

Anthropologist leads global effort to improve climate change models

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One of the goals of the five-year project LandUse 6K is to understand how variances in land use, like dry versus wet crops (such as rice paddies), had different impacts on the climate. Credit: Kathleen Morrison/University of Chicago

Current climate models do not accurately account for humans' role in changing the environment, according to a UChicago-led team of international researchers embarking upon a project to help climate scientists better document land cover and use over the past 10,000 years.

Calling it an "insanely ambitious effort," Kathleen Morrison, the Neukom Family Professor of Anthropology, is one of the leaders of the LandUse 6K, a study that includes dozens of scholars from around the world. "I think one of the big stories we're going to find is that there's a

deeper human impact on the environment than what has been previously recognized," said Morrison.

The five-year project will have two tracks running simultaneously. One group will look at land cover changes across the globe, using pollen analysis as a way of reconstructing the past vegetation to see how forest cover, crops and plants have changed over the entire Holocene, our current geological epoch.

The other group, which Morrison will head, is looking at land use data, or how people have used the land. The researchers in Morrison's group will rely on evidence from archaeology, history and historical geography—social science disciplines that are not often included in climate scientists' models and predictions.

"We're going to develop a land use [classification system](#) that can be used for the whole world for the last 10,000 years," said Morrison. "That's our big job. Once we get our classification system, we'll start making maps to plot out historical land use." Eventually, there will be interactive maps available to the public to better explore the relationships between land cover and land use, and their effects on the climate.

Part of a working group of the Program on the Global Environment, Morrison's team on campus includes Emily Hammer, director of the Center for Ancient Middle Eastern Landscapes at the Oriental Institute; and Alice Yao, assistant professor of anthropology. Morrison also is busy lining up leaders for each continent and teams of researchers for each region of the world to help gather data.

Morrison is an archaeologist and paleoecologist who has worked on agriculture and vegetation change in India for the past 30 years. When she and her colleagues look at some of the anthropogenic land cover change (ALCC) models, which reconstruct human-modified vegetation,

they see problems.

"The models are over-simplified," Morrison explained. "They are based on mathematical equations relating how many people were in a particular area and what they think that did to transform vegetation. But, they don't integrate evidence we have from the fields of history, archaeology and historical geography about how people organized agriculture—differences such as dry versus wet crops, like rice paddies—that show the same number of people can have a very different impact on the land. We need data-based reconstructions to correct the model-based ones. With both land use and land cover data, we can begin to do that."

Morrison added that the scientists who create these ALCC models are working with the LandUse6K researchers because they, too, want to better understand the relationships between land use and [land cover](#) through time.

Morrison and the international researchers will be convening this fall at the University of Chicago Center in Paris to work on the land use classification system.

Provided by University of Chicago

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