North Central Region Sustainable Agriculture Research and Education

FIELD NOTES
The Newsletter of the NCR-SARE Program
Spring/Summer 2007

NCR-SARE Goes Back to the Bioenergy Future

Enthusiasm for ethanol and biodiesel production in the United States is growing. Government initiatives and business capital are looking to increase corn and soybean production to meet growing energy demands and lessen dependence on foreign oil.

Many sustainable agriculture experts are asking if these are the best options for moving the bioeconomy forward. There is a concern that simply growing more corn and soybeans will not provide the best long-term strategies. NCR-SARE Administrative Council member Doug Karlen is one such proponent who believes in taking a comprehensive look at the entire range of options that are available.

"What SARE is really trying to bring forward in a unified manner is that bioenergy has to be looked at as a complete holistic system; looking at the soil, the water, the air and the human components in an integrative manner," said Karlen, who works as a supervisory soil scientist and research leader at the National Soil Tilth Laboratory in Ames, Iowa as part of the USDA Agriculture Research Service. "There are many issues that need to be looked at as a whole system rather than picking one part and saying that this is the answer that fits the entire piece."

This isn't the first time that Karlen has been thrust into the bioenergy debate during his career.

"This is where my agriculture research service career started," said Karlen. "We are actually going back to the future. In the late 1970s there was a lot of interest in bioenergy during the second of the major oil embargos. The Department of Energy actually funded a lot of work on bioenergy fuels and residue removal. Then after about three years of funding oil prices dropped drastically and most of the technology was shelved. Now it's coming back out again with the current high oil prices."

A mustard field in Western Nebraska is just one example of how alternative crops may be used to better serve the bioenergy needs of people throughout the world.

Unfortunately, shelving the technology also means that a lot of the work done during Karlen's early years needs to be reintroduced into the public consciousness. That is what NCR-SARE is attempting to do through a unique Bioenergy Committee that has been set up to try to draw attention to the issue.

"The North Central Region SARE fully endorses the goals of developing a viable renewable energy source for the bioenergy economy. Our approach has been to lay out and identify the problem and that has to be done in a sustainable manner. It has to look at ways to capitalize on the bioeconomic opportunities but at the same time protect our soil, water and air quality."

One way to broaden the discussion for NCR-SARE has

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been to assert bioenergy topics directly into the grant program Call for Proposals. Regional Coordinator, Bill Wilcke, is encouraged with the impact that this will have.

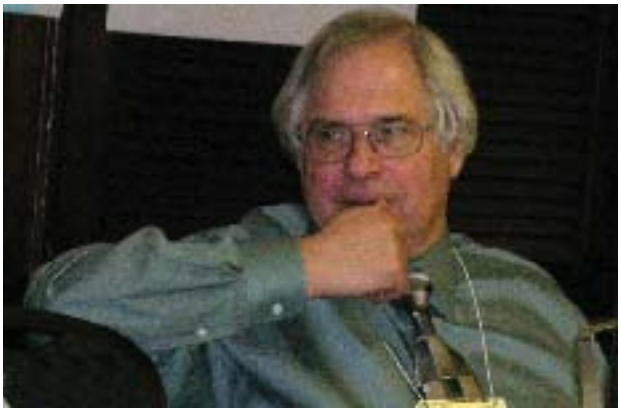
"We are trying to guide people into areas that we think are our niche," said Wilcke. "People put their heads together and decided that our niche was really sustainability. There's some concern that there are a lot of bioenergy projects being funded that don't completely address the sustainability angle. So we're just trying to get people to do more thinking about that. The position paper that we wrote and put on our web site tries to help people understand the kind of projects that we will fund. We wanted to list some of the areas that we might be interested in funding. It tries to give people some guidance and steer the proposals toward sustainability in bioenergy systems."

To help with that guidance Karlen and the Bioenergy Committee have tried to identify some major points of concern with the rush to ethanol. One of these is to examine the effects of being married too closely to corn and soybean production as the only options.

