Toolkit for collaborative working across disciplines and sectors

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ACCESS

Advancing Capacity for Climate and Environment Social Science

The Institution of Environmental Sciences

Contents

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This project was led by ACCESS and the Institution of Environmental Sciences (IES). This toolkit was co-produced by a group of approximately 40 people from varying backgrounds, disciplines and experience within the environmental sciences, e.g. academia, consultancy, government and NGOs, who came together in a series of workshops between November 2025 and June 2026 (see **Appendix B**).

ACCESS is a 5-year ESRC funded knowledge exchange program that aims to champion and coordinate environmental social science in the UK in interdisciplinary research, training, policy and practice. It aims to help address key environmental challenges spanning biodiversity, sustainability and decarbonisation. ACCESS is supported by the Economic & Social Research Council [grant number ES/W00805X/1].

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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1. Introduction

Environmental science is an interdisciplinary field. However, many definitions or descriptions of this field do not explicitly include the social sciences even though environmental and social challenges are deeply interlinked (see **Box 1**).

Box 1. IES definition of environmental science.

"Modern environmental science is an interdisciplinary challenge-led field studying, developing, and disseminating knowledge of natural processes and systems through scientific tools, methods, and understandings, including their application to social and economic systems, the creation and assessment of solutions to environmental challenges, and the two-way interactions between the human and natural worlds.

Environmental scientists work across natural and social disciplines, comprising academics, policy professionals, environmental engineers, and practitioners. They use scientific methods to inform environmental work, as well as insights from diverse sources of knowledge including professional practice, the interactions between science, policy, and society, and indigenous forms of knowledge."

A driving rationale for the work we have conducted is to address this issue and to consider what collaboration looks like within the environmental sciences across disciplines and sectors, including within research, policy and practice.

In 2025, ACCESS provided funding for a collaboration with the Institution of Environmental Sciences (IES) to develop resources to support collaborative working across disciplines and sectors within the environmental and social sciences. The project represents a timely, strategic opportunity to build stronger links between environmental and social scientists and practitioners, and to equip these communities with the tools and insights needed to work more effectively together on urgent environmental issues.

The starting point of the work was to highlight the environmental social sciences as a crucial part of wider environmental sciences. Previous work by ACCESS has highlighted how environmental natural scientists may be unfamiliar with the value and significance of environmental social sciences in addressing environmental challenges. Moreover, environmental social scientists are often underrepresented in

environmental research, and in professional bodies such as the IES. Therefore, this toolkit was co-developed in a series of workshops and led by a core team of environmental scientists working in social sciences, natural sciences, and engineering. It was developed over the course of a year, with input from over 40 UK-based environmental researchers and practitioners.

This project aimed to strengthen collaborative working between the natural sciences and social sciences in environmental research, policy, and practice, by co-producing a set of practical resources and building a lasting network of practitioners and researchers. It was delivered jointly by ACCESS and the IES, drawing on their complementary missions and extensive networks.

ACCESS promotes the value and application of environmental social science in research and practice. It has built a strong network of partners within and beyond academia.

The IES is a charitable organisation and a global professional membership body for environmental scientists. It has a large network of members working across fields within the environmental sciences in consultancy, industry, academia, local and national government, and NGOs. Both organisations are committed to advancing collaborative approaches to environmental challenges.

The key aim of the project was to co-produce tailored resources and practical approaches to bridging disciplines and sectors. This was done by:

a. Reviewing existing resources, frameworks and toolkits for collaborative working;

b. Holding 3 facilitated workshops in person (and a fourth online); and

c. Distributing a survey to collate case study examples of successful and unsuccessful collaborative working in environmental research and practice.

The work was underpinned by the ACCESS guiding principles of EDI, Sustainability and Co-production. These principles informed recruitment, the selection of workshop participants, organisation of the workshops, and all other aspects of the project.

1.1 What is the toolkit?

This toolkit provides a practical framework and supporting information for collaborative working across disciplines and sectors within the environmental sciences. It is designed to be flexible rather than prescriptive, so that it is applicable for projects spanning research, policy, and practice.

The toolkit is structured around the BRIDGES Framework co-developed for this project (see **2. The Toolkit**). It comprises of a set of six principles to help bridge disciplinary and sectoral boundaries and support collaboration. The toolkit is intended as a flexible guide that can be adapted to different contexts and ways of working. It provides practical questions, prompts, and co-produced resources to help teams and individuals navigate different phases of collaborative working, from project design through to evaluation and reflection.

1.2. Who is the toolkit for?

The toolkit has been designed to be used by anyone wishing to explore, explain, and champion the value of collaborative working across disciplines, sectors, seniorities, and specialisms in the environmental sciences.

Throughout the toolkit, we use the term 'collaborative working' to describe working in teams across disciplines and/or sectors (see **Appendix B** for more information on understanding collaborative working). The focus of this toolkit is to support those working across the environmental sector, in academia, industry, policy, government, public bodies, NGOs, and practice, who want to work more collaboratively. This may include project managers, researchers, funders, practitioners, stakeholders, researchers, or beneficiaries.

Whatever your role, the toolkit is intended to support your understanding of the value of collaborative working in addressing complex environmental challenges, what collaborative working involves, and how different methodologies can support effective collaborative working that delivers positive impacts for the project and for participants.

1.3. Why use the toolkit?

Collaborative working is vital to tackling the complex environmental challenges that we face, from climate change to pollution to biodiversity loss. Environmental, social, and economic systems are closely interlinked, and therefore in order to develop holistic solutions, it is essential that expertise and knowledge across disciplines, sectors, and specialisms are used to develop solutions with multiple benefits. When applied effectively, collaborative working improves project outcomes, reduces risk, and delivers greater long-term value. Collaboration is not just an academic idea; it's a practical way to deliver more effective, resilient and deliverable projects in real-world conditions.

Whilst there is a shared recognition of the value of collaborative working across disciplines and sectors within the environmental sciences, it can be difficult to adopt in practice (see **Box 2**).

Box 2. Challenges of collaborative working

Challenges include differences in disciplinary languages, limited mutual understanding of methods and approaches, varied experiences of and motivations for collaborative working, lack of guidance, lack of appropriate frameworks to support collaboration, and the absence of shared spaces or networks.

Collaborative working can be perceived as time-consuming, complex, and sometimes confusing. The input of different perspectives is not always well-understood or valued, and knowing where to start, who to involve, and how to collaborate can be challenging, especially when resources are limited.

This toolkit provides clear steps and practical resources to support collaboration across different phases of a project. It has been co-produced by a group of researchers and practitioners actively working on environmental issues and from

across a range of environmental science disciplines and sectors. As such, it builds on end-user experiences and insights, and responds to their specific needs.

1.4. How to use the toolkit

The toolkit is designed to be useful at any phase of a project, whether you are preparing a funding bid with a collaborative project in mind, are looking to establish a collaborative project, or you are already working within a collaborative team.

The toolkit is designed to be iterative and can be adapted to suit your needs, capacity, and resources. We recognise that time and capacity are often constrained. While the toolkit is designed to be used as a whole, it can also be navigated selectively depending on your needs, project stage, and context. Throughout, we aim to acknowledge the diverse perspectives, disciplinary backgrounds, and sectoral contexts that may shape collaborative work. Rather than being prescriptive and providing a single model of collaboration, the toolkit encourages users to reflect on how collaboration can benefit their work, how it can be facilitated, and how it can support delivery of greater impact towards project aims and objectives.

The BRIDGES Framework outlines six principles of collaborative work that we recommend all users engage with. The six principles are guided by questions that address key foundations of effective collaboration. Users of the toolkit can answer these questions for their own work to develop a bespoke collaborative working plan and process. Guidance on good practice is offered throughout. Engaging with these questions also facilitates thinking processes to reflect on different perspectives, and surface potential synergies and trade-offs. Supporting resources throughout the toolkit are based on existing and adapted methodologies. Relevant further information is signposted to support team members in self-directed further learning and exploration.

2. The toolkit

This toolkit is based on the BRIDGES Framework, which incorporates six key principles to support the development of collaborative working across disciplines and sectors (see **Figure 1**). The bridge is underpinned by good communication and leadership, without which the bridge may fall. This framework is a guide and offers a method for approaching collaboration that addresses some of the main challenges and barriers experienced when working across sectors and disciplines.

The framework is designed to be iterative and reflexive and can be adapted as appropriate. However, we encourage you to engage with each principle at least once.

Figure 1. The BRIDGES Framework for Collaborative Working.

BUILD an understanding and the right team

- **What knowledge and insights are needed to understand and address the issue?**
- **What impact are you aiming to achieve with the collaboration?**

From the start, consider what input may be needed, and review and adjust on a regular basis. When different knowledge needs are identified, consider how this will feed into team composition and roles to ensure appropriate expertise and insight is represented. Consider who may need to be recruited or brought in, or where and how to strengthen capacities of existing teams.

INTEGRATE knowledge and insights

- **How are different perspectives included, reflected on, and integrated in the development of aims, objectives, activities and outputs of the work?**

Determine (and balance) the boundaries and scope of the project and people's roles within this. Ensure that everyone knows and agrees who does what and how the different perspectives, insights, and knowledges complement each other and work together. Plan how to deal with potential conflicts and differences in opinions that may affect integration.

REFLECT and adapt to drivers and barriers for collaboration

- **What are the drivers and barriers for collaboration within the team?**

Explore drivers and barriers for collaboration from the start. This includes existing constraints, and different understandings and perspectives of the value of collaboration in general (as well as for the specific issue addressed in the work). It may include assessment of knowledge, skills, and motivations, as well as trust, power relations, and mutual learning. It may also include external drivers and constraints such as institutional support, or lack of facilities. Map out and reflect on possible drivers and barriers of collaboration in the team, and the potential to harness drivers and overcome barriers, where possible.

DEVELOP and GROW a collaborative culture

- **How are team members' understanding, appreciation, confidence, and skills for collaboration developing throughout the work?**

Provide sufficient resources to support collaboration. This includes time, space, materials and funding, as well as leadership, followership, management, and guidance. Review and adjust (if needed) time, space, and resources, as well as support and guidance. Learn and listen, avoid technical language and develop a shared language where possible.

SHARE outcomes and outputs

- **How are collaborative outputs planned, produced, and reviewed?**

Plan, review, and produce collaborative outputs informed by the diverse knowledge, skills, and perspectives of all team members.

EVALUATE learning and impact

- **How are the learnings, experiences, benefits, and challenges of collaborative working evaluated and reported upon?**

Review and reflect on the benefits and challenges of collaborative working throughout the process, and again in final project evaluation and reporting. Ensure that contributions to the evaluation are made from all stakeholders involved. For each of the previous principles, record, review, analyse, and report learnings including initial decisions, evaluations, and adaptations in the collaborative process.

3. Applying the six principles

The following section explains the six principles, and points to the appendices where you can find more information, guidance, and tools for each principle. **Appendix A** provides a template you can use for your work to keep a record of your reflections for each of these six principles.

