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Kosher  raised on the prairie

Dawson meat packing plant sells kosher meats nationwide

BY LIZ MORRISON

Dawson, Minn. — "Soul food" has come to corn and soybean country.

Noah's Ark Processors Corp. recently began producing glatt kosher meat, processed according to Jewish dietary laws set forth in the Hebrew Bible. The company sells fresh, case-ready beef, lamb, bison, elk and goat under the Solomon's Finest Kosher Meats label. Noah's Ark is the only kosher bison and elk supplier in the world, says company founder and owner Ilan Parente of Madison, Minn.

Parente opened the Dawson plant in February 2008 after operating a kosher meat processing plant in Bridgewater, S.D. for a decade. "We'd grown out of our facility in Bridgewater. The opportunity came up to buy the Dawson plant and we took it."

The move to a larger facility has allowed Parente to quadruple output. And it positions the company for further growth, says Jen Wagner-Lahr, AURI project director. AURI is helping the company develop new products, including kosher deli meats and cooked entrees. "They bought a plant that wasn't being used, they are providing jobs, and they are sending Minnesota products all over the country," Wagner-Lahr says.

PHOTOS BY ROLF HAGBERG

Ilan Parente, left, owner of Noah's Ark Processors in Dawson, and his brother Tal, chief financial officer, produce case-ready kosher beef, lamb, bison, elk and goat for more than 400 retail stores nationwide.

Bison brainstorm

Parente started his company in 1998 to process kosher bison. Trained as a software engineer, he was living in Boulder, Colo. in the mid-1990s, working for a pharmaceutical software company. His younger twin brothers were students at the University of Colorado at Boulder, which has a bison mascot. Tal Parente, who joined his brother's business in 2006, remembers watching the mascot at football games and saying, "We'd sure like to eat bison!"

The Parente brothers, who keep kosher, wondered if consuming bison was permitted by Jewish dietary laws. It is, Ilan discovered, but nobody was producing it for kosher consumers. "That's where the idea got started," he says.

Ilan — then, ironically, a vegetarian — spent a couple years learning about the U.S. meat industry and visiting packing plants as he traveled around the country for his software business. He laughs about the reactions he would get when, "I'd knock on the packing plant door in my suit." Gradually, his bison brainstorm "went from an idea to a business plan to a plant."

In 1998, Parente left the software industry, set up an 8,000-square-foot meat plant in Bridgewater and introduced the kosher community to farm-raised buffalo. "We started with just bison," he says, "but we kept getting calls asking, 'Do you have any lamb?' I learned there was a tremendous shortage of lamb for the kosher consumer." So he added lamb and, before long, beef. Goat and elk followed. "It was a natural progression."

After outgrowing the Bridgewater facility, Parente found a vacant 50,000-square-foot meat plant in Dawson's industrial park. Built in 2001, it has five times the packing capacity of the Bridgewater plant, plus cooking facilities.

The move, aided by Minnesota JOBZ tax breaks, enabled Noah's Ark to quadruple output and create 40 more jobs. Parente now employs 55 workers, including all 11 of his South Dakota crew — longtime employees who followed him to Minnesota and settled in the Dawson area.

A market for growers

Noah's Ark buys animals from about 45 livestock producers, primarily in Minnesota and South Dakota. "We struggle with getting enough supply of bison," Parente says. To ensure consistent quality and humane livestock treatment, "we have visited 90 percent of our producers," he says. "We don't buy animals over the phone. We visit their environment."

Jerry Wulf, manager of Wulf Farms in Hancock, Minn., supplies Noah's Ark with about 160 head of Limousin-Angus cross cattle a week. The Wulf family produces Limousin genetics and finishes about 22,000 head a year.

"West central Minnesota, where we're located, is very well-suited for cattle feeding," Wulf says. "We have some of the best feeder calf suppliers in the world, the cheapest grain in the world, and now access to ethanol coproducts for feed. From that standpoint, it's an excellent place to finish beef cattle. But the negative is no access to nearby processing plants."

The Wulfs ship cattle to packers from Windom, Minn., 170 miles south, to Grand Island, Neb., 400 miles south. "Being able to transport cattle just 45 miles down the road to Dawson is a huge advantage," Wulf says. "In an era of consolidation and concentration, it's always good to see another packer, another buyer for our cattle."

Tapping niche markets

Noah's Ark also offers an outlet for the Wulfs' value-added "all natural" beef, raised without hormones or antibiotics. Processing meats for niche markets "is a big advantage," says Carissa Nath, a meat technologist and manager of AURI's meat lab in Marshall. "Kosher is a higher value market, and it's increasing in size."

What does 'glatt-kosher' mean?

