

Together, the toolkit and report provide both conceptual guidance and empirical insight to help teams plan, undertake and strengthen collaborative working in environmental and social science contexts.

1. Part one: The BRIDGES framework

1.1 Overview of the BRIDGES framework

The BRIDGES framework provides a structured, practical way to plan, implement and reflect on collaboration across disciplines and sectors. It is based on six key principles, supported by good communication and leadership, which act as the foundations of the 'bridge'. Without these foundations, the bridge, and the collaborative effort, may be unstable or fail.

The BRIDGES framework is intended as a guide rather than a rigid model. The toolkit and accompanying resources offer a structured guide to work through the BRIDGES framework. It is iterative and reflexive, and can be adapted to different contexts, project types and organisational settings. The six principles of successful collaborative working identified in the BRIDGES framework are shown below. Each of the case study authors has reflected on their case study examples in reference to these six principles.



Figure 1. The BRIDGES Framework for Collaborative Working

BUILD understanding and the right team: Establish a shared understanding of the issue and the intended impact, and bring together the right mix of people, knowledge and skills. Review team composition and capacities over time to ensure appropriate expertise and perspectives are represented.

REFLECT and adapt to drivers and barriers for collaboration: Identify and reflect on the factors that support or hinder collaboration, including skills, motivations, trust, power dynamics and institutional constraints. Use this understanding to harness drivers and address barriers where possible.

INTEGRATE knowledge and insights: Clarify project scope, roles and responsibilities, and ensure that different perspectives and forms of knowledge are meaningfully included and combined in aims, activities and outputs. Anticipate and manage tensions or conflicts that may affect integration.

DEVELOP and GROW a collaborative culture: Invest in the conditions needed for collaboration, such as time, space, resources and supportive leadership and management. Encourage mutual learning, avoid unnecessary technical language and build a shared language and norms within the team.

EVALUATE learning and impact: Embed ongoing reflection on the benefits, challenges and impacts of collaborative working throughout the project. Involve all relevant stakeholders in evaluation and document key decisions, adaptations and lessons learned.

SHARE outcomes and outputs: Plan, produce and review collaborative outputs that draw on contributions from different disciplines, sectors and forms of expertise. Consider how best to communicate these outputs to diverse audiences and support further collaboration and impact.

1.2 Collaboration in practice: survey insights

In May 2026 a survey was sent to IES and ACCESS members to gather examples of successful and unsuccessful collaborative working across the sector and insights on key contributing factors to the success or challenges of collaboration. From the examples described in the survey, participants were invited to develop their case studies in more detail. These are provided in part two of this report.

The survey also aimed to gather insights to understand better what enables and supports collaborative working. The findings from the survey were used to inform development of the BRIDGES framework, and subsequent in-depth case studies reflected specifically on the points in the framework.

1.2.1 Survey participants

The survey asked participants to briefly describe their case study example, and to rate this example on a range of criteria identified during the co-creation process which explored the barriers and enablers to collaborative working. The examples that were described varied in size, budget, duration and topic. Most projects lasted between two and five years, though some were shorter than three months and others lasted more than five years. Budgets ranged from under £10k to over £5m. The most common project types described were

research, knowledge and stakeholder exchange, consultancy work, and Environmental Impact Assessment.

The survey was completed by 34 participants. The majority of respondents were senior and had experience with collaborative working. Participants came from a range of sectors, including government, academia, consultancy, business/industry and third-sector organisations. Disciplinary representation included those working in environmental science, social science and the wider natural sciences.

1.2.2 Survey findings

Overall, a range of different (but mostly successful) examples were shared:

- 82% of examples were rated good or excellent in terms of overall success.
- 92% were rated good or excellent as examples of collaborative working.
- 74% of respondents said collaboration definitely improved the success of the work.

These case studies were analysed by participants through the lens of the barriers and enablers. These barriers and enablers were later applied to the BRIDGES framework to explore how they relate to project success.

Across all the six BRIDGES principles, ratings were generally positive in their impact in enabling a successful collaborative project (rating 5 or higher on a 1-7 scale, where 1 is "very poor" and 7 is "very high"). As shown in **Figure 2**, project success was most strongly related to positive ratings on:

- Integrate – planning to bring together different perspectives and forms of knowledge
- Reflect – considering barriers and drivers of collaboration
- Develop & Grow – providing dedicated resources and support for collaboration

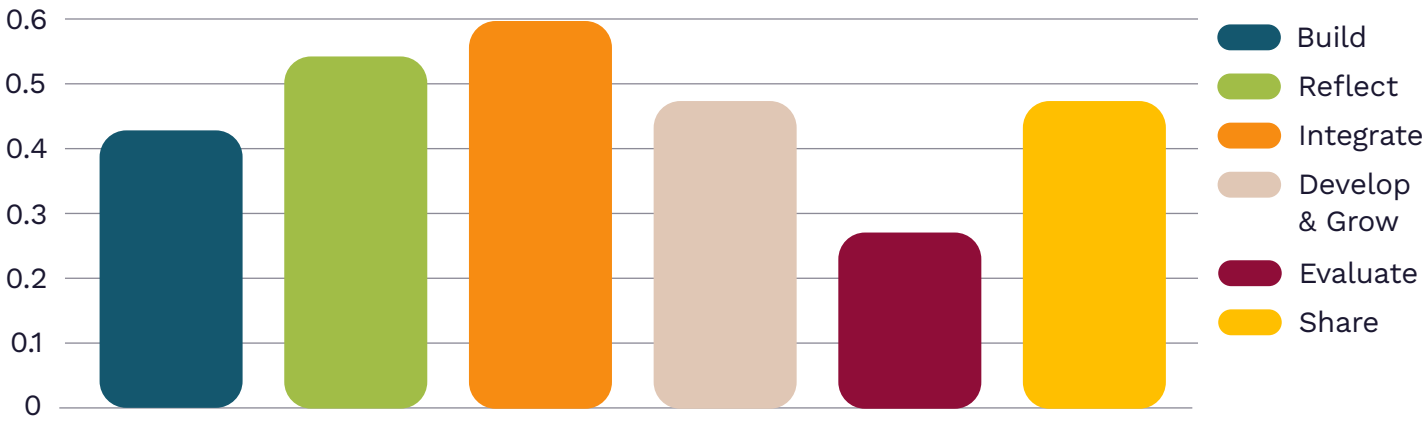


Figure 2. Correlations between overall project success and scores on each of the six principles. Correlations were analysed using non-parametric (Kendal Tau) correlations, and show positive correlations across all principles. There are significant correlations on all principles apart from Evaluate, and strong, significant correlations (above 0.5) on Integrate, Reflect and Share.

Success was also positively related, though less strongly, to:

- Build – developing a clear understanding of the problem and assembling an appropriate team
- Share – communicating project findings

In contrast, ratings for Evaluate (evaluating collaborative working) did not necessarily benefit the project itself but can of course be valuable for future work.

Participants were also asked to share what they found were the barriers and enablers of collaboration within their projects, which were then mapped against the BRIDGES principles. The table below highlights some examples of the different factors which acted as barriers to or enablers of collaborative working.

Whereas issues with project or outcome evaluation were mentioned infrequently, participants often referred to the need to understand the issues and necessary inputs (Build), to understand and reflect on team members' motivations and capacities to work collaboratively (Reflect), to understand and value different inputs and consider how they should be integrated (Integrate), and to provide physical and social support for collaboration (Develop & Grow) (see **Table 1**).

	Enablers	Barriers
BUILD	"Planned from the start, good selection..." "The work with...was built in from the start..."	"Lack of shared understanding of interdisciplinarity" "...poor scope definition"
REFLECT	"Willingness to try new ideas and think outside the box" "Ongoing progress/ impact review, agility to circumstances..."	"...different cultures/ways of working with different organisations" "Conflicting agendas..." "...busy schedules"
INTEGRATE	"Having clear goals and objectives that everyone understood" "Proposal was developed collaboratively" "...sign off of designs at all stages by all disciplines involved"	"Unclear expectations or scope changes" "Imbalance in member contributions..."
DEVELOP & **G**ROW	"A leader with clear idea the direction of travel" "Good communication and opportunities to shape throughout"	"Lack of a clear chain of command " "Strong characters. Time constraints" "...missing strong leader"

1.3 Key conclusions

The survey responses enriched the discussions in workshops throughout the project, and contributed to the development of the BRIDGES framework as a way to develop and strengthen collaborative working across sectors and disciplines. Across the examples described, there was clear evidence for the importance of establishing a clear shared understanding of:

1. The issue to be addressed and necessary inputs to do so (Build)

2. The barriers and drivers of collaborative working in the team (Reflect)

3. The value of different perspectives and how they can and should be integrated (Integrate)

4. The physical and social support needed for effective collaboration (Develop & Grow),

5. The value of evaluating collaboration for future works (Evaluate),

6. The importance of creating shared outputs (Share).

These factors were mapped retrospectively to reflect each of the BRIDGES principles, and the survey insights contributed to the development of the BRIDGES framework.

2. Part two: Case studies of collaborative working

Some survey respondents provided extended reflections on specific collaborative projects, offering rich, practice-based insights into how collaboration unfolds in different contexts. The case studies that follow draw on these longer accounts to illustrate the opportunities, challenges and learning associated with collaborative working.

After analysing the survey results and co-production workshop outcomes, we formalised the structure of the BRIDGES framework. The contributors who provided more detail on their case studies were asked to reflect on their projects with BRIDGES principles in mind. Each contributor was asked the same questions to highlight how teams built understanding, the right mix of expertise, reflected on drivers and barriers, integrated diverse knowledge, developed a collaborative culture, evaluated learning and impact, and shared their outcomes and outputs:

- What different types of knowledges and insight are needed to address your issue? (**Build** an understanding)
- Who needs to be involved and when to represent different insights? (**Reflect** on the assumptions and perspectives that are needed for the project)
- How are different perspectives and insights included and reflected in defining aims, objectives and activities of the work? (**Integrate** knowledge and insights)
- How are collaborative working practices reviewed, addressed and discussed? (**Develop** shared approaches)
- What does meaningful opportunities for collaborative working mean for your project? (**Grow** support and collaboration)
- How are learnings, experiences, benefits and challenges of collaborative working evaluated and reported upon? (**Evaluate** learning and impact)
- How are collaborative outputs planned, produced and reviewed? (**Share** outcomes and outputs)

This collection of case studies brings together past experiences of collaborative working from a wide range of disciplines and sectors, illustrating the many ways collaboration can be designed, supported and practised in real-world environmental work. The examples highlight diverse forms of collaborative working: from how issues are understood and framed, to who is involved and when, how different perspectives are integrated into aims and activities, and how learning and impact are shared. They are deliberately reflective, showing not only what worked well, but also what proved challenging or did not work as intended. We hope readers will find these case studies both insightful and practically useful as prompts to think about how collaboration might be strengthened in their own contexts.

2.1 Sustainable management of coastal lagoons in West Africa



by Siân Davies-Vollum, University of Leeds and Chair of IES Marine & Coastal Science Community

The creation of the Resilient Lagoon Network (RLN) and how the network developed a framework for the sustainable management of coastal lagoons in West Africa provides an example of how interdisciplinary expertise and transdisciplinary knowledge were combined to address a complex "wicked" environmental problem.

Funded by a network grant from the UKRI Global Challenges Research Fund (GCRF), the project brought together twelve researchers from Ghana, Nigeria, Benin and the UK from a diversity of disciplinary backgrounds. To develop the management framework the network drew on their individual expertise and worked with more than 50 coastal stakeholders of varying backgrounds and connection to lagoons. The resultant framework combined interdisciplinary understanding with the multiple perspectives, knowledges and lived experiences of these stakeholders. The GCRF funding provided £20,000, which was mainly used to hold a hybrid conference and stakeholder events in West Africa in 2022 and enabled construction of a website to showcase and share the work of the Resilient Lagoon Network. Development, dissemination and publication of the resultant management framework (Davies-Vollum et al. 2025) took place in subsequent years, and the project was finalised in 2025. The network continues to provide a platform to share interdisciplinary expertise, experiences and good practice for building resilience in coastal communities.

