



Ag Innovation News

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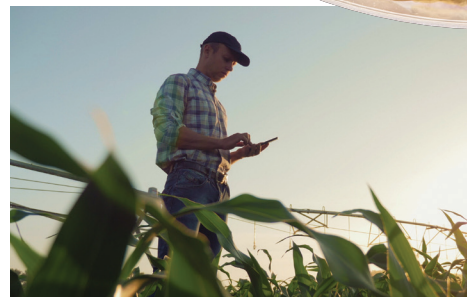
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EXECUTIVE IDEAS

For a non-profit like AURI, which pursues innovations in so many different areas of food and agriculture, issues like mission drift or mission creep are of significant concern. These are situations where an organization loses sight of its “true north” or its operational compass and unintentionally strays off its mission path. The result can be catastrophic, in that it creates confusion, leads to inefficient business practices and potentially a total deviation from what the organization was originally created to do.

To keep our north star central to our efforts, AURI stays focused on its multi-year strategic plan which lays out a game plan for creating a common understanding among board, staff and stakeholders of where AURI is headed as an organization and to drive AURI to meet the needs of the agriculture industry.

AURI recently transitioned from its last strategic plan to its next five-year plan, so it is time to review and reflect on what efforts created positive returns on investment and which strategies needed reshaping to better align with AURI's mission and vision for success.

To that end, AURI developed four strategic objectives to pursue over the next five years.

- ▶ **Goal 1:** Leverage AURI's resources to create the greatest impact for agriculture and the economy
- ▶ **Goal 2:** Strengthen AURI's brand awareness and key relationships
- ▶ **Goal 3:** Grow overall funding levels and diversify sources
- ▶ **Goal 4:** Continuously improve processes and systems and empower people

For this edition of the Ag Innovation News, I want to share a little perspective on Goal 1 which I feel is most essential to the organization's growth as it moves into the future and implements this new plan.

- ▶ **Goal:** Leverage AURI's resources to create the greatest impact for agriculture and the economy

AURI is a research institute focused on applied research with an emphasis on early-stage food and agriculture innovations. This strategic goal lies at the very heart of our work of advancing real world solutions with commercial opportunities. I'm proud of the efforts to both commercialize ideas and to do so via a value chain approach, knowing that solutions need to benefit value chain participants to succeed. The new plan calls for a number of steps and trackable metrics to measure and achieve our mission as we move forward. Some of these include focusing additional efforts on the commercialization stage of an innovation, in addition to the early-stage innovation assistance, making resources more accessible, as well as developing and offering services that we believe will better assist MN entities in proactively meeting opportunities that align with food and ag megatrends.



By AURI

This quarter, Ag Innovation News highlights one of its longstanding board members, Jerry Hasnedl. Currently in his third term and serving as the board's Vice Chair, Jerry has a long history in agriculture. In this edition of AIN's Board Q&A, Jerry shares his thoughts on his board tenure, how things have changed and what's in the future for AURI.

AIN

In your time on board, how do you feel AURI has evolved or grown?

JH

When I came to my first board meeting seven years ago both staff and fellow board members welcomed me with open arms. Today that has not changed. I feel that new board members quickly recognize that AURI staff is friendly, professional and welcoming to fellow board members. Those early board meetings quickly brought a realization that the staff and board did not function well as a team. AURI is a much more cohesive organization from when my time began on the board and today we are a team, both staff and board.

AIN

In your time on the Board, have your goals for the organization changed?

JH

I believe I have changed my goals for AURI because the organization has evolved. However, our mission remained constant. We continue to find ways to add value to agriculture production. As an example, if we add value to Minnesota soybean production it creates value for Iowa, Wisconsin and South Dakota production as well.

AIN

What value-added ag topic do you feel has the greatest potential to positively impact MN?

JH

Many things have tremendous potential to affect Minnesota's ag economy. A few are aquaculture (both shrimp and fish), soybean oil as road treatment, and the Ag Innovation Campus in Crookston.

AIN

Now that you are currently in your third term, please share what has kept you engaged with the organization and wanting to stay involved.

JH

I believe pride has kept me engaged. I watch our staff all working on solving problems, promoting a new product, helping an entrepreneur with a formula, sharing expertise and tools to help a farm businessperson and/or food company, and I feel personally rewarded.

AIN

What do you see for the future of AURI?

JH

The future for AURI will be figuring out how to grow beyond Minnesota's borders that will bring regional and national opportunities back to the state to benefit Minnesota agriculture. That means that we need to grow our funding model, a subject we are beginning to address.

AIN

In looking back over your time on the board, what do you feel was AURI's biggest impact in Minnesota?

JH

I believe it is the growing respect and trust that the Minnesota Legislature now has in AURI. This is key to ensuring AURI will be successful for another 30 years.

A Platform for Accelerating Innovation

After last year's hiatus due to COVID-19, one of the nation's premier value-added agriculture and innovation-focused events is back. The fourth New Uses Forum, scheduled for March 23-24, 2022, at the Earle Brown Heritage Center in Brooklyn Center, Minnesota will continue to serve its goal of accelerating innovation and investment in value-added food and agriculture.