3.1 Principle 1: Build an understanding and team

What different types of knowledge and insights are needed to understand and address the issue?

All projects or programs of work start with trying to understand the issue at hand and interrogating the issue from different perspectives. Building a holistic understanding of the issue will help identify who (bringing what knowledge, insights, and skills) may need to be involved in the work. This should involve mapping out the different types of knowledge and knowledge holders that are, could or should be associated with the issue, for example, the different scientific inputs needed, different stakeholders, and end users affected). Try and consider the wider picture: including, for instance, potential intended and unintended consequences of interventions, policies, or technologies, and wider contextual and social factors that explain the issue. A systems thinking approach will help to support this process (see **Appendix C**).

As part of this process, it is essential to consider what impact and outcomes the collaboration is hoping to achieve, as this will help identify the perspectives needed and to determine relevant stakeholder engagement. Using or developing a stakeholder mapping tool can be very useful (see **Appendix C**). Such tools can help consider wider perspectives and determine appropriate stakeholder engagement methods. For large projects, it is likely that there may be different (and sometimes overlapping) teams within the wider project team. Carefully mapping out who should and can be involved, when, and where, can support project management decisions.

Once knowledge needs are identified, try and build a team to cover the different perspectives. It may take time to find the right team if you need to find collaborators outside of your own discipline or network. Don't rely on the people you already know. Networking is important: finding the right people, and even knowing who they are, will take time. Ensure you understand what

assumptions you are making about those who are involved or not involved in the team.

Several constraints may make it difficult to identify knowledge needs and shape a team. Resource constraints can limit the inclusion of everyone who would ideally be involved. If resources are very limited, try to draw on existing strengths of team members or consider training and capacity building.

Reflecting with the team on emerging knowledge needs should be embedded into the process. Carefully planning and regularly reviewing what input is needed, when, and where, is important. Developing a clear understanding of the costs and benefits of including or excluding different perspectives for project resources and outcomes helps support decision making and planning.

Table 3.1. BUILD – Actions to take

Actions to take	Build a team and shared understanding
Essential	• Build an understanding of the issue through mapping who is currently involved and whose perspectives may be missing • Map potential limitations, tensions, or blind spots in the current framing of the issue • Facilitate a team discussion on how different disciplines or sectors understand the problem differently
Enhanced	In addition to the above: • Bring in an external facilitator or systems thinking practitioner to support collaborative problem framing • Undertake a more comprehensive systems mapping exercise involving a wider range of stakeholders and perspectives

How to approach building an understanding if you are:

- **A leader, director or manager**
  - With the team, reflect on the complexity of the issue and identify the different types of knowledge, expertise, and lived experience that may be needed to address it;
  - Ensure a process to identify who needs to be involved in the project, including stakeholders, practitioners, and knowledge holders; and
  - Discuss how different knowledge holders will participate and collaborate in the work.
- **A member of the team**
  - Reflect on how your own disciplinary background or experience shapes your understanding of the work;
  - Reflect on others' disciplinary backgrounds and their contributions to the work; and
  - Understand what the proposed outcomes of the project are and how that reflects the deeper understanding of the issue.

3.2. Principle 2: Reflect and adapt to existing drivers and barriers for collaboration

What are the drivers and barriers for collaboration within the team?

Collaborative working can be challenging and not everyone will approach it with the same skills or experience. A wide range of factors influence whether team members can collaborate effectively including prior experiences, workplace support, interpersonal skills, and more. The (perceived) challenges and benefits of collaboration may also vary between team members.

From the start, it is important to try and understand the different drivers and barriers for collaborative working in the team. Power dynamics, lack of confidence, and feeling unable or unwilling to speak up can form significant barriers to successful collaboration. Moreover, when working across organisations or sectors it is very possible that team members experience different levels of institutional support for collaborative working. This can impact team members' abilities to engage with collaborative activities.

We have developed a bespoke survey tool that can help you with this (see **Appendix D**). This process should ideally be repeated at regular intervals to review learnings, as well as limitations and imbalances in people's experiences of collaborative working and their motivations and abilities to do so. Gaining a clear understanding of the potential drivers and barriers of collaborative working helps develop tailored support, to grow capacity for collaboration (see **3.4 Develop and Grow**).

A good understanding of team member motivations and abilities to collaborate can help develop an effective plan for collaboration and integration in the work (see **3.3 Integrate**). It can also help develop a clear business case for collaboration for the team, the program of work and for individual team members and their institutions (if necessary). It is essential to articulate the benefits of collaboration in a way that aligns with team member needs, understanding, and priorities.

It is important to acknowledge wider conditions in which collaborative work takes place. Recognition of these constraints is essential, both for navigating them in practice and for making them visible. This also helps to develop activities that can address some of these challenges. In this context, documenting, evaluating, and sharing experiences of collaboration becomes particularly important, as a way of evidencing its value and advocating for structural change.

Some key structural challenges to be aware of – and, where possible, to question or challenge – include:

- **Hierarchies of knowledge and expertise**: Collaborative projects often privilege certain forms of "expert" knowledge over others. This can marginalise local knowledge, lived experience, and alternative ways of knowing;
- **Participation and inclusion**: Decisions about who is involved, and how, are shaped by both explicit criteria and unconscious biases. These influence whose perspectives are represented and whose are excluded; and
- **Temporal and funding pressures**: A preference for rapid, measurable outcomes can limit the scope for slower, more iterative, and relational forms of research. This can affect how problems are framed, who is able to participate, and the kinds of impacts that are ultimately realised.

Table 3.2. REFLECT – Actions to take

Actions to take	Reflect on existing barriers and drivers for collaboration
Essential	• Evaluate existing barriers and drivers of collaboration across the team from the start and on a regular basis • Identify how you will assess collaboration itself, including what evidence you will collect and how different perspectives will be accounted for • Plan to manage the obstacles you cannot remove throughout the project. • Building a business case for collaborative working based on varied needs and constraints of team members.
Enhanced	In addition to the above: • Take a reflexive approach and revisit the drivers and barriers as part of your regular project review stages.

How to approach reflecting on existing drivers and barriers for collaboration if you are:

- **A leader, director, or manager**
  - Encourage the regular use of the bespoke survey tool (see **Appendix D**) to understand barriers and drivers for collaboration across the team;
  - Reflect on the wider, structural challenges that form the context around the project;
  - Build a plan to manage these, and spend time making these challenges explicit within the wider team;
  - Start developing collaborative outputs and outcomes that are sensitive to differences in team member needs and constraints for collaborative working; and
  - Provide support for collaborative working (see **3.4 Develop and Grow**).
- **A member of the team**
  - Reflect on how your own disciplinary background or experience shapes your understanding, willingness, and ability to engage with collaborative working; and
  - Consider what it means to you to be part of a collaborative team, what the challenges and benefits are of collaboration for yourself, the wider team, and program outcomes.

“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”

– Mudassar Adil, Former Technical Advisor – Resource Efficiency, GIZ GmbH

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3.3. Principle 3: Integrate different perspectives

How are different perspectives included, reflected on, and integrated in the development of aims, objectives, activities, and outputs of the work?

Building a collaborative project involves integration of knowledge and insights. It is essential that team members do not work in silos but share a common goal, know what their role is in the achievement of that goal, and how their work relates to that of others. A key challenge is to reflect on how different elements work together.

Bring the team together early to develop a plan and revise it together on a regular basis. In doing so, the team can develop a shared understanding of the goal and aims of the work and how different elements and activities fit together. It may help to use a Theory of Change approach to do this (see **Box 3** and **Appendix E**).

Box 3. A Theory of Change

A Theory of Change is co-developed by members of the team team to outline:

- the impact the work is aiming to achieve;
- the outputs and outcomes that will lead to that impact; and
- the activities and inputs that will deliver the outcomes and outputs, and the assumptions and understandings that underpin why and how this will happen.

It is important that the team works together to develop and refine project aims and objectives, and identify how different perspectives, activities, and outputs work together to deliver them. The team should develop an impact pathway laying out how the collaborative work will achieve its aims and objectives. This will support identification of any gaps in delivery and an interrogation of underpinning assumptions and understandings. Consider the broader contextual dynamics that shape collaborative working, as well as personal factors that support or undermine collaboration (see **3.2 Reflect**) within your team. Engaging with these reflections critically is an important part of using this toolkit effectively.

Involving team members (from different disciplines, stakeholders, and sectors) in the development of this plan can take time. However, it is important to try and achieve consensus and to develop a shared vision. This includes ensuring everyone understands how different perspectives and inputs (including their own and that of others) interact and contribute to intended outcomes, and how collaborative activities support this. Developing a clear plan for the project in this way can help create a shared sense of purpose, and help manage and clarify accountability and inputs across the team to foster a collaborative culture (see **3.4 Develop and Grow**). It can also help with the planning of shared outputs that can further support collaborative working (see **3.6 Share**). Reporting against these initial and ongoing conversations can help create a clear, engaging story that reflects and brings together the variety of insights and learnings across the team (see **3.5 Evaluate**).

When developing and revising your plan for integration, it is important to:

- Reflect on the assumptions shaping the framing of the issue by different members of the team;
- Consider how different perspectives can be integrated to tackle the issue and achieve project aims and outcomes;
- Create a shared understanding of what the collaboration is trying to achieve, i.e. its desired impact and related outcomes;
- Make a plan for achieving the identified impact and related outcomes, i.e. a pathway to impact through collaboration;
- Consider whether additional disciplines, sectors, stakeholders, or lived experiences need to be involved to understand or address the problem. You may need to revisit this throughout the duration of the project;
- Understand tensions as well as multiple benefits, co-benefits, and synergies in the system and recognise that the optimum solution to a problem may not maximise all benefits for everyone; and
- Agree on the boundaries of a particular project within the wider system, recognising the resources and expertise available.

Table 3.3. INTEGRATE – Actions to take

Actions to take	Integrate different perspectives
Essential	• Bring the core team (however big or small) together to develop a shared plan or vision for the project. Review regularly. • Develop a plan for integrating knowledges and perspectives during the project. Review regularly. • Develop a plan with clear expectations and responsibilities for each team member and ensure that everyone knows how their contribution fits with the wider aims and objectives of the project. Review regularly. • Identify where disagreements or competing priorities may emerge and how these will be navigated.
Enhanced	In addition to the above: • Allocate dedicated time and resources for reflection, negotiation, and relationship building at the outset. • Revisit and develop your understanding of the issue (see **3.1 Build**) to understand the complexity of the problem • Undertake a longer Theory of Change (ToC) exercise (see **Appendix E**), or use an external facilitator to develop this alongside your team.

