WeatherZine

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Environmental and Societal Impacts Group

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Comments? Send us email at thunder@ucar.edu

Editorial

Stakeholders and Science

In the past ten years, recognition of the importance of stakeholders has been one of the most dramatic changes in science. People who are affected by and use the results of research - who are variously lumped together under the terms "end users," "decision makers," and "stakeholders" - have in many areas of science become accepted as important participants in aspects of the research process. This is particularly true in the atmospheric and related sciences where the connections of research and society are often significant.

The change in perspective stands in sharp contrast to what some of my colleagues have referred to as the "loading dock" model of science, where researchers (and even those involved with operations, e.g., weather forecasting) simply provide a product without much concern for its use. For those of us interested in the interface of science and stakeholders, recent trends have been welcome.

But like many trends in science, stakeholder involvement in the research process runs the risk of becoming a passing fad if it does not contribute to the shared goals of the scientific community and the broader society of which it is a part. Thus, it is important to carefully consider the different ways that science and society interact through stakeholder involvement in the research process. I can think of three important ways:

A "Customer Service" approach. The public, through its elected representatives, provides tens of billions of dollars in support for science and technology. Some of this support is targeted at grand questions that broaden our perspectives; other parts go to the development of useful knowledge with immediate applications. All of the support is subject to accountability and questions about the effective use of scarce resources. Thus, in recent years (and particularly since 1993 with the passage of the Government Performance and Results Act), federal science agencies have begun to take steps to enhance their ability to ask their "customers" questions such as "how are we doing?" "How might we do better?" As a matter of practice this could involve surveys or focus groups, but necessarily requires input from the stakeholder. The results from such feedback can play an important role in improving government performance. Of course, those in the private sector might rightly note that this perspective is not news to them – it would be difficult to stay in business without satisfied customers!

A "Benefit/Cost" approach. Often, proponents of science are asked by those paying the bills to justify why investments in these areas make sense. This of course is neither new nor unique to science. But what is new is the increased attention that the science community has paid to documenting the value of its work. For example, in recent years the National Science Foundation has added to its proposal review criteria research's broader impact on society. This stands in sharp contrast to even the recent past in the atmospheric sciences when in the 1980s the entire multi-billion dollar National Weather Service Modernization was, in part, justified by a $15,000 study of dubious academic merit! To the extent that benefits and costs of science are effectively considered in the research process, scientific priorities can be set with a more accurate expectation of societal benefits. But it is also important to recognize that a "benefit/cost" approach can just as easily be conducted in the context of the "loading dock" model of science, which would not necessarily involve stakeholder input. How one approaches delineation of benefits and costs depends on whether one asks, "What is the value of this particular science?" or "How might we conduct science to ensure that it has value?"

A "User-Centered Research" approach. People who conduct research often use the term "units of analysis" to refer to the characteristics of the

phenomenon being studied. For a chemist the unit of analysis might be the atom or the molecule; for a political scientist it might be the election or the nation-state; for an ecologist it might be the ecosystem or the plant, and so on. There is a group of scholars with backgrounds in many disciplines whose focus is on how people - in groups or as individuals - make decisions in the context of scientific information. For these scholars, stakeholders (or more accurately, decisions made by stakeholders) are the units of analysis. Researchers with this perspective often hold improved decision making in the context of science as an explicit goal of their work. A good example of this type of work is supported by NOAA's Office of Global Programs (www.ogp.noaa.gov/mpe/csi/econhd).

As I have observed the trend of increasing recognition of the importance of stakeholders in the research process over the past decade, I have also begun to note with some concern that often the practice of adopting a more stakeholder-focused approach to science confuses the approaches described above. There should be a healthy overlap among the three perspectives - e.g., one must typically interact with and solicit stakeholders in doing "user-centered research," a good "benefit-cost" study should be based on solid research not predetermined answers, "user-centered research" often provides knowledge of costs and benefits and gathers information about stakeholders as well, etc. But it is of critical importance that the science community understands the importance and distinctive value of each of the three approaches. Confusion can lead to dissatisfaction among stakeholders and scientists alike, and to the extent that "customer satisfaction" and "cost/benefit" are viewed as surrogates for "user-centered research," the lack of knowledge at the interface of stakeholders and science (which has been a frequent topic in the WeatherZine) will persist, largely un-addressed.

