



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 Initiative Competitive Grant No. 2011-68005-30411). CenUSA's goal is to research the production and use of perennial grasses on marginal lands for use as alternative biofuels and bioproducts. More information is available at www.cenusa.iastate.edu.

Tom Binder, CenUSA Advisory Board Chair and retired senior vice-president of research and development at ADM spoke with CenUSA Communications Tyler Worsham in April 2019 about his work and involvement with CenUSA in the areas of commercialization. As a part of his role with CenUSA, Binder determined the feasibility of using the Acetosolv chemical process on switchgrass and other perennial grasses.¹

How did you initially get involved with CenUSA?

"ADM (Archer-Daniels Midland) had several research projects and was involved in some other ongoing programs at Iowa State University. Jill Euken (Extension and Outreach Co-Project Director) and Robert Brown (Feedstock Conversion/Refining Co-Project Director) asked researchers from ConocoPhillips and I to help them with their presentation of the CenUSA program for the USDA, so we got involved early on in the project."

What was your position at ADM when you got involved?

"I was the senior vice-president of research and development."

Could you briefly describe why you were interested in working with CenUSA?

"At the time when the CenUSA project started, there was a huge interest in looking at biomass for fuel applications, as well as using crops like switchgrass to control some of the pollution runoff problems associated with row-crop agriculture. ADM was interested in developing those areas so that corn could be more sustainable."

What new ideas and disciplines were you exposed to as a part of your CenUSA experience?

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¹ 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.

earned about a lot of the plant breeding that was involved in developing new strains of switchgrass, as well as some of the more theoretical environmental research on how planting different crops on different areas would affect sustainability in agriculture.”

Have you been involved in any other government-funded research projects other than CenUSA, whether as a participant or in an advisory capacity?

“I was on the Biomass Research and Development initiative. I’ve also been involved with the National Petroleum Council in developing the energy outlooks for the United States. I’ve also been involved in several projects funded by the USDA through ADM.”

How was CenUSA different from these other government-funded projects?

“The CenUSA project was very large as far as the amount of funding is concerned. It involved multiple universities and multiple disciplines, so after getting all of those things together, it was nice to see that it actually happened.”

You became a co-project leader in the third year of the project when CenUSA really started looking at the commercial side of things. Was there a specific area of research that you wanted to see advance?

“At that point, the USDA was pushing CenUSA to expand into the commercialization of switchgrass, so two different programs started that went beyond pyrolysis. We at ADM already

had a project looking at corn stover as a feedstock for the Acetosolv chemical process for isolating cellulose, hemicellulose and lignin.

What we proposed to do is look at the energy crops as well, including switchgrass and miscanthus, to see if those would work as well as corn stover.”


What were some noteworthy successes that you achieved in your role as a CenUSA commercialization co-project director?

“Both the switchgrass and miscanthus worked well in that Acetosolv process we were looking at. The most interesting thing was that miscanthus had a very high lignin content compared to other grasses, so if you are after lignin, miscanthus would be a good source for processing for that product.

I think that the biggest problem with bioenergy crops right now is that there’s no developed market for energy crops that can be commercialized, so I don’t know that there are any major discoveries. I do think that in the long-term, the energy crops could provide a lot of the fiber needs of the world, but until that is expanded beyond what we currently have available, the market’s just not there.”

Did you and your team encounter any unforeseen obstacles in your research?

No, not really, since switchgrass and miscanthus fit pretty well into our process. That worked well.”



“I do think CenUSA helped develop a lot of the tools so that when someone does come up with an idea for an application, those can be put into place, but we just haven’t found the markets with high enough value to get anyone to invest in this industry.”

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What do you think it would take to create those markets?

“Your guess is as good as mine.”

There are niche markets that are slowly starting to develop for perennials, but there is small demand for producers to invest in producing for them. In your opinion, what is the potential tipping point that will get producers to plant more switchgrass acreage?

“The market has to be large enough before someone will invest in a processing plant that can take significant acreage of switchgrass. The market’s just not there. It’s just not large enough. Someone has to find a really efficient way to convert it into a fuel or a chemical feedstock in order to get someone to invest in a large processing plant.”

So You don’t know exactly what it would take to make them competitive in the biofeedstock market?