"The cautionary points are that in the communication and development of the ideas for switching to the bioeconomy and biofuels is the misperception that crop residues are trash. We in agriculture have to accept part of the responsibility because every one of us that has been around a combine will frequently speak of the plant material that's going through as trash. 'Oh, that trash just plugged up my header or that trash just got my combine plugged.' We in agriculture also realize that the 'trash' is actually what we call the crop residue and has a lot of value for the soil resources. It assists specifically in the protection from wind and water erosion. It's a food source for the soil, fauna, earthworms and other animals. It assists in returning the carbon to the soil, which as that crop residue breaks down helps restore and build soil structure. It improves soil structure from the carbon, retains water and holds nutrients. The residues themselves cycle nutrients back to the soil system."

According to Karlen, many of these points were missing when the United States Energy Department released *The Billion Ton Report* which was an attempt at developing a long term U.S. government strategy regarding the use of corn ethanol as a major biofuel solution.

"*The Billion Ton Report* attributes a lot of the potential for bioenergy to the crop residue that's available with the perception that it's trash and doesn't have other important roles. There are many aspects of the report that from a sustainable agriculture perspective are flawed. That's where the SARE organization is moving to be more vocal



NCR-SARE AC member Doug Karlen contemplates sustainability strategies on the Bioenergy Committee.

in their statement. For instance, in *The Billion Ton Report* they are projecting crop yields to nearly double in order to meet the amount of residue that could be removed. They are attributing a lot of this to genetic engineering. They have not thought about the changing climate conditions that we are experiencing. They also look predominately only at erosion down to the level of T -- or the Tolerable Soil Loss -- yet I think most any farmer that's committed to a sustainable agriculture program recognizes that if you're eroding at the T level you're still in trouble with your soil resources. So they've underestimated the degree of erosion and they've overestimated the amount of the crop residue and other cellulosic sources that are available."

To strengthen the sustainability approach to bioenergy, NCR-SARE is also looking to partner with other organizations including the other SARE regions.

"When we established the committee to work on this, one of the things that we said is that we do want to work with other SARE regions," said Wilcke. "We have a plan to meet with representatives from other SARE regions so that we're doing things somewhat uniformly. The needs are always going to be a little different in every region but there are some commonalities and we want to make sure that were taking advantage of that. We just happened to be the first ones out of the gate on this particular issue because it impacts our region quite a bit. This is where a lot of the livestock are raised and a lot of the typical agronomic crops are grown, and the energy situation is impacting those crops and livestock that are fed from them probably more in our region than others."

Karlen would also like to see more done in terms of a national unified message coming from SARE.

"We put together a draft document with a number of strategies that we feel would help move this bioeconomy forward. Our plan is to eventually move it to the other SARE regions who expressed interest in it. At the national level we also need to re-

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The Artisan of Cheese

Charuth van Beuzekom-Loth grew up in Holland. Her family raised goats and good cheese was plentiful. Eventually, she moved to the United States and years later settled down with her husband on a small farm named Shadowbrook near Lincoln, Nebraska. The transition went along nicely except for one thing. The cheese just wasn't the same.

"I guess I'd always had a dream of doing some kind of a cheese making venture," said van Beuzekom-Loth. "I love the cheeses in Holland. I never was very satisfied with the cheese that I could buy here unless it came from Europe."

That's where van Beuzekom-Loth's dream of becoming a cheese maker met up with the NCR-SARE Farmer Rancher grant program.

"Talking to [NCR-SARE grant partner] Krista Dittman we kind of thought, wouldn't it be fun to do something like this, but the expense of getting into dairy and the regulations are really stringent. It made it pretty prohibitive for a small producer."

Fortunately, being a small organic vegetable producer, van Beuzekom-Loth did find her way on to the NCR-SARE call for proposals mailing list.

"We'd get the paperwork from SARE every year and think, 'We should do that. We should do a project and get a SARE grant.' But we never really had a concrete idea of what we wanted to do and we were kind of intimidated about applying for a grant. So a friend of ours encouraged us and said she would proofread it for us and hold our hand and help us feel confident that we could do it. Plus, Krista's a great writer so we didn't have that much of a problem and found the process to be really straight forward. It's geared to producers."

Getting the grant was only a first step. Exploring what it was going to take to become successful artisan cheese makers was the more difficult, yet fascinating part.