How to approach integrating different perspectives if you are:

- **Leaders, directors, and managers**
  - Organise and lead workshops with the team to develop a plan for integrating knowledges and insights throughout the project (or employ an expert to do so);
  - Clarify the purpose and value of the integration plan for the project as a whole and individual inputs;
  - Ensure that collaborative working is embedded within the wider project plan from the start, rather than managed separately;
  - Check and support understanding of who is doing what and how it all fits together; and
  - Recognise that different disciplines and stakeholders have different understandings and create space for these perspectives to be discussed openly.
- **All team members**
  - Actively collaborate in developing an impact pathway and ToC for the program of work. This is a joint effort, not the responsibility of the management team; and
  - Engage with complexity, share your knowledge, listen and learn from others, and try to understand how different inputs may relate to, and complement, each other.

3.4. Develop and grow a collaborative culture

How does the project provide the support, time, space, and resources needed for meaningful collaboration?

A supportive culture is key for successful collaboration. It is everyone's responsibility to contribute to the development of such a culture. Providing sufficient opportunities (e.g., time and space) and support for collaborative working is hugely important. This will be particularly effective if these address any barriers identified by the team that may prevent collaborative working (see **3.2 Reflect**). Throughout the project, it is essential to review how the project supports collaborative working and addresses existing, ongoing, and emerging challenges for collaboration throughout the work is essential.

Finding common ground and building common language across key concepts, themes, and methodologies is fundamental to effective collaboration. Different words can mean very different things in different sectors and disciplines. There are not always shared understandings of different methodologies, tools, and epistemologies. Take the time to listen and learn from each other and develop a common understanding. Disciplinary hierarchies that value "hard" (natural sciences and engineering) over "soft" (social sciences and humanities) perspectives may exist. Discuss these and agree on how such tensions may be resolved if they emerge.

Developing agreed aims and objectives, alongside ways of working to support group dynamics, is also essential and allows all members to provide input and feel a sense of ownership of the project and its activities. Agreeing the group's terms of reference and other supportive structures is important for managing member involvement, articulating the scope of the group, providing accountability, and setting expectations. It is important that all members of the team feel valued and accepted, and can speak up and challenge ideas.

Supporting collaborative working involves both physical support and social support. Physical support can involve provision of space, time, and resources (activities, facilities, facilitators) to support collaborative activities. Planning and resourcing of physical support may be particularly important for large-scale, complex projects, especially if the team meets in person and people are geographically dispersed. Social support involves leading by example, sharing and inviting perspectives, and encouraging people to speak and listen. It is the responsibility of all team members to try and support collaboration where they can.

Box 4. Seven pillars of interdisciplinary working (Beaumont et al)

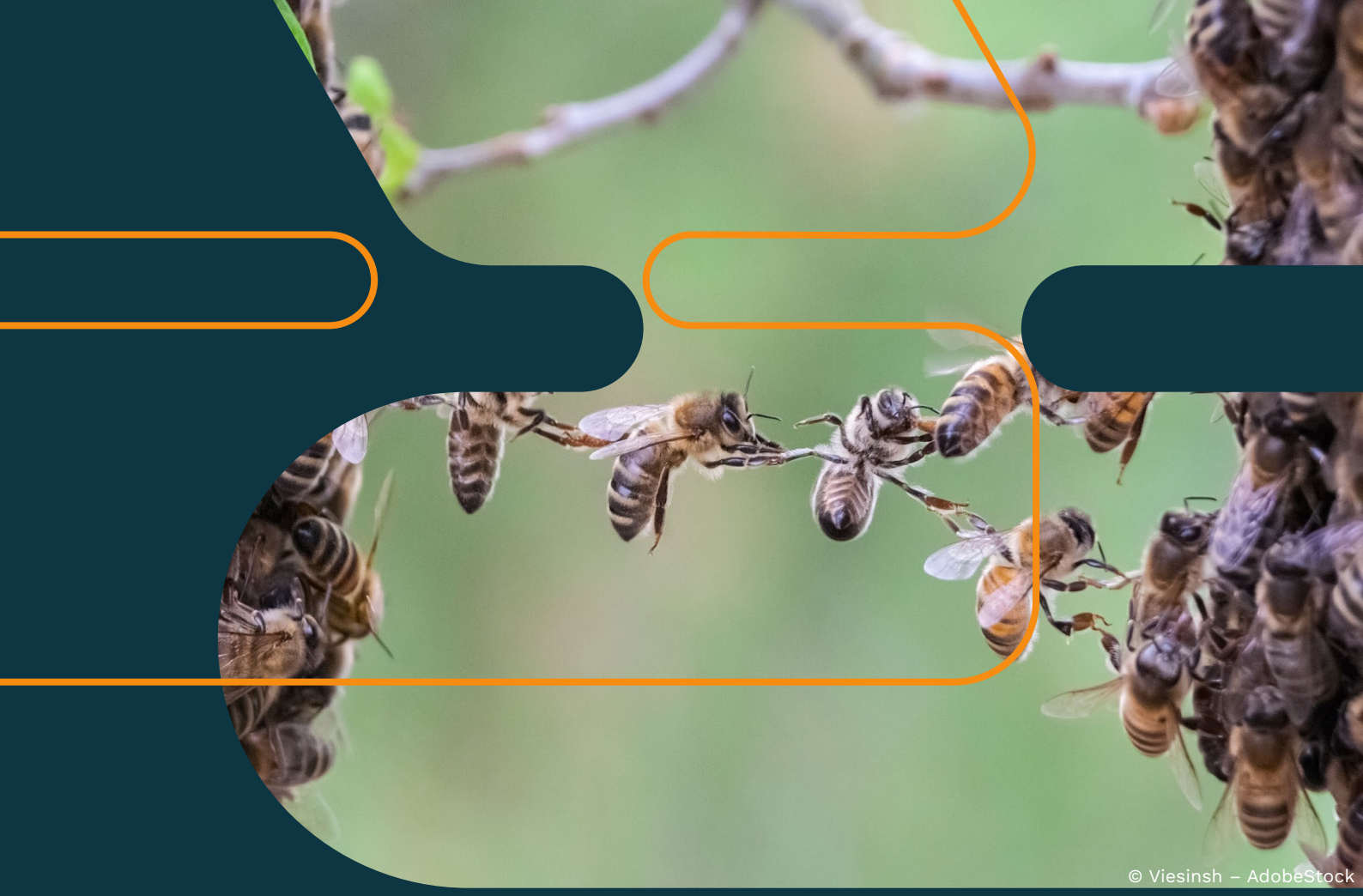
1. Respect each other's knowledge and contribution.
2. Take time: to get the right people together, develop shared aims and objectives, and understand each other's contributions.
3. Communicate: practice open, clear communication. This is particularly important when facilitating discussions with interdisciplinary teams. Learn each other's language, assumptions, worldviews, limitations, and boundaries.
4. Work with other people, not just disciplines. This is about collaboration.
5. Prepare together and develop your Theory of Change together.
6. Adapt, learn, be open and flexible. Things may change while you learn from each other.
7. Share: continue sharing ideas, feedback, and thoughts from start to finish.

Table 3.4. DEVELOP AND GROW – Actions to take

Actions to take	Develop and grow a collaborative culture
Essential	• Adapt, learn, be open and flexible. • Take the time to develop a shared language • Agree practical ways of working, decide how often you will meet, in what format (online or in person), how you will communicate, and where collaborative work will take place. • Promote respect and humility and support communication that improves understanding of each other • Review and address power dynamics and support an open culture where people respect one another, learn and listen. Establish leadership and management that support interdisciplinary working.
Enhanced	In addition to the above: • Develop a shared agreement or 'terms of reference'. Co-create a short statement outlining how you will work together, including commitments to openness, mutual learning, and how conflict or disagreement will be managed. • Embed the ACCESS Guiding principles of EDI, sustainability and co-production within your project

How to approach developing and growing a collaborative culture if you are:

- **Leaders, directors, and managers**
  - Support a clear and open communication strategy and a shared language, remind people to avoid technical language and jargon to support mutual understanding;
  - Encourage continuous reflection of the barriers and drivers of collaboration and take onboard feedback about the barriers;
  - Use and follow resources for good project management;
  - Reflect and evaluate the project, not just on project aims, but also on how to do effective interdisciplinary and collaborative working. Are team members growing in confidence and knowledge? If so, what is driving this? If not, what are the barriers?;
  - Be attentive to power dynamics and value different forms of knowledge that contribute in different ways; and
  - Allow time and space for collaboration and regular reviews of collaborative working.
- **All team members**
  - Reflect on and embed the guidelines for interdisciplinary working developed by Beaumont et al. (see **Box 4**);
  - Develop a shared language. Adopt an open, clear and honest style of communication. Each discipline brings with it a culture and a language, complete with specific words to describe objects and concepts that



“Recognising collaboration as essential infrastructure for systems change is important, as is funding it accordingly.”

— Harriet Hunt and Rebecca Lovell, University of Exeter

may be alien to others or may be familiar under a different name;

- Reflect on your own learning and experiences with collaborative working. Identify drivers and barriers that impact your collaboration and discuss with others. Treat fellow collaborators with respect and as equals because superficial inclusion will weaken the work and potentially lead to conflict;
- Be open and curious about other people's perspectives, inputs, and knowledge;
- Regularly reflect on how the project is evolving, whose perspectives are shaping it and what might need to change; and
- Be mindful of power dynamics and support and encourage others to contribute.

3.5. Evaluate learning and impact

How are the learnings, experiences, benefits, and challenges of collaborative working evaluated and reported upon?

Evaluation of collaborative projects should consider the success of the project itself and the effectiveness of the collaborative process used to deliver it.

At the start of a project, teams make decisions about how an issue is defined, which perspectives are included, what knowledge is considered relevant, and where project boundaries are drawn (see **3.1 Build**). These decisions are often shaped by available resources, existing networks, institutional requirements, and assumptions about what expertise is needed.

Evaluation provides an opportunity to revisit these decisions and reflect on whether the right perspectives, stakeholders, and forms of knowledge were included, how well they were integrated, and what may have been missed. Reviewing how the outcomes and outputs of the work may have been affected (positively or negatively) by approaches adopted for each of the six principles of the BRIDGES Framework can support learning and benefit future work.

Collaborative working can require additional time, resources, and effort, but it can also generate benefits that would not have emerged through a single-disciplinary or single-sector approach. However, different disciplines and actors are likely to see success differently. Evaluation should consider the practical realities of collaboration, including resource constraints, institutional barriers, and the challenges of balancing different expectations, priorities, and ways of working. Understanding how participants were able to contribute meaningfully and how they benefitted from the work can provide valuable insights for future collaborative work.

Participants may develop new skills, relationships, networks, and understandings that influence their future work. Collaboration may also change how participants understand the issue itself, revealing new knowledge needs, reframing assumptions, or highlighting previously overlooked perspectives. Evaluating these experiences can help demonstrate capacity-building and identify areas for further development.

Importantly, evaluation should not be left until the end of a project. Building in regular opportunities for reflection throughout the project can help teams identify challenges early, adapt their approach where needed, and strengthen collaboration over time.

