

Fiscal Year 2022

Legislative

REPORT



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From the EXECUTIVE DIRECTOR

Once again it is my distinct honor to present to you the operational results of the Agricultural Utilization Research Institute (AURI) for Fiscal Year 2022 (FY22). As you read through the following pages, I hope it will become evident that FY22 was a successful year for AURI, one which saw the organization achieve important goals while expressing its mission of fostering long-term economic benefit for Minnesota through value-added agricultural products at every step.

THE YEAR IN REVIEW

As you will see in the pages that follow, AURI made great strides in supporting Minnesota's agricultural ecosystem by utilizing a deliberate approach to developing new processes and uses for agricultural products through science and technology. Throughout FY22, AURI conducted research, disseminated public information, built strategic collaborations and placed a strong emphasis on innovative project applications with the potential for near-term implementation.

The results were positive across the spectrum.

In FY22, AURI's staff worked on a total of 253 projects across its four focus areas— Food, Coproducts, Biobased Products and Renewable Energy. This was a 20 percent increase over the previous year due in large part to the addition of new staff members in the areas of food and meat science, analytical chemistry and emerging crops.

These staff additions increased the entire organization's bandwidth, giving AURI the capability to develop a larger portfolio of work to further the organization's impact for Minnesota. This is clearly evident when looking at the number of projects opened in FY22 (117) and the number of projects completed (114), both of which represent meaningful increases over the previous year.

What's more, AURI made significant impacts on communities throughout the state by supporting small-to-medium sized businesses. Thanks to AURI's work, these entities reported an estimated 413 jobs created or retained across the state, with another 861 future jobs anticipated. Also, these same clients project to invest \$316 million in future capital infrastructure, creating increased economic impact going forward and benefitting the communities in which the companies are located.




SHANNON M. SCHLECHT
Executive Director

AURI'S ROLE IN THE LARGER ECOSYSTEM

AURI takes a collaborative approach to its mission and this proactive approach with the larger food and ag ecosystem undoubtedly results in an outsized impact for the organization. This manifested in a number of ways for AURI, including widening our meat and food science capabilities, hosting a number of events and collaborating with a wide variety of groups and organizations throughout Minnesota.

Specifically, in FY22, the AURI Connects program, with a purpose of developing and executing a variety of informative events that offer educational content and networking opportunities, expanded its efforts by utilizing a successful mix of web-based, in-person and hybrid events. During the fiscal year, the program served 2,468 individuals and partnered with dozens of collaborating organizations to raise awareness around opportunity areas and to support Minnesota's food and ag industry.

In addition, AURI's leadership supported other organizations and entities by participating with strategic partners of all sizes in an effort to accelerate opportunities through collaboration and advancing the common goal of illustrating Minnesota's food and agricultural production, innovation and commercialization opportunities. Thanks to these efforts, the entire state benefitted from new jobs, economic growth and increased options for consumers.

Also, AURI welcomed a new Board Chair, Federico Tripodi, who you will hear from on page 2. Thanks to his food and agricultural experiences, as well as his entrepreneurial approach, Federico will help AURI develop even deeper relationships within the larger food and agriculture ecosystem.

THE STORY IS JUST BEGINNING

What you've read so far is only the beginning; a high-level overview of AURI's successes and achievements in FY22. The following pages provide a snapshot of how AURI, its dedicated staff and Board of Directors, worked diligently to fulfill AURI's mission and make a positive impact on Minnesota. I hope you will read on to learn more about the great work being done, as well as see examples of AURI's contributions to Minnesota producers, entrepreneurs and businesses.



Message from AURI'S BOARD CHAIR

As the new Board Chair, I appreciate this opportunity to introduce myself to the many supporters of the Agricultural Utilization Research Institute (AURI). In looking back at my first year in this position, I'm proud to say FY22 was truly a year of impact. It was a year in which AURI increased the number of projects it undertook, and added new staff to address specific, identified gaps in various ag and food sectors. These important additions allowed AURI to make progress in developing new solutions to a variety of industry challenges and opportunities, creating impactful outcomes for Minnesota. Examples of this work can be found throughout the following report.

Above all, I'm proud of AURI's substantial economic impact on businesses and communities throughout Minnesota, enabled by AURI's unique role in developing value-added innovations in the areas of food, coproducts, biobased products and renewable energy (see pages 7-13). The contributions highlighted in this report speak to the heart of why the state legislature created this organization and how AURI continues to produce success more than 30 years later.

Looking forward, I believe it will be important for AURI to strategically explore and find ways to further increase the impact it has on producers, entrepreneurs, and businesses that utilize agriculturally derived products and benefit the Minnesota economy. In doing so, AURI will play a significant role in maintaining Minnesota's reputation as a leader in food and agriculture innovation. I'm excited to lead the AURI Board of Directors through this strategic effort and realize the impact it will generate in the coming years. What's more, I firmly believe Minnesota will benefit through deeper involvement in the food and agriculture ecosystem across the region and I look forward to advancing collaborations with partners, both new and old, to further AURI's mission.

In closing, it was an amazing first year as AURI's Board Chair. I want to thank my Board of Directors for their dedication and contributions to AURI's success, the dedicated AURI staff, as well as the Minnesota Legislature for its visionary and ongoing support of the organization's mission.

