Centre for **Climate Change** and **Social Transformations**

Tyndall°Centre for Climate Change Research

# Best practice through interdisciplinarity for researching global environmental challenges

(Draft for Comments to a.minns@uea.ac.uk)

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## 1. Introduction

Many of the global challenges humanity is currently facing, including the climate and biodiversity crises, involve understanding complex interactions between human and environmental systems. Addressing these challenges crosses traditional disciplinary boundaries and requires input from the natural sciences, social sciences and humanities.

Interdisciplinary research can address these complex global challenges, expanding on traditional knowledge structures and producing innovative solutions. Interdisciplinarity explores a problem through a variety of perspectives, combining the theories, methods, and tools of different disciplines to address a problem and develop more integrated knowledge.

Over the last decade, there has been an increase in engagement, investment and interventions around interdisciplinary research in higher education institutions in many countries, including England[1]. A report by King's College London and Digital Science analysing the impact case studies submitted to the UK's Research Excellence Framework (REF) 2014 found that 'a majority of the research underpinning societal impacts is multidisciplinary'[2]. Impact case studies are submitted to the REF to grade the research performance of all University Schools or Departments, with performance financially rewarded.

Multidisciplinary is people from different disciplines working together. Interdisciplinary integrates knowledge together by crossing disciplinary boundaries and combining methods.

There are substantial benefits of encouraging interdisciplinarity and conducting research across disciplines, but also significant challenges with this. Typically, interdisciplinary research has been harder to fund, do, review and publish. Overcoming barriers to interdisciplinary research is important for effectively addressing complex societal challenges.

This report summarises effective efforts and best practice for growing interdisciplinary research to address global challenges. The document begins with the main governance and organisational challenges with interdisciplinary research, then capacity building, approach to funding issues, and finally communication and engagement. Our method is a narrative review of academic and grey literature, supplemented by interviews with selected current and former centre Directors working in the climate and interdisciplinary policy relevant research space.

## 2. Governance, Culture and Organisation

Organisational structures and governance are highly variable, but some structural issues can significantly impede interdisciplinarity. Within governance and organisation, interdisciplinary research for addressing global challenges can be supported and encouraged by:

- Co-locating researchers
- Avoiding silos
- Promoting longer term thinking
- Dedicated support staff

[1] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

[2] King's College London and Digital Science, 2015. The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies. Bristol: HEFCE.

- Effective leadership
- Bottom-up and top-down approaches

In surveys and interviews with directors of interdisciplinary programmes and university leaders conducted by Lyall et al. (2015), when considering the topic of university structure and organisation, respondents noted the need for supporters at all levels, as well as the need to address logistical and cultural challenges to developing interdisciplinarity.

*2.1 Co-locating researchers*

As noted by Professor Richard Pancost, former head of the University of Bristol's Cabot Institute for the Environment, 'bringing different disciplines together is intrinsically about bringing people together'[3]. Having an institute where researchers from different disciplines can work under one roof can increase opportunities to interact with experts in other disciplines. This was noted as a key strength of the International Research Institute of Disaster Science (IRIDeS) at Tohoku University in Japan, which was established to conduct disaster mitigation research[4]. Similarly, the Centre for Energy and the Environment (CEE) within the University of Exeter found that co-locating staff with different expertise in the same office was central to their way of working. Dzeng (2013) considered the design of physical and social spaces a key aspect to the development of interdisciplinary networks[5]. In their words, 'creating spaces where people continuously come into contact with people outside their discipline in natural, casual social settings over and over again, helps develop social networks that eventually become the source of intellectual inspiration and creativity.'

Although a great advantage for interdisciplinary research, co-locating researchers is not a necessity. Many successful research centres have a distributed structure. For instance, the Tyndall Centre for Climate Change Research is a partnership of universities, with members of the centre at each of these institutions. The success of distributed research centres has shown that obstacles associated with geographic distance between researchers can be partially overcome. However, overcoming the limitation can require a lot of travel for researchers, which requires time, cost, and carbon emissions. Traditionally, virtual meetings have been seen as only partially effective although these have recently become the norm. Where travel is expected, it should be done sustainably. The Tyndall Centre Travel Strategy encourages staff to actively consider whether travel is necessary or whether there are other reasonable options, therefore encouraging individual researchers and the Centre as a whole to reduce their emissions through time [6]. It includes a code of conduct, and a system to monitor and justify travel emissions and to support individual commitments to reducing emissions. A new travel tracker led by the Stockholm Environment Institute and based on the Tyndall Travel Tracker, Tr2ail, will be available soon.

