## BACKGROUND: OUR NSF SPARC PROJECT


In 2004 we received funding from the National Science Foundation for a project titled "Science Policy Research and Assessment on Climate" or SPARC. One component of this project is an effort focused on understanding and assessing mechanisms/institutions that oversee the interconnections of the supply of and demand for research. Our research acknowledges is motivated by a simple fact: there is both a supply side and a demand side for scientific information relevant to decision making. This acknowledgement suggests a hypothesis that is strongly supported by results from our prior research, as well as the work and experience of many others: The capacity of scientific research to support decision making is greatly enhanced when the supply side (i.e., researchers) and demand side (i.e., decision makers) understand each other's capabilities, needs, and limits.

We are consciously using the terms "supply" and "demand" because in the economic marketplace, supply and demand are effectively linked, modulated, and optimized through many mechanisms. If there is no demand for a product, companies will not produce it (or, at least, not for long)—or perhaps they will advertise aggressively to create a demand. Producers are constantly monitoring, assessing, and responding to consumer preferences so that they can enhance sales and profits. Competition between producers of similar products (e.g., different brands of CD players or pain killers), or dissimilar products that fill similar needs (e.g., CD vs. cassette players; aspirin vs. ultrasound) leads to constant evolution of both consumer preferences and producer outputs. In the high technology sector, a considerable amount of incremental innovation comes in response to specific input from consumers. Overall, a key attribute of this coevolution of supply and demand is communication: producers are constantly striving to understand, influence, and respond to the preferences of consumers; consumers are constantly making choices among options in response to their own preferences, knowledge, and experiences.

Over the past several decades, scientific information has come increasingly to play a role in decision making at every scale from the individual (e.g., a person trying to understand if recycling provides an environmental benefit) and the very local (e.g., a mayor deciding whether to order an evacuation prior to a hurricane) to the global (e.g., governments negotiating climate change agreements). Here, there is a supply side and a demand side too, but formal or informal feedbacks to enhance mechanisms to ensure compatibility between the supply of scientific information and the demands of decision makers are often lacking. In the absence of such mechanisms, there are important factors at play which militate against alignment of supply and demand, factors that reflect intrinsic differences between research and policy making. For example, from the scientific (supply) perspective, the types of questions and problems that scientists are able to address or are interested in addressing are not necessarily those that decision makers need to have answered. And from the policy perspective, most important policy dilemmas are almost always underlain by value disputes that science cannot resolve.

Science policy scholar Harvey Brooks aptly characterized the inter-relationships of supply of and demand for scientific information:

> "If the process of using science for social purposes is though of as one of optimally matching scientific opportunity with social need, then the total evaluation process must embody both aspects in an appropriate mix. Experts are generally best qualified to asses the opportunity for scientific progress, while broadly representative laymen in close consultation with experts may be best qualified to assess societal need. The optimal balance between opportunity and need can only be arrived at through a highly interactive, mutual education process involving both dimensions."[1]

Yet policy research increasingly documents that compatibility of scientific supply and decision maker demand can be increased through mechanisms that enhance knowledge of, and communication between, the supply and demand sectors. When scientists and decision makers understand each other's capabilities, needs, and limits, research agendas

[1] Brooks, Harvey, The Evolution of U.S. Science Policy, in B. Smith and C. Barfield (eds.), Technology, R&D, and the Economy, Washington, DC: Brookings Institution, 1995, p. 33.

can be better designed to support decision making, and decisions can be more successfully rooted take advantage of scientifically robust information.

***Our Focus is on the RISA's as a Place to Learn***

We are focusing on the RISAs as a body of experience that offers the promise of learning about successes of and obstacles to reconciling the scientific supply of and demand for science. We are not interested in evaluating the RISAs with respect to their NOAA missions. We are happy to leave that to the RISA program managers. But we do think that the RISAs can teach us, OGP, NOAA and the CCSP and beyond something about the challenges at the two-way interface of the complex relationship between decision making about science and decision making about climate. The RISA program explicitly seeks to work at the boundary of science and decision making[2].

