



Growing Minnesota's Economy

ANNUAL LEGISLATIVE REPORT

State Fiscal Year 2015



auri.org

This document is made available electronically by the Minnesota Legislative Reference Library as part of an ongoing digital archiving project. <http://www.leg.state.mn.us/lrl/lrl.asp>

Letter from the Executive Director



In 2015, the Agricultural Utilization Research Institute (AURI) saw change and growth. I am honored to lead an organization dedicated to serving Minnesota's agricultural clients and stakeholders to foster long-term economic benefit for Minnesota through value-added agricultural products.

AURI works with clients throughout the entire state to develop new processes and bring new agricultural products to market. The partnership with these entrepreneurs expands industries and strengthens Minnesota's economy, in turn supporting and creating jobs.

AURI also conducts carefully selected initiatives to introduce new ideas, as well as an Innovation Networking Program to foster discussion among Minnesota's vibrant entrepreneurial community.

AURI helps Minnesota find new uses for traditional, unexplored or overlooked resources. Whether through hands-on assistance, applied research or innovation networking, AURI helps companies turn ideas into reality to positively impact the state.

In this annual report, you will read fascinating stories about just a few innovative successes occurring right here in Minnesota, including the success of four entrepreneurs and the outcomes of their work with AURI. In reality, there are dozens more like them. In fact, the **amount of client projects increased roughly 50 percent** from fiscal year 2014 to 2015 (July-June) and the demand for services continues to grow.

As mentioned earlier, AURI works collaboratively on initiatives impacting entire industries. Here, you will also read how a research project and subsequent report help to define opportunities in an emerging industry.

Being part of Minnesota's agricultural innovation environment is exciting, but finding new uses to increase the utilization and value of Minnesota's commodities does not happen overnight. Throughout 2015 and over AURI's 25 years, many businesses have realized success due to their commitment, innovative thinking – and the assistance provided by AURI.

I look forward to developing many more successful partnerships with Minnesota's agricultural and business innovators in 2016 and beyond.

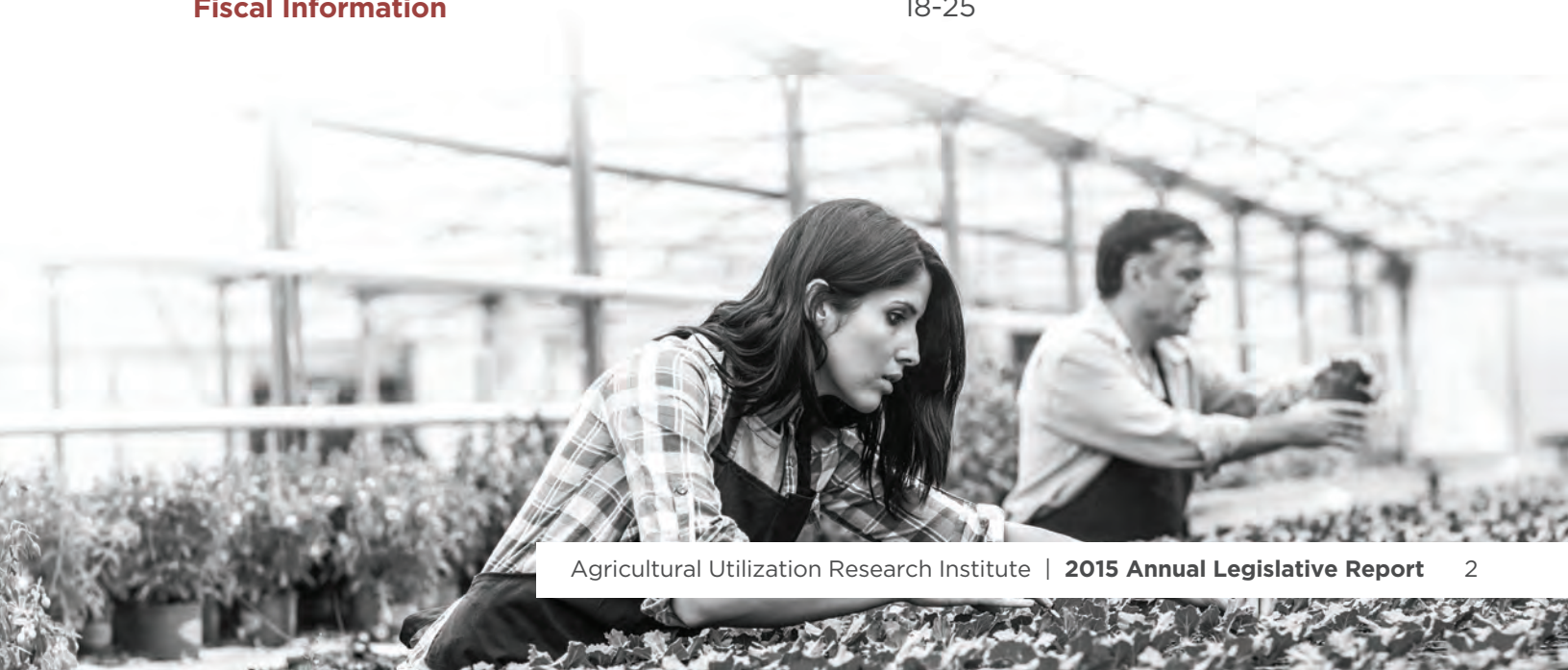
Sincerely,

A handwritten signature in dark ink, appearing to read 'Shannon Schlecht'. The signature is fluid and cursive.

Shannon Schlecht, AURI Executive Director

TABLE OF CONTENTS:

Letter from the Executive Director	1
Table of Contents	2
2015 Board of Directors	3
Statewide Reach	4
Mission	5
Services and Focus Areas	6
Client Spotlight	
Biobased Products: Entrepreneurial Project	7-8
Coproducts: <i>Midwest Ag Enterprises</i>	9-10
Food: <i>E&C Snacks</i>	11-12
Renewable Energy: <i>Viking Company</i>	13-14
Industry Initiative: Bioplastics	15-16
Impact: Client Satisfaction	17
Fiscal Information	18-25