Not co-locating researchers can sometimes also lead to a duplication of effort as the same things may need to be implemented at different institutions (such as seminar series, administrative support etc.). It must also be noted that researchers will inevitably be

[3] https://gw4.ac.uk/opinion/lessons-learned-interdisciplinary-research-leadership/

[4] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[5] Dzeng E. (2013) How to inspire interdisciplinarity: lessons from the collegiate system [online]. The Guardian, available: http://www.theguardian.com/ higher-education-network/blog/2013/mar/15/ interdisciplinary-academic-universities-research

[6] https://www.tyndall.ac.uk/travel-strategy See also CAST's Sustainability Charter: https://cast.ac.uk/sustainability/

influenced by the practises and culture of their host institutions which can make creating a coherent culture more difficult within a distributed centre[7]

*2.2 Avoiding silos*

It is now widely recognised that single-discipline or siloed approaches are limited when addressing global, multi-faceted problems[8,9] but it can still be incredibly challenging to reach agreements within multidisciplinary teams[10]. Even individual researchers who are strongly involved with interdisciplinary research can feel the need to defend their discipline and their methods when in an interdisciplinary environment. Different definitions of terms between disciplines can be major obstacles. Key concepts and terminology should be defined early on. Successful interdisciplinary research can lead to the creation of a common methodology and language. Identifying commonalities between different disciplines can facilitate interdisciplinary working. Previous endeavours have shown that regular whole-team meetings are needed to ensure interdisciplinary learning. This was a key lesson from the Norwegian Governing risk society (GOVRISK) transdisciplinary project[11].

Organising research into 'strategic themes' can help research centres to avoid structuring research into areas that can inadvertently lead to a single-discipline focus. Many existing centres for interdisciplinary research organise their activities into themes[12]. These strategic themes can ensure research within a centre works to accelerate social transformations. For instance, Accelerating Social Transitions is a key research theme for the Tyndall Centre. This theme delivers research to support evidence-based decision-making to improve the design of low-carbon innovations and interventions. In addition, the Centre for Climate Change Transformations' (CAST) research themes are focused on transformative change. They recognise that this change will require: '*inspiring yet workable visions of the future (Theme 1); learning lessons from past and current societal shifts (Theme 2); experimenting with different models of social change (Theme 3); together with deep and sustained engagement with communities, business and governments, and a research culture that reflects our aims and promotes action (Theme 4)*'. This is further discussed in Section 5 below, which focuses on Communication, Impact and Engagement.

*2.3 Longer term thinking*

The development of a dedicated research centre with a clear focus can allow for the development of long-term research projects that individual researchers might find difficult to justify and maintain. Recruiting the right people is also paramount to the success of research on global challenges, including ensuring people have a good match to goals of the research

[7] Tyndall Centre (ed.) (2006) Truly useful … doing climate change research that is useful for both theory and practice. Tyndall Centre, UK, pp44. May 2006

[8] Howarth and Monasterolo (2016) Understanding barriers to decision making in the UK energy-food-water nexus: The added value of interdisciplinary approaches. Environmental Science & Policy. 61. Pp.53-60.

[9] Howarth and Monasterolo (2017) Opportunities for knowledge co-production across the energy-food-water nexus: Making interdisciplinary approaches work for better climate decision making. Environmental Science & Policy. 75. Pp. 103-110.

[10] Tyndall Centre (ed.) (2006) Truly useful … doing climate change research that is useful for both theory and practice. Tyndall Centre, UK, pp44. May 2006

[11] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[12] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

centre. High staff turnover and short projects can limit interdisciplinarity and ability of a centre to have a substantial impact.

*2.4 Dedicated Support staff*

Allocating core resources, including personnel, is also key to building expertise in interdisciplinary methods and practice in order to effectively address global challenges. When adequate resources are provided, support staff can help ensure administrative issues are handled quickly and efficiently. For instance, many successful centres have a Communications Manager to support staff in their communication and engagement work (see Section 5 below for a discussion on communication and engagement). This is particularly important for international projects, where language, culture and jurisdictional boundaries will also pose significant challenges.

*2.5 Effective Leadership*

Clear, strong leadership is vital to the success of any project or research centre. They should be able to lead by example: conducting interdisciplinary research, writing funding bids, and engaging with potential end-users outside of academia including policymakers. It is important for leaders to be willing to learn from the other researchers within the team to understand their disciplines and methodologies.

