



Checking in With CenUSA

Sustainable Production and Distribution of Bioenergy for the Central US

CenUSA Bioenergy is a multidisciplinary project funded by the U.S. Department of Agriculture-National Institute of Food and Agriculture (USDA-NIFA). The goal of the project is to research the production and use of perennial grasses on marginal lands for use as alternative biofuels and bioproducts. Learn more about CenUSA at www.cenusa.iastate.edu.

Jason Hill¹, professor at the University of Minnesota in the Department of Bioproducts and Biosystems Engineering, spoke about his work and experience in system performance as a co-project director with CenUSA Communications Intern Tyler Worsham in March 2019.² Hill outlined how he went about the task of evaluating biofuels for environmental sustainability.

How did you initially get involved in CenUSA?

“The director of the University of Minnesota’s Institute on the Environment put me in touch with Ken Moore.”

What made you the ideal candidate for your co-project leadership position?

“I don’t know about ideal, but I had experience in the life cycle assessment of biofuels. The USDA-NIFA (National Institute of Food and Agriculture) had requested in their call for proposals that newly-developed biofuels should be assessed for their environmental sustainability.”

In what ways did the project broaden or challenge your knowledge and skill set?

“The people of CenUSA came from many professional backgrounds and locations, and it was necessary for me to learn about their fields of study so as to better understand how to integrate our work. I was also challenged by the intricacies of helping administer a multi-institutional grant.”



Jason Hill, CenUSA Bioenergy
Co-Project Director

Could you describe your experience working with these other co-project directors?

“It was fantastic! I learned so much from them!”

¹ Learn more about Jason Hill at <https://bbe.umn.edu/directory/department-faculty/jasonhill>

² All of the words and ideas expressed in this interview fairly and accurately represent the speaker. Some quotes may be paraphrased for brevity and clarity. The opinions expressed in herein do not necessarily reflect those of Iowa State University, USDA-NIFA, Purdue University, Ohio State University, USDA-ARS, the University of Minnesota, the University of Nebraska, Lincoln, the University of Vermont, or the University of Wisconsin.

Have you worked in any other projects as large or as well-funded as CenUSA?

“Yes. I’m part of a \$10 million US EPA (United States Environmental Protection Agency)-funded project called CACES (Center for Air, Climate and Energy Solutions).”

How have these other projects of yours differed from CenUSA?

“CACES focuses on air quality and climate change, while CenUSA explored biofuels from switchgrass in the Midwest.”

What new ideas and disciplines did you encounter in your CenUSA work?

“I learned about conversion technologies, biomass production, Extension activities and so much more!”

Did you and your team encounter any obstacles in your research, whether unforeseen or otherwise?

“When CenUSA began, oil prices were high. By the time CenUSA finished, oil prices had fallen, so public interest in biofuels had waned. The real challenge we faced was that CenUSA only lasted five years. There was so much more we could have done.”



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Could you describe some of those papers and explain what more research could be done?

“I’ll give you two examples. In an early paper, we showed that different federal agencies (USDA, US EPA, and the Department of Energy) were using vastly different estimates of future biomass availability in their analyses, including for switchgrass. We pointed out that there was massive uncertainty about how the cellulosic biofuels industry might develop.

Just last year, we published a paper on the air-quality impacts of switchgrass production. Farmers often fertilize switchgrass with nitrogen to increase yields, but some of that fertilizer volatilizes as ammonia. Ammonia forms particulate matter in the air which can lead to heart attacks, strokes and cancer. We showed that farmers could reduce the number of people who die as a result of switchgrass production by using nitrogen fertilizer types that emit lower amounts of ammonia.”

What were some noteworthy discoveries and success that you achieved in your work with CenUSA?

“We trained graduate students and post-doctorates who have gone on to good jobs in academia and industry. We also hosted a conference in St. Paul, Minnesota on how switchgrass can be used to improve water quality.”

How did you determine the environmental impacts of switchgrass establishment and production?

“We used a method called life cycle assessment which tracks the flow of energy and matter in biofuel production. This allowed us to understand what resources are used and what pollution is created when growing switchgrass, converting this switchgrass to biofuel, and burning this biofuel in vehicles.”

Could you go into more detail about what those environmental consequences are?

“Like gasoline and diesel from petroleum, biofuels derived from switchgrass affect air quality, water quality, and climate change. We sought to compare these fuels on the basis of these environmental impact categories.”

The dead zone in the Gulf of Mexico is an important environmental concern. Can planting switchgrass on marginal land in the Corn Belt help reduce the size and impact of that dead zone?

“Yes. If strategically planted on the landscape, switchgrass could help by reducing nutrient loading in streams and rivers.”

How do you inform and interact with policymakers to make sure that they get the necessary accurate data to help them in their policy-making efforts?

“We invite them to our conferences and meetings and we send them copies of our papers. When they ask us to discuss our work with them, we rapidly respond to their requests.”

What do you think will be the greatest benefit of achieving CenUSA’s vision of planting perennial grasses on marginal lands throughout the Corn Belt?

“One important benefit is that it has the potential to offset some of our current petroleum use. Many of the real benefits would be environmental as a result of converting land in conventional agriculture to a perennial system that could be a carbon sink, as well as improve air and water quality.”

What is the most interesting or most noteworthy facet of your work that you would like for interested members of the general public to understand about your work?

“CenUSA’s vision has the potential to improve the environment while benefitting farmers and the public.”

How will you take your experience with CenUSA and put it to use in future research projects?

“I learned a lot from other CenUSA personnel about grant management and advising graduate students and postdocs.”

In what directions do you hope to take your own research moving forward?

“My research has moved into the environmental impact of food production and into the air-quality impacts of agriculture.”



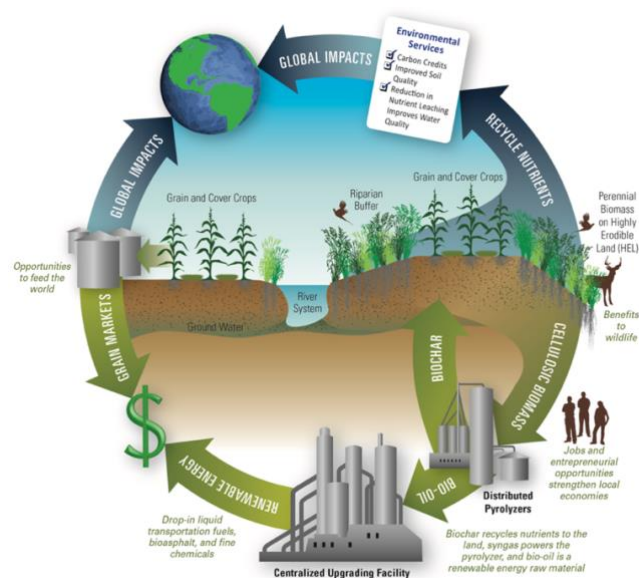
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Jason Hill CenUSA Work Product

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CenUSA Bioenergy Vision

Learn more about CenUSA at www.cenusa.iastate.edu

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