FEDERICO TRIPODI
Board Chair

Board of DIRECTORS

FEDERICO A. TRIPODI, CHAIR
At-Large Board Member

JERRY HASNEDL, VICE CHAIR
Minnesota Farmers Union

CAROLYN OLSON,
SECRETARY/TREASURER
Minnesota Farm Bureau

SEN. GENE DORNINK
Minnesota Senate

REP. MIKE SUNDIN
Minnesota House of
Representatives

RON OBERMOLLER
Minnesota Soybean Research
& Promotion Council

JOHN SCHAFFER
Minnesota Beef Council

JON VELDHUSE
Agribusiness, Qore

KEN ASP
Minnesota Wheat Research
& Promotion Council

JEFF GREV
At-Large Board Member,
Hormel Foods

Fiscal Year 2022 AT A GLANCE

PROJECT AND INITIATIVE HOURS by Focus Area

- 04% Renewable Energy
- 20% Food
- 15% Coproducts
- 04% Biobased
- 57% Multi-Area

114 PROJECTS AND INITIATIVES CLOSED

- 05 Renewable Energy
- 56 Food
- 20 Coproducts
- 08 Biobased
- 25 Multi-Area

\$4,961,957
FISCAL YEAR EXPENSES

FISCAL YEAR REVENUE
\$4,999,754

117 NEW PROJECTS AND INITIATIVES OPENED

- 03 Renewable Energy
- 53 Food
- 18 Coproducts
- 07 Biobased
- 36 Multi-Area

253 TOTAL PROJECTS AND INITIATIVES SERVICED

- 06 Renewable Energy
- 126 Food
- 39 Coproducts
- 15 Biobased
- 67 Multi-Area

AURI Connects Events BY FOCUS AREA

12 FOOD **03** RENEWABLE ENERGY

03 COPRODUCTS **11** MULTI-AREA

29 AURI CONNECTS EVENTS

2,468 TOTAL PARTICIPANTS AT AURI CONNECTS EVENTS

2,083 MINNESOTAN PARTICIPANTS AT AURI CONNECTS EVENTS

42 TOTAL NUMBER OF STATES REPRESENTED

33 TOTAL NUMBER OF COUNTRIES REPRESENTED

759 NEW PARTICIPANTS AT AURI CONNECTS EVENTS



CLIENT IMPACT

July 2017 - June 2022

861 ESTIMATED FUTURE
JOBS CREATED/RETAINED

\$316,207,500 ESTIMATED FUTURE
CAPITAL INVESTMENT

\$291,236,000 ESTIMATED NEW
GROSS ANNUAL SALES

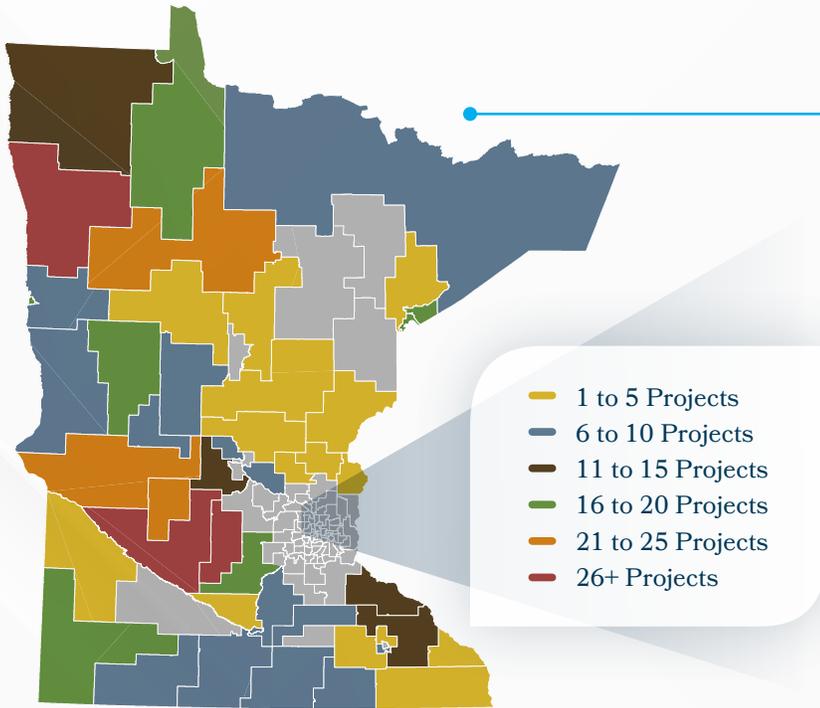
\$117,846,069 ESTIMATED NEW
CAPITAL INVESTED

413 ESTIMATED JOBS
CREATED/RETAINED

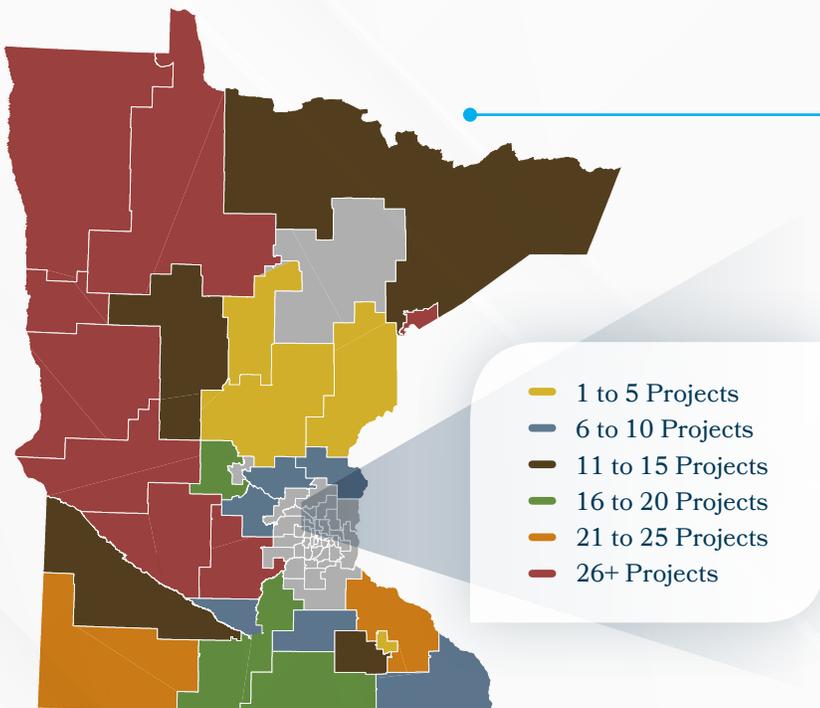
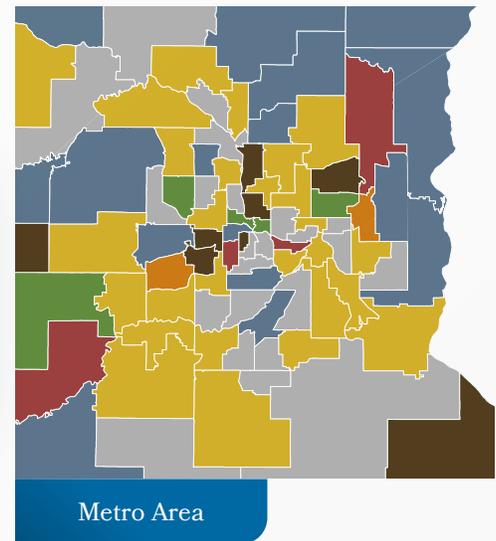
CLIENT PROJECTS WORKED ON