Box 5. Questions to support project evaluation

The following questions may help guide development of an end of project report:

1. To what extent were the project's aims, objectives, intended activities and outcomes achieved?
2. To what extent was this an example of effective interdisciplinary collaboration?
3. How suitable was the combination of different perspectives/disciplines/roles for the project?
4. Were there important perspectives, knowledge holders, or stakeholders that were not included? If so, what were the implications?
5. How effectively were different forms of knowledge integrated throughout the project?
6. Did the collaboration generate insights, outputs, or impacts that would not have emerged otherwise?
7. What benefits did different participants gain from working collaboratively (e.g. skills, networks, knowledge, confidence, relationships)?
8. How equitable and inclusive were the collaborative processes (see **3.4 Develop and Grow**)?
9. What were the enablers of collaborative working, and what barriers or challenges were encountered?
10. What lessons from this collaboration should inform future projects, partnerships, or ways of working?

Table 3.5. EVALUATE – Actions to take

Actions to take	Evaluate learning and impact
Essential	• Evaluate and reflect on experiences of all those involved, using the above questions. • Ensure that learning and reflection are being documented throughout the process. • Reflect on whether interested parties and beneficiaries are experiencing the project in the way originally intended and whether this is affected by the collaborative approach.
Enhanced	In addition to the above: • Write reflective reports on experiences to benefit the community • Analyse and embed learnings into wider organisational strategies for future interdisciplinary collaborative projects • Develop an indicator framework alongside your Theory of Change to support impact measurement and evaluation (see **Appendix 3**).

How to approach evaluating learning and impact if you are:

- **Leaders, directors, and managers**
  - Ensure the process of collaborative working is part of the evaluation as well as the project outcomes;
  - Ensure contributions for the evaluation from all stakeholders involved; and
  - Ensure that successful collaboration and building capacity for collaboration is an outcome identified at the start of the project (see **3.1 Build**).
- **All team members**
  - Think reflexively about both the process of collaborative working, and whether collaborative working allowed new insights and new outcomes for the project that would otherwise not have been possible; and
  - Evaluate and reflect on your capacity building for collaboration.

3.6. Share outcomes and outputs

How are collaborative outputs planned, produced and reviewed?

Collaborative working should result in outputs that reflect the contributions of different disciplines, sectors, stakeholders, and forms of knowledge. Start planning these outputs from the start, alongside discussions about integration, roles, responsibilities, and intended outcomes (see **3.1 Build** and **3.3 Integrate**). Developing collaborative outputs often requires active coordination across team members and work packages, particularly in larger projects where participants may otherwise work in parallel.

It can be helpful to agree from the outset how collaborative outputs will be developed, reviewed, and recognised. This may include establishing guiding principles for authorship, contribution, intellectual property, and decision-making. Be mindful of differences in individual, disciplinary, and sectoral needs and capacities. Where appropriate, these considerations should be embedded within the project's wider understanding or collaborative terms of reference.

Collaborative outputs often need to be communicated across sectors and disciplines to different audiences, including researchers, practitioners, policymakers, funders, community partners, and the general public. Sharing outputs effectively may require different formats, languages, and dissemination approaches. Consider who the intended audiences are, what information they need, and how outputs can be made accessible and useful to them. Follow open science practices as much as possible to maximise the accessibility of new research findings. Collaboration can create opportunities to communicate findings in new ways and to reach audiences that may not otherwise engage with the work.

Finally, consider the longer-term legacy of the project. Many projects generate valuable resources, relationships, datasets, networks, and learning that risk being lost when funding ends. Discuss early on how outputs will be stored, maintained, and accessed, who will be responsible for them, and whether there are opportunities to sustain partnerships, networks, or communities of practice beyond the lifetime of the project. Collaboration across disciplines and sectors can mean that resources may be hosted in different places, making them accessible to a wider group of researchers and sectors.

Table 3.6. SHARE – Actions to take

Actions to take	Share outcomes and outputs
Essential	• Ensure specific collaborative outputs are created and everyone is invited to contribute. • Present findings to different disciplinary and sectoral audiences. • Present findings across different disciplinary and sectoral norms (e.g. reports, visual outputs, editorials, exhibitions).
Enhanced	In addition to the above: • Think creatively about how to share collaborative outputs and outcomes in clear ways to a wide audience. • Consider using creative formats to share findings such as visuals, comic strips, sound, video recordings and art projects. • Disseminate as widely as possible, share project experiences, findings and learnings about interdisciplinary, collaborative learning.

How to approach sharing outcomes and outputs if you are:

- **Leaders, directors, and managers**
  - Agree from the start what your outputs will be and ensure different disciplinary and sectoral perspectives are included in these decisions;
  - Plan and agree on shared outputs from the start and build them into your Theory of Change;
  - Manage wider dissemination across the team; and
  - Consider project legacy from the start, identifying opportunities for the outcomes of the project to have continued impact beyond the lifetime of the project.
- **All team members**
  - Be reflexive and share learnings of what went well, and what didn't go well. Do not be afraid to discuss failures;
  - Think creatively about what outputs could be generated from the project; and
  - Contribute actively to collaborative outputs.

4. Resources

For each key principle, there is a collated set of useful resources that you can explore. Some of these are existing resources, and some are bespoke to this project. You can find these resources in Appendices A-H. Table 4.1 gives an overview of some of these resources and points to the key principles and actions they relate to. The appendices are intended as live documents that will be updated over time with external input from experts.

Table 4.1. Key principles and related resources

Stages	Resources
ALL	• Case study examples of successful and unsuccessful interdisciplinary working • BRIDGES Framework template (**Appendix A**) • Explaining interdisciplinary working (**Appendix B**) • Further reading (**Appendix I**)
BUILD (Appendix C)	• Resources on systems thinking approaches • ACCESS knowledge exchange maps (Environmental Social Science kNowledge Exchange Map of Opportunities (ESS NEMO) • Stakeholder mapping • ACCESS Expert Database
REFLECT (Appendix D)	• Bespoke survey tool to assess team Capabilities, Opportunities and Motivations for collaborative working • Guidance on reflexive thinking • ACCESS guiding principles • Example reflective reports from ACCESS

INTEGRATE (Appendix E)	• Resources on systems thinking approaches • Resources on creating a Theory of Change (ToC) • Framework and tool to assess, review, analyse and plan for barriers of interdisciplinary working
DEVELOP and GROW (Appendix F)	• Framework and tool to assess, review and analyse and plan for barriers of interdisciplinary working • Tips for collaboration • ACCESS guiding principles
EVALUATE (Appendix G)	• Developing an impact pathway • Developing an indicator framework for a Theory of Change (ToC)
SHARE (Appendix H)	• Guidance on interdisciplinary comms

“Collaborative culture is critical, and efforts must be taken not just to create the culture, but to sustain it over time.”

– Gary Kass, Vice President, IES

5. Limitations and challenges

Before using this toolkit, it is important to acknowledge its limitations. Collaborative working across disciplines and sectors is shaped by a range of structural and institutional constraints that cannot be resolved through tools or guidance alone.

While this toolkit offers guidance, many of the barriers to effective collaboration require broader, systemic change within funding structures, organisational cultures, and knowledge hierarchies. Opportunities, such as time, funding, institutional support, and equitable access to decision-making, are often unevenly distributed and, for many, remain beyond immediate control and may therefore impact the usability of (parts of) the toolkit.

This is not intended to discourage collaborative work. Rather, it is an acknowledgment of the wider conditions in which collaborative work takes place. Recognising these constraints is essential, both for navigating them in practice and for making them visible. This also helps to develop activities that can address some of these challenges. The toolkit provides useful guidance to help you navigate these challenges and enable you to make challenging decisions where needed to support collaboration within those existing constraints. In this context, documenting, evaluating, and sharing experiences of collaboration becomes particularly important, as a way of evidencing its value and advocating for structural change.

Appendix A

Template for developing a collaboration plan for your work

Date of completion:	
People involved in completing the document:	
Agreed time to revisit:	

BUILD an understanding and team What different knowledge and insights are needed to understand and address the issue? *Consider what different inputs may be needed. Review and adjust on a regular basis. When different knowledge needs are identified, make sure these are represented within the team.*	
REFLECT and adapt to existing barriers and drivers for collaboration What are the drivers and barriers for collaboration within the team? *Explore existing constraints, different understandings and perspectives of collaboration as well as for the specific issue addressed in the work. This may include assessment of knowledge, skills, motivations as well as trust, power relations and mutual learning.*	

INTEGRATE knowledge and insights How are different perspectives included, reflected and integrated in the development of aims, objectives, activities and outputs of the work? *Reflect on and agree who does what and how the different perspectives, insights and knowledges complement each other and work together.*	
DEVELOP and GROW a collaborative culture How are team members' understanding, appreciation, confidence and skills for collaboration developing throughout the work? *Assess, plan and review how much time, space, and resource is needed, as well as what guidance you expect from leadership and management to work collaboratively.*	
EVALUATE learning and impact How are the learnings, experiences, benefits and challenges of collaborative working evaluated and reported upon? *Review and reflect on the benefits and challenges of collaborative working throughout the process and in final project evaluation and reporting.*	
SHARE outcomes and outputs How are collaborative outputs planned, produced and reviewed? *Review your plan for collaborative outputs, and reflect on which team members; knowledge, skills, and perspectives have contributed.*	

Appendix B

Different types of collaborative working

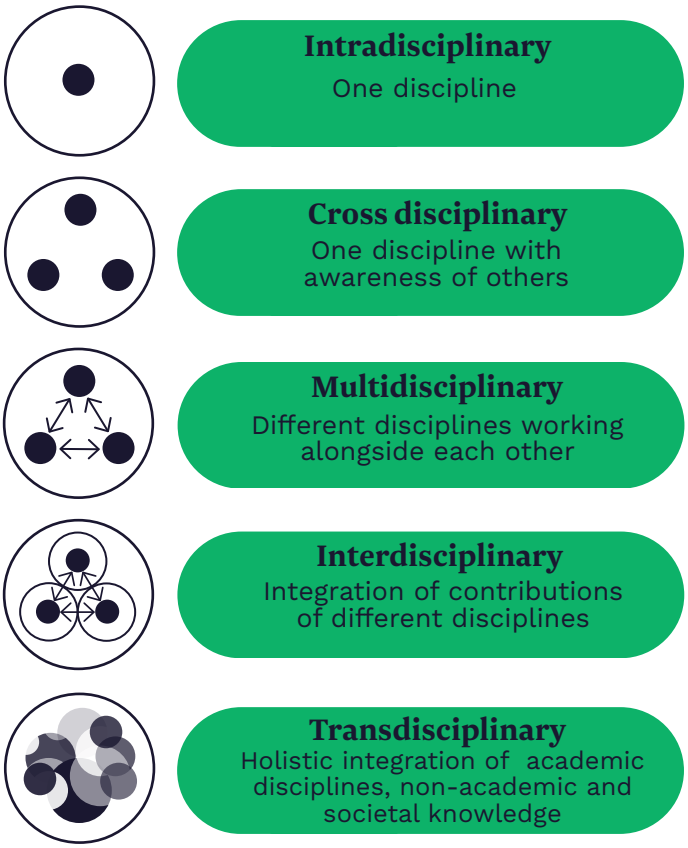


Figure AB.1 Definitions of different types of collaborative working

Collaborative working means bringing together different people, knowledge, skills and perspectives to understand problems and find solutions that one group or viewpoint may not achieve alone.