AURI is proud to partner with Compeer Financial and Georgetown's Rural Opportunity Initiative again in 2022 to bring together the capital investment experts and food and ag innovation entities under one umbrella for this year's conference.

“There are two big reasons for the forum - to showcase what different companies, individuals and entrepreneurs are doing in value-added agriculture innovation and to highlight financial investment opportunities and trends to grow innovative businesses,” says Jennifer Wagner-Lahr, AURI senior director of commercialization.

“Even broader than value-added agriculture, certainly things are happening on the farm and in the digital ag space that are exciting to hear about, too,” said Wagner-Lahr.

The event accelerates utilization for regional commodities and products, generates awareness and enthusiasm around value-added ag products and creates opportunities for innovation. At the same time, the forum brings people together to explore ideas, expand networks and incorporate finance and investment. Connecting multiple stakeholders, partners and sponsors will also potentially lead to greater ongoing collaborative relationships and new idea generation.

“We want to showcase what's happening and inspire others who are seeking services in these areas, as well as those who are looking to make connections, or even start their own company, to inform them of how others have done it and to potentially walk in their footsteps,” Wagner-Lahr says.

“The New Uses Forum helps us highlight and connect new value-added innovations and opportunities with investment capital, producers, businesses and entrepreneurs,” explains AURI Executive Director Shannon Schlecht. “It allows us to highlight great innovations within our borders, while also showcasing innovations from outside Minnesota that have some potential to benefit the agriculture industry.”

“And the partnership with Compeer Financial and Georgetown's Rural Opportunity Initiative brings a capital markets perspective to inform participants about new financial resources and tools to grow their business,” said Schlecht.

Learning Together

Wagner-Lahr says the forum will examine how companies are dealing with issues related to sustainability, and what various organizations are doing in terms of product innovation and securing capital.

“Then we'll dig into some of the major themes in areas related to food and bio-industrial products, coproducts and renewable energy,” Wagner-Lahr says.

Among the biggest challenges for established and emerging businesses alike, is accessing information, assistance and funding needed to increase the likelihood of business success and scale their businesses. The New Uses Forum brings many of those pertinent resources together in one place.

“The forum creates greater awareness across different sections of the value chain to highlight opportunities that may not otherwise occur,” Schlecht says. “This awareness can accelerate solutions to problems that make them more efficient and profitable. We all know that business is about relationships, and this platform allows relationships to get started through exposure to new ideas.”



○ Capital Gains

Among the challenges facing entrepreneurs and companies pursuing new innovations is access to capital. Launching new businesses or ideas requires funding, so the New Uses Forum will delve into the topic to help connect innovators with potential sources for the capital necessary to move ideas forward.

“Capital is almost always a need,” Wagner-Lahr says. “Especially in our region, there’s been a lot of focus on trying to identify and provide opportunities for capital to flow into these new companies or even just new concepts.”

Wagner-Lahr says a number of different sessions focused on financing innovations, as well as representatives of investment funds that are active in the region, will be on hand at the New Uses Forum and will help highlight what those organizations look for when considering investment.

○ Sustainability

Social and environmental responsibility are also becoming increasingly important as consumer preferences and demands influence how companies do business. Sustainability will be another topic addressed at the New Uses Forum.

“What we’re looking at as a starting point is consumer-driven demand for sustainability, as well as what legacy food and ag corporations are including in their corporate sustainability goals and how that translates to innovations that they are putting forward in their own supply chains or potential opportunities for start-ups to plug in,” Wagner-Lahr explains. “We’re working to develop partnerships to meet the needs of our bigger corporate players who have some serious goals to achieve related to climate change and soil health preservation.”

Wagner-Lahr says consumers have an interest in putting their money into products that are sustainable. Those decisions can include purchasing food products based on where ingredients are sourced, packaging, and a company’s overall production process. But, Wagner-Lahr contends, sustainability issues could extend further up the supply chain to include the type of feed that is going into a livestock operation which can impact the ability of a retailer down the supply chain to market their products differently.

“Sustainability is much more ubiquitous in terms of the entire supply chain of food and ag, and you can spread that out to fuel and fiber, because sustainability doesn’t impact just one sector of agriculture, it’s the entire industry,” Wagner-Lahr says.

AURI will also announce the 2022 AURI Ag Innovator of the Year at the New Uses Forum. The Ag Innovator of the Year award was created to showcase an innovative Minnesota-based company that is making positive contributions to the state’s agriculture industry and to draw attention to the impact value-added agriculture has on Minnesota’s economy.

○ Valuable Connections

After COVID-19 forced the cancellation of the 2020 and 2021 events, the 2022 New Uses Forum will be a hybrid event consisting of in-person offerings as well as some events that will be available online.

“After 20 months of pandemic, we are hoping that we can provide opportunities for people to network and build connections and find resources,” Wagner-Lahr says.

