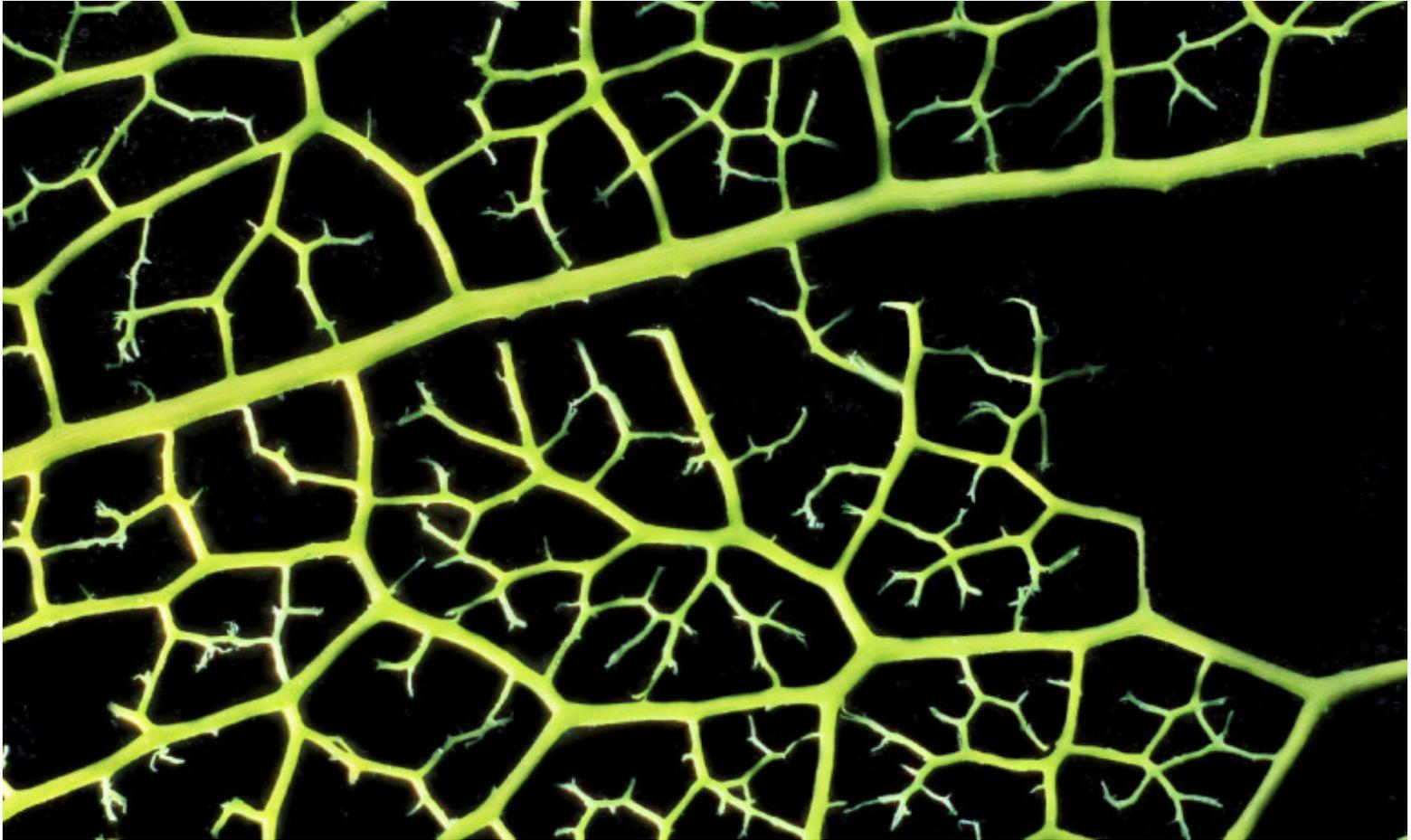


# EARTH AND ENVIRONMENT



**P**ieces has caused many global problems." (Credit: Macroscopic Solutions/Flickr)

**FUTURITY.ORG 2FEARTH-CRISIS-SCIENCE-DISCIPLINE-**

**16%3BTURF%26%238217%3B+COULD+MAKE+EARTH%26%238217%3BS+CRISIS+WORSE)**

## **SCIENTIFIC ‘TURF’ COULD MAKE EARTH’S CRISIS WORSE**

**MICHIGAN STATE UNIVERSITY ([HTTP://WWW.FUTURITY.ORG/UNIVERSITY/MICHIGAN-STATE-UNIVERSITY/](http://www.futurity.org/university/michigan-state-university/))**