The final report on the UK Centre for Business Relationships, Accountability, Sustainability and Society (BRASS), which was an interdisciplinary research centre funded between October 2001 and January 2013, explained that one of the two main roles of the director was maintaining strategic coherence in the centre's work[13]. This involved maintaining and promoting the overall research agenda and ensuring all researchers understood where their contribution fitted into this agenda.

However, successful research centres should not rely on a single director alone to make decisions. The BRASS Final Report recognised the importance of co-directors and research managers for pushing for research that was outside of the interests of the Director.

The Tyndall Centre for Climate Change has an internal management committee, called the Tyndall Council with the Director as Chair. It works by consensus and its representatives span across the partners of the Tyndall Centre, the research themes of the Tyndall Centre, includes Early Career Researchers, and some special senior advisors. It meets four times a year and has discussions and decision-making protocols in between meetings..

Leadership at CAST and Tyndall is distributed. Both organisations have Research Directors and co-Directors or Executive Directors. Responsibilities are devolved including Early Career Researchers for fresh ideas and enthusiasm, ownership and capacity building.

*2.6 Bottom-up vs top-down approaches*

Established interdisciplinary centres have employed both top-down (institution led) and bottom-up (researcher led) approaches to strategy and operation. Both approaches have been shown to be successful and some institutions have effectively combined these. When a bottom-up approach is employed, continued support is needed at all levels. This includes practical support and a strong interdisciplinary culture. The University of Bristol's Cabot Institute for the Environment, which is an exemplar interdisciplinary institute, was both

[13] Centre for Business Relationships, Accountability, Sustainability and Society (BRASS) Final Report

supported from the top of the university and led from the bottom[14]. A report by Technopolis found that most interviewees felt that a bottom-up approach was more likely to encourage participation in interdisciplinary research[15]. Even respondents that advocated a top-down approach acknowledged that top-down initiatives that are forced on researchers will fail. The Arizona State University Decision Center for a Desert City (DCDC) concluded that both formal and informal structures to support collaboration are essential[16].

## 3. Capacity Building

This section considers lessons for creating structures that support interdisciplinary collaborations and build the capacity of individuals and organisations. These include:

- Networking
- Training and supporting early career researchers
- Training champions
- Evaluation during and following projects

### *3.1 Networking*

Networking is recognised as one of the best ways of establishing knowledge exchange and encouraging interdisciplinary understanding[17,18]. Having a focus for networking is often critical, though – for example, working towards a funded project can motivate participation in networking events. Even within dedicated research centres, academics from different disciplines sometimes only come together when research proposals are developed[19]. If these proposals are not successful, the potential interdisciplinary team is lost. To avoid this, networking events such as seminars, conferences, and workshops can bring academics from different disciplines together more frequently. These events can also be used to develop external networks with other institutions. Annual retreats or office away days to encourage communication, interaction and learning between researchers. In addition, routine social events, such as weekly coffee breaks, along with corresponding weekly reminders, is effective in encouraging interaction between researchers, because cultural capital is a key component of feeling part of a Centre.

Developing visiting scholars and offering secondments and placements for researchers within the centre, is another way to foster new relationships and networks. This approach will be central to the Centre for Climate Change and Social Transitionss (CAST).

[14] https://gw4.ac.uk/opinion/lessons-learned-interdisciplinary-research-leadership/
[15] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England
[16] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf
[17] Bammer, G., 2012. Strengthening Interdisciplinary Research: What it is, what it does, how it does it and how it is supported.
[18] National Academies of Science, USA (NAS), 2010. Facilitating Interdisciplinary Research, Washington DC, National Academies Press.
[19] Dooling, S., Graybill, J K. and Shandas, V. (2017) Doctoral Student and Early Career Academic Perspectives on Interdisciplinarity. In Frodeman (ed) The Oxford Handbook of Interdisciplinarity.

*3.2 Training and Supporting Early Career Researchers*

Several successful interdisciplinary centres and research projects have noted the importance of training and encouraging interdisciplinarity early on in researchers' careers. This can be challenging when some traditional disciplines tend to promote very different perceptions of what constitutes a successful researcher. These perceptions can be particularly disparate between social science and natural science and are taken in by researchers early on in their careers[20]. Supervisors and mentors are key to supporting early career interdisciplinary researchers. Encouraging co-supervisors from different disciplines or non-academic partners can encourage inter- and transdisciplinary work at the PhD level. Transdisciplinary crosses disciplinary boundaries and methods for unified holistic knowledge.