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What might some of those tools be?

“I refer to the breeding tools for if you want to change the cellulose, hemicellulose or lignin content, maybe to change what organic molecules are in the lignin.”

Did you and your team encounter any unforeseen obstacles in your research?

Were there any challenges that you expected to have going into your work?

“No, I assumed that they would act similarly to corn stover, and they did. The major thing that we found was that if I wanted to produce lignin as my major product, miscanthus would be a better crop than corn stover and switchgrass.”

In what new directions do you hope to see perennial biofeedstocks go moving forward?

“I would like to see a regrowth in the U.S. cellulose market. Most of the pulp used for paper and other applications like that has moved to Canada. Even a measured portion of that has moved to Brazil and Asia. I’d like to see a revitalization of paper and pulp industry in the United States. I do think that some perennial crops could be feeding into that.”



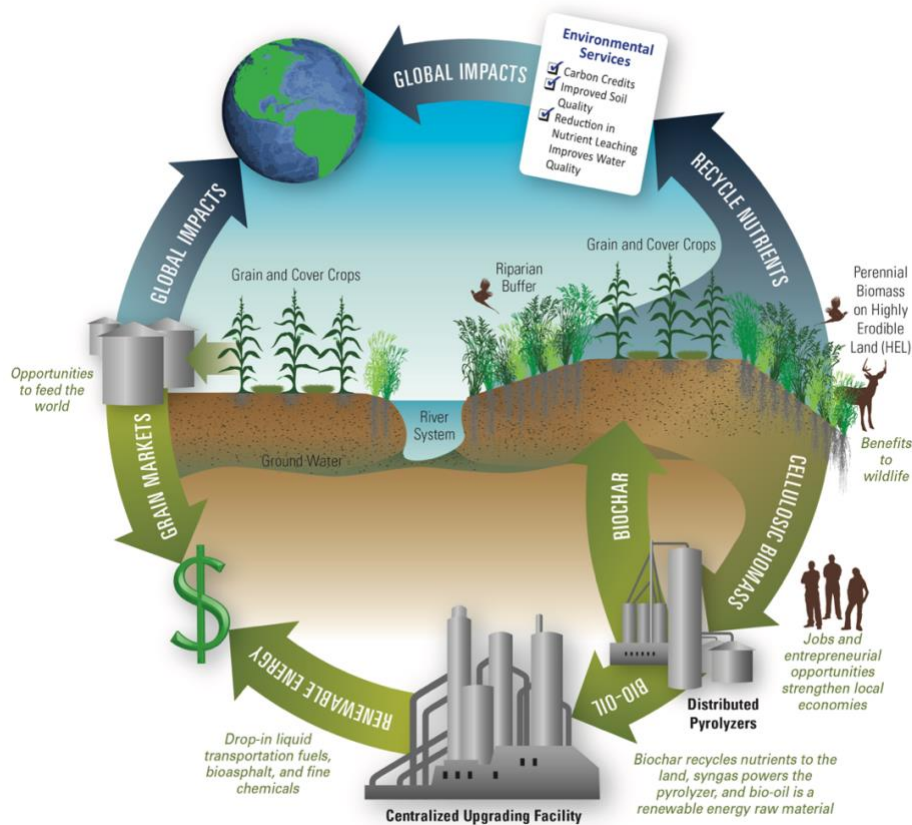
Read our White Paper
https://cenusa.iastate.edu/files/cenusa_2019_075.pdf

In what ways did your participation in the project challenge and broaden your professional knowledge and skillset?

“There were a large number of teams that were working on this project from plant breeding to Extension and safety which really put into perspective that if you’re going to develop something new, you not only have to be developing that new product, but you have to get the public to accept it. You have to have safe operations and so on. A very broad team is needed to bring a new product along.”

What is the most important or most interesting facet of your work with CenUSA that you would like for the interested members of the general public to know and understand?

“The public should know that the universities and the federal research groups are really working to have things in place so that when the need for them is there, they’re ready to go. They’re looking to the future rather than simply solving today’s problems. There’s a huge amount of information that Iowa State University and the other universities have put together so that when we do need it, it will be available.”



CenUSA Bioenergy Vision

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

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