➔ Original Study (<http://www.sciencemag.org/content/347/6225/1258832.abstract>)

Posted by [Layne Cameron-Michigan State](http://www.futurity.org/author/michigan-state-cameron/) (<http://www.futurity.org/author/michigan-state-cameron/>) on

February 27, 2015

Carving up Earth's ecological challenges among different scientific disciplines won't get the job done, say experts.

A group of scientists argues in *Science* (<http://www.sciencemag.org/content/347/6225/1258832.abstract>) that the growing global challenges have rendered sharply segregated expertise obsolete.

Disciplinary approaches to crises like air pollution, biodiversity loss, climate change, food insecurity, and energy and water shortages, are not only ineffective, but also making many of these crises worse because of counterproductive interactions and unintended consequences, says lead author Jianguo "Jack" Liu, chair in sustainability at Michigan State University.

"The real world is integrated," says Liu, director of the university's Center for Systems Integration and Sustainability.

"Artificially breaking down the real world into separate pieces has caused many global problems. Solving these problems requires systems integration—holistic approaches to integrate various pieces of the real world at different organizational levels, across space and over time."

## **BEYOND BOUNDARIES**

For example, Brazil, China, the Caribbean, and Saharan Africa show how the world demands to be approached not just for its singular qualities, but for its lack of boundaries over time, distance, or the organizational levels humankind imposes.

The rapidly growing food export to China from Brazil destroys tropical forests and changes food markets in other parts of the world, including the Caribbean and Africa.

Agricultural practices in the Sahara Desert in Africa stir up dust, which enters the atmosphere and floats as far as the Caribbean. That African dust has been shown to contribute to coral reef decline and increased asthma rates in the Caribbean. These interactions defy borders both on maps and in academic disciplines.

Yet conventional research and decision-making often have taken place within separate disciplines or sectors. The paper notes that one of the systems integration frameworks—human-nature nexuses—help anticipate otherwise unforeseen consequences, evaluate

tradeoffs, produce co-benefits, and allow different interests to seek a common ground.

Many studies on sustainability have focused on one place, but the world is increasingly “telecoupled”—a term that embraces socioeconomic and environmental interactions over distances, sometimes several thousand miles away.

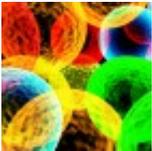
## **NO MORE ISOLATED EXPERTS?**

Effective policies and management for global sustainability need the human and the natural systems to be more integrated across multiple spatial and temporal and the authors think it is essential to quantify human-nature feedbacks and spillover systems. Science has largely ignored these, but they can have profound impacts on sustainability and human well-being.

It is time to integrate all disciplines for fundamental discoveries and synergetic solutions because of increasingly connected world challenges, Liu says.

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“Furthermore, the world no longer has the luxury of the past, when there were fewer people on the planet and resources were more abundant,” Liu says.

“This will require funding agencies and universities to make more drastic changes to alter the reward mechanisms and transform the scientific community from isolated experts to integrated scholars.”

Scientists from Michigan State; Stanford University; University of California, Irvine; the World Bank; Purdue University; Oregon State University; Yale University; the Pacific Institute; and University of California, Berkeley are coauthors of the paper.

The National Science Foundation and Michigan State’s AgBioResearch supported the work.

*Source: Michigan State University (<http://msutoday.msu.edu/news/2015/worlds-challenges-demand-science-changes-and-fast/>)*



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