It is critical that stakeholders have a means to provide direct feedback to the scientific community and its overseers, that decision makers have some basis for comparing the relative value of alternative scientific activities based on their expected societal benefits, and that scholars develop knowledge based on rigorous research at the interface of stakeholders and science. All three perspectives are mutually reinforcing and contribute to science in service to society, but to achieve this objective requires that we recognize the different interfaces of stakeholders and science.

-- Roger A. Pielke, Jr.

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Guest Editorial

Changing importance of weather during the 20th century

The 20th century saw major changes in how the nation views the importance of weather and the value of weather-related information. While society once had an implicit belief in the importance of weather, it now has an explicit need to define that value in economic, societal, and environmental terms. This major shift affects how atmospheric sciences will be conducted, how much financial support for research and operations will be provided, and how much public and policy acceptance and use of meteorological information there will be.

When the 20th century dawned, society had very little practical weather information. Weather could be very deadly, and forecasts were at best an art, not a science. Consequently, weather-related death tolls were enormous: 6,000 (1901 hurricane at Galveston, Texas), 685 (1925 tornado in Illinois), and 1,100 (1927 floods along the lower Mississippi River).

The fledgling science of meteorology evolved slowly during the early decades of the 20th century. Weather information's shift from an agricultural orientation to an aviation and business focus occurred during the 1930s, as reflected by the transfer of the U.S. Weather Bureau from the Department of Agriculture to the Department of Commerce. The emergence of commercial aviation and its need to know existing and future weather conditions fueled the demand for weather forecasting and forecasters. Science and the necessary forecasting tools were also developing rapidly.

World War II had a profound influence on meteorology. Suddenly there was an enormous need to know the state of the weather in many parts of the world, including climatic conditions where troops were headed in Africa, Asia, and Europe. Military operations required information about the state of the weather at the front, and desperately sought weather predictions. This huge demand for weather expertise also created a need for meteorologists, principally forecasters. Hundreds of persons trained in other disciplines had to take weather training. The number of meteorologists jumped from a few hundred in 1940 to thousands by 1946. Of course, the value of weather information was obvious and did not require measurement.

Major droughts during the 1950s led to attempts to make rain through cloud seeding. Successful fog suppression efforts during WWII were sufficient to lead to a growing belief that humans could somehow control the weather. The potential for modifying weather

became a new focus of government weather research, along with forecasting, in the late 1950s and 1960s.

Profound, fundamental societal changes in the 1960s led to major revisions in public views about the value and importance of weather. The emerging environmental movement expressed great concern about human impacts on the environment, including air pollution and cloud seeding. Although meteorologists had previously assumed that "If we could change the weather, it would benefit everyone," studies of economic effects showed this assumption to be fallacious. Another fundamental change during the 1960s was the end of essentially unlimited government funding for weather research. A tightened federal pocketbook meant that scientists now had to compete for funds against hundreds of other major demands on government resources, including those of other sciences. This led to the realization that scientists needed to define the value of weather and how weather science could benefit society and the environment.

In essence, the events of the 1960s and 1970s ended the era of *implicit belief* in the value of weather. Unfortunately, most meteorologists believed that weather was an all-important societal issue and were not prepared to define its value and defend what they were doing by working with economists and scientists of other disciplines. Additionally, technological advances in weather-sensitive industries such as agriculture, transportation, and heating and air conditioning made society less vulnerable to many vagaries of everyday weather conditions. Citizens became less concerned about weather than they had been in 1900 or 1930. Vast improvements in storm forecasting allowed society to make informed decisions, reducing deaths due to weather events. Many of the every day problems due to weather had disappeared.

