Climate Panel: Science Must Support Efforts to Cope with Climate Change-Related Problems

Federal panel chaired by Scripps scientist addresses future of U.S. Climate Change Science Program

February 26, 2009

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The federal government's climate change research program should broaden its focus to include research that would support actions needed to cope with climate change-related problems that will impact society, while building on its successful research to improve understanding of the causes and processes of climate change, says a new report from the National Research Council committee chaired by V. Ramanathan, a climate and atmospheric sciences professor at Scripps Institution of Oceanography, UC San Diego.

As the U.S. Climate Change Science Program (CCSP) looks to the future, it should establish a U.S. climate observing system; develop new modeling capabilities for regional- and decadal-scale forecasts; strengthen research on adaptation, mitigation, and vulnerability; initiate a periodic national assessment of climate impacts and responses; and routinely provide policymakers with crucial scientific information, tools and forecasts.

"CCSP has created a robust infrastructure for observations and modeling, which has enabled scientists to document trends in critical climate parameters and identify the human impacts on climate change," said Ramanathan. "Now we need to know how to respond to climate change, while working closely with policymakers on mitigation and adaptation strategies."

In 2007, the committee issued its first report, which evaluated the program's progress at the request of CCSP's former director. For this second report, the Research Council was asked to identify future priorities and lay out a framework to guide the evolution of the program.

The committee found that the program is hindered by its limited research into the social sciences -- such as research on the role of human actions and behavior in changing climate and how societies can mitigate and adapt to the impacts -- and the separation of natural and social sciences research. Spending on human-dimensions research has never exceeded 3 percent of the CCSP research budget. As a result, research, data collection and modeling of how people interact with or affect their environments have lagged behind corresponding activities on the physical climate system. The program should make transformational changes to adopt a holistic approach that connects research across disciplines, as well as engages policymakers and other stakeholders, the committee said.

Integrating research in the natural and social sciences should make it easier to tackle climate change problems that could directly impact communities, some of which include extreme weather and climate events and disasters; sea level rise and melting ice; fresh water availability; agriculture and food security; ecosystems management; new and re-emerging diseases; and effects on the U.S. economy. The knowledge gained from this integrative approach would guide the nation on choices to reduce the costs and risks of climate change impacts,

and provide early warning of changes that are abrupt and large enough to push climate and human systems past tipping points.

Progress in these areas could be sped up by supporting research on vulnerability, adaptation and mitigation. Moreover, targeted research in the natural sciences could help meet various community needs for climate information and services, such as drought forecasts for a particular region. These research initiatives would help address societal concerns of direct relevance to the program and provide a concrete focus for collecting human-dimensions data, the committee noted.

Another priority should be to help establish a U.S. climate observing system that includes physical, biological and social observations to ensure that data needed to address climate change are collected or continued, the committee said. Even if people significantly reduce their greenhouse gas emissions, further climate change is inevitable. Therefore, CCSP needs to have the capacity to explain what is happening to climate and why. It should work with federal, state and international agencies to establish and maintain the system, as well as determine the agencies' different roles and responsibilities for making the observations, archiving and distributing data.

As research attention shifts toward the impact climate change has on societies, more information is needed at regional to local scales. CCSP should develop and implement a strategy to improve modeling of regional climate change and initialize seasonal to decadal climate forecasting, the report says. Such enhanced predictions will require models that cover a wide range of space and time scales, especially those that can predict climate phenomena at regional (a few kilometers) or decadal time scales. Climate modeling to date has been primarily at the global scale, with time scales only for the next hundred years.

Moreover, CCSP should work with stakeholders to design and implement a comprehensive national assessment that identifies evolving science and societal needs. While CCSP is mandated to carry out a national assessment every four years, the last one involving a broad range of stakeholders was a decade ago. The collection of 21 synthesis and assessment reports published from 2006 to 2008 -- although useful -- did not add up to a comprehensive national assessment.

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NOTE: Copies of *Restructuring Federal Climate Research to Meet the Challenges of Climate Change* are available from the National Academies Press; tel. 202-334-3313 or 1-800-624-6242 or on the Internet at HTTP://WWW.NAP.EDU. Reporters may obtain copies from the Office of News and Public Information.

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