Dedicated training for early career researchers and established researchers who are new to interdisciplinary work is also important. This training could involve in-house courses or use external classes and programmes. In the UK, Doctoral Training Centres (DTC) or Partnerships (DTP) are programmes sponsored by one of the research councils. Specific, funded PhD projects are advertised, and successful candidates also become part of the DTC/DTP and receive integrated transferable skills training programmes. The White Rose University Consortium found that Doctoral Training Centres/Partnerships can foster collaborations and stimulate interdisciplinary research in supervisors as well as PhD students[21].

At the centre level, establishing and actively managing a PhD and early career research network can facilitate an interdisciplinary focus early on. However, it is also important to develop an environment that allows for exchanges between researchers at different levels, from students to senior faculty.

There are generally limited numbers of positions for interdisciplinary researchers, which are often taken by the most senior researchers. Dedicated opportunities for early career researchers, including placements, can help them progress. A key lesson learned from the Norwegian Centre for Research-based Innovation in Sustainable fish capture and Processing technology (CRISP) was that students that can take up opportunities to work with non-academic partners can develop important transferable skills and gain entry into careers beyond academia[22].

*3.3 Champions*

Training champions within the centre who are committed to the principles of interdisciplinary research and can encourage interdisciplinarity within colleagues and the wider institution is another important tool for capacity building. Focus on people who will devote time to the development of the Centre, be enthusiastic and inspire others with their motivation. As noted by the Network for Transdisciplinary Research of the Swiss Academies of Arts and Sciences 'personalities who have dedicated their professional career to establish interdisciplinary and

[20] https://steps-centre.org/blog/disciplinary-identities-and-other-barriers-to-advancing-interdisciplinary-working/

[21] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

[22] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

transdisciplinary research are important role models in the scientific community'[23]. These champions should also be encouraged to share their own learning about good practices to support development of the research centre.

*3.4 Evaluation during and following projects*

Capture lessons from projects and use these to enhance future projects and funding bids. Ensuring these findings are available for others seeking to develop their own interdisciplinary projects within the institution. Several authors have noted the need for evidence of demand for and validity of proposed interdisciplinary programmes[24]. Compared to individual disciplines, there is little evidence of how to conduct a successful interdisciplinary research project. Previous analyses have remarked on the fact that interdisciplinary projects are highly heterogeneous, which hinders the development of generalised frameworks for their development and assessment[25].

## 4. Approach to funding issues

Funding of interdisciplinary research has been a key challenge. Funding for some types of research tends to be skewed towards certain disciplines over others or over interdisciplinary approaches to tackling the problems. For instance, funding for sustainable transport (which is important for climate change) is skewed towards technological research and development over social or humanities research[26]. In addition, even when interdisciplinary research is explicitly asked for, funding agencies will have their own definitions and precedents for what interdisciplinary research looks like[27]. However, the desire to access more diverse and larger funding streams has also been a key driver for the development of interdisciplinary research in UK Higher Education Institutions[28].

Following a workshop with research, funding and end-user organisations, Morris et al. (2016) identified seven challenges with funding interdisciplinary research[29]. These were:

1. No agreed criteria defining 'excellence' in interdisciplinary research.
2. Poor agreement of the benefits and costs of interdisciplinary ways of working.
3. No agreement on how much or what kind of additional funding support is required for interdisciplinary research.

[23] Zinsstag J, Perrig-Chiello P, Paulsen T, Truffer B 2016. Exemplary Transdisciplinary Projects – swiss-academies award for transdisciplinary research 2015. GAIA - Ecological Perspectives for Science and Society, V25, N3, pp 182-184

[24] Lyall et al. (2015) Interdisciplinary provision in higher education. Current and future challenges. Technical Report.

[25] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[26] Lue et al. 2014 Future priorities for a climate-friendly transport: A European strategic research agenda toward 2030. International Journal of Sustainable Transportation.

[27] Konig and Gorman (2017) The Challenge of Funding Interdisciplinary Research: A Look inside Public Research Funding Agencies. In Frodeman (ed) The Oxford Handbook of Interdisciplinarity.

