

Researchers help develop sustainable bioenergy across the Americas

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David Shonnard, Sustainable Futures Institute director at Michigan Tech, and Mexican industry representatives, visit a jatropha plantation near Merida, Mexico.

Michigan Technological University's Sustainable Futures Institute (SFI) and a broad range of Pan American partners see biofuel as a good answer to society's growing need for alternative energy. But they want to make sure that it is produced in a sustainable way, benefiting rather than harming the societies and environments producing it.

The National Science Foundation is funding a Research Coordination Network (RCN) to help researchers, policymakers, industry leaders and others investigate the effects of mass biofuel production on human

communities and natural systems. The Sustainable Futures Institute (SFI) manages the RCN program at Michigan Tech.

Last year, RCN participants met in Merida, Mexico, to share information about their work. This May, they met again in Buenos Aires, Argentina, to discuss their progress and plan future research.

"It's invaluable to get everyone together in one place," says Robert Handler, a research assistant professor and the operations manager at the SFI. "These meetings allow us to coordinate all of our separate activities and build a coherent body of knowledge on biofuel sustainability."

Impacts of bioenergy production

Partnerships for Research and Education (PIRE) is another NSF-funded project that grew out of RCN. PIRE's lead researcher is Kathleen Halvorsen, a professor of natural resource policy at Michigan Tech. The PIRE team is studying impacts from bioenergy production in Brazil, Canada, Mexico, the US and Argentina.

"We're working to fill the research gaps in bioenergy production so we can maximize the benefits and minimize the negative impacts," Halvorsen explains. "Another thing we want to do is improve policy in these countries to support the research and development of bioenergy."

The meeting in Buenos Aires also provided a way for RCN members to make their presence and mission known in Argentina.

"This meeting was a great way to introduce the research network and connect with key people in Argentina," says Handler. "We got the chance to highlight our interests and let them know what we're trying to do."

Pan American countries are the focus of the RCN's work because they have favorable characteristics for biomass production such as large land areas, productive soil and relatively temperate climates. Additionally, some nations have growing bioenergy industries, while others have active research and development programs, offering potential partnerships.

Since the effects of biofuel production on [human communities](#) and natural ecosystems are largely unknown, the RCN takes an interdisciplinary approach to its research on local biomass production. Involving researchers from fields like engineering, social sciences and environmental sciences, the RCN is able to take into account historical contexts, cultural-political relationships and availability of natural resources.

The annual meetings help researchers view the issue from multiple perspectives. Since producing biomass requires land, water and labor, things are more complex than simply creating new technologies. Support among local communities is key.

"It's been good for those of us who are engineers, because we want to make all of this great technology, but we don't always consider how to make it work in the field," says Handler. "The meetings help us think about how we might gain support for biofuels so that we can take our developments beyond the lab."

In many cases, biofuels are not brought into commercialized markets because they don't meet emissions standards. This means that producers of biomass are not given government subsidies, so there are few incentives to grow such crops.

"There is a lot of attention in this country—and others—on overcoming the technological barriers to biofuels, but little attention on making them sustainable," says David Shonnard, professor of chemical engineering

and SFI director. "Often times, it's sustainability that's the true barrier to commercialization."

Another goal of the RCN is to offer an online graduate course in biofuel sustainability that would be available to students at Michigan Tech and other RCN universities. The course will establish a common knowledge among students throughout North, Central and South America and will feature lectures from RCN experts, student-led case studies and a multidisciplinary project. Such a course will increase awareness about sustainable biofuels and promote research on the topic.

On to Brazil

A larger conference in Recife, Brazil is planned for next year. There will be a focus on expanding the network to include government officials, industry leaders and non-governmental organizations.

"We're really trying to open it up to people outside of the current network," says Shonnard. "We want a broad range of people involved so that our future research can reflect a diversity of perspectives."

Brazil was chosen because it is a major biofuel producer, and Recife is the site of the first sugarcane ethanol production facility in the country. The members of the RCN will create a Research Roadmap Report (RRR) that details all of the sustainability themes in the network and ties all of the separate projects together.

"We want the conference to be more than a one-way street of communication. Each person won't just talk to the group about their research. We'll be going more in-depth with a dialogue about the issues we're facing," says Shonnard.

Based on the RRR, the network plans to produce several peer-reviewed

publications that focus on high priority research areas and topics that are necessary to understand the implications of mass biofuel production.

Beyond the research goals, Shonnard and Handler hope that the partnerships created through the RCN will last and grow stronger. Ultimately, they would like to see Michigan Tech students and faculty visiting and collaborating with labs in Central and South America.

"We want to create an exchange that lasts beyond this project," says Shonnard.

Provided by Michigan Technological University

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