There are different types of collaborative working, which range from cross-disciplinary to transdisciplinary (Beaumont, 2020; Morris et al., 2022). While our toolkit is not limited to academic research, we can draw on relevant literature for a useful distinction between different forms of collaboration.

Problems can be addressed from a single disciplinary perspective on their own (intradisciplinary), or while looking outside and being aware of other disciplines (cross-disciplinary). Different disciplines can work alongside each other to address the same problem (multidisciplinary) or they can work together to integrate their findings and provide more holistic insights (interdisciplinary). Finally, problems can be addressed with a wider range of inputs from science, stakeholder input and societal knowledge to provide a holistic integrated insight into complex problems (transdisciplinary). The approach taken in any project or setting will depend on a range of factors including the challenges that are to be addressed, the desired outcomes and impact, and external constraints.

When we refer to collaborative working in this project, this tends to mean working across disciplines and sectors. It can involve collaboration akin to what is defined above as multi, inter or transdisciplinary working. It is important for any team to consider what approach is most suitable and practical for their projects and programs of work as this has implications for the types of activities and processes to put in place. Many of these terms are often used interchangeably, therefore it's important that the team has a shared understanding of them within the context of the project.

Why is collaborative working important?

"It is increasingly acknowledged that working with other academic and non-academic colleagues within and outside people's own discipline is important to provide holistic solutions and understandings to complex problems (Klein, 2017; Stokols et al., 2008).

This is particularly important when addressing multifaceted threats such as climate change and environmental degradation (Klenk & Meehan, 2015; Pohl, 2005).” (Warren et al. 2024).

Collaborative working is essential for tackling complex environmental and social challenges, such as climate change, biodiversity loss and pollution. These issues cannot be solved by one discipline, organisation or perspective alone.

Environmental problems are sometimes approached in isolated ways, with a focus on technical solutions. However, these solutions may not fully consider the social, cultural and political factors that affect whether they are relevant, acceptable and effective. They may also overlook wider impacts on people and the environment.

Working collaboratively can lead to better, more practical and more relevant solutions. It can create benefits for both people and nature, while reducing the risk of unintended consequences. It can also encourage creativity, innovation, stronger methods and new ways of understanding and sharing knowledge.

Making the business case for collaborative working

Environmental challenges are inherently complex and demand a collaborative approach. When applied effectively, collaborative working improves project outcomes, reduces risk, and delivers greater long-term value. It’s not just an academic idea; it’s a practical way to deliver more effective, resilient and deliverable projects in real-world conditions.

There is growing expectation across sectors that work should be interdisciplinary, cross-sectoral and collaborative. Funders (e.g. UKRI), governments and organisations increasingly require it and professional roles are evolving to include collaboration across disciplines. Demonstrating collaboration strengthens funding bids, partnerships, and organisational reputation, and improves credibility of interventions.

Collaborative working can offer:

1. Better outcomes for complex problems

   Most real-world environmental challenges are not purely technical or social, they are both.
   Adopting collaborative working across sectors and disciplines brings together different types of expertise and perspectives which lowers the risk of partial or siloed solutions leading to more robust and implementable solutions. It also helps to unlock multiple benefits for people and nature. In practice, this means projects are more likely to deliver outcomes that work not just in theory, but in real-world contexts.

2. Reduced risk and unintended consequences

   Projects that do not consider multiple perspectives can create unintended negative impacts. Social, environmental, financial, technical and political risks are often interconnected and undertaking a more collaborative approach can help identify blind spots early. Investing time and resource upfront can avoid significant costs later on, reducing the likelihood of public opposition, costly redesigns, or delays.

3. Improved stakeholder engagement and trust

   Collaborative working across sectors and disciplines supports more inclusive and meaningful engagement by recognising different forms of knowledge including technical, local, and lived experience. Collaborative working can support the translation of complex scientific evidence into actionable and relevant data, making it easier for policymakers and government

bodies to form effective, evidence-informed environmental policy. By engaging with a wide range of stakeholders and knowledges, trust, legitimacy and support can be built.

4. Greater innovation

   Working collaboratively brings together different skills, experiences, methods and perspectives. This can encourage new ways of thinking and help teams develop more creative and effective solutions to environmental challenges. Collaboration can also develop the teams involved by helping them learn from each other and become better equipped to respond to complexity, uncertainty and change.

Conclusion

Collaborative working requires integration of information, data, knowledge, methodologies, etc. from different disciplines, sectors and stakeholders to find answers to environmental issues that go beyond the scope of a single perspective. It is important because environmental problems tend to be complex, wicked problems that require input and collaboration from different perspectives to find effective, long lasting, innovative and acceptable solutions. Collaborative working can be complex and time consuming, especially when team members and leaders lack the skills, knowledge, motivation, and support that is needed for successful collaboration. However, not including collaborative working can lead to greater cost and risk, along with sub-optimal solutions. Understanding those potential barriers and putting in place a plan to maximise opportunities, support motivations and grow capacities is key to making it work. The toolkit aims to support this process.

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Appendix C

Build an understanding and team – further information and resources

Building a team begins with developing a shared understanding of the challenge you are seeking to address and the different forms of knowledge that may be needed to engage with it. This process is not about identifying every possible perspective or attempting to capture the entire complexity of a system, but about making informed decisions about the scope of a project, what inputs are needed, who should be involved, and where important gaps may remain.

There are many approaches that can support this process, including systems thinking approaches, stakeholder and knowledge mapping, and identifying potential collaborators (Appendix I points to additional guidance). These approaches can help teams explore relationships, dependencies, and different ways of understanding an issue before deciding how the project will be shaped and who needs to be involved.

The process of defining knowledge needs and building a team is iterative. As understanding develops, new questions, perspectives, and expertise may emerge. Revisiting these decisions throughout the project can help teams adapt to changing contexts, strengthen collaboration, and ensure that different forms of knowledge are meaningfully integrated.

Systems approaches

What is a systems approach?

The term 'system' refers to the interrelated components within ecosystems, economies, organisations, societal structures, and other complex networks, along with the interactions between them.

A systems approach is an approach which recognises how social, economic, and natural systems influence outcomes, adopting ways of working that address the dynamic and complex nature of systems to effect change and avoid unintended consequences.

Systems thinking is a specific systems approach that incorporates tools, methods, and mindsets to provide insights into how systems work and to inform decisions.

There are many examples of tools and methodologies that can support systems thinking, with varying levels of complexity and accessibility. The type of tool or methodology that is most appropriate will depend on the type of project. Different tools may also be useful at different stages of a project and for different stakeholder groups.

Why use a systems thinking approach?

Systems thinking provides a useful framework for interrogating a question or issue in a way that recognises its context, interactions, and feedback loops from multiple perspectives. It can allow you to articulate and visualise a question or issue in a new way, helping to identify new ways of addressing it, whilst understanding potential implications of an intervention for other parts of the system. This provides an opportunity for unlocking multiple benefits across the system, or minimising the potential for unintended consequences. It also highlights that no solution or intervention is perfect but is likely to have trade-offs across the system.

Systems thinking therefore provides a tool for decision-making by helping to better understand a question or issue and provide information to support development of

potential interventions and solutions. It also helps to surface diverse and subjective viewpoints of a question or issue, the system it exists within, and the interactions within a system across a project team. This helps to build a shared understanding.

What are examples of systems thinking tools and methods?

There are many examples of tools and methodologies that can support a systems thinking approach. A project may utilise different tools at different stages of a project, or follow a methodology through from start to finish. Which tools and methods are most appropriate will depend on the project, team composition, available resource, and desired outcome. The list below is by no means exhaustive but provides an overview of some tools and methods, which differ in complexity and resource requirements.

- **The Iceberg Model** is a simple, accessible systems thinking tool which uses the metaphor of an iceberg to illustrate how the surface-level events we react to are underpinned by less visible patterns, structures, and beliefs. It is a highly accessible tool that can support understanding of different perspectives and help to identify less visible aspects of a system.

- **Rich Pictures** is a technique to identify the different parts of a system and how they interact, by drawing the system free-hand collaboratively with a group. Members of the group can use whatever drawings they like to represent components of a system and relationships between them. It is a highly accessible tool that can be particularly useful at the start of a project to identify key issues and support development of a collaborative understanding and goals.

- **Theory of Change (ToC)** - a framework to support a group in understanding how their activities can lead to their desired impact. It is done backwards: you start with defining the desired impact of the project, then the outcomes that would be needed to achieve that impact, the outputs needed to achieve the outcomes and finally the activities that need to be done to produce those outputs. ToC can help identify underlying assumptions of how a proposed impact or goal is linked to a problem via a set of activities, outputs and outcomes. It is a more complex tool and is often iterative and participatory in nature. This tool is useful for identifying pathways to impact, articulating outcomes, and undertaking gap analysis. (See **Appendix E** for more detail on ToC).

- **Participatory Systems Mapping** is a participatory approach where a group of stakeholders develop a causal map of an issue. This process is often more complex and iterative and can involve multiple workshops where participants revisit map creation, and analyse and reflect on the issue. This supports its use as a tool for discussion and decision-making. It can facilitate a greater understanding of enablers and barriers, and identify potential leverage points for action within a complex system. This tool is useful for identifying and analysing specific interventions and activities in a project.

- **Soft systems methodology** provides a framework for analysing an issue that is complex or not well-defined (i.e. 'soft'), where there are differing views on the definition of the issue. It recognises that complex problems cannot be easily defined and acknowledges the need for an analytical approach that can bring stakeholders together to discuss the problem from multiple perspectives, identify the root causes of issues, and explore potential interventions. It is a highly collaborative methodology, focused on supporting discussion, developing shared understandings, and joint problem-solving. Typically it is made of up of seven stages. It was

developed by Peter Checkland at Lancaster University.

- **Critical systems heuristics** is a framework for reflective professional practice using boundary critique. This involves working through a set of questions that helps to surface the conscious and unconscious judgements we make to understand questions or issues and the solutions and interventions we develop to address them. This includes things like values and motivations, power structures, knowledge bases, and legitimacy. This helps to support development of shared understanding, reflective practice, and challenges pre-conceived ideas and assumptions. It was developed by Werner Ulrich.

It should be noted that systems approaches are not neutral or straightforward tools, and they do not remove disagreement or contestation. Decisions still need to be made about whose perspectives are included, what boundaries are drawn around the issue, and which forms of knowledge are included.

Stakeholder mapping

A key part of building your team is understanding the stakeholders of your project. Making a list of all of those who you think may be stakeholders at the outset of a project is a key first step in the process, after which stakeholder mapping can be used to develop strategic approaches to building your team and engagement throughout the project.