[28] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

[29] Sue Morris, Christopher (Kit) J. A. Macleod, Gabriele Bammer, Laura Meagher, Iain Gordon, Sue Hartley, Catherine Lyall, Katrin Prager, Lindsay C. Stringer and Mark Tibbett (2016). Funding interdisciplinary research: improving practices and processes. Working Together for Better Outcomes, 26-27 March 2015, Edinburgh, UK

4. No consensus on terminology.
5. No clearly delineated college of peers from which to select appropriate reviewers.
6. Limited appropriate interdisciplinary peer review processes.
7. Restrictions within funding organisations concerning budget allocations and support for interdisciplinary research.

A review for the Australian Council of Learned Academies recognised the importance of funding an exploratory phase for interdisciplinary research[30]. Internal funding, as start-up or seedcorn funding, for interdisciplinary projects has been successful in many institutions[31]. However, effective interdisciplinary research and collaboration requires sustained funding so relying on internal funding would not be a viable long-term solution. It is also important to pursue external funding opportunities. Maintaining a good relationship with funding bodies is important.

In the UK, recent funding has encouraged interdisciplinary research. Several funders, including the Research Councils, government departments and charities have supported interdisciplinary research through challenge-based strategic funding calls, such as the UK Global Challenges Research Fund and the UKRI Interdisciplinary Circular Economy Hub, which was a funding call for the development of a hub that could address several key cross-cutting challenges [32]. Similar problem-based funding schemes have developed in other countries[33].

Reviews of successful projects have shown that research teams with previous experience of working together have a greater chance of securing interdisciplinary funding[34]. These research teams can demonstrate the ability to work together effectively and therefore give funders greater confidence in them.

From the funders' side, there should be a recognition that interdisciplinary research is extremely important but can come with additional processes. For instance, building a community within an interdisciplinary team[35], the need for time and funding to learn about what works within interdisciplinary research. A recent OECD Science, Technology and Industry Policy Paper on transdisciplinary research (research that involves researchers from different disciplines and non-academic partners) concluded that two of the key recommendations for research funders is to allow experimentation, including sand-pit processes and training workshops for researchers, and to allow collaboration with non-academic stakeholders[36]. Key to interdisciplinary research in an ideal world, because

[30] Bammer, G. (2012) Strengthening Interdisciplinary Research: What it is, what it does, how it does it & how it is supported. [online]. The Australian Council of Learned Academies, available: http://www.acola.org.au/PDF/Strengthening%20Interdisciplinary%20 Research.pdf

[31] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

[32] https://www.ukri.org/opportunity/ukri-interdisciplinary-circular-economy-hub

[33] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[34] Technopolis (2016) Case Study Review of Interdisciplinary Research in Higher Education Institutions in England

[35] Lyall and Meagher (2012) A Masterclass in interdisciplinarity: Research into practice in training the next generation of interdisciplinary researchers. Futures. 44(6). Pp. 608-617.

[36] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

interdisciplinary needs to be responsive to real-world stakeholder needs not only academic questions, is core funding that allows for flexibility to chase down new ideas to apply theory to practice.

## 5. Communication, Impact and Engagement

Communication strategies are key to effective dialogue. Where possible, these should involve a dedicated Communications and/or External Engagement Manager. A lack of dedicated communications resource was noted as a key limitation of the early days of the Centre for Business Relationships, Accountability, Sustainability and Society (BRASS). The importance of dedicated communications staff was already touched upon in Section 2.4 above.

Within the topic of Communication, Impact and Engagement, it is important to consider:

- Scientific publishing
- Developing a brand
- Outreach and encouraging social change
- Stakeholder engagement
- Delivering Impact
- Fostering change within the academic community

### *5.1 Scientific Publishing*

Peer-review and journals traditionally organised by discipline. As already discussed with respect to funding (Section 4), a lack of interdisciplinary peer reviewers can be limiting. Despite these challenges, it is important to pursue scientific journal publications. A lack of publications can limit the effectiveness of future funding applications. Equally important, professional publications are essential to the evidence-based that delivers impact and the narrative and renown of the research centre.

Once published, it can take longer for this type of research to be picked up. Van Noorden (2015) noted that interdisciplinary research takes time to have an impact, with most interdisciplinary research papers picking up fewer citations in the first few years following publication[37]. However, in the longer term, these papers can receive many more citations.

Pohl et al. (2015) compiled a list of recommendations for publishing interdisciplinary research[38]. This list included the recommendation that methodological insights gained should be reported in publications and that both disciplinary and interdisciplinary insights should be presented.