BY LIZ MORRISON

You probably eat kosher food every day — without knowing it. Thousands of American food products are certified kosher, from Oreo cookies to Coca-Cola, says Rabbi Seth Mandel of the Orthodox Union, a leading kosher certification agency.

"Kosher" means that the food was prepared in accordance with "kashrut," the Jewish dietary laws, explains Ilan Parente, founder and owner of Noah's Ark Processors in Dawson, Minn. "Glatt kosher," a more exacting standard for meat preparation, means that the slaughtered animal's lungs were free of lesions. "Glatt" is the Hebrew word for "smooth."

At the Noah's Ark plant, Hasidic rabbis from Jerusalem, trained by the Rabbinical Council, oversee kashrut. Two groups of five alternate six-week assignments, returning to Israel between stints. The plant's facilities were designed by Temple Grandin of Colorado State University, a world-renowned authority on humane animal handling.

Noah's Ark uses special chutes to reduce the animals' stress before slaughter. In the ritual shechita, a skilled rabbi slaughters the animal in compliance with strict religious guidelines, using a precise stroke with a large, razor-sharp knife free of nicks or imperfections. Done correctly, the shechita is a humane slaughter method, says Carissa Nath, meat technologist and manager of AURI's meat lab in Marshall, Minn. "The animals lose consciousness almost immediately."

Another rabbi carefully inspects the animal's body cavity and lungs, searching for imperfections. The carcass is also examined by a USDA inspector. After an internal check, the rabbi removes the animal's heart and liver and carries the lungs to a special table for a visual inspection. The lungs are inflated and the rabbi "checks every millimeter for adhesions," Parente says.

Rabbis also oversee carcass preparation. The veins are removed in accordance with Jewish law, which forbids consumption of blood. The meat is soaked in cool water for 30 minutes, then completely covered with coarse kosher salt. After resting an hour, the meat is rinsed three times.

Rabbis Nachum Rozenberg (left) and Usher Piltchick inspect an animal's inflated lungs to ensure they are free from imperfections, in accordance with Jewish dietary laws for kosher meats.

When every trace of blood is purged, the meat is ready for cutting, further processing and packaging. Only meat from the animal's front is sold as kosher. Hindquarters are processed for non-kosher markets. ■

Over $150 billion worth of kosher-certified products are consumed annually in the U.S., according to the Orthodox Union, a leading kosher certification agency based in New York City. And the market for kosher foods extends far beyond the country's 5 million Jewish consumers, says Rabbi Seth Mendel, rabbinic coordinator for the Orthodox Union, which certifies Noah's Ark kosher products. "In the U.S., there are 22 to 24 million consumers of kosher foods," he estimates.

However, few supermarkets are set up to handle kosher meat preparation, Parente says. So these sales have typically "been left to mom-and-pop kosher butcher shops. The unique thing about us is that we do everything, A to Z," from kosher slaughtering to cutting and packaging. Noah's Ark meats are packaged in state-of-the-art modified atmosphere fresh packs, ready for the meat case. So retailers can sell kosher meat "without the need for a rabbi there to supervise."

Noah's Ark meats are shipped out daily in refrigerated trucks and distributed in the Midwest by Twin Cities Poultry; on the West Coast by Quality Glatt; and on the East Coast by Westside Kosher Foods. More than 400 retail stores carry Solomon's Finest Kosher Meats, Parente says, including Wal-Mart, SuperTarget, Fairway Foods, ShopRite, Albertsons, Cub Foods and Byerly's. "There are 500 more stores that want our products, but we don't have the capacity to supply them."

Growth continues

Parente is working on expansion plans and adding new products. The company recently installed three commercial smokers, which can handle 2,000 pounds of meat each. New on Noah's Ark menu: kosher beef hot dogs, corned beef, pastrami and beef pancetta. Next up will be kosher ready-to-eat meals.

Like all small, independent meat processors, Noah's Ark faces a lot of challenges,"keeping up with USDA processing regulations, labor issues, succession," Wagner-Lahr says. Accessing reasonably-priced capital is another challenge, Parente says. "When you take a business and grow it three, four, five fold, that's millions of dollars" of added expenditures for livestock, payroll and transportation.

Ilan and Tal Parente put in long hours, often working late at night, says Tal, chief financial officer. But Ilan says the business is not just a livelihood. "It's creative. We're bringing clean, healthy, nutritious products to consumers. That's extremely satisfying." ■

Keeping kosher

Entrepreneur first to introduce kosher bison, elk

BY LIZ MORRISON

In his new Minnesota venture, Ilan Parente combines entrepreneurship with his sacred heritage.

Parente, 47, is the founder and owner of Noah's Ark, a glatt kosher meat processing plant in Dawson, Minn. "We grew up in a kosher home," says Parente, one of four children, "and we spent a lot of time around our grandparents. I was always hearing them complain about the lack of good-quality kosher meats."

