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Collaboration between the natural, social and human sciences in Global Change Research

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ABSTRACT

In nearly all domains of Global Change Research (GCR), the role of humans is a key factor as a driving force, a subject of impacts, or an agent in mitigating impacts and adapting to change. While advances have been made in the conceptualisation and practice of interdisciplinary Global Change Research in fields such as climate change and sustainability, approaches have tended to frame interdisciplinarity as actor-led, rather than understanding that complex problems which cut across disciplines may require new epistemological frameworks and methodological practices that exceed any one discipline.

GCR studies must involve from their outset the social, human, natural and technical sciences in creating the spaces of interdisciplinarity, its terms of reference and forms of articulation. We propose a framework for funding excellence in interdisciplinary studies, named the Radically Inter- and Trans-disciplinary Environments (RITE) framework. RITE includes the need for a realignment of funding strategies to ensure that national and international research bodies and programmes road-map their respective strengths and identified areas for radical interdisciplinary research; then ensure that these areas can and

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are appropriately funded and staffed by talented individuals who want to apply their creative scientific talents to broader issues than their own field in the long term, rather than on limited scope (5 year and less) research projects. While our references are mostly to Europe, recommendations may be applicable elsewhere.

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1. Introduction

Global Change Research (GCR) is shorthand for studies of the Human and Earth System in the Anthropocene. This paper is an invitation to all disciplines and domains to collaborate in a fully rounded and integrated view of human agency and the planetary environment. The Radically Inter- and Trans-disciplinary Environments (RITE) framework offers a conceptual framework to help bridge the gaps between knowledge and action and link the past with the future. Second, it gives greater attention to biogeophysical dimensions in social sciences, to cultural narratives and humanities views in ecology, and to ecological approaches to humanistic studies. Third, it delivers a strongly defined set of concepts, theory and research goals to shape pan-European (as opposed to merely national) research. Fourth, it promotes the active and practical connection of academic and scientific communities with civil, commercial and political society. Fifth, radical interdisciplinary research can inform and steer policy makers in an overarching way (instead of informing on very specific scientific questions). Finally, it forms a link between long term historical and current environmental understandings of landscape as the basis for robust future-looking scenarios.

The IPCC observed in 2007 that the world already has at its disposal the technologies for climate change mitigation and adaptation but that the big challenge is related to human acceptance of costs and socio-cultural consequences.

The RITE framework when applied therefore helps enable research in grand research questions such as:

- How can we explain variation in resource use?
- What explains different societies' willingness and ability to mitigate and adapt to the consequences of environmental change?
- What factors – political, institutional, social, cultural, cognitive – shape the implementation and use of different sources of renewable energy?
- What unintended consequences do policies implemented to address grand challenges have on society?
- How can research projects actively contribute to societal transformation processes?

In nearly all domains of Global Change Research (GCR), the role of humans is a key factor as a driving force, a subject of impacts – and an agent in mitigating impacts and adapting to change. Similarly human and social sciences benefit from embedding anthropogenic research questions in an understanding of environmental forces. This paper proposes a strategic vision to break down the individual and institutional barriers that hamper collaboration between the physical, natural, medical and social sciences and humanities in global change studies.

Although recent work has examined the factors associated with disciplinary and interdisciplinary research collaboration (van Rijnsoever et al., 2011) to efficiently address the issues above, a common theoretical and operational framework is needed for interdisciplinary research issues.

2. Why the present system is not fit for dealing with global change issues

Although good examples of interdisciplinary research exist, the present situation is not fit for dealing with global change issues. Collaboration across faculty divides is difficult because of institutional disincentives. In particular, while it is widely recognised that Global Change studies need to benefit from collaboration between human and social sciences on the one hand and natural and technical sciences on the other hand, such collaboration happens only in very few cases. At most universities and other (academic) research institutions faculties of neighbouring disciplines have the upper hand. Some of this is even institutionalised or nationalised. For example, publically funded European universities generally receive greater funding for a graduating natural/polytechnical sciences or Health Sciences student than for social sciences or humanities. While this is meant to allow for greater costs associated with laboratory studies, the result is that many interdisciplinary programmes in GCR are anchored in natural sciences or polytechnical faculties.

Furthermore, various important disciplines, mainly social and human, are too often overlooked or neglected as a science, such as law, architecture, history, literature, communication, sociology and psychology. These are important disciplines to fully understand earth systems and human motivation and to guide decision-makers. However, they are not routinely seen as fundamental to give policy advice. Proponents of interdisciplinary research at times relegate human and social science research to an auxiliary, advisory, and essentially non-scientific status. An example is the conceptualization of social science in the 23 questions that the Global Analysis, Integration and Modelling task force of the International Geosphere–Biosphere Programme (IGBP) has put forward as overarching questions for earth system analysis (Schellnhuber and Sahagian, 2002). However, the social science questions are not viewed as part of the 'analytical' questions (which are exclusively related to natural science), but as part of the 'strategic' or 'normative' questions hence reducing social sciences to its policy-oriented, advisory dimensions (Biermann et al., 2009; IHDP, 2007). Similar conclusions might be drawn from the latest ICSU visioning process, which appears to be dominated by a natural science focus (Reid et al., 2010).

On top of that, interdisciplinarity is too often not integrated from the start. Definition of the problem often sets the terms of engagement, expected outcomes, who is involved, etc. This

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