“It’s been a tough couple years to connect, so goal number one is to connect with people again outside of a computer screen,” Schlecht says. “Secondly, things have changed across value chains with new constraints as well as new technologies since we last got together, and we hope to showcase some of the new opportunity areas and highlight issues that need ideation and creativity.”

Wagner-Lahr says the current plan is to stream the sessions online via a virtual platform, allowing people who are unable to attend in person to engage and connect with people at the event.

The New Uses Forum will feature speakers and experts from Minnesota and beyond. Previous forums have drawn participants from over a dozen states and from coast to coast.

“The agenda is set to attract a wide audience of individuals connected to value-added agriculture,” Schlecht says. “We hope that producers, investors, bankers, entrepreneurs, academics, associations and corporate representatives will attend as there is substance for everyone and it allows for a great platform for people that might not normally interact to connect with each other. Minnesota has a great backyard in the food and agriculture space and we hope this event brings them all together.”

Wagner-Lahr says that while the New Uses Forum agenda contains a lot of valuable information, organizers are well aware that there’s value in giving people the opportunity to connect one-on-one.

“What we’ve learned is that in the midst of all the good stuff that you want people to hear about, you need to give them time to talk to one another. So, we’re really being diligent in terms of fitting in time for people to network and to visit with one another and to make those connections,” Wagner-Lahr explains. “We want to share information and to build awareness, but those connections and the networking opportunities lead to action, and that action is really what we’re trying to inspire and to promote. If someone is able to make connection, they can then potentially build a partnership or build a new product line or possibly incorporate a new technology into their facilities. That action and that investment is really what we’re trying to inspire.”

“As we often see, this type of connection event brings a synergy and excitement around the subject, with the endgame of making connections and stimulating action,” says Nan Larson, AURI Connects Manager. “The New Uses Forum could also have a direct, positive impact on some of AURI’s clients who are ready for next stage funding, and it will help clients who are in the earlier stages of development. It could also be helpful for some of the underserved communities that are new citizens to the upper Midwest as well as women, veterans, black, indigenous, people of color, and others who are beginning to enter into ag/food innovation.”

Wagner-Lahr says the New Uses Forum has not only given AURI a platform to share what’s happening with its projects, but it also presents an opportunity to highlight the important work of different ecosystem partners.

“People can expect to learn about the different resources that are available to them if they are intending to commercialize a new product or technology, or if they’re looking to connect to the vibrant ecosystem which exists here when we think about food and ag,” Wagner-Lahr says.

○ Event Partners

Compeer Financial is a member-owned, Farm Credit cooperative serving and supporting agriculture and rural communities by providing e-loans, leases, risk management and other financial services throughout Illinois, Minnesota and Wisconsin.

The U.S. Department of Agriculture (USDA) and **The Global Social Enterprise Initiative at Georgetown University’s McDonough School of Business** work to foster, study, and promote rural economic development through partnerships between the public and private sectors. This effort, called the Rural Opportunity Initiative, was created to provide a larger network of academic and land grant institutions that understand the value of rural America and see opportunities to invest in its people, businesses, and infrastructure.

For more information on the New Uses Forum agenda and to register for the event, go to www.auri.org.



AURi Helps Drive Research for Wheat Digestibility Issues Amid Slumping Demand



Per capita consumer demand for wheat products is trending lower in the United States. In part, this shift is a result of an emergence of health-related concerns like non-celiac gluten sensitivity and irritable bowel syndrome. These digestibility issues have prompted many Americans to remove wheat from their diets.

For the wheat growers, bakers and processors, this trend has significant ramifications. When consumers buy less bread, bagels and cookies, demand falls and can often result in lower wheat prices, and less revenue for bakeries as they sell fewer goods. When the price of wheat drops, farmers look for crops that can provide a higher return per acre, including staple crops like corn and soybeans.

In response to this trend, the Agricultural Utilization Research Institute engaged with two coalitions to study options to reduce wheat digestibility concerns. Combined, this research has the potential to catalyze the creation of new products and processes that will positively impact the wheat industry value chain. These projects involved researchers from the University of Minnesota (UMN) and the University of Alberta, the Minnesota Wheat Research and Promotion Council and Back When Foods, a bakery in Crookston, Minn.

These projects tackled two related questions: Are wheat digestibility issues a result of unintended outcomes from wheat breeding programs and/or the change in dough and baking processing that reduced fermentation steps? If so, can different varieties and processing techniques make wheat easier to digest?

While both projects investigated options to improve wheat digestibility by looking at the fermentation process to make bread and other wheat products, UMN researchers also looked at wheat grown today in the U.S. The projects investigated options to improve wheat digestibility by looking at wheat varieties grown historically and today, and the fermentation process to make bread and other wheat products. In both projects, researchers focused on two components found in wheat thought to trigger some of the health issues associated with wheat digestibility: Fermentable sugars (fermentable oligosaccharides, disaccharides, monosaccharides and polyols or FODMAPS) and amylase-trypsin inhibitors (ATI).