The plight of coastal lagoons and the communities that depend on them present a classic complex "wicked" environmental problem. Resource depletion, biodiversity loss, poor water quality, lack of sanitation and limited waste management are commonplace in and around lagoons in West Africa. The impacts of climate change, experienced as coastal inundation, erosion, and changing weather patterns, compound these environmental stressors. This project sought to develop an interdisciplinary network of researchers and practitioners across West Africa to understand the status of lagoons and from that develop a framework for the sustainable management of lagoons that could be used across the region. The framework provides guidance to help develop governance structures and practices, as well as support sustainability-focused decision-making in the management of lagoons.

Addressing the intertwined, complex challenges and stressors experienced at West African lagoons required interdisciplinary approaches that spanned natural, physical and social sciences. Network members had backgrounds in ecology, ecotoxicology, oceanography, geoscience, sociology, human geography, education and civil engineering. Integration and use of the individual discipline expertise involved not only content knowledge but stretched to disciplinary concepts, frameworks, study design, methods and skills. This interdisciplinary approach enabled understanding through complementary analytical lenses of social, economic and environmental knowledge. Stakeholders brought a different type of knowledge to the project, sharing lived experience and practitioner know-how, bringing a transdisciplinary aspect to the project.

There were two phases to this project. Bringing together the network of experts was the first interdisciplinary phase then involving stakeholders was the second transdisciplinary phase. The expert researcher subject knowledge brought different perspectives and enabled the development of a set of indicators for the health of lagoons that drew on social, economic and environmental expertise. This took a number of iterations to ensure all perspectives were covered. The second phase, to build the management and governance concepts for the framework, required a different kind of knowledge that was place-based and experiential; a transdisciplinary approach was necessary. We worked with stakeholders to get their perspective on governance that supported sustainability and participation, and drew on their own insight and experience.

The network work built on some long-standing research collaborations that provided a strong sense of collaboration but also presented many new collaborations. A sense of connectedness and shared purpose that reflected differing perspectives and insights was important to build. Given the international nature of the work this had to be built through online network meetings. These were held monthly with actions and progress mapped and reviewed so that all members had opportunities to provide input Regular meetings that set and monitored actions and reviewed progress were important for working through the sometimes conflicting expectations of the network members, especially in relation to ownership and timelines for actions.

To ensure that the framework addressed the real needs of lagoon stakeholders and reflected their lived experience the network provided a participatory platform for stakeholders to engage via online and hybrid stakeholder events. The aim of these extended conversations and transdisciplinary collaboration was designed to develop shared understandings and a collective intelligence for the complex management challenges the framework sought to address.

It is probably a shortcoming of the project that review and reflection of the practices and process of network development and collaboration was not given more time and significance. More attention and discussion were given to the practices of setting up the project and developing stakeholder events, which took place at monthly online network meetings. Setting expectations for collaborative working practices and processes at the project development phase would have helped to ensure equitable delegation of contributions and tasks.

Meaningful opportunities for collaboration in this project were those that allowed individual network members to use their

expertise to enhance the network and contribute their individual knowledge to development of the management framework. The most meaningful opportunity the project offered for this was the in-person conference that most network members were able to attend. Meeting colleagues in person was transformative and helped us to better understand not only our disciplinary difference but also the cultural differences that come with working across multiple countries. The challenge has been keeping momentum going to ensure continued meaningful collaboration after achieving the initial goal of development of the management framework.

Given that this project received funding from a national funder a formal report was required at the end of the funding period with some subsequent follow up. For example, the network was invited by the funder to present on the experience of network building. This was helpful as it forced reflection that probably would not have happened otherwise.

Collaboration has been flexible with different members of the network contributing amounts of expertise as needed depending on the exact nature of the output. Understanding the specific expertise and experience of network members has been critical in ensuring actions and oversight are assigned to the most appropriate person. The monthly meetings noted previously provide the platform for planning and all are formally noted with clear, agreed actions points. These are all placed on a shared online space so all can access them. The production and review of collaborative outputs has been achieved through the use of an online space that enables shared working. It was important to make sure all network members could access and effectively use the space, which required testing and feedback.

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Network members developing the lagoon management framework at the in-person workshop held in Winneba, Ghana. © Siân Davies-Vollum

2.2 Rural water security in Dewas region, Madhya Pradesh, India



by Dr Mark Everard, University of the West of England (UWE)

Rural water security in the Dewas region of Madhya Pradesh state, central India, is declining under the competitive pressures of extensive agricultural and industrial uses. Industry, government, farmers, educators, municipalities and village communities, along with the NGOs that support them, share in their concern about declining water security and in the search for solutions. In this dryland region, agricultural needs were formerly served by surface water and by shallow wells accessing groundwater that was recharged annually during the monsoon. However, the proliferation of powered tube wells has increased water extraction leading to declining aquifers, currently now around 650 feet below ground and still retreating in an unsustainable cycle. Regeneration of water resources in the Dewas region by harvesting run-off during the monsoon and allowing it to percolate through the soil to recharge groundwater, is vital for the security of all affected societal sectors.

Several industries in Dewas city have invested in water harvesting infrastructure to collect and store monsoon water, both for their own use or diverted to recharge groundwater. One of these industries, Baerlocher Additives India Pvt Ltd (Baerlocher), aims for its chemical manufacturing operations to become water-neutral. However, Baerlocher is frustrated that investments in water harvesting and water recycling at its Dewas plant still leave the company with a significant shortfall in its overall water budget.

India's Companies Act 2013 introduced a mandatory requirement for investment by large companies of a proportion of profits into socially and environmentally beneficial Corporate Social Responsibility (CSR) schemes. As a consultant to Baerlocher at a global level regarding its sustainability mission, but also coincidentally active in rural water security schemes in India, I was able to spot the opportunity to design a multi-year rural water harvesting scheme using Baerlocher CSR investment connecting Baerlocher with rural governments and communities, the networks of NGOs that support them, as well as local academics, state government figures and industry networks. Water harvesting resulting from Baerlocher's CSR investment can then be calculated and used to make quantified progress towards Baerlocher's water neutrality target as a co-benefit of the key outcome of contributing to rural water security in the Dewas region.

The first of three planned and budgeted years of the rural water security programme has already resulted in installation of roof water harvesting systems on 22 family homes in the village of Jhanjarwadi prior to the 2026 monsoon. Further budgeted installations following the monsoon include roof water harvesting installations on 35 government secondary schools (estimated to harvest 4,375 m^3 of water to recharge depleted borewells), 10 public buildings and a further 110 homes in Jhanjarwadi and Chhapri villages. In addition, grey water management works will be installed in 35 schools, backed up by water literacy campaigns with students to promote water conservation. Construction of a significant check dam at Jhanjarwadi to hold back monsoon runoff for direct use and to recharge groundwater will make a substantial local contribution to water security. There will also be a district-level launch and awareness event to raise the profile of water security, demonstrate scheme successes and promote their wider uptake.

Plans for Baerlocher CSR investment in future financial years include more structures in tributary streams to hold back flows promoting groundwater recharge, further water harvesting systems on buildings, and water education programmes within farming communities and across more schools.

This rural water security scheme is unique in matching corporate aspirations with the needs of rural communities as expressed through their Gram Sabha (village governance bodies), supported by the expertise of local NGOs in the design of water harvesting schemes. Collaboration was a key strength for ensuring that these targets cohered around clear needs using robust and locally appropriate designs that were meticulously checked to enable the release of corporate funds.

Initial investment by Baerlocher enabled visits by a scientist and NGOs to connect with village governance committees, other businesses and government bodies in the area. This enabled discussion and planning of mutually beneficial and desirable water management schemes taking account of local geology, other geographical features and water needs as well as cultures. This led to a comprehensive design programme

Approvals for release of CSR funds led to some delays, meaning that some of the interventions planned in the first financial year could not be implemented prior to the 2026 monsoon as initially intended. However, as this was designed as a multi-year programme, plans remain in place to increase water attenuation and harvesting for future monsoons. The already-implemented as well as future designs for solutions to rebuild water security will yield cumulative benefits over many years ahead.

As a multi-partner scheme, the long pathway from initial idea to approval of corporate funding and the early stages of actual construction depended on all participants – corporate, local government, rural water users, NGOs and others – working closely on design and implementation.

Regular meetings – physical and virtual – over a period of over a year enabled networks to be developed, trust to be built and knowledge to be shared leading to agreed scheme design culminating in approval by all parties prior to scheme implementation. These physical and electronic meetings, electronic communication between them and a clear plan leading towards scheme approval ensured that all parties were able to focus on desired outcomes and to increase trust in each other and the process leading to scientifically founded intended benefits. The funder – Baerlocher – had interests in

contributing to its overall water footprint, but the communal approach ensured that the needs of beneficiary communities were a primary focus in the design and targeting of water management.

Physical and electronic communications between all interested parties prior to scheme commencement and during its implementation ensured that all key partners were briefed of progress and able to input their considerations, which was vital for maintaining trust and momentum. Locally known and trusted NGOs played particularly significant roles in engaging with village communities, including schools and farmers. Open meetings were undertaken with village governance committees that included representation of local interests as a further means to promote inclusivity in the design and implementation of the project.

The journey was slower than initially hoped, both due to the need to ensure all parties were in agreement but also as corporate financial approval cycles do not automatically synchronise with the arrival of the monsoon and other factors. However, initial physical delivery of monsoon water harvesting schemes has been achieved at the time of writing (November 2026). These interventions have already produced tangible and beneficial results. Commitment to a rolling, multi-year programme of further water management activities, ready for implementation and with clear and measurable outcomes, was a goal worth working for.

Rural needs constituted vital ingredients in making this scheme robust, deliverable and demonstrably beneficial. This was enabled through the participation of different interests in village governance committees, integrated with corporate intent and targeting of CSR funding and ongoing community engagement in scheme design supported by the expertise of NGOs. Government engagement and sharing of knowledge with other businesses in the region will promote generation of similar schemes contributing to water security.

Without collaborative working, integrating all perspectives to match design to funding opportunity, corporate and local needs, government support and NGO design expertise, this programme would not have been possible. Through collaborative working, there is likely to be wider uptake of this and related approaches into the future, not just within this programme but as an inspiration for wider schemes.

The multi-year scheme included not only physical interventions (roof water harvesting, check dam, small flow detention structures in tributary streams) but also school and farm community education about water efficiency, ensuring that water security was addressed not merely as a quantitative issue but one of wise community stewardship.

The serendipity of my two parallel strands of advisory work – on sustainability in the chemicals sector but also long-term engagement in dryland water management in rural India in collaboration with local NGOs – enabled identification of the opportunity that this presented. It also informed the wise targeting of mandatory CSR funding to address, in societally beneficial terms, a water footprint challenge that Baerlocher had found intractable.

Mandatory corporate CSR schemes must be approved internally in the company through

a dedicated CSR Board before then being approved at corporate Board level. There is also a requirement to audit progress against milestones. This provides a robust basis for monitoring and reporting against plans, budgetary milestones and deliverables in the multi-year approved scheme. Additional monitoring by Baerlocher includes calculation of water harvesting volumes achieved through its CSR investment programme, which can then be used as offsets to meet its corporate water neutrality goal.

A scientific report has been produced as a basis for estimating water savings achieved through water harvesting structures and efficient use under this programme, semi-quantifying benefits for local people but also enabling Baerlocher to claim these savings as a contribution to overall water footprint. Local NGOs and municipalities will input to this quantification process.

In its first year of physical implementation, the outcomes of this multi-year rural water security programme are at an early stage. A district-level launch and awareness event is planned towards the end of the first financial year involving all partners, including the perceptions of rural communities. Water harvesting estimates will also feature as part of Baerlocher sustainability reporting that, in addition to magazine and other publications, will document benefits for recipient rural communities. Farmer and schools water literacy will also disseminate the benefits. Lessons will be shared with the 'Association of Industries, Dewas' to promote this kind of scheme as an exemplar of best practice co-beneficial to businesses and communities in this region and beyond.