For wider dissemination, it is important to provide access to research outputs, including scientific publications, on social media and via a data portal or website. A well-designed data portal or website can host research centre outputs in an accessible way. This should be user-friendly and regularly updated. It is increasingly a requirement of funders that data and

[37] Van Noorden, R. (2015), "Interdisciplinary research by the numbers", Nature, Vol. 525/7569, pp. 306-307

[38] Pohl C, Wuelser G, Bebi P, Bugmann H, Buttler A, Elkin C, Grêt-Regamey A, Hirschi C, Le Q B, Peringer A, Rigling A, Seidl R, Huber R 2015. How to successfully publish interdisciplinary research: learning from an Ecology and Society Special Feature. Ecology and Society, V20, N2

scientific publications are made publicly available, to assist with replication and validation, transparency, value for money, and wider impact and societal benefit.

*5.2 Developing a Brand*

When starting a new research centre, creating a unique brand, which sets the centre apart from other groups, is vital. To create this identity/brand, communication activities, first with awareness-raising of the new Centre. Awareness-raising is constant and then followed-up with renown, Once this identity is established, it must be actively maintained. Now 20 years old, the Tyndall Centre has a recognised international brand in climate change research. This was achieved through proactive marketing, stakeholder engagement and its policy-relevant, useful research[39]. It was also the first, possibly in the world, to strive to do climate change research that is truly useful for theory and practice, and so has this advantage to its renown of being the first mover. This space is more crowded and competitive now. A quality online presence is essential, both for external and internal audiences. A website is not proof of communication, it is only a shop window. The window display must constantly change to attract passers-by.

*5.3 Outreach and Encouraging Social Change*

Communication and  activities need a strategic approach that consider the multiple and priority audiences[40]. Communication and engagement approaches should be tested to identify messages and channels that work well with target audiences. To accelerate social transformations, it is important to engage with different audiences effectively. A key Centre for Climate and Social Transitions (CAST) research theme is to use wider engagement to synthesise findings and embed change[41]. This theme recognises that engagement and transformation can occur at multiple levels (individual, community, organisational and governmental).

Within the Tyndall Centre, public engagement initiatives include public talks, art and climate change collaborations and exhibitions, and partnerships with outreach organisations including museums. The best public engagement is in spaces familiar and comfortable to the public. If a public engagement activity is on a University campus, it is probably not public engagement it is University engagement. The Tyndall Centre also capacity builds researchers and applies the science of climate change communication to its engagement practice where possible. The science of climate change communication applies the evidence base of communication theory, marketing, psychology, climate communication research, social sciences, to the practice of engagement. Early career researchers are often motivated to take part in public communication and engagement. It is essential that an interdisciplinary organisation has a supportive philosophy of engagement with policy and public as part of the organisational culture.

*5.4 Stakeholder engagement*

[39] Tyndall Centre (ed.) (2006) Truly useful … doing climate change research that is useful for both theory and practice. Tyndall Centre, UK, pp44. May 2006

[40] Howarth and Monasterolo (2017) Opportunities for knowledge co-production across the energy-food-water nexus: Making interdisciplinary approaches work for better climate decision making. Environmental Science & Policy. 75. Pp. 103-110.

[41] https://cast.ac.uk/theme-4/

Building long term relationships with non-academic stakeholder communities is another key to the success of an interdisciplinary research centre. Where interdisciplinary research involves co-production of knowledge with partners outside of academia, it is often referred to as transdisciplinary research. This type of research is often very policy-relevant and focuses on the end-users. Involving stakeholders helps to ensure that research is grounded in reality and gives the research credibility. Key to understanding and tackling global challenges is recognising and valuing that there are many different forms of expert knowledge outside of academia.

A 'stakeholder' can be interpreted as anyone with an interest in the research. Including a broad range of different stakeholders within the research can be extremely valuable. Where possible, make use of pre-existing connections between individual researchers and non-academic stakeholders. Additional knowledge brokers may be needed. Knowledge brokers are those facilitating interaction and engagement among researchers and end-users.

Non-academic partners could also be included in the development and governance of the centre. For instance, the Centre for Climate and Social Transitions (CAST) includes non-academic partners on its Advisory Board to help ensure two-way engagement and knowledge exchange.