2015 Board of Directors:

Ron Obermoller, *Chair*

Minnesota Soybean Research
& Promotion Council

John Gilbertson, *Vice Chair*

Minnesota Farm Bureau Federation

John Goihi, *Secretary/Treasurer*

Agri-Nutrition Services – Agribusiness

Art Brandli

Minnesota Wheat Research
& Promotion Council

Jerry Hasnedl

Minnesota Farmers Union

Kim Hintz

AgriBank – Agribusiness

Rep. Debra Kiel

Minnesota House of
Representatives

Richard Peterson

Minnesota Corn Research
& Promotion Council

Sen. Matt Schmit

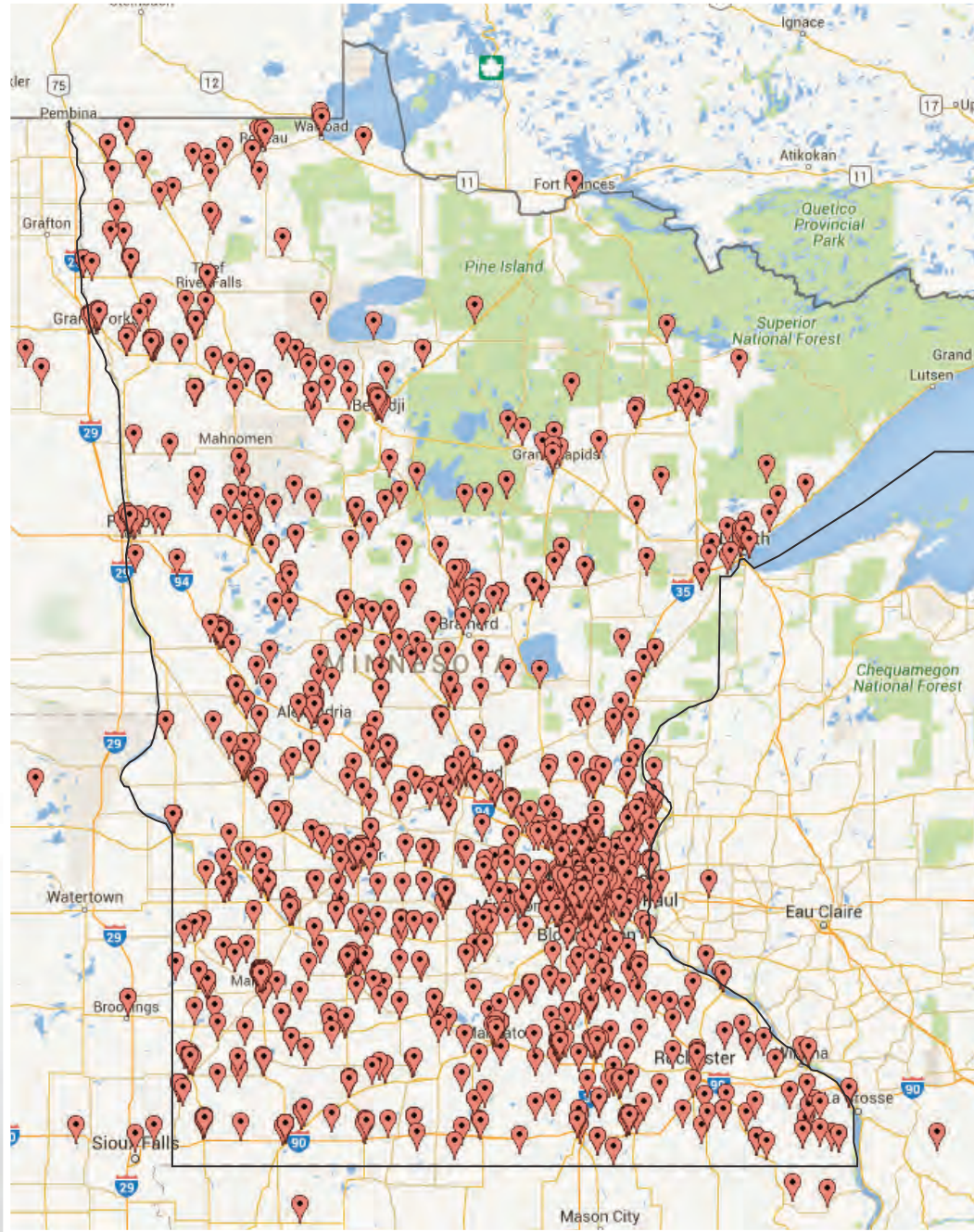
Minnesota Senate



Statewide Reach:

Serving Clients Throughout Minnesota

Agricultural Utilization Research Institute (AURI) clients through December 2015 shown below.



Mission:

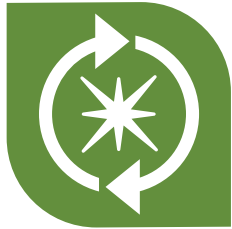
Foster long-term economic benefit for Minnesota through value-added agricultural products.



AURI Services

To develop ag-based innovations, AURI provides hands-on scientific technical assistance, applied research services, product development assistance and innovation networking to foster value-added development, commercialize new products and realize process refinements.

Focus Areas



Renewable Energy

Research uncovers ways to use agricultural products to power transportation, as well as provide heat or electricity.



Food

Industry projects develop new products and markets, as well as meet consumer needs and food safety education.



Coproducts

Work seeks to find new uses and significant revenue streams for agricultural processor byproducts.



Biobased Products

Use agricultural components to replace traditional petroleum-based ingredients in materials such as plastics, films, building materials, lubricants, sealants and more.

Biobased Products: Entrepreneurial Project

Establishing a Research Residency Program

Approximately two years ago, Goutham Vemuri, a credentialed scientist, approached AURI with an innovative idea for using a byproduct stream to produce high value bioproducts. He needed laboratory space and equipment to prove the feasibility of his process. AURI stepped in to assist.

“Our technology takes carbon from agricultural byproducts and converts it into high value chemicals,” said Goutham. AURI offered access to lab space, basic lab technology and chemicals. The partnership allowed Goutham to seek financial support from state and federal agencies.

“Although leveraging both biological and chemical conversions in product development is not necessarily unique, the end result certainly is,” said Rod Larkins, AURI senior director of science and technology.

AURI microbiologist, Jimmy Gosse, Ph.D., emphasized how this partnership is groundbreaking for AURI. “This first-of-its-kind endeavor helped AURI establish the framework for a research residency of sorts,” said Gosse. He explained that due to the success of the partnership thus far, AURI plans to replicate the process in the coming years with other entrepreneurs.



The project allowed AURI to fully map out which resources can be allocated to help support entrepreneurs in the agricultural sector. AURI played a key role in providing the space and the infrastructure necessary to transform Goutham’s ideas into a reality.

This project aims to introduce a biobased product into the market. “This project will spread awareness of the merits of biobased technology, which is capable of converting agricultural byproducts into useful chemicals,” said Goutham. “Not only will it create jobs through the conversion of agricultural products into value added sales in the chemical sector, it will also mobilize and strengthen rural communities.”



RESULTS:

AURI'S INVOLVEMENT HELPED A

NEW TECHNOLOGY

PROVE ITS FEASIBILITY AND SCALE-UP POTENTIAL, ENABLING
THE PROJECT TO SECURE MORE FUNDING



Coproducts: Midwest Ag Enterprises

R&D Services Help Commercialize New Product

Midwest Ag Enterprises, founded 13 years ago as a commodities-driven organization, now sees increased profitability from manufacturing and exporting specialty livestock feeds.