Dr Mark Everard (centre with pickaxe), together with representatives of the village governance committee, Baerlocher and the NGO 'Water Wisdom Foundation', at a 'break the ground' ceremony inaugurating construction of the check dam at Jhanjawadi. © Dr Mark Everard

2.3 GasNetNew project

by Chris Jones, University of Portsmouth



The GasNetNew project concerned innovations in the use of the legacy natural gas pipeline network in the UK, left over after the anticipated decarbonisation of the residential heating sector. The approaches investigated included the repurposing of suitable sections of the network to support compressed air energy storage (CAES), investigating the potential to use the network to extract hydrated thermochemical solutions used within the home to release heat, and to supply water to the home for use in innovative water or ice-source heat pump systems.

The project was led by chemical and mechanical engineers but purposefully integrated the environmental social sciences. This was in recognition of the fact that the views of social stakeholders (incl. policy makers, business and industry and end-users) would be integral to the success of the innovations being designed and deliberated.

The 3-year project (2022-2025), funded by EPSRC, had a headline value of £1.3M, however, this was supplemented by the intended in-kind contributions of over 15 named collaborators and project partners, variously positioned in the business, industry and policy sectors. The academic team initially comprised just six people, but this effectively doubled as the project got going and research assistants and associates were recruited to support the activities of the core team.

The team that was built to apply (successfully) for this funding comprised many of the skills and knowledge areas integral to the success of the project. It had solid engineering foundations, uniting the practical know-how of energy technology design, with expertise in energy storage innovation and energy system analytics. A stated requirement of the funding was to involve input from the social sciences, hence, why I was invited to join the consortium. The invitation stemmed both from my track-record in the field in the study of energy and environmental technology acceptance (e.g. Jones et al., 2024: Jones et al., 2025; Jones et al. 2026), but also because I was known to one of the co-investigators (Dr Grant Wilson, University of Birmingham).

The base proposal was already at an advanced stage when I ‘got the call’ to be involved. In my experience, earlier integration of the social sciences within the

design stages of a project is preferable – and is something that I have written about (Jones & Jones, 2016) –but the team were open to my ideas and there was still opportunity to meaningfully retrofit them to the project framework that had been produced.

I was, though, the only social scientist within the team at its inception and, in hindsight, it would have been nice to have had more balance between the engineering and non-engineering contributions (e.g. through the inclusion of an economist). That said, it is always the case in projects of this kind that you are trading off disciplinary breadth with the costs associated with their representation and inclusion. For example, I have recently been involved with an engineering-led project called FEVER (fever-ev.ac.uk). This project, also funded by EPSRC, concerns the design and demonstration of an off-grid electric vehicle charger. It has greater non-engineering representation (e.g. logistics, computer science, economics) but also has a much larger budget (approx. £7M).

The academic consortium for GasNetNew was strengthened massively by the presence of several high-profile non-academic partners, whose links to the focus of the project and 'real-world' experience and insight, undoubtedly aided the securement of funding. Upon reflection, there is perhaps more that should have been done to curate and retain the contributions from these partners as the project progressed. While a handful of the partners were active throughout the 3-year programme, others were only in attendance in the provisional stages of the project, after it was funded. Thus, we lost some of the insight that could have been garnered with more active management of these parties.

Conscious attempts were made throughout the project to try and integrate knowledge and insights from different partners. There were fairly regular meetings of the project team (and wider partner network), which allowed for the presentation and discussion of progress and the cross-pollination of ideas. Also, as the social scientific parts of the project required that we could provision accurate details of the technologies being developed to our participants, we regularly sought insight and contributions from the wider team. On reflection, we could have done more to integrate knowledge and insights from the different parts of the project, this is something I pick up upon below.

It is easy to consider counterfactual paths after the event, of course, but perhaps with a complex interdisciplinary project of this kind, we could have done more to develop a shared collaborative vision for the project early on: identifying expected working and reporting practices, and explicitly noting how these would be monitored, supported and maintained as the project grew. Perhaps, we should have nominated someone to oversee this activity. Perhaps, this could have been me. However, in the early throes of a new project, within an unfamiliar team, this takes courage and a fair bit of planning.

I have often wondered whether a specific goal of projects like GasNetNew should be to analyse the process and effectiveness of collaborative, interdisciplinary working. I am reminded of the Solar Energy for Future Societies (SEFS) project, an EPSRC funded initiative that former environmental social scientist colleagues of mine at the University of Sheffield contributed to. A distinctive feature of this project – which involved physicists, engineers, architects and

geographers – was a dedicated strand of research that examined how the interdisciplinary collaboration within the project was working. This has subsequently led to outputs on co-production and interdisciplinary innovation that we could have perhaps drawn upon within GasNetNew (e.g. Krzywoszynksa et al., 2016).

Could we have gone further to grow a deeper and more meaningful collaborative ethos? Perhaps. The project did tackle the common, unifying 'problem' of how to repurpose the gas pipeline network from several conceptually different angles, but at times it felt quite siloed and pocketed, with different parts of the team attending to equally important but distinct foci. This might have stemmed from the geographical, disciplinary and institutional spread of the team, the fact that the project was distilled into relatively demarcated thematic work packages, the inherent breadth of the project, or a combination of these (and other) things.

If we were to have our time again, I think that I would have championed more vociferously for more cross-pollination between the work packages; although the fact that the work packages existed in the form that they did might have proven to be a barrier to this intent. Also, I have found that the capacity to work 'across borders' on a fast-paced project when you already have an established set of individual goals (plus myriad non-project related distractions), is very challenging. Indeed, in my experience, such situations often tend to narrow rather than expand thoughts of cross-disciplinarity.

Baking in more explicit collaborative working at the proposal stage could have been an option here, but this is fuelled by the power of hindsight and, of course, one could argue that it was the specific combination of work packages within the GasNetNew proposal that secured the funding in the first place – so why tinker with a 'winning formula'. That said, my sense is that over the years EPSRC (and similar funders) are becoming more accustomed to and/or often demand more meaningful cross-disciplinarity, so perhaps the time is ripe for testing their resolve.

Because of the nature of the GasNetNew project, as outlined above, we did not really have formal means of evaluating the learning and impact stemming from the experiences and challenges of collaborative working within the project. Rather, these were more informally generated and discussed in incidental team conversation.

It is possible, of course, that others' experiences of the project were different from my own and that they were able to more formally reflect upon the process of collaborative working but, from memory, these were never made public. I should say that GasNetNew is not an isolated example in this regard. Most, if not all, of the projects I have been involved with have not sought to formally evaluate the learnings, experiences and challenges, beyond that which is required by the funders. My participation in ACCESS has opened my own eyes to the value in more formally recording the learning and impact stemming from cross-disciplinary working and this is something I shall look to implement going forward.

There was also a loose agreement about how shared outputs would be generated from the project, with an initial expectation that all team members would have the opportunity to contribute to (and be named

on) academic outputs. While this did foster some multi-author, cross-disciplinary papers (e.g. Day et al., 2024; Seymour et al., 2025), the focal nature of many of the studies being pursued within the project did not obviously lend itself to this model.

While I believe that there is a growing recognition that meaningful collaboration across disciplines holds value (and is thus attractive to funders and applicants alike) – and while many projects start out with the 'best intentions' – in my experience it is very easy to fall back into 'old ways' of working. Particularly in the face of inherent (or perceived) complexity, time pressures, competing priorities, and/or distinct disciplinary languages, practices or expectations. Again, this observation is not unique to the GasNetNew project but is perhaps exemplified by how this project developed - at least to my mind.

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2.4 Collaborative horizon scanning for post-Brexit policymaking



by Gary Kass, Imperial College London and IES

Following the 2016 referendum on the UK's membership of the EU, a group of scientists and analysts from UK public bodies collaborated to establish a baseline of fundamental drivers of change that affect policies and practice related to environmental management, agriculture and animal and plant health. The outputs would be insights, analysis and recommendations with the outcome intention being to support responses to the emerging new political landscape in key areas of policy that were heavily shaped by strategies, policies and practices emerging from EU institutions.

The scope of work was very broad, spanning environment, agriculture and animal & plant health issues. The project considered the drivers of change affecting these issues across the STEEP typology: Social, Technological, Economic, Environmental and Political factors. It was recognised from the start that these factors interact with each other and manifest over different spatial and temporal scales. And it was recognised that there is a complex system of governance across these issues. Overall, it was essential to work across boundaries of disciplines, professions, institutions and sectors.

This work was built around a core team of around 15 officials, each reaching back into their own organisations to draw on wider knowledge-bases. As the project moved forward, it was intended that the outputs would be 'plugged into' the formal policy development processes that were being established as the UK set about reviewing and then reimagining its strategies and policies for once the UK had left the EU. However, despite the work being commissioned through a formal 'evidence and analysis oversight group' set up to broker knowledge and insights into policy development, this proved difficult, due mainly to three factors, discussed next.

Firstly, the evidence and analysis oversight group had no formal governance role beyond 'oversight' – i.e. it had no authority to drive the embedding of the insights generated into policy development. Here, a distinct gap was detected between 'analytical' professionals on the one hand and 'policy' professionals on the other; this manifested in policy professionals being reluctant to absorb work from analysts that they had not commissioned themselves, and seeing this as analysts foisting their work onto them.

Secondly, when examining global-scale drivers of change, the specific project generated forms of knowledge and insight that were seen as rather 'abstract'– i.e. that this evidence was not 'down-scaled' to UK or sub-national levels or into granular topics on which policy needed to be evolved. Further, the timescales on which the analytical work programme operated did not synchronise well with the pace of the policy development process.

Thirdly, the team for the specific drivers of change project worked very well together under an effective convenor who maintained an open, respectful and inclusive approach to sharing knowledge and insights, and there was a degree of self-organisation in forming smaller sub-teams to work on clusters of drivers; with the group as a whole offering peer-support and challenge and exploring how the insights could be presented consistently and in a useful format. However, following the first phase, this collaborative culture was not maintained, due in part to the loss of the original direct commission from the evidence and analysis oversight group, but also due to a shift in the leadership approach of the main sponsor, who adopted a more directive and less emergent style, seeking to impose their own approach and structure. Thus, while the group initially was able to build and grow a collaborative culture, this was not maintained over time, leading to work that provided a minimally-viable product that did not really deliver on the full span of its original intentions – i.e. to provide down-scaled and systemic insights relating to the drivers of change across the key policy areas.

The project was constrained by having no dedicated budget, although time for participation was accounted for by collaborating organisations. It was also constrained by the timeframes involved in the requirements for responding to the referendum result. This meant that the work had to be substantively completed within a few months, with a possibility of future phases of beyond the immediate deadline.

The collaboration did survive beyond the first phase, and participants did sign up to the final outputs (some more reluctantly and under specific conditions). But none were really happy with the final products. Yet, there was a broad agreement that the outputs provided 'valuable contributions' but did not provide what had been envisaged as a primary and essential 'point of reference' with formative influence and methodological advance.

The key point from this case study was that collaborative culture is critical, and efforts must be taken, not just to create the culture, but to sustain it over time. Thus, it cannot be taken for granted that once a collaboration is in operation, it will persist; it requires deliberate and explicit work to maintain and strengthen the collaboration, and this requires open, transparent, honest and equitable participation and governance across all collaborators. The case demonstrates that in a complex and dynamic situation, motivations and incentives for collaboration can shift over time, so it is necessary to have pre-agreed approaches for airing problems and resolving these as they arise and for 'calling time' on the collaboration when it has run its course, avoiding blame-casting and seeking to learn lessons. Establishing such ways of working within pre-agreed terms of reference would have been helpful.

2.5 The EPIC Guidance on Integrating Action on Air Quality and Climate Change

by Sarah Legge, Chair, EPIC (lead author and working group chair) and Alaric Lester, Tech Writing Hub (editor)





The Environmental Policy Implementation Community (EPIC) is a network of over 800 environmental professionals working to turn environmental ambition into effective action. By bringing together colleagues from local government and the wider environmental sector, EPIC aims to understand delivery challenges, support those delivering on the ground, and advocate for implementation-minded policy. EPIC was formed in 2023 from the merger of Environmental Protection UK and the IES. The community is part of the IES and covers areas including air quality, land contamination, noise, nature recovery, climate and sustainability.