This will also help determine roles within a project team, i.e. who is in the 'core team', who will be actively involved in certain parts of the project, and who need to be consulted with and/or kept informed.

There are various methodologies and frameworks that can be used to support stakeholder mapping. These usually involve using a matrix to map stakeholders onto an engagement strategy depending on the influence and interest they hold relative to the project (see **Figure AC.1**). Once this process has been completed, you can further break down the matrix into more granular engagement strategies depending on the complexity and needs of the project.

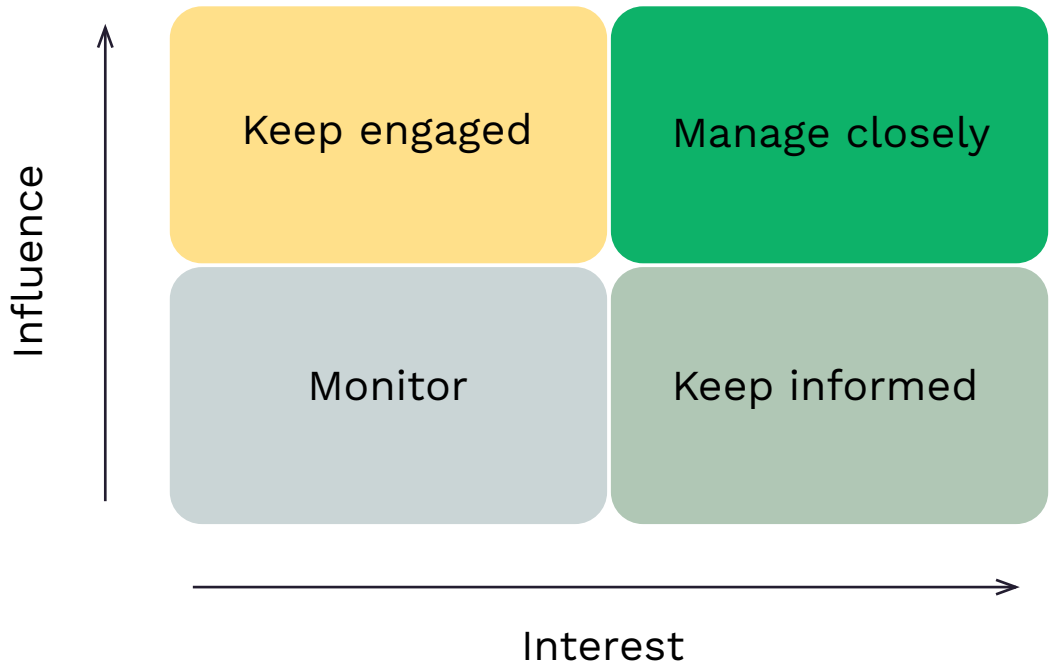

Figure AC.1 Stakeholder mapping matrix

It should be noted that stakeholder mapping is likely to be influenced by inherent biases of those who are conducting it. It can, and should, therefore be revisited at key points within a project to test thinking, include new perspectives, and adapt as needed based on project findings and needs.

Knowledge mapping

Alongside identifying stakeholders, it is also useful to consider the different types of knowledge they may bring to the project. This could include technical expertise, lived experience, local knowledge, policy knowledge, practical delivery experience, or understanding of specific communities, places or sectors. Knowledge mapping can help you see what knowledge is already represented in the project team, where there may be gaps, and whose perspectives may need to be included. This can support more balanced and inclusive collaboration, and help ensure that decisions are informed by a wider range of evidence, experience and insight.

Stages of stakeholder and knowledge analysis

1. Stakeholder identification: Identify the key external stakeholders. This can be done through brainstorming sessions, desk research etc.

2. Stakeholder mapping: Once stakeholders have been identified, you need to think about the interest and influence of the stakeholders. This will help you understand how you will interact with them moving forward.

3. Knowledge mapping: Alongside mapping stakeholders, consider what each stakeholder could contribute to the project and where there may be gaps in knowledge or experience. This can help ensure the right mix of perspectives is included and that important insights are not missed.

4. Stakeholder engagement: After mapping the stakeholder's interest and influence, you can translate this into an engagement strategy. It is at this stage that you may identify potential collaborators.

Appendix D

Reflect and adapt to existing barriers and drivers for collaboration within the team – further information and resources

As part of designing the toolkit for collaborative working we developed a set of assessment tools to support those managing and/or working in collaborative projects to assess perceived drivers and barriers for collaborative working for themselves and their team and to plan actions to address any issues. The tool takes the form of a short survey. It is based on the COMB framework which identifies three key drivers (and barriers) for behaviour: capabilities, opportunities and motivations (Keyworth et al., 2020).

The tool has four elements:

1. **Individual team member survey**. Each team member can complete this survey to assess their own position and needs for further training and support if that is needed. The survey and responses can form a starting point for personal reflection and can support team discussions to develop strategies and tools that support collaboration.

2. **Managers and team lead survey**. This short survey can used to reflect on drivers and barriers for collaboration in the team overall. Repeated completions of the survey can be used to review progress and development of collaborative working over time.

3. **Project evaluation survey**. This version of the survey can be used to support project evaluation and reflect and report on lessons learned.

4. **Examples of common barriers and actions to address them**. Identifying drivers and barriers, strengths and weaknesses for collaboration in the team is important but addressing any identified issues is essential. The final table provides some examples of common barriers and drivers and how to address them.

1. For individuals

Individual team members can use the tool to identify if, where and how they made need support or further training to engage with collaboration. The completed surveys can be shared or discussed with team leads and the wider team to put a plan in action that supports collaboration and addresses any issues that may arise.

OPPORTUNITY	**Score 1 (low) to 10 (high)**
I have the PHYSICAL opportunity to *work collaboratively.* (sufficient time, spaces, necessary materials, reminders, etc.)	
I have the SOCIAL opportunity to *work collaboratively.* (institutional support, supportive cultures, colleagues, managers, project partners, etc.)	
MOTIVATION	
I am motivated to *work collaboratively.* (belief it's important, try to plan for it, set specific goals, etc.)	
Working collaboratively is something that I do automatically. (without thinking or having to consciously remember of plan).	
CAPABILITY/ABILITY	
I am PHYSICALLY able to *work collaboratively* (the physical skills, strength and stamina to do it).	
I am PSYCHOLOGICALLY able to work collaboratively (have the knowledge, interpersonal skills, the ability to understand, learn, remember, pay attention to and hold or understand new information).	

Identify three key barriers that may undermine your collaborative activities and consider how these could be mitigated.

Barriers	**Mitigation**

2. For team leads or managers

Note. Team members can refer to anyone working in your project or program. This may vary between projects. It is worth noting down what it means to you (who is included) when answering these questions.

There will be differences between team members. Try and give an overall rating for the team. Collaboration is about bringing as many people on board with collaboration as it is about getting everyone engaged with as much collaboration as possible.

OPPORTUNITY	**Score 1 (low) to 10 (high)**
Team members have the PHYSICAL opportunity to *work collaboratively* (sufficient time, spaces, necessary materials, reminders, etc).	
Team members have the SOCIAL opportunity to *work collaboratively* (supportive work cultures, colleagues, managers, project partners, etc).	
MOTIVATION	
Team members are motivated to *work collaboratively* (beliefs it's the right thing to do, plan for it, set relevant goals, etc).	
Working collaboratively is something that team members do automatically (without thinking or having to consciously remember of plan).	
CAPABILITY/ABILITY	
Team members are PHYSICALLY able to *work collaboratively* (have the physical skills, strength and stamina to do it).	
Team members are PSYCHOLOGICALLY able to *work collaboratively* (have the knowledge, interpersonal skills, the ability to understand, learn, remember, pay attention to and hold or understand new information etc).	

Identify three key barriers that may undermine your collaborative activities and consider how these could be mitigated.

Barriers	**Mitigation**

3. For project evaluation

Note: Team members can refer to anyone working in your project or program. This may vary between projects. It is worth noting down what it means to you (who is included) when answering these questions.

There will be differences between team members. Try and give an overall rating for the team. Collaboration is about bringing as many people on board with collaboration as it is about getting everyone engaged with as much collaboration as possible.

OVERALL	**Score 1 (low) to 10 (high)**
How would you rate the overall success of collaboration during the work?	
OPPORTUNITY	
Team members had the PHYSICAL opportunity to *work collaboratively* (sufficient time, spaces, necessary materials, reminders, etc).	
Team members had the SOCIAL opportunity to *work collaboratively* (supportive work cultures, colleagues, managers, project partners, etc).	
MOTIVATION	
Team members were motivated to *work collaboratively.* This includes beliefs about whether it is the right thing to do (or not), consciously making decisions to achieve relevant goals, etc.	
Working collaboratively was something that team members did automatically (without thinking or having to consciously plan).	
CAPABILITY/ABILITY	
Team members were PHYSICALLY able to *work collaboratively* (had the physical skills, strength and stamina to do it).	
Team members had the PSYCHOLOGICAL capabilities to *work collaboratively* (the knowledge, interpersonal skills, the ability to understand, learn, remember, pay attention to and hold or understand new information etc).	
What were the main drivers and barriers for collaboration in the work (if any).	
Drivers	
Barriers	

4. Common barriers & practical solutions

Successful collaborative working will ultimately depend on the input of the individuals of the team. These inputs will be impacted by individual capabilities, opportunities and motivations to engage in collaborative working. These, in turn, will be shaped by external conditions including previous experience, disciplinary identities, institutional barriers and so forth. Some of these cannot be addressed during the project but there is plenty team members, leaders and managers can do to create a space that supports, encourages and builds capacity for interdisciplinary working. These interventions should aim to address challenges with capabilities (e.g., lack of experience), opportunities (e.g., providing space and time to collaborate) as well as motivations. Each of these factors are interlinked.

There are many proven actions team members and managers can take to support collaboration. This includes ensuring enhanced communication and resonance, improving understanding of 'the other', promoting greater respect and humility between disciplines, removing hierarchical structures and maintaining group equality, providing effective leadership, and establishing trust between group members (Beaumont, 2020; Cassidy et al., 2023; Clayton et al., 2016; Elixhauser et al., 2024; Gibson et al., 2019; Hüttermann & Boerner, 2011; Lyall et al., 2013; Newman, 2023; Sankaran et al., 2021; Schnegg, 2021; Tripp & Shortlidge, 2019).

Reflexivity to one's own disciplinary background is vital to allow those working with other disciplines and stakeholders to leave disciplinary "comfort zones." Being open in this way to other disciplinary approaches and stakeholder ways of working is important due to the sometimes stark differences that exist between groups (Castán Broto et al., 2009; Elixhauser et al., 2024, p. 3; Hadfield-Hill et al., 2020).