Around three years ago, Midwest Ag Enterprises began to develop a value-added soy product. The company appealed to AURI to support product development and opportunity identification.



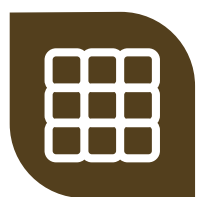
John Pollock and Jim Moline lead Midwest Ag Enterprises, the company that manufactures NutriVance™ soybean meal feed.

Given the decline in fish populations, a need exists to replace the fishmeal typically fed to piglets, poultry and aquaculture with a new, sustainable protein source. While soybean meal

has long been recognized as a more economical alternative to fishmeal, these animals do not easily digest the sugars in soybeans.

Midwest Ag Enterprises convened a team to devise and evaluate the refining process in order to remove most of the indigestible sugars and fiber and break the protein molecules in soybean meal into more digestible pieces.

“We had ideas for this process, we just needed help with the R&D to verify the potential of this soy product,” said Jim Moline, president of Midwest Ag Enterprises. “We brought in AURI for scientific lab testing and for assistance in securing funds to continue developing the proprietary process. The best thing about working with AURI was their open communication and willingness to look at ideas overall.”



RESULTS:

MIDWEST AG ENTERPRISES EXPECTS TO PRODUCE

2,000 tons

OF NUTRIVANCE™ PER MONTH UTILIZING **MORE THAN 100,000 BUSHELS OF SOYBEANS**

Now, the process successfully produces a high protein (close to 60 percent), more digestible soybean meal. Additionally, adding the indigestible sugars, a byproduct of the refinement process, to beef cattle rations creates less waste and additional revenue.

Commercial production of the soybean meal launched last spring under the name NutriVance™. Domestic and international swine starter and co-dry markets received the first shipments. AURI enabled the manufacturing process by providing input on plant design and conducting equipment evaluation.

“In two to three years we would like to be a volume supplier, particularly in specialized markets. We see tremendous growth opportunities in aquafeed and we’re pleased research points to expansion opportunities in these markets,” said Moline. AURI and the Minnesota Soybean Research & Promotion Council are currently sponsoring livestock feeding trials and nutrition studies.

Businesses like Midwest Ag Enterprises impact animal health, open new markets for Minnesota crops and create job opportunities throughout the production process.

“

AURI helped us become more profitable, identify new markets for our soybean meal product, and create jobs throughout the production process.

Midwest Ag Enterprises

”

Redesign Leads to Company Expansion

Casey Webber knew he wanted to operate his own business. One day, his aunt sent him a batch of her cookies and he realized these were a perfectly-sized, wholesome snack.

Webber and his aunt, Ella Redmond, decided to launch their own cookie business. While researching packaging and shipping options, a local food company put Webber in touch with AURI.

“When we initially started selling our Heavenly Hunks product it was hard to get them into grocery stores because of the two day shelf life,” said Webber. “We basically baked the cookies ourselves and put them into a saran wrap type packaging. Working with AURI allowed us to design baking and packaging methods to reach a 60-90 day shelf life.”

AURI helped Webber and Redmond change the baking method in a way that did not compromise the natural ingredients, many of which are Minnesota grown, and preservative-free recipe. The food scientists made recommendations for new packaging that considered the materials used, as well as the air inside, so the package contained the proper amount of oxygen to preserve freshness.

Led by Donna O’Connor, AURI scientists contributed to E&C Snacks’ success with formula development, compliance evaluation, shelf-life testing and packaging design. The improvements allowed the company to expand distribution by shipping farther from their Minnesota base and by making the product more appealing to retailers, who incur less financial risk with a shelf stable product. E&C Snacks launched three years ago, but in the last few months has seen exponential growth, with product in nearly 400 retail outlets.

In addition to distribution, the company expanded from three employees to a broad outside sales team, production facility staff, brokers and more. “There’s probably about 30 people who play a part in producing each batch of Heavenly Hunks now,” said Webber. “When E&C Snacks first launched, a production run consisted of baking a couple thousand cookies. The current production facility produces 250,000 Heavenly Hunks during a run.”



RESULTS:

E&C SNACKS EXPECTS TO PRODUCE

5 Million Cookies

PER YEAR, SELLING TO NEARLY 400 RETAIL OUTLETS

“The best part of working with AURI was Donna and her ability to answer our questions. Her responsiveness and ability to solve problems got us to the next stage of our business,” said Webber. “Whatever the question, she could point us in the right direction for an answer.”

In February 2016, Webber will lead E&C Snacks in the launch of its second product line, a granola/cookie hybrid. “AURI’s support on our Heavenly Hunks product gave us the tools to start correctly from square one in the formulation, development and distribution of our new product Hunkola,” said Webber.



REAL FOOD
SMASH-UPS

HUNKOLA

AURI’s support on our Heavenly Hunks product allowed us to start correctly from square one in the formulation, development and distribution of Hunkola.

E&C Snacks

Hunks of cookie/granola mashed together.

Evaluating the Impact of Biomass Heating

In September 2015, William Koenig's Viking Company installed an Even Temp Biomass wood chip furnace (courtesy of Jim Eiyneck, distributor) in its Albany poultry farm to assess the cost effectiveness of biomass heating technology, cold climate energy savings and other potential benefits.

Previously, AURI had formed a research initiative to study the concept of utilizing biomass derived heat in poultry and greenhouse facilities. AURI presented key findings to poultry producers and green house operators, and published a Biomass Heating Feasibility Guide. The initiative needed a producer willing to install a biomass system when Koenig offered his facility.

Over a two-year timeline, 12 boiler flocks will rotate through a biomass-heated test barn and a control barn to assess cost savings and the impacts on production. According to Al Doering, AURI senior associate scientist – coproducts, this research phase will attempt to meet five goals:

- Calculate the cost effectiveness of biomass heat;
- Measure performance and operability of wood chip fired furnace technology;
- Assess flock health and potential improvements;
- Conduct an environmental assessment of ash byproduct application to area farmland; and
- Establish a host site event to inform industry on how a biomass heating technology performs in northern climates.

Typical propane heating involves inside combustion, creating a moist environment that could negatively affect flock health. Alleviating moisture in the poultry facility may prevent wet bedding, which reduces ammonia burns and sores on the animals' feet, decreases respiratory issues and could improve growth rates.



RESULTS:

FIRST BIOMASS HEATING LIVESTOCK DEMONSTRATION SITE TO EVALUATE ECONOMIC FEASIBILITY AND FLOCK HEALTH

Propane heating requires more output to maintain the desired temperature in winter, due to increased ventilation requirements to control environmental conditions in the barn, which drives up costs. Biomass uses a sustainable fuel source and also produces its own monetary output. AURI will evaluate the nutrient composition of the biomass ash to determine its suitability as a fertilizer, thus reducing the cost of commercial fertilizer for crop farmers.