In 2024, the IES Environmental Policy Implementation Community (EPIC) published Integrating Action on Air Quality & Climate Change. It is a practical guide for local authorities, aimed squarely at helping local authority officers develop effective policy on two highly intersecting issues – issues with common sources and actors, but separate legal and policy frameworks. It offers a rich set of policy measures for transport, buildings and overarching issues.

This case study tells how we updated an environmental policy document with help and input from the wider community, identifying a raft of policy levers and including real-world case studies for good measure.

We had a great document from 2013 from Environmental Protection UK (EPIC's predecessor), one that had helped local authority officers to combine, to leverage, to integrate their policy efforts on air quality and climate change. But the document was a decade old, in need of a revamp and in clear need of some up-to-date policy examples. We didn't just want to bring it bang up to date. We wanted to make it even better. We needed to update the science and the policy, naturally. We needed to take the time to scan the policy arena, gather practical examples and get input from a wider pool of experts. And we wanted to take the time to rewrite it from scratch, to make it more readable and more user-friendly.

Readability was key. Guides and guidance are only properly useful when they are user-friendly and easy to work with. No matter how good the information within, having a document that needs reading and re-reading just to extract that information, just to get it to percolate from one set of minds to another, keeps it firmly in the only-when-necessary pile, where change happens much more slowly.

A working group steered and drove the project. This group changed and evolved during the three years it took to develop and launch the new guidance, not least with the changes as Environmental Protection UK merged with the IES to form EPIC, with EPIC then seeing the guide through to completion.

Working-group members provided most of the input and examples to the project. A dozen people contributed regularly to the working group over its life. Beyond the working group, we had a wider range of stakeholders who we reached out to as recognised experts in their field, from local authorities, consultancy, academia and government. We also had an open consultation process so other experts and interested parties could contribute.

Budget was limited. This was a key constraint on the project, as volunteers inevitably have limited time to contribute. The EPIC secretariat and design support were invaluable in keeping momentum and getting us over the line.

This update would not have happened without the practical, hands-on experience of local authority officers. Theirs was the key experience we needed to deliver the guide, informed by additional expertise where necessary.

The working group had core knowledge and experience in the science and policy of air quality and climate change, from the public and private sectors. The group had people who work at the intersection of air quality and climate change policy. The group also had people with practical experience in transport and the built environment.

Our working group expertise could only get us so far. We knew we needed more knowledge and experience than this. We needed our members to look a little beyond their knowledge areas and take slightly wider perspectives. We also wanted people who had more in-depth experience of climate change frameworks, people who had delivered environmental policy in the built environment and people who had delivered on overarching issues such as procurement. And we wanted people who could give input to various adjoining policy areas, including health, inequality, noise, road safety and economic impacts. We found them by reaching out through our networks. Taking this more cross-disciplinary approach allowed us to identify a wider range of practical policy options. It helped us to signpost resources and support that local authorities can access.

We also needed a tech editor. With the best will in the world, the best documents aren't written by committee or by multiple authors. We needed to cede control of the writing style to a single editor, moderated by the working group chair and EPIC policy lead. Writing isn't usually our main focus within environmental science and environmental policy. We practitioners tend to focus on the issues rather than the detail of how we convey them, how we make the information clearer, how we structure the sentences and paragraphs that readers often need to read at speed. Having a tech

editor helped balance substance and style. It allowed contributors to make their vital contributions without needing to worry about whether their writing style fitted the rest of the guide.

The working group was formed of volunteers from Environmental Protection UK and later EPIC. We had a focused outreach for other experts to contribute when we needed it. Many kindly gave us valuable written contributions. Requests came from the working group, contributions came back and the working group evolved the update.

We launched an exposure draft in February 2024, as a call for evidence and to ask the community and interested parties for feedback: how the document read, what was missing, what else could be added.

We had a strong response, such a strong response, in fact, that we would need many more months to fill in the evidence gaps that stakeholders had identified. These strong responses gave us opportunities to grow stakeholder support, involve more experts in the guidance and include new case studies.

We launched the guidance at the inaugural EPIC conference in October 2024. We also presented and discussed it at conferences and webinars over the next year, including at events for the Chartered Institute for Environmental Health, for the Chartered Institution of Highways and Transportation and at various other local-authority-focused events. We even received international interest, with the guide as a topic at the 2025 UNECE Expert Panel on Clean Air in Cities event.

In November 2025, we held a 'one-year-on' workshop. We had very positive feedback on the guidance, plus information on how it was being used, by whom and what more was needed.

With hindsight, the project was perhaps overly ambitious for the limited resources available. After the exposure draft, a medium-sized update with one complete redraft had morphed into a much larger piece of work, with contributions from lots of new authors and sources needing to be collated, organised and redrafted to fit the flow, style and narrative of the guidance. The working group members had more document versions to review, the tech editor had a much larger document to edit and the working group chair and secretariat had much more reviewing and co-ordinating to be done. But we had come a long way already and wanted to make the extra effort to make this the document that people were now hoping for. Thanks to the working group chair and EPIC policy staff support, we got there.

Did we succeed in our aims with the guide (up-to-date science and policy; case studies and pointers to resources; a document that is easy to read and to work with)? We think so. The document has been widely downloaded – as of September 2026 it remains the most viewed resource on the IES website, with close to 4,000 views – and we have had consistently positive feedback.

Dip into the new guidance. Compare it with the old. We think that it was a big improvement, not just an update and refresh, and that it gives useful guidance to local authorities tackling these and wider issues. What do you think?

2.6 Developing, delivering and evaluating the Preventing and Tackling Mental Ill Health through Green Social Prescribing Test and Learn programme

by Rebecca Lovell and Harriet Hunt, University of Exeter





Green social prescribing (GSP) is an approach that involves connecting people with nature-based activities and environments as part of a broader programme of support for their health and wellbeing. It is a form of social prescribing, where people are referred or connected to non-clinical community-based activities, often by professionals known as link workers. GSP has emerged as a promising approach to improving mental health, but integrating GSP within health systems and other wider necessary infrastructures requires coordinated action across environmental, health, voluntary and community sectors.

This project evaluated a cross-government Test and Learn programme to understand how GSP could be implemented, scaled and sustained. Prior to the Test and Learn programme, the 'system' of GSP in the UK was fragmented, with little coordination or leadership, potentially leading to missed opportunities and risking exacerbating inequalities in care and outcomes. Whilst there was substantial GSP activity nationwide, locally it tended to be small scale and short term, placing a significant burden on key stakeholders such as the voluntary sector (VCSE) who provide many nature-based activities.

The 'Preventing and Tackling Mental Ill Health through Green Social Prescribing Test and Learn Programme' (T&L programme) and associated evaluation (Haywood et al. 2024) was a large-scale, cross-sector initiative to address challenges in the GSP system. The programme was a two-phase ~£7million initiative funded through HM Treasury's Shared Outcomes Fund and was a partnership of national government departments and agencies, including Defra, DHSC, NHS England, Natural England, Sport England, and the National Academy for Social Prescribing.



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The T&L programme was delivered through seven regional pilot sites, which broadly mapped to Integrated Care board areas or counties, between 2020 and 2025. The evaluation of the T&L programme involved collaboration between four universities, the T&L programme national policy partners and local leadership teams, public health and environment departments of Local Authorities, Integrated Care systems, VCSE organisations, social prescribing link workers, and people with lived experience. Over 10,000 individuals took part in nature-based activities. The evaluation aimed to assess effectiveness of the pilots, and to understand how collaborative working could support long-term systems change.

GSP sits at the intersection of health, the environment, and communities; understanding implementation and how to scale up and out the practice sustainably and equitably required both a breadth and depth of insight and knowledge. Inter-disciplinary evidence to guide the T&L programme implementation, and undertake the evaluation, was gathered nationally, regionally and locally, and from a wide variety of cross-sectoral stakeholders to understand how relationships, organisations, and local context shape GSP. Bringing this plurality of perspectives together provides a more robust understanding than any single discipline or sector could achieve alone. We were able to identify the conditions that enable, or challenge, GSP across different contexts. Such insight from the evaluation was iteratively built on through the phases of the T&L programme.

Developing a shared understanding, however, took longer than expected. Partners brought different assumptions

about evidence, success and delivery, while COVID-19 recovery, local health care systems restructuring, and the cost-of-living crisis continually shifted priorities. We found that when partners invested time in developing the GSP system before commencing delivery, this built relationships, developed a shared understanding of the problem, and set expectations for success. Although lived experience informed parts of the programme, there were fewer opportunities than were needed for these perspectives to shape strategic decisions. We demonstrated that 'test and learn' programmes also need sufficient flexibility to adapt as the learning from the different types of knowledge emerges, rather than forcing innovation through assumptions, or fixed delivery timescales.

For the T&L programme, the complexity of the system and the breadth of its ambitions required a wide range of stakeholders to be involved throughout the project. This recognised that no single organisation could embed GSP alone. Cross-government sponsorship created legitimacy and encouraged collaboration between organisations that would not usually work together. Locally, steering groups and provider networks fostered shared ownership and ensured implementation reflected local priorities. VCSE organisations brought essential knowledge of communities, inequalities and local delivery.

Representation was broad but not always equitable. Partners joined at different stages and with different levels of influence. Smaller VCSE organisations, for instance, often lacked capacity to engage consistently and to the degree they would have like to. Involving communities meaningfully throughout was particularly important for challenging assumptions, ensuring diverse perspectives were represented, and grounding the project in local realities.

A key conclusion we identified was the importance of considering when people should be involved as much as who should be involved. Stakeholder mapping, role clarification and dedicated support for VCSE organisations and people with lived experience should be built into programme design rather than added during delivery.

Importantly, the T&L programme required, and therefore enabled, the integration of different perspectives by defining the intervention as more than simply ‘prescribing nature'. The initial preparatory work surveyed what was happening and where, the kinds of locally specific and wider systemic challenges, and the different stakeholder needs, to define the potential ambitions, opportunities and needs for scaling up GSP practices (Garside et al. 2020).

The preparatory work helped national partners to agree shared strategic aims for the T&L programme, the Test and Learn sites adapted these aims to local needs and assets. This shared national direction combined with local flexibility encouraged innovation without requiring a single delivery model. Co-design strengthened understanding between sectors, while iterative feedback ensured emerging evidence informed ongoing implementation throughout the programme. Collaborative development of public- and policy-facing materials including infographics also helped increase understanding of the aims and objectives.

Integrating different perspectives takes time and must be flexible. National priorities evolved as understanding of GSP developed, and this required additional local adaptation, while differences in language, evidence expectations, and organisational capacity sometimes made collaboration difficult. A key finding was to treat co-design as a continuous process rather than a single project phase.

Alongside programme outcomes, the evaluation explored how partnerships developed and then the nature and impacts of the barriers that they encountered. Regular dialogue built trust between organisations, improved understanding of different roles, and strengthened GSP referral pathways. Formal governance provided accountability, while informal relationships often proved important for solving problems and maintaining momentum.

The evaluation demonstrated that building partnerships while delivering an ambitious national programme was resource-intensive, and some collaborations depended heavily on key individuals rather than embedded organisational relationships. One key learning was that investing in facilitation, reflective learning, and communication across organisational boundaries can strengthen partnerships and make them more resilient beyond individual projects.

The T&L programme created opportunities for collaboration through provider networks, co-design workshops, training, trusted provider schemes and joint work on commissioning and referral pathways. Many sites also supported networking between



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VCSE organisations to strengthen local capacity. The most valuable opportunities supported partners in solving problems together.

Strong, supportive networks improved communication, reduced isolation among providers, and created more coordinated approaches to commissioning and delivery. Supportive leadership also helped shift the power dynamics to allow smaller partners to engage confidently with health organisations.

Meaningful collaboration, however, needed more resource than anticipated. Smaller organisations often struggled to participate consistently, and sustaining networks beyond project funding has remained a challenge. Recognising collaboration as essential infrastructure for systems change is important, as is funding it accordingly. Long-term investment in networks, facilitation, and collaborative problem-solving is more likely to leave a lasting legacy than short-term partnership activity.