Specifically, UMN researchers investigated the level of ATI and FODMAPs present in current and past Minnesota wheat varieties, as well as their anti-nutrient levels, and the effects of fermentation on FODMAP and ATI levels utilizing a sourdough process.¹ The central question to their report was, are wheat digestibility issues addressable through a combination of selecting the right wheat variety and/or alternative processing, such as sourdough fermentation, to substantially reduce the ATI and FODMAP levels in finished products?

Dr. George Annor, a professor in the Department of Food Science and Nutrition, and Jim Anderson, a professor in the Department of Agronomy and Plant Genetics, characterized the FODMAPs and ATI across ancient, heritage and modern spring wheat varieties curated by the University of Minnesota wheat breeding program, going back to the late 19th Century. A total of 220 whole grain wheat samples were analyzed for levels of FODMAPs and ATI. Researchers extracted DNA and genotyped samples using genotyping-by-sequencing. Researchers used the resulting genetic markers to find associations with genes influencing FODMAP and ATI content.

Dr. Michael Gänzle, a professor in the Department of Agricultural, Food and Nutritional Science at the University of Alberta, focused his research on developing fermentation technologies to reduced levels of unfavorable components in wheat and improve tolerance of wheat products.

¹Funded by the Minnesota Department of Agriculture.

Conclusions

Results from genetic mapping did not show any genomic region responsible for a large portion of the genetic variation for these traits. Rather, many genes of minor effect were found to be responsible for most of the variations for ATI and FODMAPs. Both traits, however, should be amenable to selection using conventional breeding methods and genomic prediction. Additionally, the analysis did not indicate any significant increasing trend of FODMAP and ATI levels in varieties from the late 19th into the early 21st century that could explain the increased digestibility issues.

Additionally, wheat samples showed significant variation in FODMAP and ATI levels across a diverse panel of wheat varieties. The wheat samples were grouped according to FODMAP and ATI levels for the fermentation phase of the research, which examined the effects of sourdough fermentation on the levels of FODMAPS and ATI.

“The most interesting part of this research for growers forms the basis of how we can reduce FODMAPs and ATI levels through breeding,” Annor said. “We believe that if we can continue to screen more samples, we can put our hands on the exact things responsible for the increase in FODMAPs and produce wheat that is low in ATI.”

Anderson said that it is clear from the research that the length of the fermentation process in wheat production plays a larger role in digestibility issues. He believes there is a market for bread products produced with a longer fermentation period.

“For the consumer, the interesting part of this research is, you may not have a gluten sensitivity. It very likely could be the FODMAPs and the ATIs that are causing these issues, not the protein of the wheat,” Anderson said.

AURI and the Minnesota Wheat Research and Promotion Council also partnered with Dr. Michael Gänzle on a second project. Dr. Gänzle studied sourdough bread as a possible solution to digestibility issues because the longer fermentation process used in sourdough bread making significantly reduces FODMAPs.² His research will be published later this year.

“In the past few years, I have talked to many bakers who use sourdough and tell me that their customers can tolerate their bread better. As more consumers start to learn about the positive health effects of sourdough, I think it will spread through the industry. It will take another five years until the American baking industry is using sourdough bread as default process,” Gänzle predicted. We are shifting back to where we were in the early 20th Century in terms of fermentation process.”

The work AURI is doing to facilitate more research into wheat digestibility is exciting and very much needed, said Charlie Vogel, the executive director of the Minnesota Wheat Research and Promotion Council. Finding new markets for wheat grown in Minnesota is critical to the future health of the industry. There are about 800 wheat growers in Minnesota. Most of the crop grown in the state is exported.

Vogel said if it is possible to improve the perception of wheat among consumers, there will be many benefits. Minnesota farmers can grow and sell more wheat domestically. Further, when demand for wheat increases, more of the crop will be planted which will directly improve soil health in the state, he said. AURI is also looking into process verification tools that could assure consumers of properly fermented wheat sourdough products with lower fructans and ATI.

“We need to be proactive, and to look ahead to develop these markets. To do that requires us to be nimble and work with other partners to explore these niche areas that will over time become mainstream markets,” Vogel said. “For our group, we are often focused on what is happening right now, so it is very valuable to have partners like AURI to collaborate with on projects like these that are looking forward to new markets and new opportunities.”

Brian LaPlante is the owner of Back When Foods, a sourdough bakery in Crookston, Minn., that is scheduled to open in 2022. He said this research on fermentation process, FODMAPs and ATI is critical to the health of the baking industry and to his own business plans. He has worked with AURI for many years.

“The shift to gluten free diets is really clobbering our industry,” he said. “The spring wheat used in baking is only about 25 percent of the wheat grown in the United States. Pretty soon all wheat produced is going to be spoken for by the large millers and bakeries. We need to create more demand and more markets. To do that we need to turn around the perception that wheat is bad for you. If we can do that, we can encourage farmers to grow more wheat and to be paid more for it.”

There is a clear example in the craft beer industry for how the wheat industry can change from the bottom up, LaPlante said. When small, independent brewers started to make beer with better ingredients and a better production process, consumers took notice. Soon, larger breweries imitated that model.

