

A photograph of a person from the side, wearing a dark baseball cap and a red and black plaid shirt. They are holding a white tablet device and examining a wheat ear in their other hand. The background is a field of golden wheat under a bright sky.

BRINGING IDEAS TO REALITY

auri.org



WASECA PILOT LAB

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FROM THE EXECUTIVE DIRECTOR

On behalf of the Agricultural Utilization Research Institute, its staff and Board of Directors, it is my pleasure to present you with our Fiscal Year 2018 Annual Report. This is one of my favorite duties as Executive Director, because it's an opportunity to celebrate the organization's positive impacts over the past year and share a vision for AURI's future.

Fiscal Year 2018 was a good year for AURI, full of growth and progress. We welcomed new staff and Board members, expanded capabilities and increased awareness of the organization's capabilities and programs. Throughout the year, AURI teams worked on more than 200 projects across the organization's four focus areas (food, coproducts, renewable energy and biobased products), of which 128 were new projects. Results of these efforts will have a lasting and positive impact for Minnesota and beyond.

Another sign of progress in Fiscal Year 2018 was the continued development of AURI's business model. This included pursuing additional revenue from companies utilizing AURI created intellectual property, initiating nominal event registration fees and implementing a new project fee structure. Not only do these steps help AURI align better with the Minnesota state statute governing the organization, they also generate supplemental funds to provide additional services, which will enhance agricultural innovation opportunities across the state.

Additionally, our leadership undertook efforts to increase synergistic collaborations and partnerships between AURI and other organizations throughout the region. Throughout Fiscal Year 2018, AURI enjoyed a positive working relationship with a wide range of dedicated partners from the state legislature and the greater ag community. I'm proud to count organizations like the Minnesota Department of Agriculture, Minnesota Association of Wheat Growers, University of Minnesota and its Forever Green Initiative, Minnesota Soybean Research & Promotion Council, Compeer Financial, Larta Institute, Grow North, Midwest Pantry and Southwest Minnesota State University as some of our most valued collaborators throughout the year. But this list only represents a handful of the many partners AURI worked with throughout the year to advance opportunities for the agricultural industry.

Finally, AURI increased its capabilities by adding new staff and resources to better serve clients and businesses. First, we brought in new staff to fill project management and development roles, and added two positions in engineering and information technology. Each individual brings a unique skillset, which gives AURI the opportunity to assist more clients and offer additional services. We also launched new programs, which provide support, education and networking opportunities to clients and partners. Examples include sensory panels for food businesses, the Ag Innovation Partnership program and AURI's New Uses Forum, all of which create unique platforms to support innovation and encourage collaboration.

In closing, 2018 was an exciting year for AURI. In the report that follows, you will learn more about the year's accomplishments while gaining insight into the organization's operations and impact on the state of Minnesota. Together they provide an easy to understand overview of AURI's dedicated effort to further innovation across the agricultural industry and within the region.

Regards,

A handwritten signature in black ink, appearing to read "Shannon M. Schlecht".

Shannon M. Schlecht
Executive Director

2018 BOARD OF DIRECTORS

RON OBERMOLLER

Minnesota Soybean Research
& Promotion Council

KEN ASP

Minnesota Wheat Research
& Promotion Council

SEN. RICH DRAHEIM

Minnesota Senate

JERRY HASNEDL

Minnesota Farmers Union

LARRY JOHNSON

LLJ Consulting

REP. DEBRA KIEL

Minnesota House
of Representatives

CAROLYN OLSON

Minnesota Farm
Bureau

JOHN SCHAFER

Minnesota Beef
Council

JILL ZULLO

Cargill

A MESSAGE FROM AURI'S BOARD CHAIR

On behalf of the Board of Directors of the Agricultural Utilization Research Institute, I extend a heartfelt thank you to everyone who supported the organization throughout the past year. Thanks to your belief in our mission and confidence in the work we do, AURI took significant steps in furthering innovation within and across Minnesota's agriculture industry.

In reviewing AURI's Fiscal Year 2018 achievements, I believe the organization is stronger than ever, and positioned to grow its services and capabilities even further to benefit the state's researchers, innovators, entrepreneurs, businesses and producers.



