Question Predictions

Research Turns Focus to Long-Term Climate Effects

On the wall in Roger Pielke's office is a bumper sticker that provides a clue to the state climatologist's way of thinking: "Question Predictions."

It's not that Pielke, who also is a professor in the Department of Atmospheric Science and president of the American Association of State Climatologists, doesn't believe in predictions. But to help people affected by the weather – and that includes just about everybody – Pielke would like to see the emphasis shift to vulnerability and resiliency rather than concentrate on predictions.

In fact, Pielke gave testimony to that effect to the House Committee on Energy and Commerce in Washington, D.C., in late July.

"The House testimony provided both my perspective and the perspective of the AASC that there really is no foolproof method known to science to predict long-term climate because of the many feedbacks between land surfaces, the atmosphere, oceans, and other variables," Pielke says. "As well, the human influence on climate is significant and multifaceted and has greater impact on climate than what has been suggested by national and international assessments."

"By focusing on vulnerabilities rather than predictions as a focus of research, I think the scientific community can provide more comprehensive and likely more useful information to decision makers."

As an example, Pielke says that tree-ring records over the past 800 years show more serious droughts than those experienced in the 20th century, and those events were natural – humans had little or no influence. He suggests that our society needs to plan ways to deal with events on the magnitude of such climate changes, especially in light of the burgeoning human population and higher demands on resources now taking place.

Pielke's taken a big step in that direction with the establishment of DroughtLab with colleagues Jose Salas, professor of civil engineering, and Robert Ward, director of the University's Water Center and the Colorado Water Resources Research Institute. DroughtLab is a new collaborative drought analysis and management laboratory that redirects current resources and establishes new studies to provide information to government leaders, businesses, and individuals as they plan for and manage drought events. Along with Pielke, Salas serves as co-director of the lab.

The lab brings together the knowledge of more than 100 researchers from 22 academic departments at Colorado State and labs and departments at the University of Colorado at Boulder. Disciplines contributing to DroughtLab's efforts include atmospheric science, civil engineering, watershed sciences, soil and crop sciences, rangeland science, forest science, ecology, sociology, political science, and agricultural and resource economics.

"Severe Colorado droughts, such as the one we currently are experiencing, have occurred in the past and will happen again in the future," Pielke says. "With increased population along the Front Range, our vulnerability to severe drought has greatly increased."

DroughtLab serves as a framework for researchers to collaborate and develop a wealth of information that helps water managers reduce Colorado's vulnerability to drought. Research will be conducted on campus and across the state at the Agricultural Experiment Station research centers located in communities throughout Colorado. Outreach education, statewide Cooperative Extension efforts, technology transfer, and the communication of drought knowledge to state and local officials and the general public will complement the lab's research efforts.

While Colorado is quite vulnerable to drought, Pielke says that vulnerability varies with specific water users.

"For agricultural interests on the eastern plains, wet fall seasons would be great – the dryland farmers could actually recover fairly quickly from dry summers. But the municipal water supplies of the Front Range cities require longer recharge time, and that's one reason why the DroughtLab will look at these diverse impacts to try to quantify them so managers know what we can recover quickly from, what takes longer, and what they can do to help mitigate or adapt to droughts."

In the end, Pielke recognizes the difficulty in understanding all the variabilities of climate and how land-use alters the local microclimate and cumulatively affects the regional climate, but that's not going to keep him from asking "what-if" questions: If we had an above-average rainfall, could we recharge the aquifers, given what we know about the system? What would happen to our reservoirs if we have a dry winter? How vulnerable are we to long-term drought?

And those are some big questions that keep Roger Pielke coming back to work every day. "Climate is multidimensional, unpredictable, and fascinating," he says.