Common barriers	Practical actions	Who can act
Motivations Limited motivations to work collaboratively, habitual silo working	**Actions** Encourage, support and reflect	
Examples	**Examples**	
Collaboration is seen as optional, extra, or someone else's responsibility	Make integration of disciplines explicit Visibly allocate or rotate coordination and synthesis roles	Project leads; Team
Limited belief that interdisciplinary working improves outcomes	Revisit and articulate why collaboration is essential for this problem and these outcomes	Project leads; Team

Fear of loss of ownership, credit, or disciplinary identity	Establish ground rules for respectful challenge Normalise uncertainty and “good enough” solutions	Project leads; Team
Interdisciplinary work perceived as risky or illegitimate	Leadership clearly communicates that interdisciplinary working is valued and supported from the outset. Highlight positive examples and recognition	Leadership; Institutions
Capability Limited physical abilities, knowledge and skills to work collaboratively	**Actions** Develop and support skills, confidence and knowledge	
Examples	**Examples**	
Difficulty communicating across disciplines	Use plain language as default Check understanding Summarise discussions in an accessible way	Team
Jargon excludes or intimidates	Pause to unpack terms Legitimise asking “basic” questions	Team; Facilitators
Low confidence to challenge assumptions	Actively invite different perspectives Model openness to being challenged	Project leads; Team
Limited understanding of other disciplines’ roles	Run early “what we do” sessions Visually map roles and contributions	Project leads; Team
Methodological tensions or incompatibilities	Allow time to learn each other’s methods Clarify where integration is essential vs optional	Project leads; Team
Difficulty balancing complexity and clarity	Agree boundaries around scope and integration at each stage	Project leads; Team

Opportunity Limited opportunities and support for working collaboratively	**Actions** Encourage, support and reflect	
Examples	**Examples**	
Relevant disciplines involved too late	Involve all relevant disciplines in problem framing and project design	Funders; Project leads
Time pressure limits reflection and integration	Build protected time for reflection and synthesis into project plans	Project leads; Institutions
Hierarchies or power dynamics undermine collaboration	Use clear governance Rotate facilitation roles Counter default hierarchies	Project leads; Facilitators
Institutional systems reward siloed outputs	Align monitoring, evaluation and recognition with collaborative goals where possible	Leadership; Institutions
Lack of shared spaces for collaboration	Find or create shared physical or virtual spaces for joint working	Project leads; Institutions

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Appendix E

Integrate knowledge and insights – further information and resources

Interdisciplinary collaboration is not simply about bringing different expertise together; it requires active integration of different perspectives, methods, and ways of knowing throughout the project. This means creating opportunities for team members to jointly shape the aims, approaches, and activities of the work, rather than contributing separately to a shared project.

Developing a shared understanding of the issue, how to address it, the intended impact and outcomes, and how change is expected to happen can provide an important foundation for collaboration. Developing a Theory of Change is one approach that can support this process by helping teams develop a shared impact pathway.

An introduction to the Theory of Change (ToC)

The ToC is a framework and methodology to support understanding of how activities can support achievement of a desired impact. It is a participatory process whereby groups and project stakeholders identify the conditions they believe have to unfold for their long-term impact to be met.

Critically, the ToC is developed starting with the desired impact, and then working back through the outcomes needed to achieve that impact, the outputs needed to achieve those outcomes and the activities that would need to be done to develop those outputs.

This has a number of benefits:

- It shows a causal pathway from impact to activities by specifying what is needed for impact to be achieved.
- It changes the way of thinking about initiatives from what you are doing to what you want to achieve. This helps to identify any gaps in activities, as well as revealing any activities that are not contributing to achieving the desired impact.
- By breaking the impact down into outcomes, you can better understand the different mechanisms for change and the stakeholders that need to be engaged with.

A ToC can also be used to develop evaluation metrics in order to better understand how impact can be measured.

There is no single definition or methodology for ToC, it is both a thinking process and a product so the process of developing the thinking behind the ToC is as useful as the final product itself and can be adapted to suit the needs of the project. The below is one approach to using ToC, other examples are linked in Appendix I (additional reading).

ToC is also useful as a systems thinking tool as it directly interrogates the links and feedback loops between different activities, stakeholders, outputs, and outcomes helping to support a holistic overview of a project.

Benefits of the ToC approach

The ToC approach is a great way to bring project stakeholders together to develop a comprehensive understanding of the different elements of a project and how they relate to the long-term goal, or impact, of the project. In turn it helps elucidate interconnections between different activities, mechanisms of change for achieving the outcomes and impact, and identifies gaps in delivery and priorities for action.

It is also a great way of visualising a project in a logical way, showing how the different elements of a project are connected and feed into one another. It is also a powerful engagement tool to support others in understanding and engaging with the project. The questions below can be used collaboratively to develop a shared ToC and identify where different contributions fit within the wider work.

Integration is an ongoing process. As projects develop, teams may need to revisit their aims, approaches, and understanding of the issue as new insights emerge. Taking time for open discussion, questioning, and reflection can help teams navigate different perspectives, develop shared language, and create outputs that draw on the strengths of different disciplines and sectors.

An example of the IES' ToC can be seen here.

Key definitions

To support the ToC approach, a number of key terms are used to describe different elements of the project. For this toolkit, we use the following terms with the following meanings. These can be adapted based on the project teams needs and preferences, but the main thing is everyone has a shared understanding of the terms.

- **Impact**: The long term change a project is working to achieve in society. This could also be considered the mission of the project.
- **Outcomes**: The short- and medium-term changes that need to happen to achieve the impact and can happen as a direct result of the project. These can be organised in different ways, e.g. by project strand, or by stakeholder group.
- **Outputs**: The direct products or deliverables of the project. For example, research papers, methodologies, tools, collaborations, networks etc.
- **Activities**: The activities directly done by the project, for example funding research, hosting events, holding meetings, conducting fieldwork etc.
- **Impact pathway**: An impact pathway is the route from activity to impact, highlighting the activities, outputs and outcomes that need to be in place in order to achieve a certain impact. Mechanisms of change should be considered as part of the impact pathway.
- **Mechanisms of change**: the psychological, biological, or social processes that explain how and why an activity produces an outcome. The space between activities and outcomes is important. Mechanisms are the things that interventions cannot work without. They are the causes of change.
- **Assumptions**: the underlying beliefs, conditions, and causal links that a team member accepts will cause an activity/ output to lead to a certain outcome within a ToC, without directly testing them.

Eight questions for developing a Theory of Change

1. Need	What is the issue that is being addressed?
2. Stakeholders	Who is involved or affected?
3. Impact	What long term change are you hoping to contribute to?
4. Outcomes	What changes do you want to see as a result of your work? This can include short term outcomes (to be achieved within the timeframe of your project) and longer-term outcomes.
5. Mechanisms of change	What conditions or external influences might help or hinder progress? What needs to be in place to translate an output to an outcome?
6. Assumptions	Why do you think outputs will lead to outcomes?
7. Outputs	What will you need to produce?
8. Activities and inputs	What will you need to do and what resources do you need (staff, time, money, etc)?
9. Indicator framework	How can you measure progress towards your outcomes and impact?

Appendix F

Develop and Grow a collaborative culture – further information and resources

Effective collaboration requires more than bringing people together from different disciplines, sectors, or backgrounds. It requires creating the conditions for different perspectives, forms of knowledge, and ways of working to interact meaningfully throughout the project.

Developing a collaborative culture is an ongoing process that involves building trust, establishing shared expectations, and creating opportunities for open communication, learning, and reflection. This includes being attentive to power dynamics, recognising different forms of expertise, and ensuring that all contributors are able to participate meaningfully.

There is no single model for successful collaboration. The ways teams work together will depend on the context, purpose, and people involved. However, taking time to agree how the team will work, reflecting on what enables or constrains collaboration, and adapting approaches as the project develops can help create a stronger foundation for interdisciplinary working.

The resources below provide further guidance on developing shared approaches, supporting collaborative cultures, and creating opportunities for meaningful integration throughout the project.

The accompanying Case Study report shares findings about what makes a successful collaborative project, building on findings from a wider survey conducted of professionals and researchers within the IES and ACCESS networks.

Diagnosing barriers and ways to address the challenges

The diagnostic tool in Appendix D is designed to identify team drivers and barriers for collaboration. Based on the first two workshops of our project we have developed an overview of possible ways to address barriers and develop support for collaboration.

The table below sets out a series of commonly reported barriers to collaborative working, alongside suggested ways of preventing, managing, or responding to them. Rather than focusing on individual shortcomings, the tool encourages reflection on the capabilities, opportunities, and motivations that shape how collaboration unfolds within teams and projects.

Agreeing how to work together

An important way to overcome discrepancies in team member motivations and abilities to collaborate is to establish and agree clear shared ways of working at the outset. This involves developing and making explicit a terms of reference for how the team will function in practice, how roles are defined, how decisions are made, and how different perspectives will be brought together. Taking time to agree on these elements early on can help manage expectations, reduce misunderstandings, and create a more transparent and equitable working environment.

Key considerations include:

- **Clarify roles and contributions:** Agree who is responsible for what, what each person brings to the project, how different perspectives will be integrated and how decisions will be made.
- **Agree practical ways of working**: Decide how often you will meet, in what format (online or in person), how you will communicate, and where collaborative work will take place.
- **Develop a shared values statement:** Co-create a short statement that sets out the key values that will underpin the collaboration. This might include commitments to openness, respect, mutual learning, inclusivity, and valuing different forms of knowledge and expertise.
- **Plan for integration, not just contribution:** Consider how different disciplines and stakeholders will interact throughout the project, rather than working in parallel.
- **Build in reflection and evaluation:** Identify how you will assess collaboration itself, including what evidence you will collect and how different perspectives will be accounted for.

Common barriers to collaborative working	Practical actions	Who can act
Motivation – main issues: • **Limited motivations to work collaboratively** • **Habitual siloed working**	**Encourage and reflect**	
Collaboration is seen as optional, extra, or someone else's responsibility	Make integration of disciplines explicit Visibly allocate or rotate coordination and synthesis roles	Project leads; Team
Limited belief that interdisciplinary working improves outcomes	(Use ToC to) Revisit and articulate why collaboration is essential for this problem and these outcomes	Project leads; Team
Fear of loss of ownership, credit, or disciplinary identity	Agree early how to work together and how contributions will be represented, credited and acknowledged	Project leads; Team
Conflicting values or theories of change	Hold explicit conversations about values, assumptions and success criteria Co-develop a shared theory of change	Team; Facilitator

Fear of conflict, criticism, or loss of control	Establish ground rules for respectful challenge Normalise uncertainty and “good enough” solutions	Project leads; Team
Interdisciplinary work perceived as risky or illegitimate	Leadership clearly communicates that interdisciplinary working is valued and supported from the outset. Highlight positive examples and recognition	Leadership; Institutions
Capability – main issue: • **Limited physical abilities, knowledge and skills to work collaboratively**	**Develop and support skills, confidence and knowledge**	
Difficulty communicating across disciplines	Use plain language as default Ensure shared understanding of key project terminology and methodologies Summarise discussions in an accessible way	Team
Jargon excludes or intimidates	Pause to unpack terms Legitimise asking “basic” questions	Team; Facilitators
Low confidence to challenge assumptions	Actively invite different perspectives Model openness to being challenged	Project leads; Team
Limited understanding of other disciplines’ roles	Run early “what we do” sessions Visually map roles and contributions	Project leads; Team

Methodological tensions or incompatibilities	Allow time to learn each other's methods Clarify where integration is essential vs optional	Project leads; Team
Difficulty balancing complexity and clarity	Agree boundaries around scope and integration at each stage	Project leads; Team
Opportunity – main issue: • **Limited opportunities and support for working collaboratively**	**Encourage and reflect**	
Relevant disciplines involved too late	Involve all relevant disciplines in problem framing and project design	Funders; Project leads
Time pressure limits reflection and integration	Build protected time for reflection and synthesis into project plans	Project leads; Institutions
Hierarchies or power dynamics undermine collaboration	Use clear governance Rotate facilitation roles Counter default hierarchies	Project leads; Facilitators
Institutional systems reward siloed outputs	Align monitoring, evaluation and recognition with collaborative goals where possible	Leadership; Institutions
Lack of shared spaces for collaboration	Create regular shared physical or virtual spaces for joint working	Project leads; Institutions

Appendix G

Evaluate learning and impact – further information and resources

Evaluation should consider not only whether a project achieved its intended outcomes, but also what difference the collaborative approach made. This means considering the outcomes and outputs of the project, participants' experiences of working collaboratively, and what people learned or gained through the process.