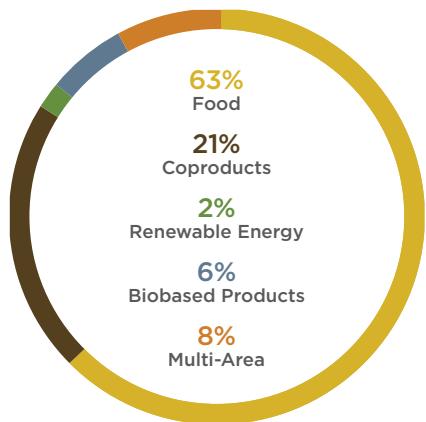
Ron Obermoller
Chair

AURI's leadership put a premium on attracting new, talented staff who, in turn, focused their efforts upon expanding AURI's reach and partnership opportunities. This, in turn, helps the development of important value-added innovations and a meaningful contribution in commodity disappearance throughout the state. I couldn't be happier with everyone's contribution to AURI's mission.

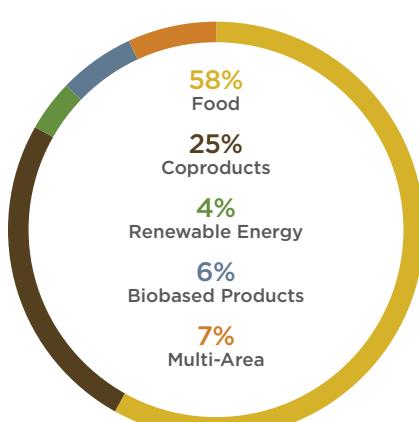
In closing, I thank AURI's staff, partner organizations, clients and the Minnesota Legislature for supporting AURI during Fiscal Year 2018.

AT A GLANCE

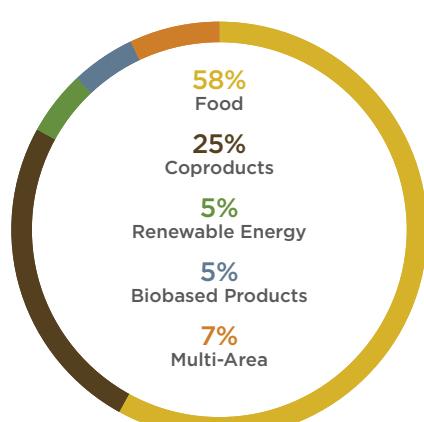
128
New Projects and
Initiatives Opened



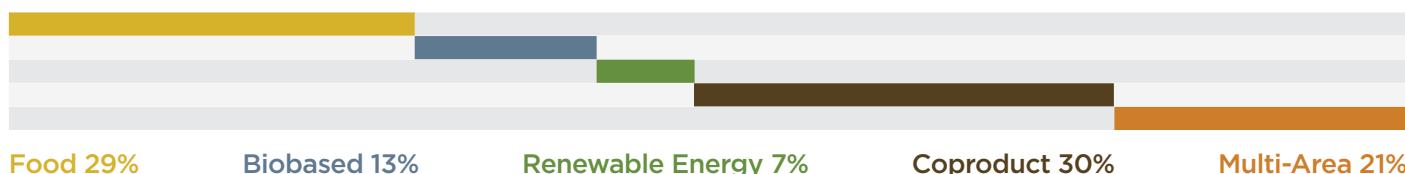
236
Total Projects and
Initiatives Serviced



144
Projects and
Initiatives Closed



Project and Initiative Hours by Focus Area



State Fiscal Year 2018 Revenue

\$4,390,398

State Fiscal Year 2018 Expenses

\$4,592,750

Data provided from AURI's Microsoft Dynamics GP Accounting System. All data based on State FY18 (July 1, 2017 to June 30, 2018)