Since the 1970s, a few interdisciplinary groups have tackled the issue of defining weather impacts, but the human and financial commitment has been meager. What is clear, as the 20th century ends is that atmospheric scientists must define the value of weather, including weather data and information. For example, responsible action in response to global climate change rests heavily on correctly ascertaining the impacts of future climates. Highly accurate long-term forecasts generated during the 1997-1998 El Nino provided new insights about the vast value of long-range predictions and the widely different economic impacts of anomalous weather conditions.

During the 20th century, meteorology has been very successful in reducing weather-related deaths, as well as minimizing many detrimental effects of day-to-day weather conditions. As we enter the 21st century, atmospheric sciences are competing with many other societal issues for visibility and support. The field of meteorology cannot go forward sensibly into the 21st century without credible information on weather's economic, societal, and environmental impacts. Policymakers at all levels now insist on such information; environmentalists seek definitive information on how weather and climate affect ecosystems; and members of society want meaningful information about how weather affects their lives and the global economy.

-- Stan Changnon
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Correspondence

Dear WeatherZine,

The web pages are very informative and I hope you continue publishing in this manner for many years to come. I do recommend that you create an archive of past issues in ASCII (or text) format for those who prefer to receive and read these messages in straight text format. I suspect that there are more of us (text readers) than you may suspect.

Thanks for your time and once again, keep up the excellent work!

--Mike Bell (mike.bell@noaa.gov)

WeatherZine responds:

You can access text-only versions of the WeatherZine at the following URL:
www.esig.ucar.edu/socasp/zine/txt/

Thank you for the suggestion. Let us know if we can be of further assistance.

Weather Related News

Aquila Energy, a global leader in weather derivatives and energy, is pleased to announce the launch of the world's first online weather risk management portal, guaranteedweather.com. Through this web site, businesses with weather-sensitive risk can learn about weather risk in their industry, quantify it, and purchase financial derivatives to help manage it.

Aquila Energy is also offering academics and professionals the opportunity to publish weather risk management-related studies on the site in exchange for worldwide exposure, full authorship credit, a small

gift, and the chance to win a cash prize. Papers and studies are sought in the following areas: uses of weather derivatives, examples of how derivatives have been used to address a business's weather risk, pricing methodologies, climate events, and seasonal forecast methodologies.

For more information, visit www.guaranteedweather.com or email Ravi Nathan at rnathan@utilicorp.com.

The Disaster Research Center (DRC) of the University of Delaware announces that effectively immediately all its publications--not copyrighted by others--will be available for free downloading from its web site (www.udel.edu/DRC/). This applies to all new publications. DRC publications from 1985- on will be online by the end of the year 2000. The DRC will attempt to put all its earlier publications from 1963 to 1984 online during 2001. Paper copies will still be available by mail for those without Internet access. Anyone with questions about this new DRC policy should contact Susan Castelli, DRC Library Coordinator at castelli@udel.edu.

Job Opportunities

Atmospheric Scientist/Climatologist

The Bermuda Biological Station for Research, Inc. (BBSR) is a U.S. incorporated 501(c)(3) 'not-for-profit' marine research and education institution incorporated in New York State and based in Bermuda since 1903. BBSR currently employs a multi-national staff of approximately 100 people and caters to 2,000 scientific and educational visitors per year. Activities include oceanographic and marine biological research conducted by resident and visiting scientists, and university-level courses on topics ranging from marine pollution to remote sensing. Additional information on BBSR can be found at www.bbsr.edu.