July 2012 – June 2022

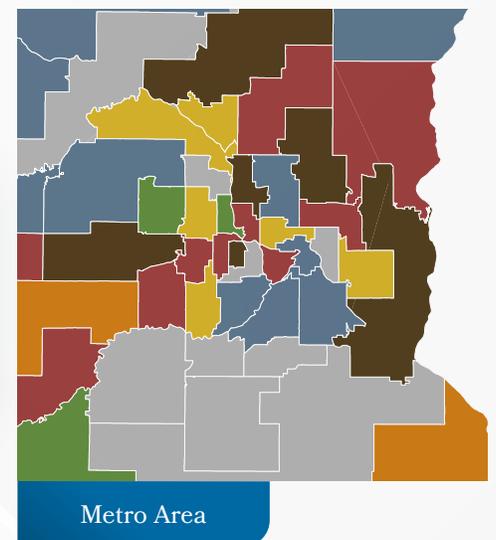
AURI is proud to partner with producers, businesses and entrepreneurs throughout Minnesota. As the map below shows, AURI worked on client projects in most of Minnesota's Legislative Districts between July 1, 2012 and June 30, 2022. The impact of these collaborations was significant to communities throughout the state. AURI also conducted several state-wide initiatives throughout the year.



Minnesota House Districts



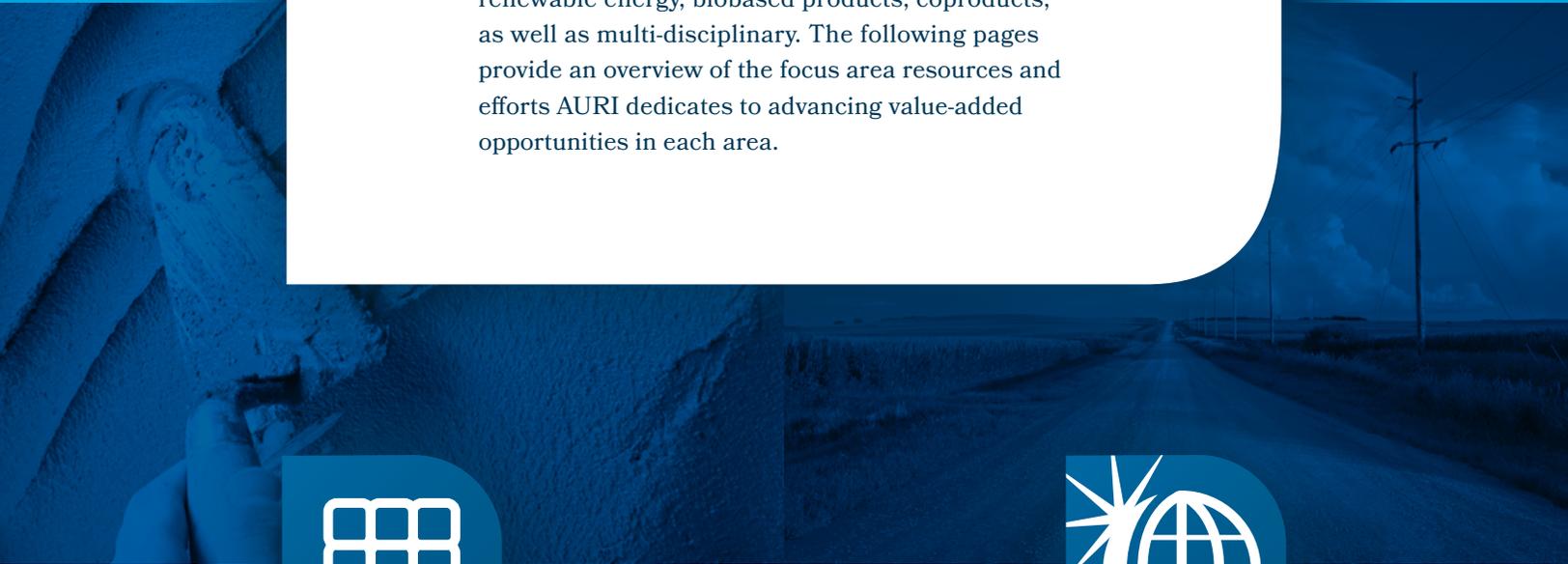
Minnesota Senate Districts





Focus Areas

Our work across ag commodities and agricultural derived products focuses on four core areas: food, renewable energy, biobased products, coproducts, as well as multi-disciplinary. The following pages provide an overview of the focus area resources and efforts AURI dedicates to advancing value-added opportunities in each area.





Food



Minnesota has a burgeoning food innovation ecosystem. This is due, in part, to AURI's work in the area of food. Specifically, AURI's food team provides consulting and technical services to entrepreneurs to help bring business ideas to reality.

In FY22, the food team focused on enhancing the value proposition for Minnesota commodities, expanding market opportunities for Minnesota's small food businesses and building a support infrastructure for local and regional meat processors. In total, the team worked on 126 projects throughout the state. Of those, 53 were new endeavors.

AURI engaged in initiatives related to improving the nutritional and health impacts of two important Minnesota commodities, wheat and cultivated wild rice.

The team collaborated with researchers at the University of Alberta (UA) and the Minnesota Wheat Research and Promotion Council in the first project on starch and protein digestibility, and in a second effort sponsored by the Minnesota Department of Agriculture, AURI worked with the University of Minnesota (UMN) College of Food, Agricultural and Natural Resource Sciences and the Regional Sustainable Development Partnership, along with the Minnesota Wheat Research and Promotion Council and Back When Foods, Inc. to gain a better understanding of wheat digestibility issues. The projects tackled two related questions: Can different wheat varieties and/or processing techniques result in easier to digest wheat?