The development of this project was a collaborative effort of AURI, Fritz Ebinger (University of Minnesota Extension's Clean Energy Resource Teams), Kevin Hennessy (Minnesota Department of Agriculture), Jim Eiyneck (Even Temp Biomass distributor and owner of Becker Fireplace Center) and Bruce Jones (Minnesota

State University Mankato). According to Doering and Becky Philipp, AURI project manager, without William Koenig's poultry farm facility, his interest and commitment, the project would not have come to fruition.

"Overall, this project fits with AURI's mission and innovation strategy, while focusing on research along the way," said Doering. "AURI generates ideas for value-added agriculture; selects the best ideas that have the potential to create the greatest return for the existing ag industry; and implements these ideas in the marketplace to grow Minnesota's economy."

AURI plans to continue education outreach through broad dissemination of the research results.



This project could lead to increased market opportunities for the biomass industry resulting in job creation and industry growth.

AURI Staff

Industry Initiative:

Guiding Bioplastics Innovation

Much like renewable energy, experts believe the rapidly expanding bioplastics industry will not only protect the environment but also create a large number of jobs. To help guide this expanding industry, AURI conducted extensive research regarding the opportunities and challenges inherent to the industry and compiled the results into a one-stop resource.

This initiative involved many project partners, including the Minnesota Corn Research & Promotion Council and the Minnesota Soybean Research & Promotion Council. AURI also leveraged the expertise of consultant Jim Lunt to draft the report.

AURI microbiologist, Jimmy Gosse, Ph.D., explained that the development of this resource was partly prompted by changing consumer sentiments. “While interest in these products is not necessarily a recent trend, growing willingness to purchase them is,” Gosse mentioned. Now more than ever before, consumers will pay slightly more for a bioplastics product.

Randy Hilliard, AURI project manager, added that both consumers and researchers may hear about alternatives to plastics products and later look for an exhaustive summary of the work that’s been





completed thus far or a list of products currently available. He explained, “AURI developed the bioplastics report to answer the queries of those working within the biopolymer space.”

Gosse described the bioplastics report as a dictionary of sorts. The report allows individuals with a background in the topics to learn more about subjects of interest.

One way to understand the impact of this report is through the lens of worker efficiency. As researchers and scientists learn more about bioplastics, their capacity to apply this knowledge to research and development similarly increases. Using bioplastics in new projects will lead to economic benefits for Minnesota as development continues to be streamlined, creating jobs and revenue through product sales.

Experts project consumer interest in bioplastics products will continue to grow, necessitating additional research initiatives. When this happens, future researchers will reference AURI’s bioplastics report, which can be viewed online at auri.org/research-reports/marketplace-opportunities-plastics/.



Impact: Client Satisfaction

Percentage of clients who agree with the following statements, as reported in the 2015 AURI Satisfaction Survey.

81%

AURI SIGNIFICANTLY HELPED
ADDRESS OUR BUSINESS
CONCERNS.

75%

AURI CONNECTED US TO
VALUABLE RESOURCES/
ORGANIZATIONS.

73%

AURI HAS IMPROVED MY
PRODUCT/PROCESS
SIGNIFICANTLY.

77%

BECAUSE OF MY WORK WITH
AURI, MY BUSINESS IS MORE
SUCCESSFUL.

70%

AURI ENABLED MY PRODUCT/
PROCESS TO BE SOLD
COMMERCIALY.

74%

AURI'S PROGRAMS AND
SERVICES HAVE BEEN VITAL
TO GROWING MY BUSINESS.

Fiscal Year 2015

AURI is a 501(c)3 nonprofit corporation created by the Minnesota State Legislature to help develop new uses for agricultural products. As a state created independent non-profit corporation, AURI is partially funded through a direct appropriation from the Minnesota State Legislature. Each biennium, AURI seeks funds through the state budgeting process.

AURI Revenue During Fiscal Year 2015

<u>REVENUE SOURCE</u>	<u>REVENUE PERCENTAGE</u>	<u>TOTAL REVENUE</u>
Interest & Miscellaneous Income	2.7%	\$ 126,824
State Appropriations	77.6%	\$ 3,643,000
Grants & Outside Sources	7.0%	\$ 328,404
Collaboration & Partnerships	12.7%	\$ 596,384
Total Revenue		\$ 4,694,612

AURI Expenses During Fiscal Year 2015

<u>EXPENSE AREA</u>	<u>EXPENSE PERCENTAGE</u>	<u>TOTAL EXPENSE</u>
Operations <i>Institute-Wide Expenses, IT, Board of Directors, Insurance</i>	11.6%	\$ 533,482
Institutional Advancement <i>Communications / Strategy</i>	12.7%	\$ 585,942
Program Support <i>Administration and Support Staff</i>	18.6%	\$ 856,191
Programs & Services <i>Project Expenses/Innovation /Applied Research</i>	57.1%	\$ 2,628,041
Total Expenses		\$ 4,603,656

Revenue in excess of expenses is allocated to the organization's reserves.

AURI Projects Initiated During State Fiscal Year 2015 (July 1, 2014 – June 30, 2015)