"The project we came up with was figuring out how to do an affordable on-farm processing plant. We did research to see if a mobile unit would be appropriate that you could move from one farm to another. We found that actually cheese isn't a one day process. It's generally four days and then the aging after that. So it didn't really work because if you had more than one producer wanting to use the facility it would be on the wrong farm on the day that you needed it. So a stationary plant is what we went to."

Deciding on the stationary plant did mean making some concessions but they were determined to keep one of their main goals intact.

"Our goal is to make it possible for other small producers that were really intimidated by the up front costs to come and use our facility to get started, and test the water of marketing and the production aspect of it. If that worked for them they could figure out how to put their own plant on their farm. That seems to be a concept that people are excited about -- using our facility to get started."

Charuth van Beuzekom-Loth pours a morning's worth of milk.

Another important aspect of the project planning was the education necessary to learn all of the detailed knowledge they would need to make cheese.

"Neither of us were really cheese makers when we started. I had made cheese in our home kitchen growing up that was good enough to eat but probably not good enough to sell. So our first goal was to take classes to learn how to make farmstead artisan cheese. We went to Cal Poly. They have a wonderful dairy department. They used to do commodity type cheese classes but they had such a calling for small scale cheese producers who wanted to learn how to make cheese on their farms that for the last ten years or longer they have done farmstead artisan cheese classes. It's a four day short course that was perfectly geared for the kind of cheese that we wanted to make. It was pretty heavy duty science emphasis. You learned about the biochemistry of cheese. You learned about marketing, evaluation, tasting. They even took us on a tour of a sheep dairy that made cheese. That was a wonderful first experience with the overview of artisan cheese."

The cheese education didn't stop in the classroom. The next step involved visiting experienced cheese makers who had already perfected the craft.

"The most valuable part was visiting other farms that were in production. Most of them were using the milk exclusively from their own herd and making the cheese right there on the farm. So in the last three years we visited 21 farms all over the country. I went to two farms in Holland. One was a goat farm that had 400 head of goats and the other had about 40 head of cows. They made traditional farmstead gouda cheeses."

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NCR-SARE Grad Student Grant Touches Cranberry Fields Forever

The SARE Graduate Student grant program has funded over 70 projects since 2002. One of the original goals was to give younger audiences exposure to sustainable agriculture topics. Beyond that initial goal has come a rippling effect of other benefits including creating invaluable research projects, connecting sustainable agriculture ideas with producers, and bringing additional education opportunities to the general public.

Sarah Stackpoole is a perfect example of how the Graduate Student program has become more than a modest success. Her NCR-SARE grant began as a study of nitrogen cycling in cranberries throughout central Wisconsin and the research has taken her further than might be expected.

"There had already been a lot of work done about nitrogen use in cultivated cranberry beds -- how much to apply and when to apply it, but that has mostly focused on an inorganic form of nitrogen -- ammonium," said Stackpoole. "We were interested in looking at another form of nitrogen that could be available to cranberries which is dissolved organic nitrogen.

"Dissolved organic nitrogen can come in so many different forms. It comes from the breakdown of organic matter and so that really hadn't been documented and put into context for growers in terms of management. They do their nutrient management plans for nitrogen based fertilizer inputs. They do really well at that but we thought that dissolved organic nitrogen would be a large pool in these systems."

Through comprehensive analysis of the cranberry bed soils, Stackpoole was able to identify that the availability of dissolved organic nitrogen (DON) was indeed high.

"What we thought was happening is there. That's really exciting for us to try and make these next steps in approaching nitrogen management and demonstrate that we're getting these high colonization rates and we have large pools of DON. This is an important part of nutrient management."

Healthy cranberry blossoms form as the result of balanced levels of nitrogren cycling taking place in the soil beneath them.

Sarah Stackpoole has benefited from a reciprocal relationship with cranberry growers in Wisconsin. "Every time I go into the field I have a research plan but it's such a bonus if the growers have a moment to stop and talk. They have provided so many great pieces of information and have been such great cooperators."

Stackpoole didn't end her study there. She wanted to explore more of the detailed symbiotic relationships taking place in the nitrogen cycling of the soil.