The UMN project found that there was no indication of a significant increasing trend of harder to digest starches and proteins such as FODMAP and ATI levels in varieties from the late 19th into the early 21st century that could explain the increased digestibility issues. However, both the UMN and UA projects demonstrated that longer fermentation times and fermentation technologies in the bread making process significantly reduced the presence of FODMAPs and ATI in wheat doughs, which improved some consumers' ability to ingest wheat bread.

Fiscal Year 2022

PROJECTS

53 NEW PROJECTS AND INITIATIVES OPENED

56 PROJECTS AND INITIATIVES CLOSED

126 TOTAL PROJECTS AND INITIATIVES SERVICED

In Spring 2022, AURI partnered with researchers at the University of Minnesota's Department of Food Science and Nutrition, the Minnesota Department of Agriculture and the Minnesota Cultivated Wild Rice Council to develop and publish a report on the protein quality of cultivated wild rice. The study established a protein quality score (PDCAAS or Protein Digestibility Corrected Amino Acid Score) for cultivated wild rice of 0.60 (scale of 0 to 1) which is very good for a plant protein and comparable to that of brown rice.

Concurrently, AURI hired a meat scientist with designated funds from the Minnesota Legislature to advance work with local and regional meat processors. AURI was able to leverage those funds to secure two cooperative agreements with the United States Department of Agriculture- Agricultural Marketing Service (USDA-AMS) to administer programs and distribute resources to local meat and poultry processors and livestock producers. The first cooperative agreement focuses on empowering local and regional meat and poultry processing in the Upper Midwest region. Secondly, AURI became one of five Meat and Poultry Processing Capacity Technical Assistance (MPPTA) network providers that offer meat and poultry processors technical assistance through four scopes of work.

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“We’ve always appreciated the expert assistance that AURI has been able to provide. Their help and expertise in understanding our production process and creating nutritional facts for our products has been outstanding and affordable, a great value to a small business like ours.”

DAWN EGBERT, DASHFIRE



Renewable Energy



Recent global events have underscored the importance of identifying and harnessing renewable energy sources. AURI believes the Upper Midwest's agriculture sector is poised to benefit from technological advancements and a renewed interest in utilizing locally produced, renewable energy.

AURI's Renewable Energy Team is pleased to continue working on projects that can create value and jobs across Minnesota.

In FY22, clients sought AURI's assistance to develop and improve innovative uses of agricultural products in fuels for transportation, heat, and electricity. In total, the team tackled six projects and initiatives, three of which were new endeavors.

AURI completed significant work across the region on the advancement and development of anaerobic digestion for use as an energy source. Anaerobic digestion is a booming market globally, with total revenue expected to grow from \$7 billion in 2020 to \$18.5 billion by 2027, according to Fairfield Market Research. AURI is working to ensure that Minnesota businesses and producers are primed to take advantage of this growing market opportunity. In addition to being a renewable energy source, anaerobic digestion presents other new market opportunities.

One compelling example is happening at AURI's lab in Waseca, Minn. AURI currently has a pilot-sized digester on site and can test and analyze biomass materials for biomethane production and potential digestate uses. In FY22, scientists began testing various livestock litter and manure sources to measure carbon, nitrogen and ammonia production. This testing provides essential data on how to maximize energy production via anaerobic digestion. With this equipment on site, AURI can partner with businesses, municipalities and other entities to perform biomethane potential testing on different biomass materials to refine and improve the biomass feedstock to create new revenue streams and help entities meet their sustainability goals.

Fiscal Year 2022

PROJECTS

03 NEW PROJECTS AND
INITIATIVES OPENED

05 PROJECTS AND
INITIATIVES CLOSED

06 TOTAL PROJECTS AND
INITIATIVES SERVICED

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“There are many actors working within the growing Renewable Natural Gas space in Minnesota. Events like AURI’s Renewable Energy Roundtable help bring everyone together and promote valuable connections across different areas of the market that ultimately will help us move projects forward.”

EMMA INGEBRETSEN, CENTERPOINT ENERGY



Coproductions



AURI's coproducts team provided client support in the areas of product and process development, product evaluation and pilot lab testing services for entrepreneurs, businesses, agricultural leaders and industries across Minnesota, with the goal of identifying new uses and opportunities for coproducts. In total, the team worked on 39 projects and initiatives throughout FY22. Of those, 18 were new endeavors.

One area in which the team made great strides was alfalfa research. Through a project funded by the Legislative-Citizen Commission on Minnesota Resources, the team conducted research on the mechanical extraction of alfalfa juice and spray drying it to analyze its potential use in food and feed applications. In addition, research was done to study the use of the extracted alfalfa juice for fertilizer use in organic and conventional production systems.

Additionally, the coproducts team obtained key equipment and technology to support businesses and entrepreneurs in renewable natural gas endeavors. For example, AURI's lab facility in Waseca, Minn. became home to a pilot scale anaerobic digester that has a capacity of 2,400 gallons, a much larger scale than typical bench-top units. This presents a unique opportunity to analyze agricultural feedstocks at a larger scale to help companies understand the business potential to create new revenue streams and utilize livestock and food processor coproducts while also increasing economic development in rural areas of Minnesota. Having a pilot scale anaerobic digester on site also allows for expanded research into value-added products benefiting Minnesota citizens by identifying low-value waste product and turning it into new products such as digestate and renewable natural gas for new uses.

Also, AURI assisted Round Lake Winery in its investigation of adding value to its waste grape pomace that remains after extracting the liquid. AURI developed a process to dry this material to a shelf-stable moisture content, separate the grape seeds from the fiber, and ultimately extract the oil from the grape seeds, yielding a filtered grape seed oil and milled grape seed flour product for the food market.