CLIENT IMPACT: JULY 2011 – JUNE 2018



323,900

Estimated Tons of
Commodities Utilized
Per Year



\$89.9 Million

Estimated
New Capital
Invested



605

Estimated # of
Jobs Created
and Retained



\$76.9 Million

Estimated New
Gross Annual
Sales



\$139.3 Million

Estimated Potential
Future Capital
Investment



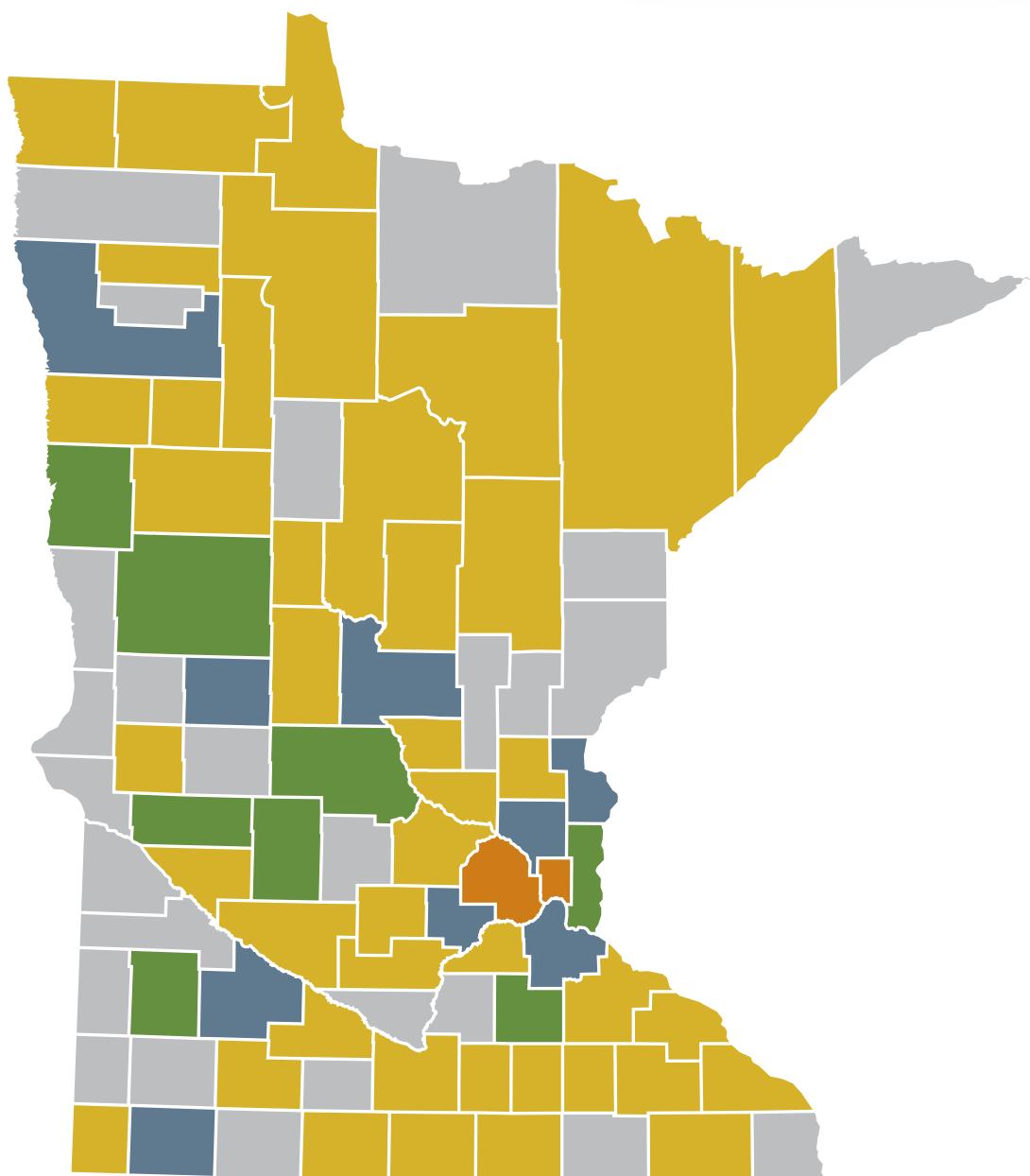
606

Estimated # of
Future Jobs Created
and Retained

AURI Client Projects Worked On July 2011 – June 2018

AURI is proud to partner with businesses and entrepreneurs throughout Minnesota. As the map to the left shows, AURI worked on client projects in most of Minnesota's 87 counties between July 1, 2011 and June 30, 2018. The impact of these collaborations, as noted on page 4, were significant to communities throughout the state.

- 1 to 5 Projects
- 6 to 10 Projects
- 11 to 15 Projects
- 16+ Projects



ECONOMIC IMPACT OF AURI'S EFFORTS

As seen on pg. 4, AURI's activities generated a number of positive direct impacts across Minnesota. AURI's efforts also created a significant indirect impact on the state's economy via employment and economic contributions that result from AURI's work with clients.

The following is an overview of past and projected impacts collected from a report published by the University of Minnesota Extension.

ECONOMIC CONTRIBUTION OF ANNUAL OPERATIONS FY2011-2017:

Businesses receiving AURI assistance directly created \$76.9 million of economic activity between FY 2011 and 2017. The businesses themselves created 605 jobs and paid an estimated \$6.5 million in labor income.