<i>Project Number</i>	<i>Project Name</i>	<i>Begin Date</i>
14067PJ	Pierogies	7/1/2014
14066PJ	Product Market Testing	7/2/2014
RCDG028	Cooperative	7/3/2014
14069PJ	Commercialize Pickles	7/7/2014
14068IN	U on the Prairie Education	7/8/2014
14070PJ	Analysis of Volatile Oil in Spices	7/9/2014
14071IN	AURI Technical Advisor with the MCRPC	7/9/2014
RCDG029	New Litter Development	7/15/2014
14076PJ	Densification Technologies for Dairy Coproducts	7/22/2014
14072PJ	Pickles	7/28/2014
14073PJ	Feta Cheese Spreads	7/28/2014
14074PJ	Candies and Other Hand Crafted Food	7/28/2014
14075PJ	Feta Cheese Spreads	7/30/2014
RCDG030	Glycerol Based Additives for Value Added Soymeal	8/1/2014
14077PJ	Drink Vinegars	8/6/2014
14078PJ	Hot Sauce	8/11/2014
14079PJ	Granola	8/12/2014
14080PJ	Dog Treat Reformation	8/13/2014
14081PJ	Hot Cocoa Mix	8/25/2014
14082IN	Soybean Meal for Food	8/28/2014
14083IN	Dairy Research in Food	8/28/2014
14084IN	Sustainable Sources of High-Value Biomass	8/28/2014
RCDG031	Organic Sugar Beets	8/28/2014
14085PJ	Commercialized Dry Soup Mixes	9/3/2014
14086PJ	Nut Product	9/3/2014
15001IN	Biobased Bale Net Wrap	9/11/2014
15002IN	2015 Soybean Technical Advisor	9/16/2014
14089PJ	Milling/Densification	9/18/2014
14090PJ	Envirotech Fuels	9/18/2014
14087PJ	Probiotic Organic Beverage	9/26/2014
14088PJ	Sawmill	9/29/2014
15003IN	SMSU Culinology Charcuterie Lesson	9/30/2014
15006PJ	Italian Baked Products	10/1/2014
15007PJ	Plant Based Probiotic and Protein Enriched Products	10/1/2014
15004IN	2015 Meat Lab HACCP and Maintenance	10/3/2014
15005IN	HACCP-2015 Workshops	10/3/2014
AIC221IN	Heating the Midwest	10/5/2014
15008IN	WealthWorks Process II	10/6/2014
15009IN	Cattlemen's Convention	10/6/2014
15010PJ	Sunflower Oil	10/10/2014
15011PJ	Gluten Free Cake/Pizza Dough Mixes	10/23/2014
15012PJ	Nutritional Comparison	10/24/2014
15018IN	Client Survey	11/5/2014
15014PJ	Pork Manure Digester	11/7/2014
15015PJ	Development Rumen Protected L-Lysine	11/12/2014
15016PJ	Sambusa Product Development	11/12/2014
15017PJ	Buttercream Frosting	11/12/2014
15019PJ	Grain Mix Development	11/20/2014
15020PJ	Feta Cheese and Garlic Dip	11/21/2014
15021PJ	Berries Jams	11/21/2014
15022IN	Pet Food Manufacturing	12/1/2014
15024IN	Pork Cutting Demo	12/1/2014
15023IN	Meat Processors Database	12/3/2014
AIC222IN	Biodiesel-Distillers Corn	12/4/2014
15026PJ	Corn Husk Processing	12/12/2014
15027PJ	Glycerin Anti-Freeze Project	12/12/2014
15028PJ	Gluten Free Oatmeal Cookie	12/16/2014
15033PJ	Feed Product Integration	12/16/2014

Project Number	Project Name	Begin Date
15034PJ	Product Comparison Testing	12/16/2014
15029PJ	Chewy Granola Bar	12/23/2014
15030PJ	New Beverage	12/23/2014
15031PJ	Woodfire Pizza	12/23/2014
15032PJ	Caramel Spread	12/23/2014
AIC224PJ	Wood Heat-Poultry Products	12/28/2014
15035IN	Food Safety Networking	1/9/2015
15036IN	Blend Formula/Sensory	1/12/2015
15037IN	Industry Thought Leaders	1/16/2015
15038IN	MN Agri-Value Chain	1/16/2015
AIC223IN	Minnesota Renewable Energy Roundtable FY15	1/16/2015
15039PJ	Verjus Products	1/23/2015
15040PJ	Samubusa Product Development	1/23/2015
15041PJ	Beverages	1/26/2015
15042PJ	Hummus Garlic Dips	1/26/2015
15043PJ	Gluten Free Pasta	1/26/2015
15046PJ	Exploration of Glycerin and Other Ag Crop Derivatives as a Blending Agent for Cold Temperature Stability	1/26/2015
15044PJ	Pelleting Evaluation From New Dryer Technology	1/27/2015
15045PJ	Corn Water Recovery and Utilization Project	1/27/2015
15047PJ	African Frozen Entrees	1/29/2015
15048PJ	Beverage Powder Mixes	1/29/2015
15049PJ	Plantain Chips and Salsa Seasoning	1/29/2015
15050PJ	Dip Product Development	1/31/2015
15052PJ	Infrared Drying Applications	2/5/2015
15053PJ	Grain Process/Poultry Diet	2/17/2015
15054IN	Grain Process/Poultry Diet	2/17/2015
15051PJ	BioPak Biodegradable Packing	3/3/2015
15055IN	Minnesota Goat Meat/Milk Status of Industry Report	3/9/2015
15056PJ	Hot Sauces	3/13/2015
15057PJ	Salsa Dip	3/13/2015
15058PJ	Gluten Free Cookies	3/17/2015
15059PJ	Energy Bars	3/17/2015
15060PJ	Functional Food	3/18/2015
15061PJ	Frozen Pies	3/18/2015
15062PJ	Sugarbeet Hemoglobin Project	3/27/2015
RCDG030PJ	Value Added Glycerin Fermentation to Protein Project	3/27/2015
15063PJ	Cheese Development and Analysis	3/31/2015
15064PJ	Cracking/Utilization in Chocolate Process	4/8/2015
15065PJ	Gluten Free Granola Bars	4/8/2015
15066PJ	Beet Molasses for Bioreactor Applications	4/15/2015
15067PJ	Greenhouse Technology and Aquaculture Feed Soybean/Algae Protein Systems	4/21/2015
15068PJ	Alternative for Dried Coproduct	4/22/2015
15069IN	MN Cup Food, Ag and Beverage Division	5/6/2015
15070PJ	Micro-Malting Pilot Facility	5/19/2015
AIC225IN	Wood Heat-Poultry Products	5/26/2015
15071IN	2015 Farm to Plate	5/28/2015
15072IN	Communication Greenhouse Model	6/2/2015
15073PJ	Evaluation Torrefied Biomass	6/3/2015
15074PJ	Cookie Dough	6/10/2015
15075PJ	Fruit Jams and Snacks	6/10/2015
15076PJ	Ghee Butter	6/10/2015
15077PJ	Mixed Nuts	6/10/2015
15078PJ	BBQ Sauce	6/10/2015
15079PJ	Juice Beverages	6/10/2015
15080PJ	MN Grown Produce	6/10/2015
15081PJ	Frozen Food Appetizers	6/10/2015
15082IN	Bioheat Expanded Polystyrene	6/11/2015
15083PJ	Jams	6/11/2015
15084PJ	Hot and Sweet Sauces	6/11/2015
15085PJ	Pepper Sauce	6/11/2015
15086PJ	Butanol Process-Aquaculture	6/15/2015
15087PJ	Butanol Process-Soil Amendment	6/15/2015
AIC226IN	Heating the Midwest Contracted Services	6/16/2015
15088PJ	Anaerobic Digestion of Value Added Small Molecules	6/29/2015

122 Total Projects Initiated

AURI Project Disbursements

(July 1, 2014 – June 30, 2015)