Fiscal Year 2022

PROJECTS

18 NEW PROJECTS AND INITIATIVES OPENED

20 PROJECTS AND INITIATIVES CLOSED

39 TOTAL PROJECTS AND INITIATIVES SERVICED

A final example of AURI's work in the coproducts field is that of Eyncks Oat Farm, which worked with AURI's coproducts team in FY22 to increase its production for the pet food market. Its facility in Mahnomon County processes oats into groats (dehulled oats). With an increase in market demand for its groated oat product, AURI helped identify and evaluate equipment for a new mill that would increase processing capacity to 10,000 pounds of oats per hour. With AURI's assistance, an equipment provider was identified that could provide a turn-key solution. The new facility broke ground in fall 2022 and should open in spring 2023.

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“AURI has really taken the time to understand what we are trying to accomplish. They have been out to the farm many times and are always willing to take a look at our operation, do some testing and make sure everything is working. We have had a lot of conversations with the staff. They are a great group to work with.”

TYLER HOBAN, E-H OATS

A close-up photograph of a metal hose nozzle spraying water onto a concrete surface. The water is captured in mid-air, creating a fine mist. The background is a blurred outdoor setting.

Biobased Products



The development and innovation of biobased products is a huge opportunity to reduce our environmental impact and create new economic opportunities for agricultural feedstocks. The region's agriculture sector plays an essential role in finding new ways to replace petroleum-based products like plastics with renewable alternatives. AURI's biobased team is assisting commercialization efforts of several exciting and new innovations.

Scientists provide technical assistance in the laboratory, product development and onsite guidance throughout the state for a variety of clients while business development staff help make connections and explore market opportunities. In addition, staff also help businesses protect their intellectual property, including trade secrets and other proprietary information to compete in this emerging and ever-changing global market. In FY22, the biobased team worked on 15 projects and initiatives, of which seven were new.

For example, dust on high-traffic gravel roads can be a nuisance as well as a safety and environmental concern. AURI worked with BioBlend Renewable Resources and the Minnesota Soybean Research and Promotion Council on the development of a soy-based dust control product to help address these concerns. The research team led a comparison study for this product to gather important information and analyze the product's effectiveness in controlling dust spread, its environmental benefits compared to competing chloride-based products, and its economic viability for large-scale use in rural areas.

AURI continued its collaboration with the Minnesota Soybean Research & Promotion Council and the Soy Transportation Coalition by testing PoreShield, a soybean-oil-based concrete enhancing product, on sites in Hutchinson, Minn. The data will help researchers understand the opportunity to extend the life and lower the cost of concrete used in transportation infrastructure through soy-based preservation products. Results indicated PoreShield can extend the life of concrete, protecting the significant financial investments by local governments to maintain roads and bridges. Further, this work increases the utilization of soybeans for applications in the transportation and construction sectors.

Fiscal Year 2022

PROJECTS

07 NEW PROJECTS AND INITIATIVES OPENED

08 PROJECTS AND INITIATIVES CLOSED

15 TOTAL PROJECTS AND INITIATIVES SERVICED

AURI has worked to support and grow the region's hemp industry for many years. In FY22, the biobased team, in conjunction with AURI's coproducts team, contributed to research on the benefits of hemp in the construction industry. AURI partnered with a construction company and a hempcrete manufacturer on a side-by-side comparison demonstration project to determine how hempcrete, a bio-composite material used for insulation, performs against traditional fiberglass insulation.

For this research, Fargo, N.D.-based Grassroots Development built two identical homes. Both have a traditional wood frame; however, the walls of one home are filled with fiberglass insulation, while the walls of the second home are filled with hempcrete, which contains the hurd of the hemp plant mixed with a lime binder and water. AURI helped install monitors to track energy use as well as heating and cooling costs in the two homes. The research team intends to use the data collected during the study to illustrate the benefits of hemp in the green building industry to grow investment in local hemp fiber production and processing, and to provide stronger awareness of hemp's diverse market applications.

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“We are very grateful for AURI’s support on our Hempcrete project. It has been a dream of ours for some time to be able to gather data, and AURI helped us accomplish that. Hempcrete is a grow-your-own type of building material with a lot of social and environmental aspects to it. We feel strongly about its benefits, and we are so happy to be able to have the support of partners to be able to see this product grow.”

SYDNEY KENNY, GRASSROOTS DEVELOPMENT



AURI Connects

Throughout FY22, the AURI Connects program created a variety of platforms for engagement and networking by hosting a number of events that covered a variety of topics via its Webinar Wednesday and Fields of Innovation series, as well as signature events, highlighting AURI's work in the areas of food, coproducts, biobased products and renewable energy. In total, the AURI Connects program hosted 29 different events and brought together nearly 2,500 people from 42 states and 33 countries during FY22. It's also important to note that 30 percent of those attendees had never participated in an AURI event before.

These results were due, in large part, to the Connects program's commitment to offering high quality, wide-ranging, informational topics to AURI's stakeholders. Throughout the year, the Webinar Wednesday series offered educational opportunities across several topic areas, ranging from the value of cultivated wild rice to current insights in anaerobic digestion for renewable natural gas.

What's more, the Fields of Innovation event series hosted both in-person and online events for the purpose of bringing together representatives from across Minnesota's ag and food value chain to create awareness, build capacity and accelerate the commercialization of new and emerging crops and traits, while also highlighting emerging ag opportunities for producers, processors and entrepreneurs. In the 12-month period that comprised FY22, Fields of Innovation explored issues, like the future of controlled environment agriculture in Minnesota and opportunities and challenges in Minnesota's aquaculture industry.

A third, and equally important component of the AURI Connects effort is in hosting signature events, like the Minnesota Renewable Energy Roundtable and New Uses Forum. Both of these events offered attendees opportunities to learn about important ecosystem topics and network with other professionals to create connections to advance new innovations and products.

This work will undoubtedly be a catalyst in developing new opportunities to positively impact the state's ag and food industry for years to come.