After accounting for indirect and induced effects, the businesses generated an estimated \$141.8 million in economic activity during this period. They also supported 935 jobs and an estimated \$26.3 million in labor income. The highest indirect and induced effects were in the wholesale trade, crop farming, and professional and scientific services industries.

ECONOMIC CONTRIBUTION OF PROJECTED ANNUAL OPERATIONS 2018-2023:

Businesses that received AURI assistance also reported plans to create and retain 606 jobs in the next five years. This would result in a total estimated potential of \$157.8 million in additional economic activity, including the support of 966 jobs and \$28.2 million in labor income. The industries with the largest potential effects include crop farming, wholesale trade, and professional and scientific services.

ECONOMIC CONTRIBUTION OF SHORT-TERM CAPITAL INVESTMENTS FY2011-2017:

Businesses receiving AURI support between FY 2011 and 2017 reported investments of \$89.9 million in capital equipment due to AURI assistance. The model estimates that 500 people were hired and paid \$39.3 million.

In total, capital investments by these businesses created an estimated \$168.8 million in economic activity, including support for 1,010 jobs and \$68 million in labor income. The highest number of supported jobs were in professional and technical services, food services, and administrative and support services.

ECONOMIC CONTRIBUTION OF PLANNED SHORT-TERM CAPITAL INVESTMENTS 2018-2023:

Businesses that received AURI assistance also planned future capital investments of \$139.3 million over the next five years. In total, an estimated 1,570 jobs and \$261.5 million in economic activity would be created due to AURI's assistance.

The consistent investment in AURI each year contributes to more than \$300 million of economic activity and nearly 2,000 jobs based upon this analysis. AURI strives to create impactful outcomes to benefit the agricultural industry and the state's economy each day, and we are proud to partner with so many Minnesota businesses and stakeholders to achieve these positive returns.

AURI's Indirect and Induced Impact on Minnesota's Economy

Via Work with Clients
(2011-2017)

\$141.8 Million
in economic activity

935 Jobs
supported

\$26.3 Million
in labor income (est.)

1,010 Jobs
created by client capital investment

\$68 Million
in labor income created by client capital investment

FOOD

Food is a vital part of Minnesota's economy, history and culture, so in Fiscal Year 2018, AURI's Food Team continued to grow its expertise, client base and roster of services. AURI worked on projects in all corners of the state, with significant impact to the state's long-term financial health and stability. In total, AURI worked on 136 food projects and initiatives throughout the year, of which 80 were new.

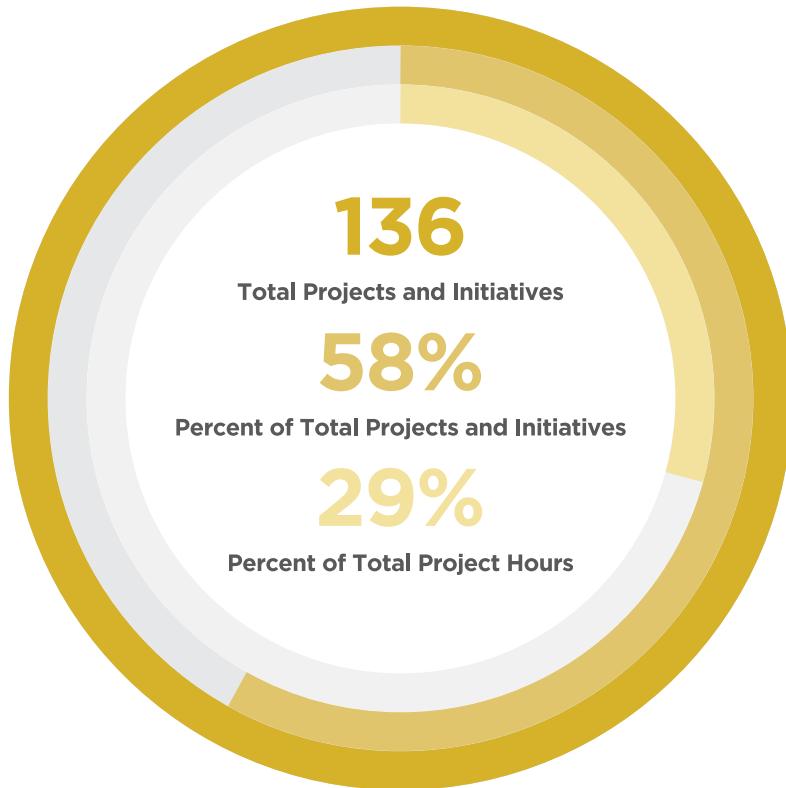
One common theme of AURI's work in the food sector was to partner with clients that were ready to take the next step in their development. For example, staff worked with Mighty Jam, the makers of a fruit spread, on food safety, formulation guidance and nutrition facts. AURI also connected the company to other resources, such as The Sprout Kitchen in Little Falls, to produce its product, and provided guidance on scale-up options to make production more efficient. The fruit spread hit store shelves in early December 2018.