“Once the large wheat processors take a look at this research and understand the ramifications, they can shift to using a wheat that is lower in ATIs and a longer fermentation process to reduce some of the anti-nutrients from the beginning of the process,” he said. “Right now, it is the smaller independents that are out front on this, but I think the bigger companies will follow.”

LaPlante said AURI’s contribution to this field is invaluable. The organization is an expert product manager and facilitator of large-scale projects like this one, he said.

“It is not easy for an individual like me to connect the many players for this type of research, but AURI can lead a project like this all the way from helping secure a grant from the Minnesota Department of Agriculture, to putting together the right partners, to answering the questions that come up along the way. They are a perfect partner to work with,” he said. Project Manager Becky Philipp and Business Development Director Harold Stanislawski are working on both projects for AURI. Philipp said partnerships like these are central to AURI’s core mission of advancing value-added agriculture.

“This project has so much potential. Everyone knows someone affected by wheat digestibility issues. Plus, if we can help get people to eat more wheat again, it will help the growers and bakers financially. This is really meaningful work,” Philipp said.

The wheat research highlights how AURI can perform the role of a convener and new business accelerator, Stanislawski said.

“There are a lot of products that can be made using the techniques studied in this research. Bread, pasta, cookies, crackers, you name it,” he said. “AURI can help advance ideas like this into commercial products and use our networking channels to get this information in front of consumers.

²Funded by the Alberta Wheat Commission, Saskatchewan Wheat Development Commission, Minnesota Wheat Research & Promotion Council and the Natural Sciences and Engineering Research Council of Canada.

Capital Investment in Food and Ag is Taking Off, Will Minnesota Capitalize?



Capital investment in the food and agriculture market is growing at an unprecedented rate. According to capital investor Finistere Ventures, 2020 was a record year for investment in agrifood tech. Significant new capital is flowing to companies making plant-based protein alternatives, as well as those providing digital solutions and financial technology alternatives to growers and processors.

In the U.S., companies like Impossible Foods, Memphis Meats and Perfect Day Foods made headlines by quickly raising hundreds of millions of dollars last year. According to Ag Funder, a food and ag tech venture capital fund, startups raised \$26.1 billion in 2020, a 15.5 percent increase from 2019.

This is visible in Minnesota, too. New food and ag investment funds are opening and investors from other sectors of economy are increasingly targeting the space. Minnesota's large food and ag businesses are investing in ag startups and launching new venture funds. One manager of a Minnesota food and ag investment fund says he is exploring more deals now than at any time in his career.

This activity benefits Minnesota's economy and entrepreneur community. For example, So Good So You, a Minneapolis-based maker of organic and non-GMO plant-based probiotic shots, closed a \$14.5 million Series C funding round in November 2020. Minneapolis-based Sentera, a provider of integrated remote sensing and analytics to agronomists, announced a \$25 million Series C financing in June of 2021.

For analysts and investors, the new money and attention is welcome, but it is still only scratching the surface. There is untapped potential in food and agriculture investing, especially in Minnesota, with its rich history of successful businesses and entrepreneurs and savvy investors.

“There is a ground shift. You can really feel it. We have so many world class resources that can be applied to these businesses in Minnesota, and a vibrant food businesses community. There is so much opportunity here and if we can grow this sector it has the potential to benefit many other industries as well,” said Greg Hoyt, the managing partner of Gather Venture Group.

Gather Venture Group invests mainly in food startups to support growth and ultimately scale their businesses. They work with restaurants, consumer packaged goods companies and others to build a more powerful Minnesota food ecosystem. Michael Stern, the operating partner at Gather Venture Group, said one encouraging sign is where the money is coming from. Both established and new investors are participating.

“What we are seeing is Millennials and other younger investors who have that connectivity to food are taking an active role,” he said. “That is important because unlike Baby Boomers or Gen Xers, this age group has more of an appetite to invest in alternative areas. When we see younger investors move to this space it is a good sign for the future.”

That is important because with food and ag investment, the returns are there, Stern said, but it takes a patient investor to realize them.

“We can often deal with a lack of understanding as to how investment in food truly works. These deals are not like a typical investment in technology or a more traditional industry where you see 10 times the return in three years,” Stern said. “So, one of the things we are going to need to do as we continue to grow the activity in this space, is some education on what it means to be a successful food and ag investor.”

Brett Brohl is the Managing Partner of Bread and Butter, a Minneapolis-based early-stage venture capital firm. Ag/food tech companies are one of the firm’s three core areas. The modern era of food venture capital is only about a decade old, Bohl said, but many trends and developments have contributed to a recent jump in interest and activity.

For example, the COVID-19 pandemic created an opportunity for businesses to rethink grocery shopping and meal delivery. Entrepreneurs are also capitalizing on growing consumer interest in sustainability, cyber security, food traceability and Fintech within food and ag.