"Another factor that we looked at in the root of cranberry plants is the ericoid mycorrhizal fungi. These fungi have enzymes that can access some of these dissolved organic forms of nitrogen. So we were interested in combining those two things -- this new pool of nitrogen and associating that with this fungus. Both of those factors hadn't really been looked at in terms of nutrient management with cranberries."

Stackpoole is now able to provide growers with research data regarding the dissolved organic nitrogen that is in their cranberry beds. She is continuing to study where new pools of DON are formed. Her research seems to indicate a close connection between the ericoid mycorrhizal fungi and the role it plays in the entire nitrogen cycling process.

"The cranberry soil is an interesting thing because it has layers in it. Organic matter falls and then every three to five years the cranberry growers apply sand. I'm looking at those organic matter layers and seeing how they are decomposing over time. Right now I know there are pools of DON out there but where did it come from? I'm looking at maybe suggesting that the ericoid mycorrhizal fungi has mediated the nitrogen cycling. "

Stackpoole is also studying the economics of growing cranberries. She is trying to paint a clearer picture for growers to help them use fertilizers in a more cost effective manner.

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Cranberry Fields Forever

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"I'm interested in putting it into the context of a budget. I'm thinking about all of the different [nitrogen] inputs so growers know how much fertilizer they are putting on. I'm also taking into account the nitrogent rates in the precipitation and irrigation water. I've looked at mineralization rates in the soil. Growers in this area haven't had a sense of how much that's adding in terms of nitrogen. I'm looking at what the flooding regimes are doing. I'm putting these pools into the context of what growers already know. I find that really rewarding."

As much information as Stackpoole is providing cranberry growers she is receiving back in kind.

"The interesting thing about my study is that there are no cranberry test beds in Wisconsin. We are the number one growing region for cranberries but there are no experimental research plots. All research that's done in cranberries in Wisconsin is by the grace of growers. I was tromping around in beds where growers were trying to get a crop."

The reciprocal relationship between Stackpoole and the growers has benefited both parties.

"I have learned so much from talking with the growers. Every time I go into the field I have a research plan but it's such a bonus if the growers have a moment to stop and talk. They have provided so many great pieces of information and have been such great cooperators."

Growers give Stackpoole a comprehensive history of the land and provide information beyond that which she would learn in a research lab.

"One of the growers is able to give the whole history of his cranberry beds. He put things into a historic context. It used to be a cornfield and now it's cranberry beds. His dad was in cranberry production so he bought this land and it was converted. For him the cranberry production is more profitable."

Stackpoole has also been shown the important land use issues that the growers have learned while working in the cranberry beds over a period of many years.

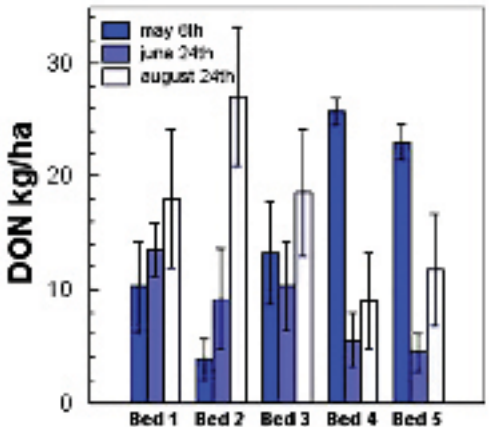
"One grower is drawing from a creek that has high nitrates. That in particular really put it into perspective how integrated everything is. He had to adapt his growing as to how much nitrogen he was applying. He couldn't really do anything to change what other people are doing but it is influencing what he was doing as a grower to adapt. He was willing to share that information which has molded a lot of curiosities that I've had about where I want to go next with my research. You can't just think of these as isolated farming units. They are all connected in the land. What somebody is doing upstream is affecting somebody downstream."

Stackpoole visited this cranberry harvest in British Columbia, Canada in 2005 to help supplement her cranberry studies.

Stackpoole has been carrying the message of dissolved organic nitrogen everywhere she goes. In addition to taking journeys to study cranberry harvests in places such as British Columbia, Canada, she has also taken her results to conferences.