The realist evaluation combined quantitative and qualitative evidence to understand not only participant outcomes but how collaboration influenced implementation and systems change. Examining collaborative processes alongside outcomes explained why impact differed between places and generated practical lessons for policy and commissioning.

Collecting consistent data across multiple organisations proved challenging, particularly for smaller VCSE organisations with limited staff and evaluation capacity and due to the limitations of existing data systems. Understanding the nuance of relationships, trust and other aspects of collaboration took considerable evaluative resource. The T&L programme timeframe limited opportunities to assess longer-term systems change.

The evaluation demonstrated that stakeholders saw collaboration as something that needed to be actively nurtured, rather than assumed to emerge simply from the creation of formal partnership structures. Future evaluations should measure collaborative capacity and partnership development as outcomes in their own right.

Reviewing outputs collaboratively improved their relevance and credibility. Sharing findings during the programme helped partners refine recommendations, and either translate evidence into practical resources for policy and practice.

Different audiences needed different types of evidence. Balancing the needs of policymakers, practitioners and researchers within tight reporting timescales was challenging, while some longer-term impacts could not be captured within the programme. We learned the value of developing a plan for outputs from the outset, co-designed with intended users. Producing practical implementation resources alongside formal evaluation outputs including accessible infographics, and supporting ongoing communities of practice, can help ensure collaborative learning continues beyond the life of the project.

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2.7 Beyond the Generator: Cross-Sector Collaboration to Decarbonise Construction Power

by Daniel Marsh, The Centre for Low Emission Construction, Imperial College London and Committee member of IAQM



The construction sector has long depended on diesel generators to provide temporary off-grid power. These machines are often oversized for the jobs they do and spend much of their time operating at low load, which wastes fuel and creates avoidable air pollution and carbon emissions. The Clean Air Gas Engine (CAGE) project set out to address that problem by developing and demonstrating CAGE Technologies' Hybrid Gas Engine (HGE) as a practical alternative: a generator platform designed to match diesel performance while significantly reducing harmful emissions and creating a credible route towards net zero.

This was not simply an engine development exercise. Replacing diesel in construction means dealing with the realities of live sites: strict safety rules, demanding logistics, variable power needs, and the need to keep essential operations running without disruption. The project therefore brought together expertise from engineering, fuel supply, plant hire, construction delivery, emissions science and public innovation policy.

The delivery partnership was led by CAGE Technologies and included Calor Gas, Imperial College London's Centre for Low Emission Construction, High Speed 2 (HS2), HS2's delivery partner EKFB, and Speedy Services. Together they developed, tested and trialled multi-fuel generators capable of switching between LPG and hydrogen, with additional work on LPG and DME blends. The aim was to show that cleaner off-grid power could be reliable, workable and commercially relevant, not just technically promising.

A key strength of the project was the way technical development was tied closely to real operational use. Engineering work focused on combustion control, ECU development, fuel systems, telematics, safety systems and exhaust design. At the same time, the consortium had to think through how the technology would actually function on construction sites, powering welfare units, water management systems and charging battery energy storage systems without creating new operational burdens.

That required different kinds of knowledge from the outset. Fuel supply expertise was essential, particularly around safe storage, delivery and handling, and around the

practical differences between LPG, hydrogen and future fuels such as biomethane. Construction-sector knowledge was equally important because a solution that works well in a test environment may still fail if it cannot fit site routines, maintenance requirements or approval processes. Independent emissions testing added another layer of insight by showing how the generators performed against diesel and Stage V reference standards in both laboratory and 'real world' site conditions.

A key strength of the project was not only that it drew on different kinds of knowledge, but that these were shared continuously between partners rather than held separately. Engineering, fuel supply, emissions testing, site operations and logistics were connected through regular governance and problem-solving meetings, live testing, and trial planning with delivery partners. This helped us build a shared understanding of what would be needed for the technology to work in practice, not just in principle.

One of the clearest lessons from the project was that diesel replacement cannot be delivered by technology developments alone. It required early and sustained involvement from partners with different priorities and definitions of success. For CAGE, success meant proving that a robust multi-fuel engine could be built.
For contractors and delivery teams, it meant dependable power with minimal disruption. For plant hire and servicing partners, it meant maintainability, compliance and practical deployment. For policy and research stakeholders, it meant credible evidence on emissions, safety and potential for wider adoption.

Early involvement from delivery partners proved especially valuable. Speedy Services played a critical role from the outset because access, servicing and compliance on tightly regulated construction sites are major barriers to innovation. HS2 and EKFB were equally important in translating technical capability into a live site trial. Their involvement helped shape trial design, use cases, approvals and logistics, ensuring that the project reflected operational reality rather than idealised assumptions.

A big challenge in this project was identifying and engaging with key stakeholders across multiple niche sectors.



Water-vapour-rich exhaust from a CAGE multi-fuel hydrogen/LPG genset during on-site testing. © Daniel Marsh

An example would be identifying a state-of-the-art hydrogen engine test facility in the UK, however not being able to proceed with the emissions testing and engine certification as our project was not seen as being big enough to allocate time in a test cell, or as lucrative as developmental work for major engine manufacturers. This broad involvement shaped the project's aims from the outset. We did not treat environmental, technical and commercial goals as separate issues; instead, we worked from the understanding that emissions benefits alone would not drive uptake unless contractors could also trust reliability, serviceability and fuel logistics. Our objectives therefore combined diesel-equivalent performance, fuel flexibility, live site deployment and the evidence needed to support future adoption and certification.

That integrated approach worked well because it reflected how off-grid power is actually used. The trial paired generators with battery storage and real site demands, including water management and welfare support on HS2 and EKFB sites. This helped demonstrate where a corectly-sized low-emission generator could outperform the common practice of running larger diesel engines inefficiently at low load. It also showed that flexible gas fuelling can provide a practical transition pathway, with LPG offering an immediate lower-emission option whilst hydrogen and other net zero fuel supply chains mature.

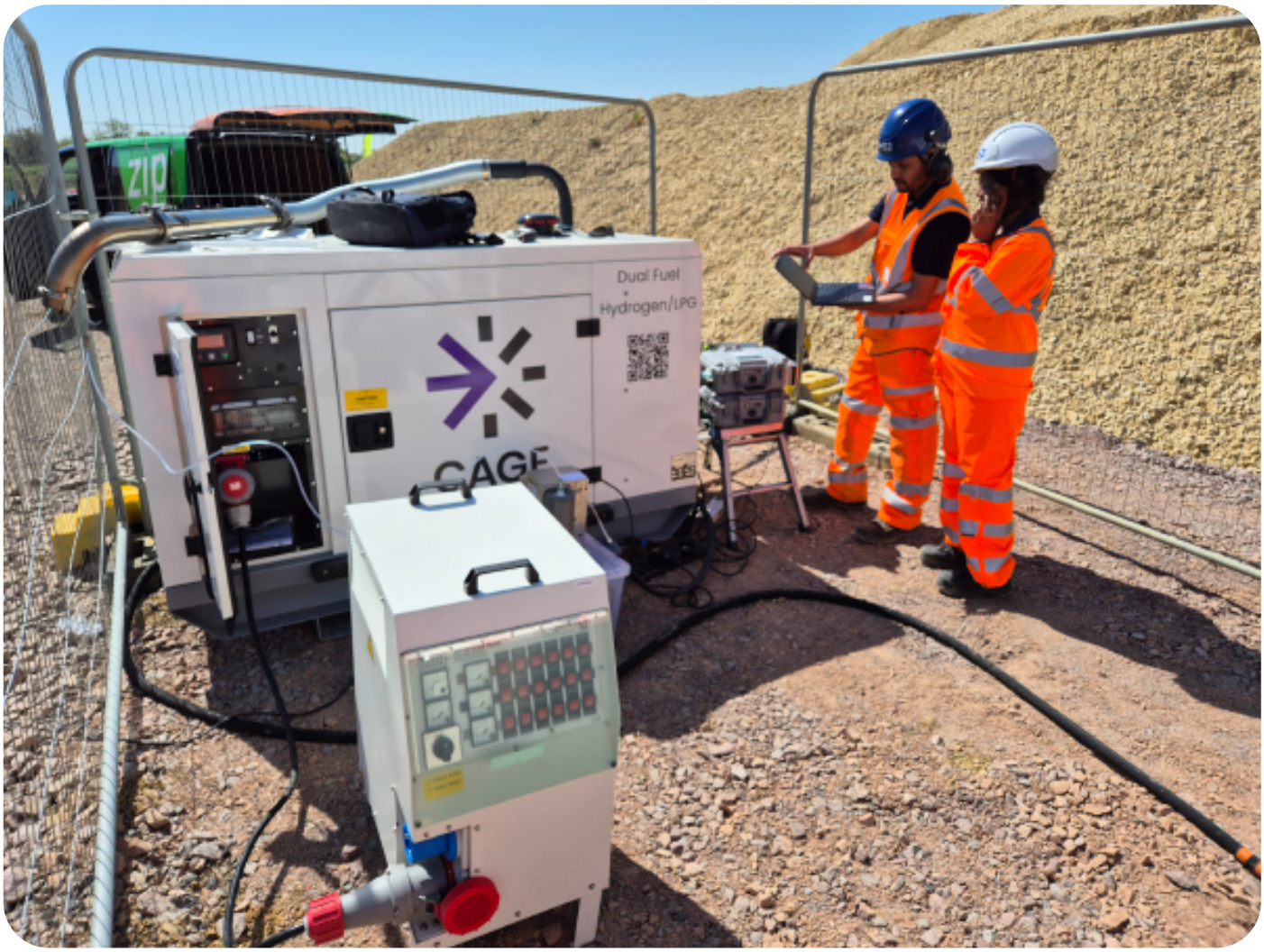
In hindsight, we could have involved a wider group of downstream users earlier in shaping the objectives, particularly procurement and operational decision-makers. That would have helped test adoption barriers sooner and strengthened the project's relevance beyond the core consortium.

We organised the project around a shared practical challenge: proving that a new generator platform could work credibly on a live major construction site. That gave the collaboration a clear focus, but it still needed active management because each partner brought different priorities, timescales and risks. Regular governance and reporting meetings were important in keeping the work aligned. They gave us a space to raise technical issues, trial logistics, safety requirements and programme risks, and to address them as a group rather than leaving them to individual organisations to solve in isolation.

In practice, some of the most important discussion happened when things did not go to plan. Hydrogen delivery problems, the failure of renewable DME supply within the project timescale, and the need to move from the original generator platform to a more suitable UK-manufactured base unit all forced the partnership to adapt quickly. Those moments tested the collaboration, but they also strengthened it because they required partners to be open about constraints and work through trade-offs together.

What we did less well was review the collaboration itself in a structured way. We spent a lot of time discussing delivery issues, but less time reflecting on how decision-making, communication and responsibilities were working across the partnership. In hindsight, more formal review points on ways of working would have helped us capture lessons not just about the technology, but about how to run a cross-sector demonstration project more effectively.

For us, meaningful collaboration meant that partners were not simply consulted; they



Testing emissions from hydrogen powered generators during use on the High Speed 2 sites. © Daniel Marsh

had genuine influence over design, testing and deployment. The project worked best when each organisation helped shape the solution, not just validate it afterwards. Speedy's role is a good example of this. Their involvement was not limited to equipment hire they brought the practical knowledge needed to get equipment onto regulated sites, manage servicing expectations and made trial deployment workable in real construction conditions. HS2 and EKFB likewise did much more than provide access; they helped define realistic use cases, site approvals and the business case for trialling the technology.

This kind of collaboration also challenged our assumptions. We began with a strong technical focus, but delivery partners made clear that compliance, maintainability, logistics and operator confidence were just as important as engine performance. Without that input, we could easily have produced a technically promising solution

that was harder to deploy in practice. Demonstration activity was another meaningful part of collaboration. Live trials and dissemination events allowed partners and stakeholders to see the generators operating in real conditions rather than only reading about them in reports. That built trust and commercial interest and created space to discuss adoption barriers more openly. If we were doing this again, we would widen those opportunities earlier by involving a broader set of downstream users and decision-makers, such as procurement teams, local authorities and other off-grid sectors, while the technology was still being refined.

