



Institutional Perspectives on Integrating Environmental and Social Science for Problem-Driven Research

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Abstract

The Research and Development, the Environmental Protection Agency of the United States is working toward solutions-driven research and interdisciplinary integration. This article discusses the lessons learned from other federal agencies attempting to integrate social and biophysical research as well as the history of this process: finding the right mix of approaches from the top down and the bottom up; achieving a balance between the goals of scientific advancement and/or programmatic operation support; using methods from social science to guide the process; and involving a variety of stakeholders. Success is aided by paying attention to the social context of scientific practice, including how research is conducted and used. The following are three methods for supporting solution-driven environmental research by integrating the social sciences: incorporating social science into the research process, fostering interdisciplinary hubs, and strengthening social networks. Integration into the planning and execution of research has more potential to transform than integration into the production and distribution of products. The social context of scientific practice in government agencies and institutional considerations for advancing interdisciplinary are discussed in this article.

Keywords: Environmental social science, Interdisciplinary research, Solutions-driven research, Institutional science

INTRODUCTION

Multiple contaminants, media, and ecosystems may be involved in these issues, which may involve human behaviour and built environments; and show how the environment has changed over time as well as the legacy of the past (Anderson B 2015). In a variety of cultural contexts, the issues are intertwined with social, political, and economic dynamics. Research that combines the social and biophysical sciences is needed to find solutions to complex environmental issues. For instance, while risk assessments are based on toxicology, they also benefit from the social sciences. In order to determine who most at risk is, how, and why, behavioural epidemiological, public health, sociological, and engineering research is required to assess children's lead exposure or the effects of air pollution on cardiovascular health. Social determinants of

health, interactions between chemical and non-chemical stressors, and environmental justice studies. The EPA's Office of Research and Development (ORD) is advancing interdisciplinary, solutions-driven science for environmental problem solving by integrating the social and biophysical sciences, as described in this article. The use of theories and techniques from a variety of fields is included in this paper under the umbrella term "social science research." To better understand institutional considerations in interdisciplinary integration, the article draws on previous research on interdisciplinary, the social production of science, and the science-policy interface (Barnes J 2013). An overview of the organization's institutional structure and a brief introduction to social science are provided. The following are important lessons learned from other federal agencies: achieving a balance between top-down and bottom-up methods; utilizing social science research to support an agency's

programmatic operations and/or advance general scientific knowledge; utilizing methods from social science to guide integration; and involving a variety of stakeholders. Finally, specifics about the initiative's three success strategies are provided: fostering interdisciplinary hubs, strengthening social networks, and integrating social science into the research process. There are four stages to the research process: designing and distributing products, as well as planning and conducting research. The social context of scientific practice is taken into consideration at each stage. Integration into research planning and execution is more likely to result in transformative change; the advantages of integration in product development and distribution are primarily additive. The social context in which science is produced in a federal agency is examined, as are institutional considerations for interdisciplinary (Choquet A 2018). This initiative's lessons may be useful to other organizations pursuing a similar path.

MATERIALS AND METHOD

Environmental and social sciences in ORD

ORD, the agency's science division, collaborates closely with EPA program offices that oversee air, water, waste, and chemical safety, as well as with EPA regional offices that collaborate with state and local agencies to put environmental policies into action (Clayton S 2016). Decisions about regulations, the clean-up of contaminated sites, water treatment technologies, and other aspects of the agency's mission are influenced by ORD research. Scientists from ORD are employed in numerous national research facilities and laboratories. Computational toxicology, chemistry, microbiology, ecology, economics, and engineering are just a few of the many fields in which they are educated. Six National Research Programs oversee ORD research coordination: human health risk assessment, safe and sustainable water resources, sustainable and healthy communities, air and energy, chemical safety for sustainability, homeland security, and Despite the fact that the social sciences have played a limited role up until this point, the National Research Programs are by nature interdisciplinary. The need for solutions that take into account the complexity of environmental issues and decision contexts is becoming increasingly apparent within the agency. One way ORD addresses this need is through solutions-driven research that brings together social and environmental science. Through regulatory cost-benefit analysis and policy evaluation, the program and regional offices of the EPA engage in social science. An environmental economics program was established by the EPA. After Executive and an increasing emphasis on market incentives, economic analysis became a more important part of the agency during the Reagan and Bush administrations. The National Centre for Environmental Economics was established and additional economics research was carried out by its Office of Policy. More slowly, other fields of social

science were incorporated (Dunn G 2017). To investigate the human aspects of environmental issues, the Office of Sustainable Ecosystems and Communities collaborated with the Society for Applied Anthropology. The use of behavioural and social science in decision-making by federal agencies was encouraged by Executive Order (Eigenbrode SD 2007). EPA was one of several agencies whose operations were sparked by the order. The environmental laws and policies that underpin ORD's research mandate provide both the external and internal impetus for integrating social and environmental science (Fiksel J 2014). The National Environmental Policy Act, which mandates that federal agencies "utilize a systematic, interdisciplinary approach that will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision-making," serves as the foundation for support for environmental social science (Glika DC 2007).

The social setting for ORD science

The social context of scientific practice is crucial to the success of this initiative. The social sciences enrich environmental research by analyzing social phenomena that cause environmental change or mediate its effects, examining people's lived experiences with environmental problems, providing insights into human behaviour, and bringing societal outcomes (Hoover E 2015). The initiative approaches ORD research in this manner by using a four-stage process: planning, conducting research, developing and distributing products the stages may proceed in any order or overlap. This internal process is intertwined with the use of research, or how society as a whole creates the need for, comprehends, uses, and reaps the benefits of research (Maxwell K 2014).

CONCLUSIONS

Lessons learned by other federal agencies attempting to do the same have helped ORD. The lessons focus on using social science methods to inform the integration process, engaging multiple stakeholders, determining if the objective is to advance scientific understanding and/or provide programmatic support, and locating the appropriate combination of top-down and bottom-up institutional approaches. By carrying out actions at the project and organization-wide levels, ORD combines top-down and bottom-up approaches. Strengthening social networks, fostering interdisciplinary hubs, and incorporating social science into all four stages of the research process are three key aspects of its strategy. Success depends on paying attention to the social context of scientific practice. The greatest potential for transforming change exists when social science is incorporated into research planning and execution. Product development and distribution based on insights from social science enhances research outputs and may be suitable for some projects. It is not a replacement for significant changes to the research design and methods. Institutional codification, reconfiguration of research

infrastructure, and organizational cultural change are made possible by merging top-down and bottom-up approaches by fostering interdisciplinary hubs and strengthening social networks. It takes time for scientific practice norms, disciplinary hierarchies, organizational identity, resource allocation, and social relationships to shift. Changing research methods takes a lot of time and effort; the discussion of research use is even more complicated. Recent publications from the social sciences are early indicators of progress.

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