



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

Mark Hanna¹, a former agriculture and biosystems engineer with Iowa State University Extension and the Ag & Biosystems Engineering Department, spoke in April 2019 about his work and involvement as a CenUSA co-project director focused on the health and safety of producers with CenUSA Communications Intern Tyler Worsham.² Hanna elaborated on how he worked to control and minimize the risk of injury to producers.

How did you initially get involved with CenUSA?

“I knew that the project was forming. You always catch wind of things going on, but I was approached more formally as they were putting the project together. I was approached and asked if I would be a part of the safety component of the project.”

What made you an ideal candidate for your position as a co-project director with CenUSA?

“I don’t know that anyone is ever really an ‘ideal candidate,’ but I would say that my experience in extension and working with what I would call ‘user groups’ like farmers made me a practical choice due to my familiarity with what growers might do in different operations.”

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

“As you know, there is a wide range of disciplines in this project. You’re bringing in economists, sociologists, engineers, agronomists, you know, different perspectives. You always get a much more complete picture of the situation when you have all of those different points of view.”



Safety is a little bit like soil conservation, among other things. Are we all for it? Yes, but how does this affect my bottom line? Maybe it’s a little further down the list of priorities for people, so you have to create an awareness of how different factors affect people. *Mark Hanna*

¹ Learn more about Mark Hanna at <https://www.extension.iastate.edu/author/mark-hanna>

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.

In what ways have other projects you have worked on differed from CenUSA? Were they as large or well-funded?

“Most of the projects I’ve worked in have been smaller and more tightly focused on a narrower objective. You are sort of limited in the scope of what you can do, certainly by time and resources.”

Could you go into a little more detail about how some of your previous projects have differed from CenUSA?

“There are pros and cons here. The smaller the project, the more tightly focused and structured it is. It’s probably easier to see what is included in what we are trying to do and what is of interest, but you just don’t have all of the funding and resources to fully pursue that kind of thing. There are fewer people with whom you have to check-in, and when it comes to the decision-making, there’s a smaller group involved, however, there are limitations in terms of not getting as wide of an output of product when you’re done.”

Did you encounter any notable obstacles in your research, whether they were unforeseen or even if they were expected going into it?

“Two obstacles in the safety area come to my mind. One is a lack of data that you would like to have. For example, what is the accident or exposure rate if you are using forage harvesting equipment for switchgrass? There is always some information out there, but often not as much as you would like. The other thing that comes to mind is that this is really a new, evolving and emerging industry. There is a limited number of people out there who have some experience growing and harvesting perennial crops. They’re not as easy to find.”

Were there any noteworthy discoveries or successes that you achieved in your work with CenUSA?

“From a safety standpoint, I think it was the method involved in terms of establishing risk factors. What data sources did you use? How did you deploy a model to make use of that data by combining how much exposure you have to something? What would be the potential severity of risk in a particular operation?”

What was the trial-and-error process of determining what exact health and safety measures were absolutely necessary and which ones were not?

“We had to put together a list of what production practices were or could be potentially risky in growing perennial crops. We also wanted to compare that with an existing corn-soybean row crop operation. There’s a lot of background information on the existing row crop operation, but not for perennial crops. When would you start harvesting them? When would they need to be planted? All of that presents a little bit more of a challenge.”

What are the challenges in assessing and communicating potential risks to producers?

“I think that you always have to answer why anyone would be interested in this from a safety standpoint. ‘What’s in it for me?’ Safety is a little bit like soil conservation, among other things. Are we all for it? Yes, but how does this affect my bottom line? Maybe it’s a little further down the list of priorities for people, so you have to create an awareness of how different factors affect people.”

How do health and safety play into the decision of whether or not farmers want to invest in these perennial crops?

“It is a factor, although not often at the top of the list. Folks look at the economics, what it’s going to do to farm profitability, but there’s always something to be said for how operations change and how health and safety can not only affect those around me, but also myself and the environment. I would say that there is an analogy here with nitrogen fertilizer application, with which you might be a little familiar. A lot of farmers here in the state of Iowa use Urea, either liquid or dry. Many people use anhydrous ammonia, and anhydrous ammonia tends to be more concentrated and less expensive, but there are some distinct safety issues, so you see what decisions people are making in terms of how much risk and responsibility people want to assume.”

Beyond implementing health and safety precautions, is there any way that the hazards themselves could be reduced?

“Great question, there are always various operations involved, particularly for switching to a perennial forage crop. The emphasis somewhat shifts from (traditional) planting and seeding operations and more toward harvesting multiple harvests of a perennial crop. There are always issues of how to professionally work with and around forage harvesting equipment in terms of getting caught in the equipment and the transporting bales. It’s a little bit different than what folks are used to doing in grain harvesting operations.”

What kind of injuries do you often see reported in perennial crop production?

“Severe injuries are often associated with farm equipment. Certainly, livestock can also be a contributor here, but it’s mostly farm equipment.

People often think of the more severe injuries, getting caught in or under equipment if it falls on you, for example, but the most frequent injuries are when people are on top of a machine, whether on a combine or a forage harvester, slipping and falling off, and either breaking or straining something and needing some time off work.”



CenUSA Bioenergy White Paper

Does your research reflect that using custom harvest contractors could reduce risk?