We were strongest at evaluating the technical and operational performance of the project. Independent laboratory and site testing gave us robust evidence on emissions, and the live trial generated practical learning on reliability, fuel use, logistics, servicing and deployment in real site conditions. It also surfaced challenges that were just as important as the successes, including hydrogen combustion stability, fuel delivery failures, trial delays and the realities of highly regulated site access.

What we captured less systematically were the lessons about how we worked together.



A CAGE multi-fuel generator providing on-demand power to a battery energy storage system. © Daniel Marsh

These were often discussed in project meetings and through day-to-day problem-solving, but they were not always recorded in a way that made it easy to reflect on them afterwards. In hindsight, this would have been useful. More formal review points on roles, communication, decision-making and changing responsibilities would have helped us understand not just what the technology achieved, but how the partnership adapted and what that means for future projects.

That said, we learned a great deal from the experience. We learned that collaboration needs to be treated as part of the innovation itself, not just the means of delivering it. We learned that many of the most valuable insights emerge when projects hit difficulties, because that is when assumptions are exposed and partners have to work through them together. If we were doing it again, we would place more emphasis on capturing partnership learning with the same discipline that we applied to technical evidence.

The project produced a broad set of collaborative outputs, including trial-ready generators, emissions evidence, live demonstration activity, dissemination materials and early commercialisation learning. These outputs were developed through the partnership rather than by any one organisation alone.
Technical outputs depended on input from engineering, fuel supply, emissions testing, logistics and site delivery, while public-facing outputs were strengthened by the fact that they were grounded in live trial experience rather than laboratory claims alone.

One of the most valuable outputs was the evidence generated from combining technical testing with real deployment. That made the findings more useful to industry and policy audiences because they were not only about emissions performance in principle, but about whether the technology could be delivered, serviced and used on real sites. Demonstration events were also an important output, because they helped translate project learning into something visible and persuasive for stakeholders beyond the core partnership. What we could have done better was be more deliberate from the outset about how different outputs would be packaged for different audiences. We generated useful evidence, but future projects would benefit from planning earlier for a clearer suite of outputs: technical results for specialists, operational lessons for contractors and plant hire providers, and shorter practical materials for procurement and policy audiences. That would help ensure that the value of the project is not confined to the immediate consortium, but more easily shared across the wider sectors that still rely heavily on diesel.

2.8 From compliance to collaborative ownership: interdisciplinary resource efficiency and sustainability transformation in Pakistan's textile sector

by Mudassar Adil FIEnvSc CEnv, formerly GIZ GmbH



Pakistan's textile and apparel sector faces environmental, social and commercial pressures that are closely connected but often managed separately: high water and energy use, chemical and wastewater risks, production pressures, regulation and buyer requirements. Through GIZ-supported textile-sector work, including Dialogue for Sustainability (DfS), I worked with factories to move beyond sustainability as mainly an audit or compliance exercise. The aim was to bring technical, operational, management, and workforce perspectives together so that problems could be understood jointly and practical solutions owned by those responsible for implementing them.

I worked as Technical Advisor on Resource Efficiency from November 2019 to May 2023 and was involved from design and planning through implementation, monitoring and close-out. My work covered more than 20 textile and related manufacturing facilities, including Masood Textile Mills, Kohinoor Textile Mills and Arian Sports. Facilities differed in size, location, processes, management culture, buyer base and technical maturity. We used baseline/gap assessments, Change Management Teams (CMTs), mini-CMTs, training, factory visits, action plans, follow-up and peer learning. Investment decisions and budgets remained with participating businesses and therefore varied by facility.

One of the clearest lessons for me was that resource efficiency was never only an environmental or engineering problem. We needed technical knowledge of energy, water, wastewater, chemicals and production, but also operational knowledge from factory teams, commercial priorities from management, workforce experience, regulation and buyer requirements. Baseline/gap assessments gave us a common starting point, yet data alone could not explain why a technically sensible measure might not be adopted. Capital, payback expectations, production targets, skills, and management priorities mattered too.

Different people also understood 'sustainability' differently: compliance, cost saving, buyer expectation or environmental responsibility. Bringing these perspectives into the same process worked better than

specialists working separately. Looking back, I would spend more time at the beginning agreeing what the problem is, what data can be trusted, and what success means to the people involved.

Senior management was needed for investment and policy decisions; production, engineering, environment, sustainability, HR and compliance teams brought different specialist perspectives; supervisors and workers understood shop-floor realities. External perspectives could include GIZ advisors, buyers or clients, government/regulatory actors, industry bodies and other practitioners.

I found that timing mattered as much as who participated. If operational staff were involved only after a solution had been selected, practical constraints could appear too late. Technical discussions without decision-makers could produce good recommendations with no route to investment. CMTs and mini-CMTs helped keep these groups connected. Participation still varied with ownership, location, customer pressure and management culture. If designing the process again, I would map who holds knowledge, influence and implementation responsibility at the start and revisit that map as the work develops.

We used baseline assessments, CMT discussions, training, site visits and action planning to bring different perspectives into the work. We did not assume the same solution would work everywhere. A large vertically integrated mill could have very different water, energy and chemical priorities from a smaller apparel or sports-goods manufacturer. Buyer expectations, production processes, available capital and regulation also shaped priorities.

The Dialogue for Sustainability (DfS) sequence identified the problem, analysed causes and goals, found and agreed solutions, then developed an action plan to help teams move towards shared action. In practice, this was co-design.



Collaborative workshop bringing together participants from different organisational functions to discuss sustainability challenges and jointly identify practical solutions. © Mudassar Adil

The technically best option was not always immediately feasible, so we often worked through tensions between environmental ambition, production requirements, and commercial reality. I learned that integrating perspectives does not mean removing disagreement; it means making assumptions and trade-offs visible before decisions are made.

Collaboration was not limited to one workshop. Main CMT workshops created structured cross-functional discussion, while mini-CMTs and factory visits connected that dialogue with implementation. Training strengthened teams' technical understanding, action plans clarified responsibility, and follow-up created accountability.



Facilitated group discussion and participatory problem-solving during a textile-sector sustainability workshop. © Mudassar Adil

The approach worked best where senior management supported open discussion and CMT members had authority and time to act. It was harder where sustainability remained isolated in one department, production pressures dominated, or employees hesitated to challenge established practices. Some facilities initially saw sustainability mainly as an audit or buyer requirement, so trust developed gradually. I would now review collaboration itself more deliberately alongside technical KPIs – for example, cross-functional participation, closure of jointly agreed actions and whether factory teams are increasingly able to solve problems without external support.

Meaningful collaboration meant people could influence the problem and solution rather than simply receive recommendations. CMTs supported collaboration between organisational levels, while the Community of Practitioners (CoP) and peer learning allowed experience to move between organisations. This mattered because factories often faced similar issues but operated in very different circumstances.

Participation became stronger when sustainability was linked with outcomes different groups valued: resource and cost savings, productivity, safer chemical practices, buyer confidence, regulatory preparedness and environmental performance. Practical examples from other factories could be more persuasive than technical advice alone. Willingness and ability to invest nevertheless varied. If repeating the work, I would make even greater use of practitioner-to-practitioner learning, including honest discussion of



Change Management Team (CMT) workshop focused on environmental compliance and sustainability, demonstrating engagement across different functions and organisational levels. © Mudassar Adil

implementation difficulties, costs and behavioural changes as well as benefits.

We used baseline and end-line assessments, action-plan follow-up, factory visits, technical indicators, and discussions with participating teams to understand implementation and results. Programme documentation recorded improvements across partner factories in energy and steam intensity, water consumption, chemical and environmental management, productivity and workforce indicators.

Comparability was difficult. More than 60 businesses differed in technology, products, customers, location, data systems and starting maturity. A measure that worked in one factory could not simply be copied into another. Attribution also mattered: progress resulted from combined work and investment by businesses, managers, workers, technical advisors and other partners. I would now evaluate not only whether a technical indicator improved, but whether an organisation developed the relationships, skills and decision-making

routines needed to continue improving after external support ended.

Outputs were intended to support implementation as well as reporting. They included baseline/gap findings, training materials, CMT and mini-CMT action plans, technical recommendations, performance indicators, follow-up learning and business case studies. The CoP also provided a route for sharing experience beyond individual facilities.

Different audiences needed different information. Engineers needed actionable technical detail; management needed costs, benefits and investment implications; sustainability teams needed evidence for environmental and buyer requirements; wider practitioners needed transferable lessons. A single technical report could not serve all equally well. Looking back, I would plan audiences and outputs earlier, separate confidential factory information from sector-wide learning, and revisit case studies after implementation so that longer-term outcomes, unintended effects and measures that did not perform as expected are captured alongside successes.

Supporting resources

- GIZ Dialogue for Sustainability (DfS): methodology and programme outcomes.
- Common Objective: Resources – Dialogue for Sustainability in Action.

Note: Quantified programme outcomes reported in supporting materials reflect collaborative interventions across participating organisations and are not attributed to any single individual.

2.9 Collaborating for better soil health and management: introducing the SocEnv Soils and Stones project

by Sarah Ridgeon MCIPR and Martin Ballard CEnv CMgr FISEP, Society for the Environment (SocEnv)





The Society for the Environment (SocEnv) Soils and Stones project is an interdisciplinary initiative that brings together professionals and organisations to improve the protection, management, use and reuse of soils and soil-related materials.

Founded in 2019 and facilitated by SocEnv, the project is led largely by environmental professional volunteers drawn from SocEnv's extensive network. A core executive committee of around 20 volunteers sets direction and oversees delivery, supported by approximately 40 wider contributors who participate where their expertise and availability allow.

The project responds to a shared concern that soils are undervalued despite the ecosystem services they provide, and that expertise on soil management is often siloed by sector. By pooling knowledge, applying systems thinking and avoiding duplication, the project strengthens evidence, supports policymakers, signposts to existing resources and develops guidance where gaps exist.

The project's aims are as follows:

- Shaping and sharing good practice for all those managing soils.
- Connecting the expertise of practitioners with policymakers, inspiring those making legislative decisions to remove barriers and provide incentives for good soil management.
- Making connections and finding solutions via collaboration.

The project spans soil and land types and draws on sectors including construction, resource management, forestry, engineering, agriculture and land management.
This breadth enables a holistic view, from

rural soils to urban and peri-urban environments, and from soil health to soil reuse.

Its first major output was the influential 2021 report, followed by The Ten Principles of Good Soils and Stones Management, the 2024 progress report, the SILOtoSOIL tool and the Soil Management Hierarchies for Development Sites and Rural Settings.

The complexity of soils requires scientific, technical, regulatory, policy, practical and regional knowledge. The project first used the 2021 report to define the problem, evidence the case for change and draw on examples of good and poor practice across sectors. Regional and devolved differences also mean that expertise from across the UK is needed.

Systems thinking is also essential. Participants contribute different skills, including leadership, facilitation, technical review, communication and policy engagement. As members of professional bodies and learned societies, many participants also hold, or are working towards, Chartered Environmentalist (CEnv) registration, bringing both competence and a commitment to professional standards. Key to the project's successes has been a positive approach to collaboration, fostered by the interdisciplinary nature of the CEnv registration. Whilst the project's reach has grown to encompass the UK devolved nations, the project's main limitation is that its scope remains primarily UK focused, though has had reflection on practices in other countries, with touch points reflecting the participant's locality and extent of engagement.



Delegates at a Soils and Stones project CPD and networking event, held in April 2025, providing feedback on the draft Soil Management Hierarchies. © Phil Underwood



Rebecca Hearn CEnv speaking at a Soils and Stones project CPD and networking event in April 2025, to announce the launch of the SILOtoSOIL tool. © Phil Underwood

Practitioners, regulators, professional bodies, partner organisations and policymakers all need to be involved and have benefited from being brought together in the same room at project events to understand each other's perspectives. However, they have different roles and are involved in the project in different ways and often, stages. Practitioners provide practical insight and evidence; regulators and policymakers help test how recommendations could influence regulation; and partners help shape priorities, identify opportunities and extend reach.