"To see those graphs showing how large those pools of dissolved organic nitrogen are is impressive. I took it to a Soil Society conference and people were really impressed. That's what we in our lab thought was out there and to see it in such a simple set of graphs comparing those two things [inorganic ammonium and dissolved organic nitrogen] is a good basis for creating a larger picture and perhaps a more complete picture of nitrogen cycling that's going on in the cranberry beds."

To see the larger picture of an NCR-SARE Graduate Student project such as Stackpoole's is also impressive. It gives a more complete picture of the value of bringing sustainable agriculture to younger audiences so that it can indeed maintain itself in cranberry fields forever -- or in any other field that a grad student might happen to find themselves.



This dissolved organic nitrogen chart shows large quantities of organic nitrogen present throughout the growing season.

Staff Updates at NCR-SARE

Beth Bedell joined the NCR-SARE staff at the University of Minnesota as Associate Administrator on February 19, 2007. Her background includes four years as organic certification program coordinator with the Minnesota Organic Crop Improvement Association, nine years as information manager with Winrock International, an international agricultural development service, and as consulting researcher, editor and writer at several government agencies and non-governmental organizations in the Washington, DC area. Beth has a BA in Applied Behavioral Science from the National College of Education.

NCR-SARE staff members Beth Bedell and Marie Martin pose for a picture at the March AC meeting in Minneapolis.

New NCR-SARE AC Members Announced

New NCR-SARE Administrative Council members include Edgar Hicks of Omaha, NE (Agribusiness), Gerard Middendorf of Manhattan, KS (KS Research), Gary Reding of Greensburg, IN (Indiana Farmer), Robin Salverson of Buffalo, SD (SD Extension), and Cheryl Simmons of Fort Worth, TX (NRCS).

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flect a position that moves us forward in a sustainable manner. Some of the strategies that we feel are important are addressing the issue of energy conservation and efficiency. Currently there's a lot of documentation coming out daily of places that energy could be saved. A good example is the new style light bulbs and the amount of energy that is being saved by making the investment to change to those. It's looking for those little things that SARE is saying, 'Before we jump on a bandwagon and just grow more corn and beans and produce more ethanol and the subsequent products, let's look for all the alternatives to make it a truly sustainable movement forward.'"

Emphasizing bioenergy topics in the SARE grant programs and opening up a progressive national dialogue are two ways in which NCR-SARE is hoping to bring the issue back to the future. Karlen believes it's a vital first step.

"I truly look at this as an opportunity for American agriculture. It can either be the boom of agriculture in the 21st Century or it can be the bust. And it will be a bust if we do not approach it as a completely integrated system. Agriculture is based on the soil, water, and air resources. These are dynamic resources. It's not a slab of concrete that you are just going out there and building a bioenergy factory on. It has to be recognized that whenever you do something at Point A there's going to be known and unknown responses at many other points throughout that whole system. We have to do the very best job we can in research, education, and outreach to think clearly through those actions and reactions in order to truly make it the boom that this has the potential to be for American agriculture."

Kansas City Here We Come to the 2008 SARE National Conference

Plan to join SARE and its many partners March 25-27, 2008 at its next national conference in Kansas City, Missouri. Learn the latest about how SARE is forging an agriculture that is profitable, environmentally sound and good for people and communities.

2008 marks SARE's 20th year of advancing a more sustainable agriculture through a nationwide competitive grants program. SARE stays in touch with the needs of farmers and ranchers through its strong regional programs in the North Central, Northeast, Southern and Western regions. The conference will be the sixth in SARE's biennial series.

Some of the 2008 conference priorities will be celebrating successes experienced by SARE and its partners in the sustainable agriculture community, fostering a productive dialog between producers, agricultural educators, and agency representatives, and communicating SARE's guiding values and vision.

NCR-SARE Illinois State Coordinator Deborah Cavanaugh-Grant shares food and drink with participants at the 2006 SARE National Conference in Oconomowoc, Wisconsin.

The Artisan of Cheese

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With these foundational experiences van Beuzekom-Loth and Dittman quickly began giving back with some outreach of their own.

