Scientist Creates Water Use Manual for Developing Countries

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(PhysOrg.com) -- Climate scientists can predict weather trends months, even years in advance, but this vital information often is never seen by engineers and professionals who manage water supplies in developing countries, says Casey M. Brown, assistant professor of civil and environmental engineering at the University of Massachusetts Amherst.

The result can be crops and lives lost to flooding, inadequate public water supplies during droughts or the inability to handle variations in weather patterns that can cripple regions or whole countries, he says. Poor planning can also restrict power generation from hydroelectric dams and upset necessary irrigation patterns.

In an effort to link climate data that is widely available in developed parts of the world with the key decision makers in the developing countries, Brown has developed a manual that shows how to get important climate data and to use it in making seasonal adjustments to water supplies and crop decisions. The manual and its supporting research will be published in May by the International Research Institute for Climate and Society, part of the Earth Institute at Columbia University.

“Our research shows that climate variability is a huge factor and it’s an impediment to economic development in the developing world,” Brown says. It’s also well known that scientists can get access to long-range weather and climate forecasts that can alert them to the likelihood of those variations. The question is how to get the new data into the hands

of people who can use it.

The manual, therefore, offers a straight forward explanation on how to get access to available weather and climate data and it can be used for seasonal planning. While that sounds simple enough, he says, it isn't.

One critical problem that must be overcome is that in places such as sub-Saharan Africa and South Asia, the engineers who build and run dams and water districts aren't trained to use or understand climate information. This becomes more important when considering that in much of the developing world, large dams and water projects are still being built, often to standards that are decades old, Brown says. "In Africa, for example, there are large dams that are just in the design phase," he says. "They're still building the infrastructure. There is a huge opportunity to design it to use this information and as a result, perform much better."

There are also some more fundamental problems, Brown says. In much of the world, people tend to view the climate as a stationary process. They believe the weather patterns of the past will be repeated in the future. But if climate change scientists are correct, those familiar patterns may be changing. At the same time, some of the longer-term climate patterns, such as El Nino, which appears on an irregular two-to-seven year cycle, are still being studied and aren't well understood.

Finally, after taking into account the vagaries and predictable changes in weather patterns, sometimes accurate climate data isn't available for political reasons, Brown says. This is an issue, for example, in South Asia, where several huge rivers have their origins in the Himalayas and flow across international boundaries, sometimes between ancient enemies who have little incentive to cooperate. "Climate change gives them an excuse to share data and address this challenge together," Brown says.

In other cases, like the Indus River, which runs between India and Pakistan, the use of the river is so critical to both countries they have long cooperated out of self-interest.

Provided by University of Massachusetts Amherst