Because volunteers' expertise and availability vary, the project is designed to offer flexibility. The core executive provides continuity and direction, while wider participants contribute when their knowledge is relevant. Core to the project is the trust that participants have in each other's expertise. Going forward the project intends to involve partners earlier in planning so that external insights shape activity from the outset.

The project's aims are embedded in its terms of reference and overseen by the SocEnv Board. Objectives are shaped through triennial progress reports and translated into annual priorities agreed by the executive. This provides consistency while allowing new evidence, partners and policy opportunities to influence activity.



Discussions at a Soils and Stones project CPD and networking event, held in April 2025. © Phil Underwood

This agility has allowed the project to reflect new sectoral and regional perspectives as participants join, respond to emerging research and support existing work led by others rather than duplicate it. The main challenge is prioritisation: new opportunities must be assessed against the project's aims, available volunteer time and the value of collaboration.

Collaborative practice is reviewed through open dialogue, executive discussion and feedback from participants and partners. The project lead and secretary help create a constructive culture, respond to concerns and adjust ways of working. For example, the project began shortly before COVID-19 and moved quickly to remote collaboration.

As participant availability changed, the structure shifted from small working groups to a more focused executive model, with task-and-finish groups formed where needed. The project is also exploring how we might use other tech platforms to better support participation.

Meaningful collaboration means using the right expertise at the right time to improve soil policy, guidance and practice. It also supports CPD, mentoring and the pursuit of professional registration by giving participants opportunities to contribute, learn and build confidence.

Participants collaborate through workshops, events and online meetings, although time

and availability remain challenges when it comes to being able to fully take up these opportunities.

The SILOtoSOIL tool demonstrates how meaningful collaboration can work in practice: project partner Midlands Land Events (MidLE) brought the concept, SocEnv provided the platform, and both networks contributed expertise and peer review. This partnership made existing guidance more accessible while reducing duplication and strengthening cross-sector knowledge sharing.

Learning is evaluated through participants and partners assessing progress against the project's calls to action, learnings which are then publicly reported via the aforementioned triennial progress reports. This approach provides transparency and honest reflection

Impact is currently assessed through output reach, participant interest and partner engagement. The project recognises the need to strengthen evaluation further through qualitative participant feedback, such as surveys, and clearer measures of influence on policy and practice.

Outputs include progress reports, guidance tools, policy responses, case studies, journal articles, conference abstracts and event presentations. Major outputs are identified through triennial planning, while further opportunities are considered through the annual programme of activity, a live document reviewed as a standing agenda item during executive committee meetings.

The usual process is to agree the need for an output, appoint leads and contributors, prepare a draft, undertake peer review, and finalise approval through the project lead and secretary. If a new opportunity falls outside annual priorities, the executive decides whether it should proceed.

Read more about the project here.



Kerry Murray speaking at a Soils and Stones project CPD and networking event in April 2025, to announce the launch of the SILOtoSOIL tool. © Phil Underwood

2.10 Cross-sectoral collaborations for the EU's low carbon transition

by Melanie Rohse, Ami Crowther and Rosie Robson, Anglia Ruskin University







The €3 million, EU Horizon-funded SSH CENTRE (Social Sciences and Humanities for Climate, Energy and Transport Research Excellence) project supported cross-sectoral collaborations to develop socially innovative solutions for the EU's low-carbon transition. The diverse partners of the SSH CENTRE consortium facilitated various initiatives to achieve this. Partners from three universities, four research institutions, two stakeholder network organisations, and four R&I and communications SMEs formed the consortium. A central aim of the project was to amplify Social Sciences and Humanities (SSH) research in relation to EU policy work and local climate action, meaning that SSH insights and practices were present across the project's activities.

Over the course of the project's three-and-a-half years lifetime, a range of initiatives were organised that brought together researchers, policy makers, businesses and citizens to co-create interventions to address climate, energy and mobility challenges. These initiatives included the generation of interdisciplinary EU policy recommendations, the organisation of focus groups and policy panels, and the co-creation of knowledge brokerage interventions – this case study focuses on the Knowledge Brokerage Initiative (KBI).

As part of the SSH CENTRE's KBI, six interdisciplinary teams of PhD and Early Career Researchers were each partnered with a European municipality to co-create interventions that address a sustainability challenge within the municipality. Examples of these sustainability challenges included energy communities, sustainable mobility, and circular economy practices. The researchers involved in the interdisciplinary teams were deliberately selected to represent a range of backgrounds, including Law, Human Geography, Sociology, and Philosophy, as well as a range of European

countries. The municipality staff who were involved included a project manager at the 'open city' department, an employee of a Climate and Energy foundation, and the strategic advisor for energy transition and climate adaptation. An academic mentor from the SSH CENTRE consortium was allocated to each of the researcher teams to provide guidance over the course of the KBI and the development of the intervention.

The iterative, co-creation process meant that the knowledge brokerage initiative that was developed was informed by the disciplinary experiences of the researchers, the local knowledge and administrative constraints of the municipality, and the shared ambition of what the researchers and municipality wanted to achieve.

A central focus of the SSH CENTRE project was supporting collaboration and facilitating co-creation through the promotion, integration, and advancement of different knowledges. The commitment to co-creation within the KBI enabled a diverse range of knowledge types and sources to be incorporated into the interventions design – including different academic disciplines and applied policy-specific insights.

Regarding the knowledge from different academic disciplines, within the SSH CENTRE project there was a recognition of the breadth of disciplines that are categorised as Social Sciences and Humanities (SSH). As such, when recruiting for the researcher teams, and deciding on the configurations of researchers, efforts were made to have a breadth of SSH



Participants at the KBI workshop focused on Energy Communities that took place in Arnhem, The Netherlands. © Ami Crowther

disciplines represented to support interdisciplinary working. To support SSH collaborative efforts with Science, Technology, Engineering and Mathematics (STEM) disciplines, each team also had at least one member with both SSH and STEM experience. The involvement of the municipality workers enabled the incorporation of institutional and practical knowledge into the design of the interventions.

The iterative, co-creative collaboration that underpinned the KBI required open communication between the different members of the research team, the municipality representatives, and the team's mentor from the start. Through open dialogue, the researchers and the municipality representatives were able to outline their ambitions for the KBI, and how they felt they could contribute to the development and implementation of the sustainability intervention. As well as highlighting opportunities for the intervention, this open dialogue also supported the addressing of any tensions that emerged as a result of different perspectives related to disciplinary norms and expectations.

The KBI included designated opportunities to reflect on interdisciplinary working practices, for example, as an agenda point during monthly check-ins with the Knowledge Brokerage mentors.

The working relationships of the Knowledge Brokerage researcher teams were also reviewed and negotiated informally over the course of their collaborations by the team members themselves. There were a couple of instances where tensions between the practices, perspectives, and assumptions of different team members created challenges for the research teams, for example, due to different disciplinary norms when designing the interventions methodology. In most cases, these tensions were addressed by independently by the researcher teams, but there were a couple of instances where the researcher team mentor helped facilitate the identification of alternative working arrangements to ensure effective collaboration.

Over the course of the SSH CENTRE project and its various initiatives, the intention was to avoid tokenistic collaborations. Rather, effort was made to ensure that the collaborations that took place oriented around open dialogue, learning from others, and co-creation. By creating space within initiatives for participants to share their experiences and draw upon the knowledge and practices from other disciplines and knowledge sources, constructive interactions and effective collaborations were enabled.

Within the context of the KBI, the co-creative approach taken required researcher team members and municipality representatives to have a genuine openness towards collaboration, whereby they had to be flexible and willing to adapt their approaches when designing the intervention. By developing their intervention based upon this collaborative foundation, it helped empower those involved and supported the achievement of constructive outcomes. Following the completion of the KBI, both researchers and municipality representatives commented on how they felt more confident in their ability to co-create activities with others, as well as in their personal skills to deliver interventions.

All the SSH CENTRE collaborations, both at the consortium level and the collaborations that took place as part of specific initiatives, were evaluated. The evaluation of these collaborations formed part of a dedicated work package which focused on critically reflecting on the processes, dynamics, and relationships that underpinned and informed the activities undertaken within the SSH CENTRE project. Interviews were conducted with the KBI researcher teams to understand their experiences, and provided a space to share their reflections. Based upon the evaluation of the collaborations that took place across the entire SSH CENTRE project, ten briefing notes on key challenges of trans- and inter-disciplinary research have been produced.

Reflecting SSH CENTRE's acknowledgement of the diverse range of actors and knowledge required to achieve Europe's low-carbon transition, a range of project outputs were generated that were designed to be accessible to the intended audience and the context in which they would use the materials.

Within the KBI, there was flexibility in the outputs that were to be produced, and the format that these outputs could take. In collaboration with the European municipality that they were working with, the researcher teams were able to produce outputs that reflected the local needs, priorities, and preferences. They included executive summaries, infographics, and frameworks. All the outputs were reviewed by the municipality representative to ensure that they met the needs of the locality, as well as the mentor.

Additional resources:

Knowledge Brokerage Programme– SSH CENTRE – SSH CENTRE

Ten challenges for successful inter- and transdisciplinary collaboration: Briefing Note collection of SSH CENTRE – SSH CENTRE

2.11 “Culture Nature” – a series of interdisciplinary collaborative partnership projects led by Natural England and Libraries Connected

by Cordelia Spalding, Natural England; and Sarah Mears, Libraries Connected



“Culture Nature Now” is a partnership programme between Natural England and Libraries Connected. Building on the earlier Culture Nature England initiative (2024-2025), the programme aimed to strengthen collaboration between public libraries and nature/conservation organisations to broaden access to nature, support community wellbeing, and contribute to the objectives of Protected Site Strategies (PSS).

The Culture Nature series of programmes over the last two years has worked with over 35 Libraries, and over 12,000 individual participants. The two main partners Natural England & Libraries Connected- have led the project, but local partners and contributors have given on the ground support- these have included local charities, arts and culture practitioners, heritage specialists, health and wellbeing organisations, Museums, Wildlife Charities and Community gardens and green and blue space initiatives.

The project provided up to £6000 per library to help increase public awareness of the role of Protected Site Strategies through the creation of a series of interactions and activities that highlighted local nature and how people can play their part for nature and their community.

The project has required public libraries to develop knowledge of the Protected Site Strategies and improve their skills around community engagement. They had to identify target communities and work with partners to develop programmes with those communities. They needed to learn to work with colleagues from Natural England and understand more about connecting with green and blue spaces in ways that would help communities understand the importance of protecting them. Natural England and Nature Connections colleagues learned about the pressures of delivering projects whilst running public library core services and the opportunities this afforded.

New friendships and working relationships have been developed enabling projects to carry on post project and develop new partner activities.

Each participating library service co-developed their own project alongside input from their communities to deliver the expressed outcomes. They identified target groups within the community to collaborate with and they needed to identify new community partners to support engagement with communities, but they also needed to build new relationships with community experts who are able to connect with and inspire others. Some of the target groups included refugees and forced migrants, teenagers, and people with mental health and physical health challenges.



Bluebell walk. © Natural England and Libraries Connected



Brent library. © Natural England and Libraries Connected

Library staff focused on understanding and respecting the experiences of these communities, building relationships based on empathy, trust and mututal learning. A central aim was to create spaces where people felt recognised and valued and can explore their own connections with green and blue spaces. Natural England supporting library staff in training opportunities with local providers on “Nature Connection” and the benefits a closer relationship with nature can bring.

Delivered across four library services (Bradford, Hull, Northumberland and Worcestershire -Culture Nature Now 2026), the Programme supported locally designed activities linked to nearby Protected Sites. Its central focus was on fostering effective, sustainable cross-sectoral partnerships



Botanical printing. © Natural England and Libraries Connected

that connect communities with nature through the trusted and accessible infrastructure of public libraries, while extending engagement beyond protected site boundaries in line with PSS principles.

The relationship between Natural England and Libraries Connected has taken time to grow, and project leads in both organisations have endeavored to share, understand and appreciate the aims, values and cultures of their respective sectors. For instance- “The Summer Reading Challenge” is a big landmark in the Library calendar, and understanding that library staff are at full stretch in the build up to this was key in ensuring Library staff were not stretched further by Culture Nature requirements.