"We had a cheese maker come from Vermont. He and his wife taught a class at the University of Nebraska as part of our outreach. After that a Dutch representative from where we got our vat in Holland came and taught us how to make gouda. Altogether we've taught three classes and we've had two cheese maker classes that we've hosted. We had a wine tasting and cheese appreciation at a local winery where we sampled cheeses from around the world. We had 70 people show up for that event. All those things seem to show that we're on the right track with something that is really interesting to people."

After gaining the expertise necessary to make cheese there was still the remaining investment decision of getting a vat pasteurizer to facilitate production needs. The initial idea was to find quality used equipment but that hope was quickly dashed.

"We did research on the cost effectiveness of buying used equipment which would have been great except it wasn't available because everybody who is doing this is already looking for that small equipment. There's not a lot of that surplus floating around. We ended up buying a pretty expensive vat pasteurizer from the Netherlands. The new American made stuff was really not up to par with the new Dutch made equipment but it was about the same price. So we said, 'How much is it going to cost to have it shipped over here?' And it was only about $1,000 to have the vat shipped and what you got was so much better. So we went ahead and bought from the Netherlands.

Charuth van Beuzekom-Loth puts the finishing touches on a morning of milking goats for artisan cheese production.

We were able to do a three way split between Krista, me, and the grant. It really worked out well. That took a giant load off of both of us as beginning producers."

Beuzekom-Loth and Dittman began making cheese last year by renting space at the University of Nebraska's food processing center. Much of that cheese was sold at the farmer's market. Meanwhile, SARE funds continued to be spent on advertising, outreach, and some supply and equipment costs. In the Fall of 2006 with the help of both women's husbands, their own cheese making facility was ready to go after being installed at Dittman's Branched Oak Farm in Raymond, Nebraska.

The time required to implement the artisan cheese operation has been significant. What was originally intended as a part time job has turned into a full time endeavor. Eventually Beuzekom-Loth plans to put a pipeline in her milking facility which will speed up the entire process. For now the additional time constraints are all part of a long term plan to create more sustainability at Shadowbrook farm and in the community.

"We did this for a diversification to our farm. We've always said that we don't want to produce more than ten acres of vegetables. So rather than grow more vegetables and having to wholesale them, we decided we would rather continue selling our vegetables direct at farmer's markets and retail at little grocery stores and restaurants. We didn't want to be pressured or feel like we have to produce more vegetables. Rather than doing that we can diversify and bring more things in that we can market and that's what the cheese is."

Through diversification, a lot of hard work, and a little help from NCR-SARE, Beuzekom-Loth has helped turn her farm into a brand new operation which is also helping other farmers in Eastern Nebraska to sample the value of artisan cheese.

2007 Professional Development Program Call for Pre-Proposals

The 2007 NCR-SARE Professional Development Program Call for Pre-Proposals is now available. The deadline for submitting proposals is May 25, 2007. Call our office at 1-612-626-3113 for more information or access the application on our web site at:

http://www.sare.org/ncrsare/PDP/pdp.htm

Photo credits for this issue of Field Notes - Mustard Field photo from a NCR-SARE grant project by David Baltensperger, Cranberry Fields Forever photos by Sarah Stackpoole and Todd Hawbaker, all other photos taken by Roger Simonsen.

North Central Region Sustainable Agriculture Research and Education

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NCR-SARE farmer rancher grant recipient Charuth van Beuzekom-Loth of Lincoln, Nebraska is pictured here with one of her future cheese partners. Beuzekom-Loth collaborated with her friend Krista Dittman of Raymond, Nebraska to begin an artisan cheese venture with assistance from SARE grant funds. "I guess I'd always had a dream of doing some kind of a cheese making venture," said Beuzekom-Loth. "I'm from Holland. I'm actually a Dutch [and U.S.] citizen and I love the cheeses in Holland." With the guidance and encouragement of friends Beuzekom-Loth and Dittman answered the SARE call and submitted a grant proposal. "I think that the SARE producer grant is really perfect for a farmer wanting to do a project like this. It's not too intensive in terms of the paperwork. It's very doable." Read more about how Beuzekom-Loth continues to live her dream inside the newsletter.

University of Nebraska Lincoln | NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION

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