> "RISA projects point the way toward a new paradigm of 'stakeholder- driven' climate sciences that directly address society's needs and concerns."
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> "What makes science useful and usable for the public? Much work has gone into answering this question, and the RISAs have been at the forefront of the effort. RISA researchers place strong emphasis on working directly with people who have an investment—a "stake"—in activities, resources, or property that may be vulnerable to climatic impacts. These stakeholders hold the key to scientists' understanding of what kinds of climate information can aid the public in coping with climate variability, and how to provide this information in forms that people can actually use."

A 2004 NRC Report that looked at experience in seasonal climate forecasting found this area to be rich for understanding connections of science and decision making,

> "…crucial to the success of such systems is that they incorporate user-driven definition and framing of the problem to be addressed. "User-driven" is used here to mean that the agendas of analysts, forecasters, scientists, and other researchers are at least to some degree set by the potential users of forecasts. The process of collaborative problem definition would be user driven, but reflect input from the scientific (producer) community on what is feasible."[3]

In April, 2002, the House Science Committee held a hearing to explore the connections of climate science and the needs of decision makers. The hearing charter included the following question: "Are our climate research efforts focused on the right questions?"[4] And by "right questions" the Committee clearly meant questions whose answers are likely to lead to useful information to decision makers.

The Science Committee's hearing highlighted the role of the NOAA Regional Integrated Sciences and Assessments (RISA) as a promising means to connect decision making needs with the research prioritization process:

> "One approach to producing policy-relevant information is the regional assessment model, developed within NOAA and other agencies, that attempts to build a regional-scale picture of the interaction between climate change and the local environment from the ground up. By funding research on climate and environmental science focused on a particular region, [the RISA] program currently supports interdisciplinary research on climate-sensitive issues in five selected regions around the country. Each region has its own distinct set of vulnerabilities to climate change, e.g., water supply, fisheries, agriculture, etc., and RISA's research is focused on questions specific to each region. The regional assessments are developed in consultation with local stakeholders such as resource managers, farmers, and emergency responders. RISA has been called a step in the right direction by some, although the program is small (approximately $4 million in FY 2003), while others view it as a model that could guide some of the larger efforts within USGCRP."

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[2] From the 2005 RISA Brochure

[3] NRC Seasonal Climate Lessons Workshop Report

[4] http://www.house.gov/science/hearings/full02/apr17/full_charter_041702.htm

The RISA program is now 10 years old and has developed a significant body of experience in working to establish a positive feedback between decision makers and interdisciplinary science and assessment.[5] This experience provides a rich resource for drawing lessons from the various RISA projects on how science priorities might be set, research implemented, and the resulting output transferred to operational agencies in support of the needs of decision makers.

Our workshop, to be held 15-17 August 2005, hosted by the Hawaii and Pacific Islands RISA in Honolulu, HI, that will bring together ~40 participants, including representatives from each of the RISA teams, to address the questions such as the following:

- How are stakeholders' needs reflected in the research prioritization process?
- How are stakeholders' needs assessed and evaluated?
- How does each RISA prioritize areas of research and assessment to which to it devotes its resources?
- How does each RISA evaluate its resource allocation decisions?

Participants will come from each of the NOAA RISA projects, the SPARC team, as well as others with expertise in science policy and climate.

The overarching goal of the workshop is to distill from the RISA projects those understanding of processes, institutions and other conditions that facilitate making decisions about climate science research priorities that lead to useful information for decision makers. We will evaluate the extent to which climate science policy in the RISAs can serve as "a model that could guide some of the larger efforts within USGCRP."

In addition to the workshop itself, products will include a report and preparation of at least one article for submission to a peer-reviewed journal.

[5] http://www.risa.ogp.noaa.gov/index.html