BBSR seeks a mid- to senior-level scientist with interests in a broad range of atmospheric processes and an ability to enhance interactions between the climate science and business communities. The candidate will undertake independent research, collaborate with scientists at BBSR, and interact with the staff and corporate sponsors of the Risk Prediction Initiative (RPI), a unique science-business partnership based at BBSR. Scientists at BBSR study a wide variety of atmospheric and oceanographic processes and support atmospheric and oceanographic time series stations. The RPI supports research on problems related to tropical cyclone dynamics and forecasting, and seasonal and inter-annual climate forecasting. Rank and salary commensurate with experience.

For further information please contact Gillian Hollis (tel: 441-297-1880 ext. 237; email: gillian@bbsr.edu and see the RPI web site at www.bbsr.edu). Applicants should send a C.V., contact information for three references, and a description of their research interests to:

Dr. Anthony Knap, Director
The Bermuda Biological Station for Research, Inc.
17 Biological Lane,
St. George's, GE01
BERMUDA

BBSR is an equal opportunity/affirmative action employer operating a drug-free workplace and learning environment.

IIASA Postdoctoral Opportunities

The International Institute for Applied Systems Analysis (IIASA) near Vienna, Austria, offers a postdoctoral program for scholars interested in research on issues of science and policy within the Institute's three theme areas of Natural Resources and Environment, Population and Society, and Energy and Technology. The National Science Foundation has indicated that postdoctoral work at IIASA would be eligible for funding under its International Research Fellowship Program, and encouraged IIASA to solicit applicants. NSF awards a stipend, plus allowances for travel, insurance, family, etc.

APPLICATION DEADLINE IS NOVEMBER 15, 2000.
You should consider applying if:
* You are within a year of completion of your doctorate, or no more than six years removed from receiving it;
* Your field of research coincides with one of IIASA's Project Areas;
* Your research and career would benefit from a year or two at an international research institution where you could interact with scientists from all over the world;
* You would like to investigate the policy implications of your research; and
* You are an American citizen or permanent resident.

IIASA is an international institution, supported by the U.S. and thirteen other governments, that engages in scientific research aimed at providing policy insight on issues of regional and global importance. Its suite of projects presently include the following:

* Population
* Radiation Safety of the Biosphere

* Forestry
* Transboundary Air Pollution
* Environmentally Compatible Energy Strategies
* Economic Transition and Integration
* Social Security Reform
* Adaptive Dynamics Network
* Transitions to New Technologies
* Risk, Modeling, and Policy
* Dynamic Systems
* Natural Catastrophes and Developing Countries
* Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia

For more on the work done in each of these projects, see the IIASA web site at www.iiasa.ac.at.

Applications go to the NSF International Research Fellows Awards Program, and the application process is described at www.nsf.gov/cgi-bin/getpub?nsf00141. Fastlane submission is required. Among the requirements are a detailed project description (five pages or less) that offers a rationale for conducting the research abroad at the host institution, a 50-word abstract, NSF application forms, a C.V., and a letter of invitation from the IIASA scientist with whom you would work. All application materials, including 3 letters of reference, must meet NSF's November 15 deadline.

You can contact IIASA scientists directly, through the IIASA web site. Or you can have the staff of the U.S. Committee for IIASA act as intermediary, answering questions and introducing you to project leaders with whom you might work.

For more information contact:
Margaret Goud Collins, Program Director for the U.S. Committee for IIASA
American Academy of Arts and Sciences
136 Irving St.
Cambridge, MA 02138
Phone: (617) 576-5019
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Email: mcollins@amacad.org

Weather Data Coordinator

Risk Management Solutions, Inc. Weather Risk Product Marketing is seeking a Weather Data Coordinator. This individual will be responsible for coordinating the acquisition and management of a broad array of meteorological data that will be integrated in Climetrix, RMS' new Internet-based application for the weather derivatives market. Specific responsibilities will include researching the availability of different types of data around the world, interfacing with the business management and product development teams on product requirements, coordinating the acquisition of data from government and private data providers, processing and formatting data, responding to client inquiries, and gathering feedback from clients regarding new product directions.

