Media Relations

UNH Scientists Get $827K From NSF To Assess Impacts On Asian Water Cycle

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DURHAM, N.H. – Scientists from the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space (EOS) have been awarded an $827,492 contract from the National Science Foundation (NSF) to lead a multidisciplinary, multi-institutional project that will assess the impacts of climate- and human-driven changes in hydrology on agricultural production and land use in Central, South, East, and Southeast Asia.

Water and food security in Asia in the face of climate change and rising populations is an issue of global importance, and much of the study region is already experiencing physical or economic water scarcity. The aim of the three-year study is to uncover implications for regional food security and economic welfare in the coming decades.

The integrated assessment, funded under NSF's Water Sustainability and Climate program, totals $1.5 million and will also involve team members from the University of Alaska-Fairbanks, Penn State, and Boston University. It will combine future climate projections, remote sensing, and hydrological data together with hydrological, geophysical, agroecosystem, and economic modeling to characterize the relative importance of local precipitation, runoff, groundwater mining, interbasin water transfers, and agricultural and non-agricultural water use for the region's water supply-demand balance.

The project goal is to estimate how effects of climate change on high-elevation snow, ice, and permafrost hydrology will affect downstream water resources and food production. The implications of dam construction and other large-scale water engineering efforts will also be included in the analysis.

Researchers from the EOS Complex Systems Research Center (CSRC) will concentrate on modeling agricultural and water cycle components while scientists from the University of Alaska-Fairbanks will do glacier melt and permafrost modeling. An economist from Penn State will do economic modeling and team members from Boston University will do remote sensing and economic modeling. The agricultural modeling will be done using the DeNitrification-DeComposition or DNDC global ecosystem model developed at UNH by co-investigator Changsheng Li.

"NSF required integration of physical and social sciences, which is why we have the economic aspects here," says the project's lead scientist Steve Frolking, a research associate professor at EOS and former director of CSRC. Frolking adds that such an integrated approach to scientific studies "is a daunting challenge for all of us as we are accustomed to working only within our specific disciplines, but disciplinary analysis is not enough to address issues of this scope."

He adds, "This approach is becoming a bigger part of global change analysis, where you try to look not just at the physical or ecological system but also the role humans play as part of the system."

At the heart of the project will be an assessment of current and projected water resources in the watersheds of the major rivers draining from the Asian high mountains (the Himalaya), principally the Indus, Ganges, Brahmaputra, Salween, Mekong, Yangtze, Yellow, Amu Darya, Syr Darya, and Irtysh rivers, with a particular focus on the climatic change and variability impacts on runoff from the highlands.

The project will link water supply and potential food production to an economic model, enabling assessment of water use, cropping intensity and yields in each of the various crop production sectors of the economy.

Other CSRC researchers involved in the project include research professor Changsheng Li, who has strong working relationships with scientists in China; research assistant professor Richard Lammers, co-director of the Water Systems Analysis Group (WSAG) at EOS; and Dominik Wisser, WSAG research scientist.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,200 graduate students.

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