However, it is important to carefully consider *when* stakeholders are involved. The nature of the relationship between all partners needs to be clear and transparent to ensure trust is maintained and expectations are managed. Different stakeholders can have different standards, expectations, and incentives[42]. Issues such as research integrity, credit, equity, and ethics must also be carefully considered[43]. Stakeholder engagement can be challenging to implement. The Arizona State University Decision Center for a Desert City (DCDC) found that it can be a challenge to find adequate funds for stakeholder engagement. They used joint fundraising with stakeholders as a solution to this problem. In addition, competition among partners and between different types of partners can limit success. Any issues with conflicting priorities must be carefully dealt with.

*5.5 Delivering Impact*

In the UK, evidencing the societal benefit (i.e., 'impact') of research has become an increasingly important criterion for funding. A report by King's College London and Digital Science (2015) concluded that 'any attempt to define a standard route to research impact could be counterproductive'[44]. Building engagement takes time, especially to attract the attention of policymakers. It is important to be realistic and flexible in goals for engagement and impact. Activities should be timed to coincide with key policy events and flexible enough to adapt to changes in priorities.

Traditional academic communication is a dissemination workshop at the end of a project. While this is a good goal, coproduction of research partners with stakeholders at the beginning of a project (or earlier) to make sure the questions being analysed are useful to

[42] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[43] Addressing societal challenges using transdisciplinary research. OECD Science, Technology and Industry Policy Paper, June 2020 http://www.transdisciplinarity.ch/td-net/Publikationen/mainColumnParagraphs/00/download_website.pdf

[44] King's College London and Digital Science, 2015. The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies. Bristol: HEFCE.

users. Stakeholder engagement is time intensive and so needs to be factored-in to costings from the outset. Arts and Humanities, not only the sciences, can provide important societal perspectives for communicating complex global problems, as well as funding.

Impact should be monitored and evaluated through a range of methods. More valuable is assessing the level and depth of engagement and the influence that the research may have had. It is rare that one piece of environmental change research has impact on its own, but as part of a wider portfolio of activity from multiple actors, change and transformation can happen. A useful framework is AIDA – Awareness, Interest, Desire, Action – to both understanding audiences and useful engagements.

*5.6 Fostering Change within the Academic Community*

Research centres that aim to address global challenges and accelerate social transitions should also consider transformation within the academic community. This will be an important element of the Centre for Climate and Social Transitions (CAST)[45] and is embedded within the Tyndall Centre for Climate Change Research strategy. Researchers who 'walk-the-talk', and develop and follow low-carbon, sustainable practices, are the most trusted[46].

## 7. Summary

Interdisciplinary research needs to be actively promoted and supported to better address complex societal challenges. However, it is important to establish the right conditions for interdisciplinary working. This report has put forward recommendations and suggested actions for promoting best practice in research centres whose aim is to tackle these cross-cutting problems.

- Issues associated with organisational structures and governance can be eased by ensuring the centre has effective leadership and dedicated support staff. Co-locating researchers in the same building can support interdisciplinarity but is not a necessity. Avoiding silos and promoting longer-term thinking that go beyond individual research projects increase the ability of a research centre to have a substantial impact. Long-term commitment and support are necessary to effectively address complex societal challenges. Established interdisciplinary centres have employed both top-down (institution-led) and bottom-up (researcher-led) approaches but, in both cases, it is important that initiatives are not forced upon researchers.

- It is important to build the capacity of individuals and organisations through networking, supporting early career researchers, training champions and evaluating the success of projects. Increased sharing of experiences and best practice can capture lessons, which can then be used to enhance future projects and funding bids.

- Funding can be a key challenge, but this can be partially overcome by using internal funding for start-up projects and responding to external funding calls focused on the challenges or problems that the centre aims to address. Internal funding should take into consideration the time needed to develop teams and address the issues of

[45] https://cast.ac.uk/theme-4/

[46] https://tyndall.ac.uk/sites/default/files/research_strategy_2018_-_draft_for_consultation.pdf

working in interdisciplinary teams. In the UK, many funding bodies now recognise the importance of interdisciplinary research.

- Communication and stakeholder engagement through coproduction is key to the success of any new centre. Developing and maintaining a brand will set the research centre apart from others like it. Where possible, a dedicated communications team should promote research outputs and success stories, linking these to policies and events. Researchers should actively work with stakeholders, policymakers and the public to embed change and accelerate social transformations within and beyond the academic community. The impact of research should also be evaluated through a variety of methods.