Brohl says the most active area for investment is protein alternatives and fintech for food businesses. According to Finistere Ventures, alternative protein start-ups raised \$3.1 billion in funding in 2020 compared with \$858.7 million the year before.

Brohl is also the managing director of Techstar’s business accelerator Farm to Fork and is launching the podcast “Full Stack Food” that will explore investment in food and agriculture, among other topics, later this year.

He said he expects more capital from new and established investors to continue to flow into the sector creating strong companies and more jobs.

“When I started there just weren’t very many food tech focused funds. Now we are seeing the general funds starting to move into this space. You are also starting to see ex-Google, ex-Amazon people behind the scenes, without that traditional food background,” he said. “To continue and build on what we are seeing, we need to have companies that were able to raise a lot of capital have a successful exit. High profile examples like that will drive even more attention to the space.”

Minnesota-based CHS Inc. announced a promising development in November. The company is partnering with Illinois-based Growmark to form Cooperative Ventures, a \$50 million fund to support the development and distribution of new technologies in agriculture. The fund has three core investment areas: enhancing crop production, improvement the supply chain and promoting sustainability in farming.

Melissa Carmichael, Vice President of Strategy & Innovation at Bremer Bank, said it is encouraging to see more established companies like CHS Inc. look outside their walls for business solutions and new opportunities.

“Open innovation is a very efficient way to solve some of these common industry problems. The more of this we see, the more other companies will start to take note that you don’t have to handle all of this in house,” she said. “It is very encouraging to see collaboration within the industry, especially among organizations that are sometimes viewed as competitors.”

Bremer Bank is the ninth largest ag lender in the country. The bank was a driving force behind the creation of Plug and Play, an agtech-focused accelerator in Fargo. The Plug and Play accelerator has 529 global partners, 26 global locations and 16 different verticals.

She said investment in food and ag tech is primed for rapid growth in the short term. Minnesota and the Upper Midwest have distinct advantages over other regions as the activity takes off, Carmichael said. She predicts increased interest in the Midwest from large investment funds on the east and west coasts “looking for a piece of what we have.”

The investment is not solely in food and agriculture businesses. New money is also flowing into rural America and to agriculture. Aaron Knewtson is the vice president of food and agribusiness at Compeer Financial, a Farm Credit cooperative managing funds that invest money in agricultural companies and important rural institutions like health care centers and senior living communities.

He sees increased investments in farm inputs, and new markets and techniques like controlled farming, vertical farming and indoor farming. An up-and-coming investment sector is digitization in agriculture and products that will make farming less labor intensive and more efficient, Knewtson said. Farmers are looking for new solutions to manage risk, predict crop yield and monitor crop health. They also are looking to streamline business functions like inventory, sales, deliveries, payables and real estate prices, Knewtson said.

“There is definitely more technology needed in agriculture, and with the labor shortage we have right now, that has come to the forefront,” he said. “Investment in automation and digitization is something that farmers are asking for because they are seeing advancements in other industries. Investment in digitization is going to be so important to help solve some of those issues and pain points.”

In addition to new businesses, the investment dollars also benefit rural America. Knewtson’s colleague Bob Madsen is the Vice President of Mission Financing at Compeer Financial. He works to put together deals to finance construction of new essential infrastructure facilities like hospitals, clinics and senior living communities in smaller cities and towns.

“

One of the reasons people partner with us is because of our mission. There are more traditional sectors with a faster return and less risk, but the people that contact us know that in order to keep rural America a great place to live, work and raise a family, we need modern hospitals and health care facilities. Where and how they spend their money is just as important as the return,” Madsen said.

Despite the promising signs, there is room for improvement in Minnesota. Ag Funder also tracks the value of investment by state. Minnesota ranked 20th in 2020 at \$44 million, significantly behind leaders California at \$5.6 billion and Massachusetts at \$1.9 billion. In the Midwest, Minnesota also lagged neighbor states Wisconsin at \$92 million and Iowa at \$70 million.

“This is something that we still need to nurture. We are trying to build a rich ecosystem of investment and innovation here in Minnesota by tapping into the network of large, successful businesses and smart entrepreneurs. We have world class resources here to work with, but [food and ag investment] is still a relatively new area in Minnesota. We don’t have that capital flow culture yet like what exists in other parts of the country,” said Hoyt at Gather Venture Group.

Minnesota can look to other states for examples of how to drive capital investment in the space, said Stern at Gather Venture Group. California, Massachusetts and others have “dozens” of different incentive programs to fuel growth and incent capital. Similar programs here could help Minnesota maintain and grow its status as a leader in food and ag companies and develop the next generation of successful businesses, Stern said.

As Minnesota’s ag and food investment market continues to grow, the challenge will be to connect companies with good ideas that are ready to scale with investors that understand the intricacies and realities of investing in the sector. Organizations like the Agricultural Utilization Research Institute will play a vital role in forming partnerships with capital investors and business owners, and educating both groups on how to build value and achieve goals.