Fiscal Year 2022

PROJECTS

29 AURI CONNECTS
EVENTS

2,468 TOTAL PARTICIPANTS AT
AURI CONNECTS EVENTS

759 NEW PARTICIPANTS AT
AURI CONNECTS EVENTS

“

“AURI and Compeer have been collaborating for years to build and improve networking in Minnesota’s food and agribusiness value chain. I’ve seen the dedication by the team at AURI first hand improve networks, improve operational efficiencies, create and improve processes, and provide support for Minnesota’s entrepreneurs. The AURI team provides contributions from their scientists, board members, engineers, and project managers to improve the rural vitality that many of us enjoy, and I encourage anyone with questions or ideas to reach out to the friendly folks at AURI.”

AARON KNEWTSON, COMPEER FINANCIAL

Fiscal Year 2022 FINANCIAL STATEMENT

REVENUE

State Appropriations	\$4,005,269
Federal Grants	\$383,521
Collaboration & Partnership Grants	\$342,235
Royalties	\$99,726
Fee-For-Service	\$65,250
Private Grants	\$43,000
Project Fees	\$23,222
Interest - Investments	\$12,839
Sponsorships	\$10,200
Registrations	\$6,967
Donations	\$5,000
Miscellaneous	\$2,525
Total	\$4,999,754

EXPENSES

Programs & Services	\$2,265,911
Program Support	\$966,167
Institutional Advancement	\$893,578
Operations	\$836,301
Total	\$4,961,957

Net Income (Loss)	\$37,797
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Statement on FINANCIAL ACTIVITIES

AURI generated \$4,999,754 in revenue and expended \$4,961,957, resulting in a net gain of \$37,797 for FY22. However, the financial statement does not include funds AURI allocates to its capital equipment improvements, which totaled \$209,007 in FY22.

The Minnesota Legislature is AURI's largest revenue source, accounting for roughly 80 percent of funds received. Federal and collaboration grants continue to grow and represented about 18 percent of revenue. Expenses are mainly focused on delivering and supporting programs, accounting for approximately two-thirds of total expenses.

AURI's short-term financial outlook remains positive. The organization, over the past year, continues to have a pipeline of grants and contracts, which will generate revenue through subsequent fiscal years. AURI continues to have a robust project portfolio and has had several noteworthy accomplishments in FY22 to leverage appropriated funds, including: Federal Grant award commitments from the USDA Rural Cooperative Development program of \$200,000, Cooperative agreements with the USDA Ag Marketing Service for \$500,000 and \$269,500, respectively, several other grant commitments, subawards and contracting with different Minnesota entities related to Legislative-Citizen Commission on Minnesota Resources (LCCMR) projects, as well as collaborative grant projects with the Minnesota Soybean Research & Promotion Council and the Minnesota Corn Research & Promotion Council. Long-term, AURI will continue to leverage the funding it receives from the State of Minnesota to maximize its impact for Minnesota agriculture. AURI looks forward to 2023 and continuing its exceptional service to benefit Minnesota's agricultural industry.

Looking FORWARD

In looking to the future for the Agricultural Utilization Research Institute (AURI), there are many indicators showing FY23 will be another year of great innovation and progress. It will be a year in which the organization explores new opportunities to positively impact Minnesota's food and agriculture spaces. AURI plans to investigate challenges that negatively impact the sector with the goal of finding new collaborative solutions to benefit the industry. In doing so, AURI will progress with purpose and serve as the leading edge, ecosystem-supporting, and impact driven organization the Minnesota Legislature expects it to be. The coming year will be replete with examples of how AURI's work supports the creation of new innovations, new companies and new jobs in communities throughout the state, culminating in a stronger Minnesota for all.

RENEWABLE ENERGY AND FERTILIZER SOURCES

AURI will devote itself to making significant contributions in the areas of anaerobic digestion, renewable hydrogen and green ammonia, along with biobased and lower carbon intensity fertilizers utilizing Minnesota's agricultural resources. To accomplish this, AURI's on-staff experts have begun techno-economic analysis into these areas and will develop deeper networks for potential partners to strategically position Minnesota to address potential agricultural challenges and opportunities in these areas.

As mentioned, AURI is already advancing initiatives and client projects in these areas and believes greater opportunity exists as we better understand the life cycle assessments and the intersection between agriculture, renewable inputs derived from agricultural products and market demand for lower carbon intensity goods.

With the recent cost increases for energy and inputs like fertilizers, these are all areas that have the potential for significant impact on agricultural producers and processors alike. By serving as a nexus of information on these topics while supporting the development of new innovations in these areas, AURI can play a significant role in making their benefits more accessible to everyone.

PROTEINS

Another example of AURI's direction in FY23 is the continuation of our work in traditional proteins. Specifically, AURI plans to continue its partnership with the United States Department of Agriculture's Agriculture Marketing Service program to support a viable, small and local protein processing industry by establishing various support mechanisms.

AURI's efforts will create tangible and actionable benefits to advance industry opportunities. In addition, this work will provide a basis for training programs to be administered in other regions across the United States, while strengthening and enhancing collaborations for Minnesota entities across the Upper Midwest to support the industry as a whole.

In FY23, this work will encompass the identification of key industry support needs and execution to support the ongoing competitiveness of local and regional sized facilities to leverage and extend the business viability of entities within this ecosystem. The results of these efforts will include the creation of a searchable database of resources related to advocacy, education, finance and regulatory assistance as well as a benchmarking tool for local meat processors to better understand best practices to be more resilient and viable into the future.

It will also include the creation of educational, training-based opportunities, provided by AURI at various points throughout FY23 and beyond. These will include both online and in-person events where attendees can enhance their knowledge and understanding of specific topics while expanding their networks and increasing opportunities for collaboration. AURI is also exploring protein innovations including plants and other novel areas that could benefit Minnesota agriculture.



PARTNERSHIPS BENEFITTING MINNESOTA'S FOOD AND AGRICULTURE LANDSCAPE

Throughout FY23, AURI will continue its Ag Innovation Partnership (AIP) program. In the past, the AIP supported a variety of topics important to Minnesota, and in continuance of this tradition, the program will spend the coming year focusing on initiatives related to commercial kitchen business models with an emphasis on rural areas and life cycle analysis basics for businesses to position themselves for lower carbon intensity market opportunities.