Where possible, put an evaluation strategy in place at the beginning of the project alongside your communication and project planning, this can be done while creating a ToC to understand how knowledge and insight will be integrated (see also Appendix E). This allows you to identify what you want to learn about the collaboration and collect relevant evidence throughout, rather than relying only on participants' reflections at the end. A useful evaluation can consider three connected areas:

1. **Project outcomes and outputs:** Consider whether the project achieved what it set out to achieve, and how collaboration contributed to this.

2. **Experiences and learning:** Collaboration can produce important outcomes that are not captured through conventional project measures. Team members may develop new knowledge, skills, confidence, relationships, networks, or ways of understanding the issue.

3. **Costs and benefits of collaboration:** Collaborative working can require additional time, resources, coordination, and effort. These costs should be considered alongside the benefits generated by collaboration.

Developing an impact pathway

An impact pathway describes how a project's activities and outputs are expected to contribute to changes and, ultimately, to longer-term outcomes or impacts. It can help teams make explicit where collaboration is expected to add value.

The pathway should not be treated as a fixed or linear prediction. Complex projects rarely develop exactly as anticipated. Instead, it provides a framework for making assumptions visible and revisiting them as the project develops. When developing an impact pathway, consider:

- What changes are we trying to contribute to?
- How are our activities expected to lead to these changes?
- What role does collaboration play in achieving them?
- What assumptions are we making?
- What external factors might influence progress?
- What unintended outcomes might emerge?

The ToC developed earlier in the toolkit can provide the foundation for this process (see 3.3 Integrate).

Developing an indicator framework

An indicator framework provides a way of assessing whether the changes identified in the impact pathway are occurring. Indicators should be developed alongside the project's aims and ToC, rather than added only at the end.

Developing an indicator framework supports in impact measurement, by providing a set of quantitative and qualitative indicators that can be used to infer whether the desired outcomes and impact have been achieved. The following points are worth considering when putting together your indicator framework:

- Measurement of outputs tends to be quantitative
- Measurement of outcomes tends to be qualitative, i.e. changes in knowledge, behaviour, skills, or conditions
- Proxy indicators will sometimes need to be developed where a change cannot be directly measured
- Indicators play a key role in testing assumptions in a ToC, and therefore should be measured throughout a project so that changes can be made if needed
- Indicators should be SMART: Specific, Measurable, Achievable, Relevant, and Time-bound.
- A useful way of building an indicator framework is considering the following:
    - Indicator – what is being measured?
    - Population – who does the indicator relate to?
    - Threshold – what minimum level of change is needed to indicate success?
    - Timeline – when does the change need to happen?

Consider developing indicators that capture both project success and collaborative success. As noted above, indicators do not need to be quantitative. Qualitative evidence, including interviews, surveys, reflective reports, participant feedback, observations, meeting records, case studies, and examples of changed practice can be particularly valuable for understanding how and why collaboration made a difference.

Appendix H

Share outcomes and outputs – further information and resources

Sharing is an important part of collaborative working. Collaboration can generate different forms of knowledge, learning, relationships and resources, and thinking carefully about how these are shared can help ensure that their value extends beyond the immediate project team.

Planning for sharing from the outset can also help teams think more clearly about who the work is for, how different contributions will be represented, and what might happen to the project's outputs and relationships after the project ends. Different audiences may have different needs, and there may not be a single format that works equally well for everyone.

- **Plan for different audiences:** Consider who needs to use or engage with the project's findings and what they need from them. Different disciplinary and sectoral audiences may require different formats, language and approaches. Consider whether outputs could be adapted into reports, briefings, visual materials, presentations, events, exhibitions or other creative formats.
- **Share the process as well as the findings:** The experience of working collaboratively can itself be valuable. Document and share what was learned about interdisciplinary working, including challenges, changes in understanding and approaches that worked well. Sharing difficulties and failures, as well as successes, can help others learn from the experience.
- **Consider legacy:** Think beyond the end of the project. Consider how resources, data, relationships, networks and learning will be maintained and accessed after the project ends. Where appropriate, identify opportunities to continue relationships or develop communities of practice.
- **Reflect on who benefits:** Consider whether stakeholders, beneficiaries and different members of the team experienced the project and its outputs as intended. Were different forms of knowledge recognised and valued in the outputs? Did all stakeholders have space to contribute and benefit from the collaborative outputs?

Appendix I

Additional resources

BUILD an understanding and team

- An introductory systems thinking toolkit: (GOV.UK) A practical introduction to systems thinking that provides tools for understanding complex problems, mapping systems and identifying potential interventions and points of leverage.
- Systems thinking: common ground for social sciences and STEM-B (IES): A blog by Gary Kass introducing systems thinking as a shared approach across the social and natural sciences, highlighting how different disciplinary perspectives can contribute to understanding complex environmental problems.
- Environmental Social Science Knowledge Exchange Map of Opportunities (ESS NEMO) (ACCESS): An interactive mapping resource from ACCESS showing organisations, groups and individuals who could be engaged in environmental social science research, helping teams identify potential collaborators and knowledge-exchange opportunities.
- Making Sense of Environmental Problems Using Systems Thinking Approaches (IES): An introductory webinar exploring how systems thinking can be used to understand complex environmental problems by considering relationships, interdependencies and the wider contexts in which problems occur.
- An Introduction to Systems Thinking for Tackling Wicked Problems (IES): An introductory webinar exploring how systems thinking can help teams approach complex or 'wicked' problems by recognising different perspectives, relationships and forms of complexity.
- Systems Approaches for Tackling Environmental Issues (IES): An overview of systems approaches for addressing environmental issues, focusing on the interconnected social, ecological and institutional factors that shape environmental problems.
- A Systems Approach to Managing the Water Environment (Foundation for Water Research): A practical briefing demonstrating how systems thinking can be applied to environmental management, using water management to illustrate the benefits and challenges of taking a systems approach.
- Systems Thinking: What, Why, When, Where and How?: A beginner-friendly introduction to systems thinking that explains its core principles and introduces practical tools for understanding relationships, patterns and behaviour within systems.
- Critical Systems Heuristics: An introduction to a critical systems approach that encourages teams to examine the assumptions and boundaries underlying how a system or problem is defined, including whose perspectives and interests are included or excluded.

REFLECT and adapt to existing drivers and barriers for collaboration

- How to manage a major interdisciplinary research project in 4 steps: A reflection on lessons learned from managing a large interdisciplinary research project, highlighting practical challenges and approaches to team formation, communication, collaboration and

integrating different disciplinary perspectives.

- Improving Collaborative Research Practices: A collection of insights from knowledge-exchange activities with UK research consortia and networks, highlighting practical lessons for improving collaborative research practices and relationships.

- Optimising teamworking processes in an ongoing research consortium: A qualitative study examining how teamworking processes develop within an ongoing research consortium and what can be learned about supporting and improving collaboration over time.

- Developing shared understanding through online interdisciplinary collaboration: A reflection on developing shared understanding and intellectual coherence through online interdisciplinary collaboration, offering practical lessons about communication, disciplinary differences and working together remotely.

INTEGRATE different perspectives

- What is Theory of Change?: An introduction to Theory of Change as a process for mapping how activities are expected to contribute to longer-term outcomes, making causal assumptions and the conditions required for change explicit.

- Theory of Change Toolkit: A practical toolkit for developing a Theory of Change, helping teams clarify intended outcomes, causal pathways and underlying assumptions to support planning and evaluation.

- Theory of Change Toolkit: A practical guide to developing a Theory of Change that helps teams articulate how activities are expected to lead to outcomes and identify the assumptions underpinning their approach.

- Theory of Change: An accessible introduction to Theory of Change, with guidance on developing change maps, building shared understanding and using them to support planning, evaluation and learning.

DEVELOP & GROW a collaborative culture

- ACCESS Guiding Principles: A set of principles for supporting responsible interdisciplinary working, including considerations around diversity, inclusion, equity, sustainability, co-production and the conditions needed for effective collaboration.

- Guides to Better Science: Interdisciplinary Research (British Ecological Society): A practical guide to interdisciplinary research exploring why interdisciplinarity is important, how to establish effective collaborations and how to navigate common challenges associated with working across disciplines.

- A disciplined approach to interdisciplinary working: A short reflection on the practical challenges of interdisciplinary work, arguing that effective collaboration requires deliberate approaches to negotiating disciplinary differences and ways of working.

- Six tips for making interdisciplinary research work: A concise set of practical recommendations for successful interdisciplinary research, including developing shared problems and goals, establishing common language, building relationships and recognising institutional barriers to collaboration.

- Ten principles of good interdisciplinary team work: A peer-reviewed framework identifying ten characteristics of effective interdisciplinary teams, including positive leadership, communication, supportive team climates, appropriate resources, clarity of vision and respect for different roles.

- Interweaving disciplines (IES): A special issue of environmental SCIENTIST exploring interdisciplinarity in environmental science through examples of interdisciplinary research, communities of practice, education, professional careers and collaborations across environmental and social science.

EVALUATE learning and impact; and

SHARE outcomes and outputs

- Impact toolkit for economic and social sciences (ESRC): A practical toolkit covering impact planning, public engagement, knowledge exchange, events, policy engagement, publications, media and digital communication, with guidance on selecting appropriate approaches for different audiences and purposes.

- Defining impact (ESRC): An introduction to research impact and knowledge exchange that emphasises knowledge exchange as a two-way process for sharing ideas, evidence, experiences and skills between researchers and research users.

- Knowledge Exchange Framework (KEF) (UKRI): A framework for understanding and improving how universities collaborate with external partners, including businesses and community organisations, to exchange knowledge and generate wider benefits.

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