Project Number	Project Title	Amount
2010105	Value Added Ingredients from Milk	\$ 23,371.09
11027PJ	Manure Solid as a Soil Amendment	\$ 7,297.46
11088IN	Food from Farm to Plate	\$ 15,000.00
12021PJ	Development of Corn Starch Fire Retardant	\$ 24,612.39
12036PJ	Development of Bio-Products	\$ 44,924.04
12039IN	Sodium Reduction in Blue Cheese	\$ 3,207.00
12040IN	Fluid Milk	\$ 7,169.67
12051PJ	Development of Biobased Class B Fire Retardant	\$ 72,606.01
12052PJ	Improvement of Colorant Output of Purple Corn	\$ 4,566.23
12104PJ	Energy Feedstocks	\$ 1,617.50
13009IN	Fungal Processing of Thin Stillage	\$ 3,812.00
13023IN	Agricultural Processing Coproducts Assessment	\$ 9,643.75
13033IN	Milk Composition	\$ 5,804.83
13034IN	Clean Labels	\$ 12,656.25
13060IN	MN Agbioscience Network Development	\$ 400.00
13076IN	Creamery Feasibility	\$ 4,383.43
13080PJ	Preliminary Engineering Assessment of Glycerin Refinery	\$ 7,594.98
13082IN	State of the Meat Processing Industry in MN	\$ 8.82
14004IN	MN Nursery and Landscape Economic Impact Study Update	\$ 2,000.00
14008IN	Beef Strategic Planning	\$ 636.93
14014IN	AURI Technical Advisor Agreement with the MNSRPC-National Relationship Building	\$ 1,089.16
14022IN	Minnesota's Agbioscience Strategy Implementation	\$ 202.46
14030PJ	Nut Substitutes/Scale-up	\$ 435.23
14054IN	Biobased Network	\$ 390.00
14062IN	Economic Contribution of the Agbioscience Industry in Minnesota	\$ 19,265.31
14066PJ	Product Market Testing	\$ 776.78
15002IN	2015 Soybean Technical Advisor Services	\$ 3,085.19
15018IN	Annual Client Satisfaction Survey	\$ 1,225.00
AIC040	Gasification	\$ 914.71
AIC166IN	Anaerobic Co-Digestion and Genset Upgrade	\$ 3,308.39
AIC185IN	Development of Biobased Materials Profile	\$ 30,749.83
AIC190IN	Phase Feeding of DDGS	\$ 22,552.06
AIC191IN	Pork Fat Quality	\$ 13,491.29
AIC194IN	Hydrous Ethanol use in Dual Fuel Diesel Engines	\$ 18,888.34
AIC197IN	Gasification Feedstock Testing	\$ 13,050.00
AIC199IN	Determining Ratio of Condensed Distillers Solubles to Wet Distiller's Grains in Wean to Finish Pig Liquid Feeding Diets	\$ 6,101.58
AIC206IN	Increasing the Usage Level of Corn and Distillers Grains in Market Turkey Diets Through the Use of Supplemental Amino Acids	\$ 22,331.27
AIC207IN	Corn Protein Plastics for Agricultural Products	\$ 27,295.39
AIC208IN	Impact of Reduced-Oil DDGS, Dietary Energy System, and Wheat Midds in Growing-Finishing Pig Diets on Growth Performance and Pork Fat Quality	\$ 59,570.99
AIC209IN	Development of a Port Injected Hydrous Ethanol System for Diesel Engines	\$ 50,683.20
AIC210IN	Recovering Valuable Biobased Products from Thin Stillage in Corn Ethanol Plants	\$ 54,256.23
AIC211IN	Evaluation of Growth Performance, Nutrient Utilization, Metabolic Profile, and Onset of Puberty in Dairy Heifers Fed Reduced Fat Distillers Dried Grains in Replacement of Forage in Limit-Fed Ration	\$ 43,767.30
AIC212IN	DDGS Diets and Manure Pit Foaming in Commercial Pork Production Systems	\$ 28,121.96
AIC213IN	Adding Value to Corn and Agricultural Byproducts Through Production of Biochar and Bio-Oil: Step Two	\$ 28,998.27
AIC215IN	Adequacy of Manure Produced by Feedlot Cattle Housed Under Various Facility Types	\$ 16,051.78
AIC216IN	Reduced-Fat Distillers Grains in Finishing Dairy Steer Diets	\$ 73,124.13
AIC217IN	Minnesota Renewable Energy Roundtable	\$ 3,747.82
RCDG021	Treated Fiber for Livestock Feed	\$ 20,000.00
RCDG022	Potassium Sulfate Market Assessment	\$ 6,375.00
RCDG026	Seed Mixing Feasibility	\$ 6,000.00
RCDG027	Infrastructure Upgrade for Value-Added Ventures	\$ 6,000.00
RCDG028	Prairie Roots Cooperative	\$ 6,000.00
Total Project Disbursements		\$ 839,161.05

**Total amount +/- 1%

AURI Service Hours Per Project

(July 1, 2014 – June 30, 2015)

<i>Project Number</i>	<i>Project Name</i>	<i>Total hours</i>
FY15 - 14/15PM	2015 Project Management	11,813.50
14045PJ	Nutritional Analysis of Sausage Products	329.00
14071IN	AURI Technical Advisor with the MCRPC	306.00
14022IN	MN Agbioscience Strategy	295.50
11006IN	Industry Value Chains	264.00
AIC185IN	Development of Biobased Materials Profile	263.50
RCDG030	Glycerol Based Additives for Value Added Soymeal	239.00
RCDG029	New Litter Development	236.50
13044PJ	Soil Ammendment Development	221.00
15037IN	Industry Thought Leaders	184.50
15015PJ	Development Rumen Protected L-Lysine	183.00
AIC221IN	Heating the Midwest	175.50
14015IN	AURI Technical Advisor Agreement with the MNSRPC-Research Review and Development	174.50
15002IN	2015 Soybean Technical Advisor	169.00
AIC223IN	Minnesoat Renewable Energy Roundtable FY15	167.75
AIC217IN	Minnestoa Renewable Energy Roundtable	162.50
15001IN	Biobased Bale Net Wrap	142.50
11037PJ	Jerky Shelf Stability	139.75
15027PJ	Glycerin Anti-Freeze Project	135.00
AIC189IN	Coproducts and E Coli	133.50
15005IN	HACCP-2015 Workshops	127.50
13009IN	Fungal Processing of Thin Stillage	126.50
14083IN	Dairy Research in Food	123.50
15038IN	MN Agri-Value Chain	120.00
14048PJ	Fractionation of Thin Stillage	113.00
RCDG031	Pelletizing Organic Sugar Beets	103.50
14053IN	Low O Network	100.50
15044PJ	Pelleting Evaluation From New Dryer Technology	96.50
15046PJ	Exploration of Glycerin and Other Ag Crop Derivatives as a Blending Agent for Cold Temperature Stability	94.00
RCDG021	Treated Fiber for Livestock Feed	89.50
15012PJ	Nutritional Comparison	87.00
RCDG026	Seed Mixing Feasibility	87.00
12036PJ	Development of Bio-Products	86.50
14054IN	Biobased Network	86.50
14012PJ	Greek Dips	86.00
14066PJ	Product Market Testing	83.75
14069PJ	Commercialize Pickles	82.00
2008026	KDS Technology Evaluation	78.50
AIC216IN	Reduced-Fat Distillers Grains in Finishing Dairy Steer Diets	72.00
14037IN	Thin Stillage Effect Pork Quality	70.50
14062IN	Economic Contribution of the Agbioscience Industry in Minnesota	68.00
15010PJ	Sunflower Oil	68.00
14008IN	Beef Strategic Planning	66.75
13023IN	Agricultural Processing Coproducts Assessment	62.50
13033IN	Milk Composition and DDGS	57.25
15014PJ	Pork Manure Digester	57.00
13089PJ	Product Development	56.75
14014IN	AURI Technical Advisor Agreement with the MNSRPC-National Relationship Building	55.00
15026PJ	Corn Husk Processing	54.50
14031PJ	Mixed Fuel Pellets	54.00
15017PJ	Buttercream Frosting	54.00
15036IN	Soy-Meat-Blend Formula	54.00
15052PJ	Infrared Drying Applications	53.50
13036PJ	Product Development	52.75