Another example of AURI's work was with the Darling Pickle Dips company, which makes a line of cream cheese and white bean-based dips with added pickled vegetables. The company turned to AURI for help to extend the refrigerated shelf life of its product. The Food Team reviewed the formula and conducted analytical testing for guidance on food safety and stability. AURI suggested the company as a good candidate for the exclusive Land O'Lakes Dairy Accelerator Program. They applied, and were one of only six companies accepted into the cohort. The program kicked off in September 2018.

Working with the Hairless Dog Brewing Co., a company that makes a craft, non-alcoholic alternative to beer, AURI provided food safety and shelf-life guidance, helped determine processing parameters and provided analytical testing to confirm product attributes. The company is working with a Minnesota-based copacker, and its first flavor variety is expected to hit the market within the next few months.

Also, AURI worked with Blue Moon Farm, the maker of the Chloe Delectably Vegan brand - a vegan pizza that utilizes ingredients to avoid the big eight allergens. AURI worked with their chef to reformulate their mozzarella-style shreds in order to create a more consistent and processable texture. The company has identified a copacker and is planning for product to be available at retail within the next year.

Going forward, the AURI Food Team will focus its efforts upon helping Minnesota-based businesses expand and add jobs. Work will be guided by the themes of traditional and alternative proteins, the intersection of food, health and wellness, and creating an environment for scalable businesses.



AURI AND WILDLY ORGANIC



IDEA TO REALITY

To assist in the refinement of a new, organic mayonnaise product in order to address separation issues.

AURI'S ROLE

AURI's Food Team assessed the formula, ingredients and process, and identified potential variables to evaluate. Several small test runs were completed and evaluated to select one for a trial. The revised formula was then produced on a larger scale at the company's production facility.

OUTCOME

With the successful redevelopment complete, Wilderness Family Naturals plans to relaunch the mayonnaise product in the near future.

COPRODUCTS

AURI's Coproducts Team continued its impactful work in Fiscal Year 2018 through collaborations with clients, industry and state leaders to identify new uses for Minnesota's commodities and ag residues. A key goal of each coproduct project is to create and uncover additional value, translating into extra revenue sources that contribute to the state's economy. This is accomplished by refining and improving processes, and helping businesses expand product development to meet consumer demand.

The Coproducts Team worked on 47 projects and 12 initiatives. There were many highlights of the Coproducts Team's positive impact on the state's economy.

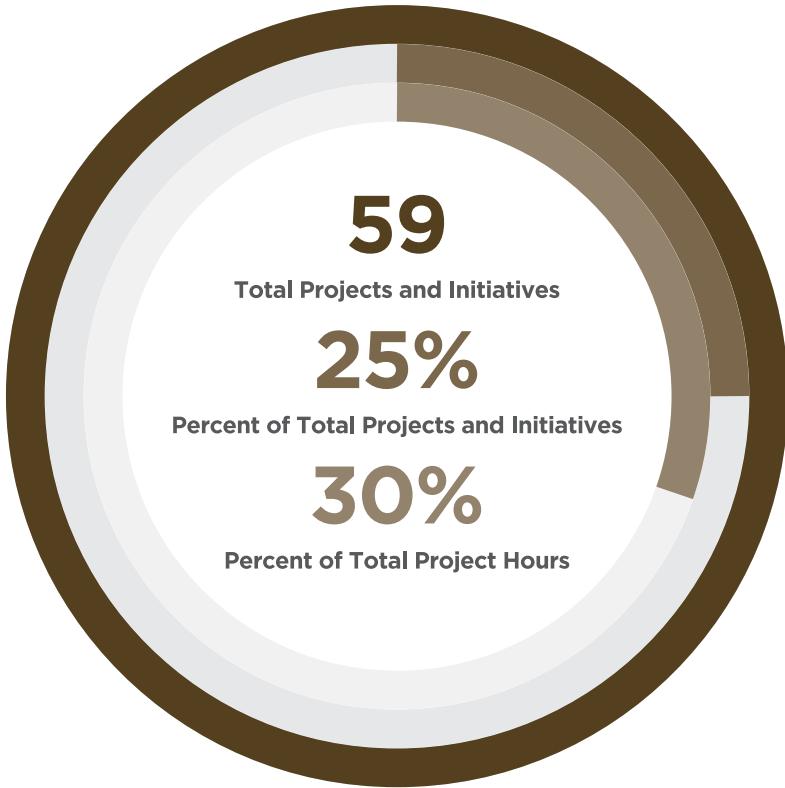
For example, the team worked with Lynn Brakke Organic Farm, an organic-feed beet producer in northwestern Minnesota. The client turned to AURI for assistance developing a better process for drying and storing beets that would extend the product shelf life and ultimately expand their reach and market opportunities. A main challenge the team encountered was how to keep the product's organic certification throughout the shredding and drying process.