This position requires a Master's degree in meteorology or a related field, strong computer skills, experience with processing and analyzing large and diverse data sets, attention to detail, and excellent oral and written communication skills. The ideal candidate is familiar with historical weather data and forecasts, has strong quantitative skills and a working knowledge of database and statistical software packages, has experience delivering and processing weather data over the Internet, and demonstrates considerable initiative and an ability to collaboratively work in a team without frequent supervision. Please see our web site at www.riskinc.com.

For more information contact:
Risk Management Solutions, Inc.
149 Commonwealth Drive
Menlo Park, California 94025
Attn: Tom Arnold - Recruiter
Office: (650) 617-2483
Fax: (650) 617-6435
Email: thomasa@riskinc.com
Reference 00-130

Selected Web Site Additions

Emergency Management

www.agctr.lsu.edu/eden/
Extension Disaster Education Network (EDEN)

EDEN is a collaborative multi-state effort by Extension Services across the country to improve the delivery of services to citizens affected by disasters. This site is designed to provide Extension agents and educators with access to resources on disaster preparedness, recovery, and mitigation that will enhance their short- and long-term programming efforts.

General Weather Resources

www.cred.be
The Centre for Research on the Epidemiology of Disasters (CRED)

CRED maintains one of the most extensive databases on disasters available on the Web.

Hurricanes

www.ametsoc.org/AMS/
The Weather Channel Forum on Hurricane Preparedness and Response

The findings and recommendations of The Weather Channel Forum on Hurricane Preparedness and Response suggest that our nation is at serious risk of severe damage and loss of life caused by hurricanes. The forum report calls for an assessment of the vulnerability of communities with potential exposure to hurricanes and the development of improvements in the preparedness, prediction, communications, and response strategies at the national, regional, and local levels.

Injury and Damage Statistics

www.iiasa.ac.at/Research/CAT/index.html
The Natural Catastrophes and Developing Countries (CAT) Project of the International Institute for Applied Systems Analysis (IIASA)

The project has developed a modeling technique to integrate direct estimated costs of natural disasters to macro-economic planning models for developing countries. The modeling work will create a platform to help interested parties evaluate tools for financing the cost of post-disaster reconstruction.

Summer/winter

www.bmj.com/cgi/content/full/321/7262/670
Heat-related mortality in warm and cold regions of Europe: Observational study

This paper offers some interesting findings: annual cold-related mortality is higher than heat-related mortality across Europe, and, overall, Europeans can be expected to adjust to global warming predicted for the next half century. The authors point out, however, that their findings in no way negate the need to take preemptive measures against heat stress.

www.bmj.com/cgi/content/full/321/7262/650
Saving lives during extreme weather in summer

This editorial from the British Medical Journal calls on health professionals worldwide to work with local health agencies and emergency management offices to develop reliable systems to warn of and deal with temperature extremes and their effects on humans.

Weather Policy

www.fsa.usda.gov/pas/disaster/assistance1.htm
Farm Service Agency's Natural Disaster Assistance

This site describes several FSA programs: The Emergency Conservation Program (ECP), The Noninsured Crop Disaster Assistance Program (NAP), Emergency Loan (EM) Assistance, and Emergency Haying and Grazing Assistance.

About Us

WeatherZine is a bimonthly newsletter on the societal aspects of weather. It contains opinion pieces, news, and a brief summary of developments at the *Societal Aspects of Weather* Web site.

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Subscription Information

The *WeatherZine* is produced both as both a Web page and an email message. Subscribing to the *WeatherZine* will add you to our distribution list and you will receive email messages whenever the *WeatherZine* is released.

To submit an item to the *WeatherZine,* use the online form at: www.esig.ucar.edu/socasp/forms/feed.html or send email to thunder@ucar.edu, and include the following information:

Name
Organization
Email Address
Interests & Needs

For additional information, please contact the webmaster at oxelson@ucar.edu