Successful partnerships were built upon complementary strengths and shared goals Libraries brought expertise in inclusive community engagement and audience development, while environmental partners contributed ecological knowledge and connections to Protected Sites and local green and blue spaces. Cross-sectoral partnerships enabled creative approaches such as arts and storytelling, which proved particularly effective in broadening participation and fostering connections between people and place.

The programme also aligned closely with the public library sector’s strategic priorities, particularly through the Green Libraries Initiative, which encourages libraries to engage communities with environmental issues, while nature-connection activity provided a valuable new dimension to libraries’ work on preventative health, wellbeing and social inclusion. As such, the programme demonstrated a strong strategic fit for both sectors.

Through each phase of the Culture Nature programme independent monitoring and evaluation has been key in ensuring learning, and greater understanding of what works, with whom, and where, and what doesn't. An internal "chat" system was set up to support inter library dialogue and additional partners were also invited into the system to share thoughts etc.

The continual dialogue between Lead partners was also supported by having a central Project Manager role. The PM worked within Libraries Connected, so could use all the Library network and understanding to support libraries on the ground, and then would provide updates to Natural England contributors, and reports to the two Project Leads. This again strengthened the cultural understanding from both partners perspectives as they could then jointly review and consider how the projects were running, and any iterative developments that were required.

The evaluation found that partnership working between libraries and environmental organisations created significant added value for both sectors, and for wider audiences. As trusted and inclusive community spaces, libraries acted as accessible 'gateways' to nature, enabling partners to reach wider and more diverse audiences than traditional environmental engagement routes. This was especially important for individuals facing barriers to accessing nature and supports PSS ambitions to engage diverse communities whose awareness and behaviors influence environmental outcomes. The programme facilitated knowledge exchange by increasing libraries' confidence in delivering nature-based programming. At the same time, Natural England and other environmental partners developed a greater appreciation of libraries as strategic community engagement assets capable of supporting PSS and other conservation aims.



Alpaca trek on Baildon Moor. © Natural England and Libraries Connected

As well as the sharing and gaining of knowledge through the delivery of the projects, the ongoing monitoring and evaluation of activities and outcomes by an independent evaluator has supported wider learning and identified challenges and areas of improvement. It has also allowed all parties to understand better what works and build upon this.

Importantly, the partnership with libraries helped connect communities to Protected Sites by highlighting their relationships to other local environments. This reflects a core PSS approach: recognising that pressures on sites are shaped by wider social, environmental and behavioural factors. By raising awareness and encouraging nature-positive behaviours, the Culture Nature Now project's activities supported broader, community-level contributions to environmental stewardship. The programme has generated important longer-term benefits, including strengthened relationships, awareness of partners and their value-adding potential, increased organisational confidence, and new approaches to collaborative delivery. Most participants expect partnership working to continue beyond the project funding, supported by enhanced networks and shared understanding of how sectors can complement one another's objectives.

Culture Nature Now has demonstrated the substantial potential of cross-sector partnerships between public libraries and nature/conservation organisations. By combining complementary strengths and recognizing shared values, these collaborations can expand engagement with nature, support audience wellbeing and inclusion, and contribute to environmental priorities at a landscape scale.

Additional links

https://www.librariesconnected.org.uk/projects/culture-nature-england

https://naturalengland.blog.gov.uk/2023/10/04/reconnecting-communities-with-nature-through-local-libraries/

https://www.librariesconnected.org.uk/news/culture-nature-england-public-libraries-help-communities-connect-nature

https://ccri.ac.uk/research-projects/11/2024/monitoring-evaluation-for-culture-nature-england-project/

https://dcmslibraries.blog.gov.uk/2025/10/29/collaboration-is-the-key-public-libraries-as-gateways-to-nature/



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2.12 Developing an integrated, cross-domain, and sector-agnostic Sustainability Hierarchy Framework (SHF) to break decision-making silos

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The work aimed to establish an integrated, cross-domain and sector-agnostic Sustainability Hierarchy Framework (SHF) to enable consistent and systemic policy and financing decision making for multidimensional environmental issues, thereby advancing a sustainable and just transition.

Despite increasing awareness of the nature, scale, and urgency of sustainability challenges, and increasing policy and financing commitments, the interconnected triple planetary crisis of climate change, biodiversity loss, and pollution continues to accelerate. The problem this work sought to addresses therefore was to understand why, and what should be done, especially under conditions of accelerating socio-ecological risk and political backsliding.

It was a small project, when considering the size of budget (zero) and core team (four co-authors from natural, social and political science backgrounds), the wider team was, however, extensive. We integrated inputs from 60+ contributors across academia, civil society organisations, Intergovernmental Organisations, UN Special Rapporteur, Indigenous Peoples, private sector/investors, press officers, campaigners, political strategists, negotiators and diplomats across countries.

The proposed outputs & outcomes included a peer-reviewed paper establishing the SHF which lasted 4+years, followed by dissemination activities to increase the framework's visibility and adoption which started recently and is expected to last a few more years. Many of the dimensions covered across the six BRIDGES questions - such as reviewing collaborative working practices ('Develop'), or evaluating collaborative learning ('Evaluate') - were not pre-designed at the project's inception, but rather evolved organically.

To build a relevant, practical and integrated tool addressing multidimensional challenges, a blend of expertise was essential. Multidisciplinary science knowledge and a deep understanding of the interconnected science and global policy landscapes covering climate, biodiversity, and pollution was needed. Academic writing and framing were needed to translate abstract and complex concepts into a robust academic paper establishing a framework. As the lead author with a natural science background, I had a clear vision of what needed to be done, but initially struggled with how. Partnering with social and political scientists was vital to bridge this key gap.

Another key to this effort were well-established diplomatic and multi-stakeholder connections, their willingness to share insights, and the project team's capability to understand different languages, concerns and priorities of multi-stakeholders.

A strategic mindset was needed to design the team, processes and contents, for optimum visibility, relevance, practicality and chance for the SHF to be considered by multi-stakeholders. Communication & dissemination skills and knowledge of how best to communicate and socialize the output for real-world impact was also essential.

At least half of the needs were recognized in hindsight rather than considered clearly at the beginning. A key lesson is that mapping these core knowledge at the outset would deliver projects more effectively.

Addressing multidimensional challenges requires integrating diverse perspectives while carefully managing team composition, which revealed diversified consideration and preferences.

Some collaborators would like an expansive co-author list across disciplinary backgrounds, considering the multiple domains covered in this project and the integrative nature of the research. Some others preferred a lean core-writing team prioritizing efficiency, especially given the time sensitivity for the SHF to inform the work of the Intergovernmental Negotiating Committee (INC) to establish the Global Plastics Treaty.

We settled on a fine balance: maintaining a compact, highly complementary co-author team representing the critical knowledge pillars, while expanding reach through extensive external stakeholder dialogues. This hybrid approach allowed us to incorporate rich insights, while keeping the project agile and effective.

Integrating cross-disciplinary knowledge was our biggest learning curve. While initial bilateral meetings with each core member suggested alignment, the drafting phase revealed significant interpretation differences. Social and natural scientists can use identical terminology to mean different things, or utilize distinct conceptual lenses for the same issue. This is the beauty of diversity, but could also be the source of misinterpretation, leading to major problems if not nurtured carefully.

The progress stalled for several weeks – the most difficult time for me as the lead author. As a voluntary effort without formal obligation, the project risked fading away. Unprepared, but driven by the strong belief in the project's value and in my co-authors, I took time to reflect, to unpack and bridge

the divides, and to reconcile the team, realigning everyone on a new "direction of travel".

A key learning is that cross-disciplinary co-design and collaboration, even among a small team, is iterative, requiring continuous exchanges and patience, sometimes involving difficult dialogues. Navigating this challenge, however, turned a major vulnerability into our greatest strength, yielding a conceptually rich, methodologically sound, and policy-relevant SHF.

There was not much planned review during the project, but rather through ad-hoc dialogues. We would have planned it in if the ACCESS/IES collaboration tool was already available before the start of the project.

As the paper aims to provide an integrated SHF to break the siloes in environmental discussion and decision making, we strongly believe that the collaboration itself should mirror the SHF's integrative spirit. Therefore, in this journey, 'meaningful collaboration' extended far beyond co-authoring and/or email exchanges, including a few more key pillars:

Trust and confidentiality: True collaboration relies on trust-and-good-faith based communication in a psychologically safe space. We engaged diverse stakeholders across the science-policy-finance-business interface, some shared information and insights that co-authors would otherwise not have had access to. Protecting this information was paramount. With key contributors, we re-verified and honoured their attribution preferences before submission, which further enhanced trust base for future collaboration.

Plenty of exchange opportunities and channels: Confidential bilateral calls, in person meetings, and/or open group debates, these safe and trusted spaces have enabled stakeholders to air different perspectives more openly.

Humility, respect, and active listening: We hold the belief that all knowledge disciplines and formats hold equal weight. Bringing in diversity, multidisciplinary collaboration also introduces challenges, which requires stepping outside our own 'bubble'. A core element of our collaboration was therefore a commitment to active listening with humility. Authors and contributors approached conversations not to "win" over each other, but to patiently understand the nuances of other domains, and to integrate those insights. This has enabled integrating, reconciling, and streamlining knowledge across domains into one integrated framework, and mirrored exactly the philosophy of the SHF.

Adaptable project leadership, shared ownership and collective decision-making: Interdisciplinary, multi-stakeholder collaboration is complex and time-intensive, the level of which was initially underestimated and became a key lesson. Coordinating collaborators across different time zones, family commitments, and work schedules revealed the need for a more active project leadership. As the lead author, I stepped into the project management role, leading milestones setting and time management with empathy and flexibility, while bearing in mind the time-sensitivity of the project. At the same time, major decisions were made collectively, ensuring true shared ownership across the team.

Formal, systematic evaluation mechanisms were not explicitly designed into our initial project work plan. Instead, reflection and evaluation occurred organically through regular project coordination calls, continuous feedback during drafting, and informal debriefs following key project milestones (such as the peer-review process, press release and major policy briefings).

Moving forward, having access to the interdisciplinary collaboration tools and the awareness of the six steps from the outset will significantly enhance our project planning. This includes embedding structured, periodic evaluation cycles and potentially formal collaborative metrics into the core project design from day one - for future multi-stakeholder projects – to ensure that learnings, experiences and challenges are tracked dynamically rather than retrospectively.

Our output strategy was planned and unfolded in two distinct phases:

Phase 1: Agility and urgency for the core academic output: Initially, we prioritized on rapid conceptual development and academic publication, to ensure the scientific foundation was in place well ahead of the final INC negotiation rounds to maximize its policy relevance & utility.

Phase 2: Adaptive socialisation and dissemination: Once the paper was accepted and the timing of the next round of negotiation was confirmed (leaving an 8–9 month window in between), our team started to develop and test a multi-channel socialization strategy to translate academic findings into real-world impact, including e.g. media and social media amplification, conference speeches, and diplomatic briefings. One key lesson we've learnt is that planning is crucial. The framework was designed to directly inform the INC negotiations for the Global Plastics Treaty. The first priority was therefore to ensure the scientific foundation to be formally published well ahead of the final INC negotiation rounds to maximize its policy relevance & utility, leaving socialization planning for later. While this two-phase planning model provided agility to enable time-sensitive publication, socialization plan and documents - if prepared in parallel from the outset - could have increased real-world uptake. For example, we missed a key journalism window because we were not aware of its strict lead-time requirement.

Multidisciplinary collaboration brings incredible richness; it also presents complexity and challenges that need to be carefully nurtured. This requires active listening, mutual trust, and a shared willingness to bridge and reconcile different viewpoints, which directly mirrors the core philosophy of the Sustainability Hierarchy Framework (SHF) itself: embracing and integrating diversity rather than pitting domains against one another. Preparing this submission using the ACCESS/IES interdisciplinary collaboration toolkit highlighted its power in guiding and enabling such complex work. We will proactively embed its six steps into future work designs.

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