Human Problems Warrant Human Solutions:

How EPA is integrating social and environmental science to help solve the most challenging and consequential problems related to air, climate, and energy

by Dan Costa and Bryan Hubbell
Society continues to face compelling problems associated with climate change and air quality as it transitions toward low-carbon energy production systems and usage patterns. Traditional approaches to resolving such problems tend to place a greater emphasis on the contributions of natural science research, which can eclipse opportunities for integrating social and natural sciences through interdisciplinary research. Considering the inextricable links between the social and natural or environmental components of these types of problems, it is essential for research institutions to adopt interdisciplinary research approaches that can illuminate innovative, previously unexamined solutions to environmental pollution.

The Air, Climate, and Energy (ACE) research program in the U.S. Environmental Protection Agency’s (EPA) Office of Research and Development has positioned itself to be a champion of interdisciplinary, social-environmental science. The ACE program possesses a relatively broad mandate to address ecological and health problems associated with environmental pollution, and it has spearheaded efforts to make the research more interdisciplinary and systems-based to achieve holistic solutions. As such, the goal of incorporating social sciences into ACE’s research portfolio is to broaden the understanding of health hazards posed by air pollution and climate change, while arriving at solutions that combine regulatory, community, and individual behavioral elements to protect health and well-being. We believe that integrating social sciences into the research process at every stage, from hypothesis formulation through the publication and communication of results, can enhance EPA’s mission of protecting public health from environmental pollution.

New Research Focus
For more than 40 years, EPA has issued science-based air quality standards and regulations, which have resulted in great improvements to air quality and public health across the United States. While significant progress has been made, there are still millions of people in the United States who live in areas where poor air quality is a concern and climate change is impacting public health and the environment. Reducing risks will require the translation of science for use by communities and individuals so they can take action to reduce exposures and protect themselves from the harmful effects of air pollution and impacts of climate change. This will require research that elucidates the social aspects of exposure and risk, as well as obtaining and disseminating improved air quality information at the local level.

Complex Environmental Challenges

Social Sciences Network
Identify best matching social sciences

Natural Sciences Network
Identify best matching natural sciences

Collaborative Problem Formulation

Actionable Results to Improve Public Health and the Environment
ACE has developed a new research focus area titled “Protecting Environmental Public Health and Wellbeing,” in order to better integrate and translate science that supports regulatory standards, while broadening its usefulness to a wider audience. This topic is ripe for the development of interdisciplinary social-environmental research collaborations, and ACE researchers are taking steps to infuse social science research perspectives into their projects.

A key part of this research is the identification of modifiable factors, including social and economic factors that contribute to health risks from exposure to air pollution. For example, understanding how social stress (e.g., exposure to crime and poverty) may exacerbate the impacts of air pollution on respiratory health and may lead to greater focus on reducing air pollution exposures for populations with high levels of social stress.

Wildfire Smoke and Health Risk Communication Workshop
ACE has identified several near-term activities that will help establish the underlying tools and infrastructure needed to support interdisciplinary social-environmental science research. A key effort underway is the Wildfire Smoke and Health Risk Communication Workshop, scheduled to occur in late September 2016. This pioneering workshop will place sociologists, behavioral scientists, psychologists, risk communicators, and other social science experts alongside environmental scientists and community and institutional stakeholders to investigate the issues associated with communicating, comprehending, and managing health risks associated with wildfire smoke exposure. The workshop has two purposes: (1) to develop a clear formulation of the problem that reflects perspectives from both social and natural scientists, as well as key stakeholders, to guide future research efforts; and (2) to evaluate the process of an interdisciplinary problem formulation exercise to help inform future interdisciplinary social-environmental research endeavors. If you would like to learn more about the results of this effort, we plan to provide more information on EPA’s Wildland Fire Research web page after the workshop.

Social Sciences Exchange
A large part of integrating social sciences into ACE’s research involves cultivating an understanding among natural scientists of the range of theories, methods, data, and tools that are employed by social scientists, and how these might be applied to environmental research questions. ACE is working with others in EPA to increase awareness of the value of social science perspectives among natural scientists, and reaching out to the academic social sciences community to open up channels for interaction. The desired result is to establish a vast network of social science expertise, supported by innovative digital infrastructure, to draw on both Agency and external.
experts. This “social sciences exchange” will be used to support interdisciplinary social-environmental research planning and serve as a source of potential research collaborators.

In considering where ACE might invest in interdisciplinary social-environmental research, we identified several topic areas that have a high degree of potential overlap between social and environmental systems that could benefit from interdisciplinary approaches. They include:

1. Impacts of climate change and air pollution on human health and the environment;
2. Quantifying and valuing impacts of climate and air pollution on ecosystem services;
3. Impacts of vulnerability, susceptibility, and modifiable factors on air pollution exposure and health responses;
4. Benefits, costs, and economic impacts of climate and air quality mitigation and adaptation programs;
5. Impacts of future change (beyond just climate) and energy system evolution;
6. Next generation air monitoring technology, visualization and impacts on behavior, exposures, and health; and
7. Health messaging and risk communication.

Summary
Building on the lessons learned from the upcoming Wildfire Smoke and Health Risk Communication Workshop, ACE will be engaging the social science community to determine the best ways to integrate social science perspectives to address these social-environmental problems. ACE’s expanded focus on public health and wellbeing provides the ideal platform for bringing social and environmental researchers together to jointly formulate problems and begin to develop solutions. Recognizing that both the problems and solutions require a more integrated understanding of the human element will allow society to address environmental issues more effectively and comprehensively.

More Information:
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