With regard to food production, AURI recognizes that a resource gap exists for food entrepreneurs as they scale their businesses from cottage foods to wholesale commercial entities. For many businesses, this means moving from a home kitchen to a shared-use commercial kitchen. But there is evidence indicating there may be a challenge in the number of kitchen facilities to support the robust food maker ecosystem, especially in rural areas. To that end, AURI will devote efforts in the coming year to developing a better understanding of the shared commercial kitchen business model and develop recommendations to strengthen it, resulting in a high degree of support for scaling food businesses, with an eye toward the dynamics that challenge operational viability.

At the same time, the AIP program will undertake efforts to positively impact commercialization efforts across a wide variety of sectors by creating a useful guide to life cycle analysis (a method to quantify total sustainability impacts, such as resource use and environmental impact over the entire life of a product).

The document will include information and instructions on the basics and considerations for implementation in products using agricultural materials. It will also address what's important and outline potential tools to use, as well as how to interpret and communicate results to help companies explore new potential market segments.

LEARNING FROM THE ECOSYSTEM

AURI will stay abreast of the latest trends, challenges and opportunities facing Minnesota's food and ag ecosystems. AURI will conduct meetings with a variety of stakeholders who represent commodity groups, private industry, state agencies and higher education to ensure its efforts are relevant and regarded. These meetings allow AURI to identify stakeholder priorities, potential areas of synergy and create an opportunity to develop initiatives and programs that benefit Minnesota's economy and agriculture and food industry.

In closing, AURI is excited to see the coming year unfold and looks forward to the opportunities and partnerships it will be presented in the areas of food, coproducts, biobased products and renewable energy. We hope you will collaborate with us in the years ahead and continue to support AURI's efforts to positively impact Minnesota's food and agriculture sectors.

State Fiscal Year 2022

ACTIVE PROJECTS AND PROGRESS REPORT

PROJECT NAME % COMPLETE

Multi-Area	
Feed Grant Support	34%
Bio-based Insulation	49%
Pulp Biobased Products	36%
Hempcrete Home Project	48%
Hemp Erosion Control	23%
Compounding Hemp Fiber	100%
Hempcrete Assistance	100%
Hemp Fiber Manufacturing	100%
Farm Hemp Analysis	100%
Foaming Alkaline Detergent	100%
Hop Concentrate	8%
Forever Green FFAR Grant	38%
Kernza Supply Chain	10%
Life Cycle Analysis	23%
FY22 MDA Tech Assistance	90%
Pennycress IPREFER	18%
Technical Advisory Program FY22	76%
Soy Nutrition Institute 2022	61%
Fields of Innovation Event FY21	100%
Bold Growth 2022	21%
Hemp Commercialization	3%
MDA FY2021 Tech Assistance	100%
Fields of Innovation FY22	100%
Webinar Wednesday Program FY22	100%
Technical Advisory Program FY21	100%
AIC Kick Starter Program	100%
Soy Nutrition Institute 2021	100%
Bold Growth 2021	100%
2021 Bold Open	100%
Webinar Wednesday FY22	100%
New Uses Forum FY22	100%
Industry Thought Leaders FY22	100%
Bark to Energy Implementation	83%
Green Amonia Fertilizer	63%
Ethanol Fuel Cells	16%
Gasification Development	100%
Gummy Product Analysis	62%
Grape Pomace Utilization	82%
Coop Business Plan Development	35%
Meat Processing	28%
UpCycled Spent Brewers Grains	13%
Food Grade DDGS (USDA-RD)	64%
Baby Carrot Line Expansion	30%
Whey Fermentation Implementation	3%
Stearns County SWCD Kernza	40%
Empowering Local and Regional Protein Processing in the Upper Midwest	29%
Mobile Meat Slaughter Grant	39%
Tech Support PPIC FY22	14%
Meat Processing Technical Assistance	13%
DDG Food Use (MCRPC)	61%
Cold Press Oils	100%
Hemp Food Processing	100%
Hazelnut Processing Assistance	100%
Industrial Hemp Manufacturing	100%
Pet Treat Pilot Test	100%
Aquaculture Industry Assessment	100%
Food Processing Waste Industry Thought Leaders FY21	100%
Tech Support PPIC FY21	100%

Community Navigator Implementation (MBFFA-Bus. Focused on Food and Ag)	7%
Portable Anaerobic Digestion Assessment	100%
Anaerobic Digester Support	76%
MW Biomass Exchange	9%
Anaerobic Digester	100%
Coproduct Retainer Assistance	100%
Conversion of Alfalfa Sugars	100%
Anaerobic Digestion Industry Thought Leader FY21	100%
Biobased	
Feasibility Study Assistance	19%
BioMulch Commercialization	4%
Soy Dust Suppressant	48%
Soy Product Dust Control	55%
Biobased Concrete Demonstration	47%
BioMulch	48%
Colloidal Barrier Pile Cover	52%
Fermentation Development	100%
Hempcrete Feasibility Study	100%
Center BioPlastics Biomaterial FY21	100%
Hemp Fiber Development	100%
Center BioPlastic Biomaterial FY22	100%
BioMulch Application	100%
Soy Road Treatment Phase II	100%
BioMulch Application II	100%
Coproducts	
UofM Forever Green-High Oleic Pennycress	68%
Grit Weeding Assessment	31%
Bio Char Sizing	18%
Waste Soybean Processing	54%
Spent Lime Pellets	90%
Hemp Fiber Applications	7%
Groated Oat Plant Expansion	70%
Alfalfa Fertilizer	72%
Tree and Shrub Fertilizer Development	69%
Feed Process Assistance	55%
Natural Fertilizer Development	13%
Characterized Coffee Grounds	33%
U of M Alfalfa Use	43%
Central Lakes College-Camelina	46%
Composting Assistance	13%
Effect of Heat on Probiotics	100%
Clumping Litter Development	100%
Densification of Corn Cob	100%
Meal Process Improvement	100%
Fish Fertilizer Development	100%
Shrimp Hatchery Algae Project	100%
Organic Soil Amendments	100%
Horse Supplement Development	100%
Fertilizer Formulation	100%
Soil Ammendment Development	100%
Hemp Dog Chew Development	100%
Organic Manure Assessment	100%
Blended Feed from By-Products	100%
Feed Additive Assessment	100%
Whey Utilization Assessment	100%
Pet Treat Development	100%
Sucrose In Swine Diets	100%
Improved Cob Pellet Quality	100%
Increase Lysine Supply Density	100%
Industrial Hemp Biomass Testing	100%
Control of Noxious Weeds	100%
Lab Column Field Denitrifying Bioreactor Replication	100%
Rye Grass Barn Trial	100%
Food Waste Industry Thought Leaders FY22	100%