Chart continued on next page.

<i>Project Number</i>	<i>Project Name</i>	<i>Total hours</i>
13027PJ	Dewatering of Cannery Coproducts	52.50
12040IN	Fluid Milk	51.75
14035IN	WealthWorks Process	50.50
14082IN	Soybean Meal for Food	46.50
15028PJ	Gluten Free Oatmeal Cookie	46.00
13076PJ	Creamery Feasibility	44.00
15021PJ	Berries Jams	44.00
15041PJ	Beverages	42.00
RCDG022	Potassium Sulfate Market Assessment	42.00
14068IN	U on the Prairie Education	41.00
15058PJ	Gluten Free Project	41.00
15004IN	2015 Meat Lab HACCP and Maintenance	40.50
15022IN	Pet Food Manufacturing	40.00
12051PJ	Development of Biobased Class B Fire Retardant	39.00
12065PJ	Black Carbon Analysis	39.00
15045PJ	Corn Water Recovery and Utilization Project	39.00
15030PJ	New Beverage	38.50
14016IN	Ag Industry Analysis Survey	38.00
15034PJ	Product Comparison Testing	38.00
14049IN	MN Cup Food, Ag and Beverage Division	37.00
RCDG024	Molasses-Based Corrosion	37.00
12104PJ	Energy Project	36.50
RCDG025	Feed Tag Development	36.50
15003IN	SMSU Culinology Charcuterie Lesson	36.25
14063IN	2015 Soybean Project Development	36.00
14073PJ	Feta Cheese Spreads	36.00
11030PJ	Chocolate Macaroons	34.50
14064PJ	Pellet Fuel Development from Ag Residue	34.50
15073PJ	Evaluation Torrefied Biomass	34.00
15020PJ	Feta Cheese and Garlic Dip	33.50
15057PJ	Salsa Dip	33.50
AIC162IN	Heating the Midwest with Renewable Biomass	33.50
14058PJ	Cheese Cake and Salsa	33.00
15040PJ	Samubusa Product Development	32.25
AIC192IN	Beef Metabolism Study	32.00
AIC215IN	Adequacy of Manure Produced by Feedlot Cattle Housed Under Various Facility Types	31.50
14034PJ	Further Processed Products	31.00
13082IN	State of the Meat Processing Industry in MN	30.75
15033PJ	Feed Product Integration	30.50
15059PJ	Energy Bars	30.00
RCDG028	Cooperative	30.00
14084IN	Sustainable Sources of High-Value Biomass	29.50
15056PJ	Hot Sauces	29.50
RCDG027	Infrastructure Upgrade for Value-Added Ventures	29.50
15047PJ	African Frozen Entrees	28.25
14076PJ	Densification Technologies for Dairy Coproducts	28.00
15035IN	Food Safety Networking	27.75
15060PJ	Functional Food	27.00
14085PJ	Commercialized Dry Soup Mixes	26.50
15009IN	2014 Cattlemen's Convention	26.50
14039IN	Biomass Heating	26.00
13046PJ	Specialty Milling of Grains	25.00
13067PJ	Performance Assessment of Proteins in Livestock Production Phase 1	24.50
15031PJ	Woodfire Pizza	24.50
15070PJ	Micro-Malting Pilot Facility	24.50
14090PJ	Fuels	23.50
AIC212IN	DDGS Diets and Manure Pit Foaming in Commercial Pork Production Systems	23.50
14072PJ	Pickles	23.00
AIC190IN	Phase Feeding of DDGS	22.75
14033IN	Industry Thought Leaders	22.50
14077PJ	Drink Vinegars	22.50
13077PJ	Caramels	22.00
14026PJ	Chocolate	22.00