In addition, AURI worked with a client operating a large egg-laying facility to develop a line of fertilizers for home, garden and commercial use that expanded its poultry manure fertilizer business. For this project, AURI conducted research and development on the pelleting and processing of the product, and helped the client with market

and process development to secure higher-value retail opportunities.

AURI also continued its work on cold pressing oil seeds for food and feed applications. In this work, the Coproducts Team partnered with the University of Minnesota to evaluate the oil from new cover crops, like camelina and pennycress, for potential end uses. Thus far, the team has worked with several clients using cold press technology to develop new feed supplements and additives.

Going forward into Fiscal Year 2019, one focus of the Coproducts Team, will be to continue the exploration of new uses for industrial hemp. This is a burgeoning industry in Minnesota, and AURI is partnering with several organizations to grow awareness, assisting clients with processing facility plans and developing new value-added products. AURI will help advance new value-added processing resources and continue to identify new opportunities for industrial hemp.



AURI AND AGRICULTURAL INNOVATIONS, LLC

IDEA TO REALITY

To develop a new, organic fertilizer from chicken manure, which reduces waste streams and creates an additional revenue stream for poultry producers.

AURI'S ROLE

AURI's Coproducts Team worked with Agricultural Innovations, LLC to show it was possible to create such a product, then developed formulations and blends for the fertilizer that could be pelleted.

OUTCOME

Agricultural Innovations, LLC is developing plans to sell the new organic fertilizer pellets to commercial organic growers, as well as individual consumers.

BIOBASED PRODUCTS

In 2018, the Biobased Products Team successfully worked with valued clients and partners to develop new, innovative products that can replace petroleum-based ingredients. The guiding principle of this work is to demonstrate the value and benefit of investing in the growth of a sustainable economy utilizing the state's agricultural crops and products.

Overall, the Biobased Products Team worked on 11 projects and four public initiatives throughout the year. Of those, eight were initiated during the fiscal year.

AURI continued important work on a multiyear initiative with the Minnesota Soybean Research & Promotion Council studying the benefits of biobased preservation products for the asphalt-based transportation infrastructure. This year, the project was awarded national grant dollars to extend the case study beyond Hutchinson. The work is an extraordinary benefit to Minnesota's agriculture economy, as well as an environmentally friendly way to economically extend the life and past investments of the state's transportation system.

In addition, AURI's Biobased Products Team and the University of Minnesota received grant funding to study the feasibility of

a new agricultural-based mulch product utilizing Minnesota crop products to replace plastic sheeting used in certain agricultural farming systems. The goal of the project is to demonstrate how a new biodegradable product could provide weed prevention, pest control and moisture control while also contributing to long-term soil health. The project is an excellent example of AURI strategic partners and stakeholders working together to develop a needed solution for agricultural producers that also increases opportunities for crops grown by Minnesota's farmers.

Going forward, the Biobased Products Team will continue to drive new utilization in Minnesota through building partnerships and expanding awareness of proven technologies and biobased products to the benefit of growers and purchasers alike.



AURI AND SANOS NUTRITION



IDEA TO REALITY

Sanos Nutrition is a Minnesota-based company developing alternative proteins to improve the economics and sustainability of animal production without the need for more acres, water or fertilizer.

AURI'S ROLE

AURI assisted in fermentation process development, strain development and further screening. In addition, AURI provided assistance in identifying state and national programs in which Sanos could apply for additional funding.