“No. First of all, it’s difficult assessing that because there is a limited number of custom

forage operators for us to assess that information. More broadly speaking, when comparing custom operators versus folks who are just doing it on their own ground, we have a lot of difficulties seeing any difference (in risk) there. The hours of exposure are typically greater for a custom operator.

Because of that, we would expect the injury rate to go up some, but it often depends on the

professional attitude of whoever is involved rather than whether or not they are doing custom work. Just because you have a familiarity with an operation and you're doing it more often doesn't necessarily make you a safer operator."

What's the most noteworthy or most interesting facet of your work that you want members of the general public to know and understand?

"There are two things. It's probably easier to explain to the general public that in terms of safety issues, as you shift more into perennial production, there is less emphasis on the seeding and planting issues and more onto forage harvesting issues. There is a different set of equipment and a greater frequency involved with harvest than with more conventional corn and soybean operation where the planting time for the traditional crops would have a greater degree of exposure to risk compared to planting perennials.

Also, from the general public's perspective, they should have the ability to look at two things. They need to look at the severity of the potential risk in an operation. 'How hazardous is it?' 'Is it life-threatening?' 'Is there only minor injury?' Then there is how the frequency at which they do an operation affects the overall hazard. A lot of times when it comes to safety, people don't stop to think that the potential for injury may not be great, but they're doing it every day or several times per week which increases the hazard. Then the safety aspect of things come into play a bit more (when they think about all of these things)."

Now that you are retired, how do you think your research can be used to further other projects in the future?

"I feel fairly certain that there are going to be some safety professionals that take a look at how we assessed risk and compared these two farming systems. It wasn't just looking at a single operation such as the risk of being around a power take-off shaft (PTO). We were looking at multiple operations over the course of multiple years in regard to working with perennial crops. What methods and what approaches did we use to do that? We got a chance to take a more detailed look at that and tried some things that withstood some scientific disclosure and publishing. That's all out there for people to see and think over."

So what do you hope will come from your own contributions?

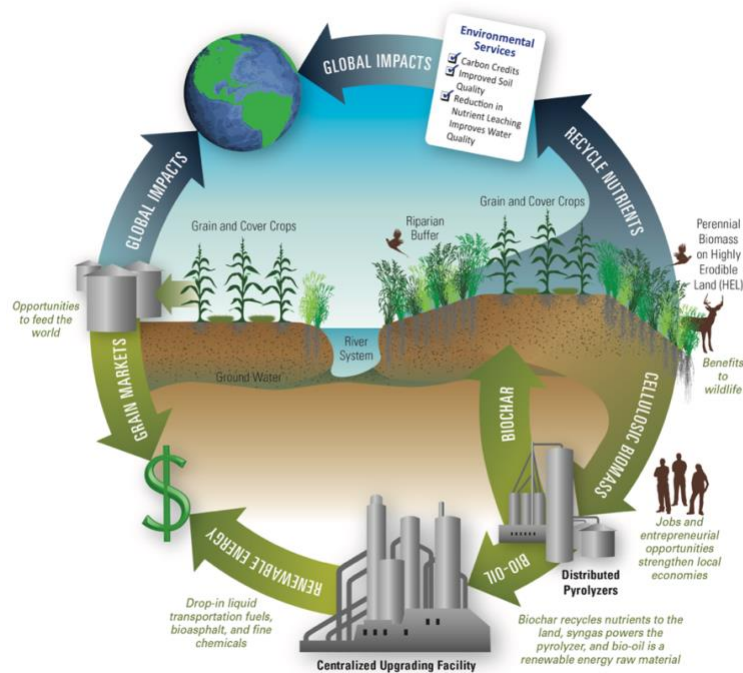
"I'm hoping to get farm operators to think more professionally about how they interact with their machines besides just thinking about adjustment and operations for optimal crop establishment and harvesting. They also need to think about how to make a safe situation with the least amount of exposure involved. There's always going to be some risk there, but people need to think beyond just getting a job done to getting a job done both professionally and safely."

Mark Hanna CenUSA Work Product

- ✓ Fact Sheet: Master Gardeners' Safety Precautions for Handling, Applying and Storing Biochar. Charles Schwab & **Mark Hanna**, Iowa State Univ. 2017.
https://cenusa.iastate.edu/files/cenusa_2019_023.pdf

- ✓ Research Summary: Overview of Comparative Injury Risk Between Annual Corn and Perennial Switchgrass Production. Saxon Ryan, Charles Schwab & **Mark Hanna**, Iowa State Univ. 2017. https://cenusa.iastate.edu/files/cenusa_2019_034.pdf
- ✓ Moore, K.J., S. Birrell, R.C. Brown, M.D. Casler, J.E. Euken, **H.M. Hanna**, D.J. Hayes, J.D. Hill, K.L. Jacobs, C.L. Kling, D. Laird, R.B. Mitchell, P.T. Murphy, D.R. Raman, C.V. Schwab, K.J. Shinnors, K.P. Vogel, J.J. Volenec. 2014. Midwest Vision for Sustainable Fuel Production. *Biofuels* 5(6): 687-702. doi: 10.1080/17597269.2015.1015312

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



CenUSA Bioenergy Vision

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