Project Number	Project Name	Total hours
13053PJ	Shelf Stability	21.50
14023PJ	High Protein Bar	21.50
14001IN	2014 Meat Lab HACCP	21.25
15039PJ	Verjus Products	21.00
AIC191IN	Pork Fat Quality	21.00
AIC213IN	Adding Value to Corn and Agricultural Byproducts Through Production of Biochar and Bio-Oil: Step Two	20.50
15011PJ	Gluten Free Cake/Pizza Dough Mixes	20.00
AIC040	Gasification	20.00
15029PJ	Chewy Granola Bar	19.50
15042PJ	Hummus Garlic Dips	19.50
14089PJ	Milling/Densification	19.00
14030PJ	Nut Substitutes/Scale-up	18.50
15008IN	WealthWorks Process II	18.50
15072IN	Communication Greenhouse Model	18.00
13034IN	Clean Labels	17.50
15019PJ	Grain Mix Development	17.50
15054IN	Grain Process/Poultry Diet	17.50
AIC208IN	Impact of Reduced-Oil DDGS, Dietary Energy System, and Wheat Midds in Growing-Finishing Pig Diets on Growth Performance and Pork Fat Quality	17.00
AIC224PJ	Advantages of Wood Heat for Poultry Production in a Cold Climate	17.00
15051PJ	Biodegradable Packing	16.50
AIC207IN	Corn Protein Plastics for Agricultural Products	16.50
2010105	Value Added Ingredients from Milk	16.00
12089IN	MN Research & Promotion Council Forum	16.00
14070PJ	Analysis of Volatile Oil in Spices	16.00
15064PJ	Cracking/Utilization in Chocolate Process	16.00
15065PJ	Gluten Free Granola Bars	15.50
2008038	Bio Tarp	15.00
15016PJ	Sambusa Product Development	14.75
15069IN	MN Cup Food, Ag and Beverage Division	14.50
AIC206IN	Increasing the Usage Level of Corn and Distillers Grains in Market Turkey Diets Through the Use of Supplemental Amino Acids	14.00
RCDG030PJ	Value Added Glycerin Fermentation to Protein Project	14.00
12052PJ	Improvement of Colorant Output of Purple Corn	13.00
14080PJ	Dog Treat Reformation	13.00
15032PJ	New Caramel Spread	13.00
AIC210IN	Recovering Valuable Biobased Products from Thin Stillage in Corn Ethanol Plants	13.00
AIC211IN	Evaluation of Growth Performance, Nutrient Utilization, Metabolic Profile, and Onset of Puberty in Dairy Heifers Fed Reduced Fat Distillers Dried Grains in Replacement of Forage in Limit-Fed Rations	13.00
11103IN	Agricultural Residue Performance Evaluation in Denitrifying Bioreactors	12.50
15066PJ	Beet Molasses for Bioreactor Applications	12.50
AIC209IN	Development of a Port Injected Hydrous Ethanol System for Diesel Engines	12.50
RCDG023	Hydroxide Treatment of Beet Tailings	12.50
12039IN	Sodium Reduction in Blue Cheese	12.00
14067PJ	Pierogies	12.00
AIC196IN	Energy Utilization of Oil Extracted DDGS in Poultry	12.00
AIC222IN	Biodiesel from Distillers Corn Oil	12.00
AIC199IN	Determining Ratio of Condensed Distillers Solubles to Wet Distiller's Grains in Wean to Finish Pig Liquid Feeding Diets	11.50
15048PJ	Beverage Powder Mixes	11.00
15082IN	Bioheat Expanded Polystyrene	11.00
15050PJ	Dip Product Development	10.25
14079PJ	Granola	10.00
14018IN	Denitrifying Bioreactor Field Trial	9.00
14086PJ	Nut Product	9.00
14088PJ	Sawmill	9.00
13018IN	Sensory Evaluation Laboratory	8.50
15071IN	2015 Farm to Plate	8.00
AIC218IN	Biodiesel Taskforce	8.00
14028PJ	Gluten Free, Dairy Free and Egg Free Healthy Wholesome Cookies	7.50
15063PJ	Cheese Development and Analysis	7.50
AIC194IN	Hydrous Ethanol Use in Dual Fuel Diesel Engines	7.50
13074PJ	Condiments	6.50

Chart continued on next page.

<i>Project Number</i>	<i>Project Name</i>	<i>Total hours</i>
14081PJ	Hot Cocoa Mix	6.50
13016IN	Clean Labels Alternatives Report	5.75
13092PJ	Sucrose-Free Fudge Development	5.50
14061PJ	Baking Mixes	5.50
15055IN	Minnesota Goat Meat/Milk Status of Industry Report	5.50
14002IN	HACCP Workshops	5.00
14050PJ	Nutritional Analysis of Gluten Free Mixes and Baked Products	5.00
15089IN	Clean Labels	5.00
13080PJ	Preliminary Engineering Assessment of Glycerin Refinery	4.50
14075PJ	Feta Cheese Spreads	4.50
15024IN	Pork Cutting Demo	4.25
11058PJ	Frozen Appetizer from Fully Enclosed Dough Shell Filled with Various Ingredients	4.00
14004IN	MN Nursery and Landscape	4.00
14051PJ	Manufacturing AJVAR	4.00
14087PJ	Probiotic Organic Beverage	4.00
15006PJ	Italian Baked Products	4.00
15049PJ	Plantain Chips and Salsa Seasoning	4.00
15061PJ	Frozen Pies	4.00
15067PJ	Greenhouse Technology and Aquaculture Feed Soybean/Algae Protein Systems	4.00
AIC225IN	Advantages of Wood Heat for Poultry Production in a Cold Climate	4.00
AIC226IN	Heating the Midwest Contracted Services	4.00
14078PJ	Hot Sauce	3.50
15007PJ	Plant Based Probiotic and Protein Enriched Products	3.50
15068PJ	Alternative for Dried Coproduct	3.50
14021PJ	Seasonings and Sauces	3.00
14065PJ	Ag Blend Absorbent Pellet	3.00
12075PJ	Condiment Sauces	2.50
13056PJ	Dog Treats-Gluten Free	2.50
13069PJ	Granola	2.50
11088IN	Food from Farm to Plate	2.00
12021PJ	Development of Corn Starch Fire Retardant	2.00
12027PJ	Pie and Vegan Products	2.00
14010PJ	Heat and Serve Pad Thai	2.00
15043PJ	Gluten Free Pasta	2.00
15062PJ	Sugarbeet Hemoglobin Project	2.00
15088PJ	Anaerobic Digestion of Value Added Small Molecules	2.00
11044PJ	Quick Wild Rice	1.50
14005PJ	Soil Amendment Development from SSOM	1.50
14029PJ	Organic Pickles and Salsa	1.50
14042PJ	Garlic Pesto	1.50
14044PJ	Cracker Product Analysis	1.50
13042PJ	Artisan Breads	1.00
13086PJ	Reduced Sugar Jams, Jellies and Preserves	1.00
13087PJ	Candy	1.00
13099PJ	Kombucha	1.00
14020IN	BBQ Training Events	1.00
14060PJ	Vegan Meat Alternatives	1.00
14074PJ	Candies and Other Hand Crafted Food	1.00
15074PJ	Favorable Treats Cookie Dough	1.00
15081PJ	Frozen Food Appetizers	1.00
15086PJ	Butanol Process-Aquaculture	1.00
12010IN	State Specialty Meat Map	0.50
12050PJ	Local Foods and Cafe	0.50
12061PJ	Gluten Free Frozen Meals	0.50
13032PJ	Identifying Greater Value for Acid Whey Lactose Permeate	0.50
13040PJ	Allergen Baked Goods	0.50
13050PJ	All Purpose Ethnic Sauce	0.50
13100PJ	Healthy Popsicles	0.50
14007PJ	Shelf Life Determination	0.50
14041IN	2014 MAMP Presentations	0.50
14059PJ	Sauce Development	0.50
15023IN	Meat Processors Database	0.50

Total **21,581.75**

**Crookston**

510 County Road 71
Suite 120
Crookston, MN 56716

218.281.7600

800.279.5010

Marshall

1501 State Street
Marshall, MN 56258

507.537.7440

St. Paul

University of Minnesota
Biological Sciences Center
1475 Gortner Avenue
St. Paul, MN 55108

612.624.6055

Waseca

PO Box 251
Waseca, MN 56093

507.835.8990

auri.org