OUTCOME

Sanos Nutrition's products include yeast-based amino balancers of high digestibility with consistent nutrient profiles, specifically designed for particular species and feeding phases.

RENEWABLE ENERGY

Throughout Fiscal Year 2018, the Renewable Energy Team worked on a variety of projects and initiatives with significant impact on the state's agriculture industry and Minnesota's overall economy. In total, the team worked on ten unique projects and initiatives. Of those, three were newly initiated. AURI continues to develop and explore opportunities for Minnesota businesses to use agricultural products in the production of renewable energy.

One highlight was the publication of a study conducted with the Minnesota Department of Agriculture, Minnesota's Clean Energy Resource Teams and Viking Farms to investigate the advantages of burning biomass, rather than using liquid propane gas, to heat commercial poultry barns. It resulted in a demonstration project and report titled: *Advantages of Wood Heat for Commercial Poultry Production*. Overall, this project provided a detailed insight into the use of wood heat to meet the thermal needs of poultry production. The initiative also demonstrated woody biomass as a viable, cost-effective fuel for producers looking for alternatives to liquid propane.

AURI conducted its annual Renewable Energy Roundtable in March. The discussion

brought together businesses and industry leaders, as well as nonprofit and government representatives, to discuss how Minnesota can engage and capitalize on the many economic opportunities in renewable energy, with an emphasis on renewable chemicals.

The Renewable Energy Team will continue working with partners across the state to identify new ways for ag-based bioenergy to contribute to the Midwest's economy and our nation's energy future.

Going forward, AURI will support and lead the continued transition to utilizing more ag-based renewable energy sources that provide both economic benefits and business goals related to increasing renewable energy usage.



AURI AND BUSHMILLS ETHANOL



IDEA TO REALITY

Bushmills Ethanol is a 400-plus farmer-owned cooperative that began operations in December of 2005. It was permitted to produce 65-million gallons of corn starch ethanol, however, the co-op desired to expand its production.

AURI'S ROLE

AURI assisted Bushmills Ethanol by helping acquire federal funding for contractual services, as well as technical and economic feasibility studies for the expansion via the Rural Cooperative Development Grant program. AURI also submitted letters on behalf of the co-op to other organizations for further development, and leveraged state dollars for the project.

OUTCOME

Bushmills Ethanol conducted the studies, which showed the expansion was both technically and economically feasible. The co-op then moved forward with its expansion.

INNOVATION NETWORK PROGRAM

The Innovation Network Program (INP) actively engaged thought leaders from businesses, industry, commodity groups, academia, research institutes and government to help accomplish AURI's mission in 2018. The purpose of the INP is to improve the competitiveness of businesses and entrepreneurs through the ongoing, purposeful connection of resources and partners along the value chain and to increase knowledge of opportunities, technologies and trends.

This was accomplished through convening industry representatives at events, seminars, forums and informal networking sessions to have thoughtful and deliberate conversations resulting in activities that would lead to economic impact.

Attendance at INP activities in 2018 increased 65 percent over 2017, including a 43 percent increase in new attendees. In addition, the INP hosted two more events in 2018 compared to last year. Overall, the INP hosted many successful programs in 2018, and many beneficial relationships were developed and expanded due to INP events.

For example, experts shared their experiences and insight at the New Uses Forum with an audience of 185 people comprised of AURI clients, producers, entrepreneurs, business

representatives and owners, government officials and leaders from nonprofit organizations. The event served as a platform to connect resources and share experiences to advance innovative food and agricultural ideas.

AURI also hosted a Camelina Field Day in collaboration with the University of Minnesota Southern Research and Outreach Center. A chef prepared dishes prepared with camelina oil, and attendees learned about the work AURI does in the food, fuel, feed and fiber categories using camelina.

Looking ahead of 2018 in developing new and diverse programming across a wide geographic reach to drive impactful outcomes for the state and agricultural industry.



AURI AND SENSORY EVENTS

IDEA TO REALITY

One of the biggest challenges faced by food entrepreneurs is developing a product that is appealing to consumers' senses. Learning what they find pleasing or acceptable is, at the same time, one of the most important and difficult steps in food development.

AURI'S ROLE

To assist food business owners in obtaining this information, AURI co-hosted sensory events with Midwest Pantry at various points throughout the fiscal year. These events brought together fledgling food products, members of the public and professionals from within the food industry.