“We know that there is more activity overall from the investment community in this area, but how does Minnesota capitalize on that trend?” said Shannon Schlecht, AURI’s Executive Director. “Minnesota’s food and ag ecosystem has really grown over the past five years, and so one of the challenges is how do we keep that momentum going.”

The trends in food and ag investment are positive for advancing innovative ideas. Minnesota has the ingredients in place to be a leader in supporting entrepreneurial ideas to attract more investment capital, and the collaborative spirit is strong to further position our ecosystem and capitalize on investment trends.



Minnesota Farmers Union Named Recipient of Meat Processing Grant

The pandemic accentuated a need for new capabilities in the local and regional meat processing space to support farmers. In response, the Minnesota Legislature appropriated \$500,000 during the 2021 legislative session for matching-fund grants for organizations to acquire, host and operate a mobile slaughter unit. The legislature then designated the Agricultural Utilization Research Institute (AURI) to create and administer a grant program to enable interested Minnesota entities to access these grant dollars. This program aims to benefit the Minnesota livestock industry by supporting education, research, training and value-added product development.

AURI released a request for proposals during the fall of 2021 to identify an entity to receive funds for a mobile slaughter unit that would also coordinate with Minnesota's two-year colleges that have meat cutting programs to accommodate education and training as it relates to animal slaughter and processing.

Minnesota Farmers Union (MFU) was selected to receive the grant. MFU will collaborate with Central Lakes College and Ridgewater College in an effort to build capacity to address the gap in small-to-medium-sized meat processing by purchasing a new mobile meat processing unit.

Through the partnership between MFU and the colleges, the mobile slaughter unit will serve a dual purpose. At different times throughout the grant, the educational institutions will use the unit as a component of their new meat processing programs. Currently, Central Lakes College is planning for one meat processing certification program while Ridgewater College has plans for a program with three different certification levels. When the slaughter unit is not used by the colleges, MFU plans to put it into use around the state, supporting farmers and ranchers who need access to smaller slaughter and processing resources for marketing value-added meat products.

AURI, MFU and the colleges expect the end result of this grant will have a positive impact on Minnesota's economy and benefit rural communities throughout the state. In addition to providing farmers a new option to bring their processed meat to market, the college programs will support the industry's labor needs and reinvigorate the work force with new meat processing graduates to fill open positions.

To learn more about this grant and AURI's efforts to support the livestock industry, be sure to read future editions of Ag Innovation News or visit auri.org.



AURI EXPANDS STAFF WITH NEW BUSINESS DEVELOPMENT DIRECTOR

To help readers understand this new position, can you share some of your duties and goals in this new role?

I will focus on the intersection of new product/process development and climate resilient solutions to add value to agricultural crops and products. I intend to serve as a resource and connector for value chain participants, from growers to processors, who wish to develop markets for emerging crops. Consumers desire more sustainable products and transparency and this role builds on that trend by assisting in the value creation of crops and practices that help build soil health in tandem with conventional cropping systems or row-crop production. In doing so, my goal is to be inclusive of all Minnesota entities interested in adding value to their operations via novel supply chain development.

Since this is a new position, what is your vision for it?

My vision is to learn about existing infrastructure and value chain actors who aim to capture a place in the exciting emerging markets for perennial and alternative annual crops such as those being developed by The Land Institute and UMN's Forever Green Initiative. These crops can be incorporated to add a third crop to a two-year rotation, diversifying cropping systems – which reduces risk and adds income, improves soil health, sequesters nutrients and carbon, and improves water quality. By accelerating the supply chain development for new crops and valuable quality traits, I hope to help improve the long-term health of a farming operation and its surrounding ecosystem. In addition to the value captured by diversifying traditional farming operations, new standards are being developed to pay growers for these ecosystem services – on top of the market prices they receive for growing these grains. My role will be to also understand the fluctuations and changes in these emerging opportunity areas, to build networks of peers and actors along the value chain, and to build best practices that de-risk entering these new markets.

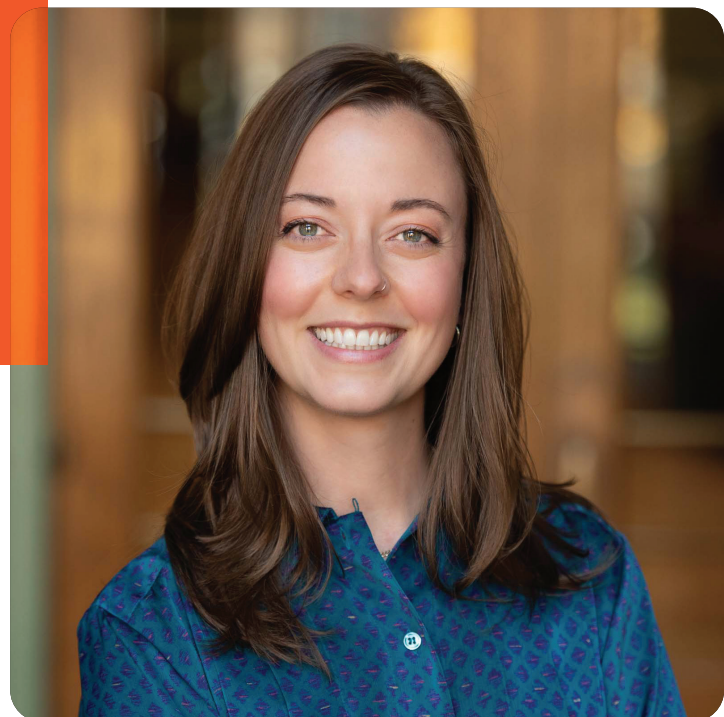
What current programs do you oversee and how will this new position benefit AURI, its clients and the state of Minnesota?