Renewable Energy

Renewable Ammonia Hydrogen	100%
Value Added Ethanol	100%
Biomass Densification	100%
Blended Wood Densification	100%
MNRER for FY21	100%
MNRER FY22	100%

Food

Commercial Kitchen Business Model Assessment	11%
Heritage Grains Sourdough	1%
Kombucha Shelf Life	19%
African Hot Sauce	0%
Shrimp Production Gallery	100%
Teff Recipe Formulation	97%
Ethiopia Savory Pies	12%
BBQ Sauce Labels	33%
Eritrean Beer Formulation #2	63%
Scaling Hot Sauces	53%
Pizza Label Development	0%
Spiced Dessert Labels	90%
Pickle Formula Assistance	0%
Milk Jam Formulation	58%
Vegan Pizza Labels	78%
Simple Syrup Tech Assistance	50%
Wild Rice Processing	53%
Chickpea Products Tech Help	84%
Seasoning Rub Nutrition	33%
Meat Copacking Labels	26%
Elderberry Juice Development	94%
Non Alcoholic Mixers	62%
Chicken Sambusa Nutrition	37%
Gluten Free Cream Pie	79%
Ice Cream Label Update	100%
Craft BBQ Sauce Scale Up	79%
Kombucha Nutritional Label	41%
Clean Label Snacks	100%
Nutrient Forward Baking Mix	66%
Juice & Hot Sauce Food Safety	46%
Lactose Free Ice Cream	52%
Elderberry Company Development	34%
Soy Food Plant Expansion	39%
Facility CAD Drawings	31%
Ground Beef Feasibility Study	31%
Toffee Nutrition Facts	47%
Leafy Greens Nutritional Panels	81%
Mediterranean Meal Nutrition	11%
Einkorn Milling & Marketing	38%
Jamaican Jerk Sauce Labels	33%
Herbal Tea Scale Up	23%
Tiger Nut Beverage Nutrition	73%
Chai Tea Scale Up	9%
Smoked Pepper Sauce	18%
Granola Nutrition	73%
Chinese Dumpling Labeling	0%
Hazelnut Processing Assistance	45%
Sauce Nutrition Labels	4%
Commercial Kitchen Feasibility	19%
Beef Locker Development	2%
Fish Jerky Labels	73%
Curry Nutrition Labels	5%
Cookie Dough Labels	50%
Meat Labels - HACCP	9%
Flatbread Labels and Scaling	27%
Sourdough Fermentation	51%
Artisan Grain Collaborative	76%
Elderberry Specialty Crop Block Grant Program	4%

Livestock Opportunity Study	100%
Kernza Process Discovery	62%
Cultivated Wild Rice PDCAAS -AIP	100%
Meat Locker Development	100%
Kombucha Development	100%
Chocolate Labels	100%
Meat Granola Bar	100%
Shrimp Analytical Work	100%
Asparagus Formation	100%
Hemp Feasibility	100%
Roasted Hemp Seed	100%
Fermented Goat Whey Beverage	100%
Pho Sauce	100%
Snack Nutritional Label	100%
Non Alcoholic Beer Reformulation	100%
Non Alcoholic Wine Development	100%
Granola Development	100%
Frozen Empananda Assistance	100%
Fish Jerky Development	100%
Grain Free Bread Development	100%
Savory Pie Labels	100%
Cold Press Ginger-Based Juice	100%
Soup Nutrition Labels	100%
Corn Pap Nutrition Labels	100%
Los Maizales Label Rework	100%
Specialty Wheat Beer/Food Project	100%
Kernza Coop Development	100%
Business Development Services	100%
Pepitas Development	100%
Bakery Nutrition Labels	100%
Coffee Cocktails Nutrition	100%
Granola Bar Labels	100%
Cocktail Mixer Labels	100%
Flavour in a Jar Labels	100%
Dairy Milk Processing	100%
Areoponic Food Process Improvement	100%
Ethiopian Stew Nutrition	100%
Carbonated Apple Beverage	100%
Cutting/Wrapping Center	100%
Corn Tortilla Nutrition Labels	100%
Cricket Flour Scale Up	100%
Breakfast Bites/Flour Labels	100%
Direct to Consumer Feasibility	100%
Whey Fermentation Assistance	100%
Pie in a Jar	100%
Goat Ice Cream Tech Assistance	100%
Baking Kit Nutrition	100%
Meat Snack Stick Research & Development	100%
Hemp Oil / Cake Pressing & Evaluation	100%
Honeyberry Nutrition	100%
Fruit and Fiber Smoothie	100%
Mobile Meat Processing Study	100%
Pumpkin Seed Roasting	100%
Vegan Cookie Optimization	100%
Granola Foods Labels	100%
Salsa Labels	100%
Keto Cracker Scale Up	100%
Frozen Empanada Assistance 2	100%
Gyro Labels	100%
Dairy Nutrition Labels	100%
Pie Nutrition Updates	100%
Agri Wheat/Sourdough Analysis	100%
Co-Manufacturing Assessment	100%
Food Industry Thought Leaders for FY21	100%
MSRPC-Tofu Okara Baking Demo	100%
Food Ecommerce and Dig. Mktg	100%
Food Industry Thought Leaders FY22	100%
US DOC E-Commerce Webinar	100%



CROOKSTON

510 County Road 71, Suite 120
Crookston, MN 56716

MARSHALL

1501 State Street
Marshall, MN 56258

ST. PAUL

1985 Buford Avenue
McNeal Hall #64
St. Paul, MN 55108

WASECA

12298 350th Avenue
Waseca, MN 56093

218.281.7600

AURI.ORG