OUTCOME

As INP looks ahead a key program goal is to develop new and diverse programming across a wide geographic reach to drive impactful outcomes for the state and agricultural industry.

LOOKING FORWARD

As you can see, Fiscal Year 2018 was a busy and exciting year for AURI. To build on the past year, the organization will develop additional strategic partnerships to further its mission, strive to grow its funding to add additional technical resources and concentrate its work on key research themes.



FISCAL YEAR 2018 FINANCIAL STATEMENT

REVENUE

\$3,793,000	State Appropriation
\$251,757	Federal Grants
\$148,558	Fee-For-Service
\$62,298	Collaborations and Partnerships
\$46,206	Interest/Investment Income
\$41,209	Royalties
\$12,742	Sponsorships
\$11,215	Donations
\$10,000	Private Grants
\$8,528	Registrations
\$2,748	Project Fees
\$2,137	Miscellaneous

\$4,390,398 TOTAL REVENUE

EXPENSES

\$843,664	Operations
\$592,736	Institutional Advancement
\$843,664	Program Support
\$2,274,850	Programs and Services

\$4,592,750 TOTAL EXPENSES

STRATEGIC PARTNERSHIPS

Continuing its efforts to build the strongest network of services, resources and opportunities for Minnesota's agriculture industry, AURI focuses upon further developing existing and new strategic partnerships. For example, work has already begun to help develop new events like an open innovation platform where Minnesota businesses will share research challenges with entrepreneurs and researchers to collaboratively develop solutions to these challenge areas.

In addition, AURI and various research and promotion councils will collaborate with new partners to further shared goals and initiatives. Results of this work will spur innovation within value-added agriculture, strengthen relationships and encourage expanded collaboration amongst all concerned partners.

GROW AND DIVERSIFY FUNDING

In Fiscal Year 2019, AURI will continue to grow and diversify its funding sources to support new technical resources to advance opportunity areas. The organization will pursue royalty opportunities, apply for additional federal grant programs and seek charitable support from foundations and entities that share mutual goals. These additional revenue opportunities will result in a stronger organization to further invest in value-added agricultural projects through additional technical expertise as well as lab equipment and resources with the overall goal of strengthening Minnesota's value-added agricultural industry.

RESEARCH THEMES

INDUSTRIAL APPLICATIONS OF BIOBASED PRODUCTS

With large domestic markets for Minnesota commodities, servicing these markets with solutions utilizing significant quantities of agricultural inputs is the goal of this research theme.

INNOVATIVE UTILIZATION OF MINNESOTA COPRODUCTS

This theme works to characterize coproducts and identify novel applications with higher value potential. This innovative utilization comes in many forms, ranging from the implementation of a new technology that makes a process more efficient to identifying new uses or applications for specific coproducts.

MONETIZING AND MITIGATING AG AND PROCESSING WASTE STREAMS

Processing waste is often a significant expense for processors and manufacturers of agricultural products. This research theme explores creative solutions to the dilemma through mitigating repurposing costs or adding value to these streams.

THE NEXUS OF FOOD, HEALTH AND WELLNESS

Increasingly, today's consumers take charge of their personal well-being through their food choices. AURI will explore this movement, as well as opportunities for how businesses and industry can identify opportunities for functional food ingredients.

EXPLORING TRADITIONAL AND ALTERNATIVE PROTEIN SOURCES

Protein ingredients continue to gain prominence due to escalating consumer awareness and demand for healthy foods. AURI's exploration of traditional protein opportunities, as well as alternative protein products, will help businesses and industry identify opportunities to more effectively meet consumers' demands.

CREATING AN ENVIRONMENT FOR SCALABLE FOOD BUSINESSES

AURI is committed to strengthening a Minnesota-wide food innovation ecosystem. This research theme advances this commitment by providing affordable and accessible food safety, regulatory compliance, product development and commercialization assistance.

DEVELOPING MINNESOTA'S INDUSTRIAL HEMP PRODUCTION AND PROCESSING INDUSTRY

This research theme explores industrial hemp opportunities with specific focus given to positioning this emerging industry for long-term economic success in Minnesota.

ANALYZING AND SUPPORTING THE COMMERCIALIZATION OF VALUE-ADDED OPPORTUNITIES FOR PERENNIAL AND COVER CROPS

AURI's efforts within this research theme aim to identify value-added markets and products for new cover crops and perennials. Work will focus upon research and development of valued-added processing and product development of new or existing crops, such as Kernza, pennycress and camelina.

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