

Accessibility of Knowledge Systems to Respond to Global Environmental Change

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Abstract

Linking knowledge with action for effective societal responses to persistent problems of unsustainability requires transformed, more open knowledge systems. Drawing on a broad range of academic and practitioner experience, we outline a vision for the coordination and organization of knowledge systems that are better suited to the complex challenges of sustainability than the ones currently in place. This transformation includes inter alia: societal agenda setting, collective problem framing, a plurality of perspectives, integrative research processes, new norms for handling dissent and controversy, better treatment of uncertainty and of diversity of values, extended peer review, broader and more transparent metrics for evaluation, effective dialog processes, and stakeholder participation. We set out institutional and individual roadmaps for achieving this vision, calling for well-designed, properly resourced, longitudinal, international learning programs.

Keywords: Global warming; Sustainability

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Description

The broad goal of sustainable development is to meet the needs of current and future generations. Supporting this goal requires both the production of knowledge and also close attention to the nature of the processes involved in the generation and validation of knowledge claims [1]. Scientific knowledge has played a vital role in framing the global problems of unsustainability, and there is strong consensus that it also plays a critical role in informing societal responses to these problems, driving substantial research investment and scientific effort worldwide. Yet to a large extent, old knowledge systems are still being deployed for these new emerging social and environmental challenges. This means that urgent knowledge needs are not well met, resources risk being dissipated, and vital skills and capacities are either not developed or not adequately supported [2]. Here, we identify how structures and processes at the interfaces between issue identification, the production and the use of knowledge could be changed to promote a more engaged and reflexive role for science in a 'knowledge democracy' (a concept explored in in't Veld, 2010) that is more oriented toward sustainability in the face of accelerating global social-environmental change. This article draws on work carried out in the European Science Foundation/COST Frontiers of Science Forward Look 'Responses to Environmental and Societal Challenges for our Unstable

Earth' [3]. It is based on discussions of the international Working Group charged with reviewing the current state of interactions and addressing improved approaches at the interface between science and policy, communication and outreach.

Open knowledge systems able to address the complex social-environmental issues of global change and tackle unsustainability require broad societal engagement, ideally through all available engagement avenues, not just changes in practices and assumptions within the scientific community. The institutional structures of science within its current disciplines and boundaries affect the relationships between science, policy and society, and many shortcomings are now well known. Our priority areas for transformed engagement processes are outlined below, before we address the barriers to these transformations [4,5].

Conclusion

Incentives for operating at the interfaces between science, policy and wider society, and for academic engagement in sustainability-oriented science are weak and generally transient a function of the demand-driven nature of transdisciplinary work. Disincentives for this kind of work are generally strong and deeply engrained in academic culture. There are evident needs for a new phase of 'democratization of science', but there is also resistance in the research community. Barriers experienced at the individual level include disciplinary differences in language

and terminology, methodologies and techniques, norms and expectations about research development and dissemination, and the criteria for prestige and self-actualisation. Individual scientists working across discipline boundaries still need to draw on some important features of established academic cultures, to assure their authority and standing. It is intellectually and practically difficult to move outside of one's own scientific domain. And finally, having embarked on the risky enterprise of participatory, integrative, user-engaged research, there are still very few career opportunities for those individuals who choose to get involved. Academic institutions and science funders have been slow to provide security of employment in ways that ensure the skills required for this work can develop throughout a career.

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