As part of the Commercialization team at AURI, I will assist on grants and programs that support the formulation of markets for novel crops and quality traits. Many novel crops are currently in a critical development phase – some of which have already begun to see action in fields and in product development – and include perennial grains such as Kernza®; winter hardy annual “cash cover crops” such as winter camelina, pennycress, winter barley, and winter hybrid rye; perennial oilseeds such as perennial flax and silphium; agroforestry crops such as hybrid hazelnuts and elderberries, improved common winter annual cover crops such as hairy vetch, and winter rye; and perennial forage legumes such as kura clover and alfalfa.

I will also be a value chain connector to explore solutions to constraints that accelerate adoption of new market spaces.

How can supporting improving novel supply chains benefit Minnesota?

Minnesota's history as the flour milling epicenter during the second Industrial Revolution made it an epicenter for the first 50+ years of the U.S. food system. By innovating and commercializing novel crops, we will move that legacy forward with an eye to sustainable agricultural approaches that provide food and agricultural food products for a growing population during another critical moment in history where the planet's natural resources are experiencing stress. However, solutions require a supply chain approach - growers and the market itself cannot spur these important changes without also incorporating other supply chain entities to incentivize and promote these new agricultural technologies.



In the fall of 2021 Alexandra Diemer joined AURI as the new Business Development Director of Novel Supply Chains. This position is part of AURI's Commercialization team and supports emerging crops and their associated value chains. To help introduce Alexandra, AIN recently conducted an interview with her to learn more about this new position and her upcoming projects.

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THIRD PARTY VALIDATION FOR SOY-BASED ROAD SEALANT

The Agricultural Utilization Research Institute (AURI), in partnership with the Minnesota Soybean Research & Promotion Council (MSRPC), released a third-party validation report of the economic performance of an environmentally friendly USDA biobased certified road preservation product, called RePlay. Specifically, the results of the statistical analysis performed using data from Hutchinson, MN show that RePlay treatment has a deterioration rate that is four times lower than an untreated surface.

“Soybean oil is paving the future of road preservation, all while providing a financial benefit to cities and taxpayers here in Minnesota,” says Mike Youngerberg, senior director of product development and commercialization for MSRPC. “This study confirmed the true benefit and increased longevity RePlay provides to treated surfaces. This is another way Minnesota soybean farmers are adding value to their product and leading the way to a more environmentally friendly, cost-saving future.”

The analysis, conducted by SRF Consulting Group, Inc., was a life cycle cost analysis (LCCA) using the State of Minnesota as a case study. The results show the use of RePlay is a financially viable bituminous surface treatment, and public agencies could use it to reduce the long-term maintenance cost of low-volume roads, which leads to a reduction in the life cycle cost of maintaining asphalt surfaces. In fact, each sensitivity analysis of the life cycle cost study illustrated that RePlay incurred a lower cost over the base case scenario (untreated/do nothing).

The technology is being used successfully in the State of Minnesota as well as other states, including Pennsylvania, Nebraska and Iowa. “Soy biobased pavement preservation products used in the Hutchinson case study are clearly showing benefits in preserving the integrity and life of the roads,” said Harold Stanislawski, AURI’s business development director. “This ultimately saves taxpayer funds and allows dollars to be stretched farther in improving more roads and trails.”

Statistical analysis revealed that segments treated with RePlay have a statistically significant lower rate of pavement degradation compared to untreated

segments. SRF combined rates of degradation from the statistical analysis with a model for untreated asphalt pavement degradation to estimate RePlay service life (worst to best-case scenarios). The service life analysis demonstrated that RePlay could increase the longevity of road surfaces by 2-7 years.

“We have used machine learning and advanced statistical analysis on the RePlay performance data to estimate the increase in the service life of a pavement surface treated with RePlay,” said Ali Nahvi, Ph.D. Data Scientist at SRF Consulting Group. “We discovered that the application of RePlay on the pavement surface, depending on the primary condition of the pavement surface, can extend the service life of pavement up to seven years.”

Since the methodology followed in this study provides agencies with a sensitivity analysis that the preferred alternative produces the lowest life cycle cost, recommendations that may result from this research are not only established in fundamental life cycle cost analysis theory but can also provide public transportation agencies with an added level of confidence in predicting the financial results of pavement treatment alternatives.

To learn more, visit auri.org/access-auri-services/partnerships/minnesota-soybean-research-and-promotion-council/

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