Parente grew up south of Tel Aviv, Israel in Rishon le Zion, known for its vineyards. "Our neighbors raised cows and flowers, and there was even a papaya orchard." His parents, who came to Israel soon after the country was founded in 1948, operated one of the largest Volkswagen garages in Israel.

His mother's family, French-speaking Egyptian Jews of privileged background, was forced to flee to Israel during the Egyptian Revolution, which overthrew King Farouk I in 1952. "They had to leave with nothing."

Most of the family eventually immigrated to the United States, but Ilan's mother stayed in Israel and married his father, who came from a family of Spanish-speaking Sephardic Jews. Ilan grew up speaking Hebrew, French, English and Spanish.

When Parente was a teenager, he moved to the United States with his family, finished high school on Long Island and attended UCLA where he earned a software engineering degree. He's a citizen of both the United States and Israel.

Parente's entrepreneurial bent emerged early. He started his first "garage business" as a college student in the early 1980s, designing T-shirts for Mitsubishi to promote their SUVs, which were just being introduced to Americans. Before long, his customers included Honda and Toyota. "My parents got very good at folding T-shirts."

Later, Parente worked for a company that produced computer programs for clinic labs and pharmacies. He spent 17 years in the healthcare software field before launching his meat-processing business in 1998.

"Ilan introduced bison and elk to the kosher community," says his younger brother Tal, 39, who also works in the business. Today, Noah's Ark is not only the world's only supplier of kosher bison and elk, but also a national distributor of kosher beef, lamb and goat. ■

Water not wasted

Industries may save money using reclaimed water

BY DAN LEMKE

St. Paul, Minn. — In the "Land of 10,000 Lakes," water resources are a growing concern as Minnesota's industrial, economic development and environmental interests sometimes collide.

Using treated municipal wastewater or "reclaimed water" instead of fresh groundwater for nonpotable industrial uses might be a cost-effective solution.

Minnesota's nearly 600 municipal treatment plants can process about 425 million gallons of wastewater a day; at the same time, state processing industries demand more than 440 million gallons of water daily.

AURI and the Metropolitan Council Environmental Services are collaborating to evaluate how value-added ag processing facilities could take advantage of reclaimed water to conserve both money and natural resources.

At times, "siting a new agri-processing facility has been difficult because of a lack of water resources," says Jennifer Wagner-Lahr, AURI project director. Using reclaimed water could help.

Metropolitan Council Environmental Services collects and treats about 300 million gallons of wastewater a day at eight regional facilities. MCES principal engineer Deborah Manning says most of the treated wastewater is discharged back into rivers.

"Industry often uses ground water as a source even though they don't always need that quality," Manning says. "If we can replace this high-quality water with reclaimed water that still meets industry needs, we can conserve a finite resource for its best use and perhaps save some money."

In 2007, the Legislative-Citizen Commission on Minnesota Resources funded an MCES project to look at industrial opportunities for using reclaimed wastewater for nonpotable water uses. An AURI-MCES project is expanding that work to evaluate economic, technical and environmental benefits of using treated water in value-added ag processing, including case studies of a Minnesota ethanol plant and another ag processor (to be determined). AURI will hold statewide industry forums to share findings, expected by June 2009.

Across the country and in Minnesota, industries have already started using reclaimed water, including a Mankato natural-gas powered electrical plant using it for cooling. A North Dakota ethanol plant in Casselton is piping in reclaimed water from Fargo, 27 miles away.

"If reclaimed water is a lower-cost alternative and conserves the high-quality water resources, it can be a factor in sustainable economic growth," Manning says.

Reclaimed water may not be feasible in all industrial applications and "water use hasn't necessarily been a big concern to this point," says Wagner-Lahr. "But it could become a big issue in the future for all types of industries." ■

Minnesota's Renewable Energy Roundtable

Renewable energy portal

Web tool is resource for energy news, data, discussion

BY DAN LEMKE

Crookston, Minn. — An internet-based communication portal is keeping Minnesota's Renewable Energy Roundtable participants connected.

An internet portal is a single site with multiple functions such as email, news feeds and blogs. The portal at www.mnrer.org tracks Roundtable activities and links to renewable-energy developments elsewhere.

Facilitated by AURI, the Roundtable includes representatives from more than100 Minnesota organizations and businesses that want to further the state's renewable-energy industry.

"The portal helps address many communication issues," says David DeMuth, University of Minnesota Crookston professor and Roundtable portal project director. "This is a communications tool to facilitate conversations and help solve problems."

Demuth and several UMC students collaborated with AURI to design the portal. As a "living site," it will be continually updated with information from the five Roundtable action teams and include speaker presentations and other news.

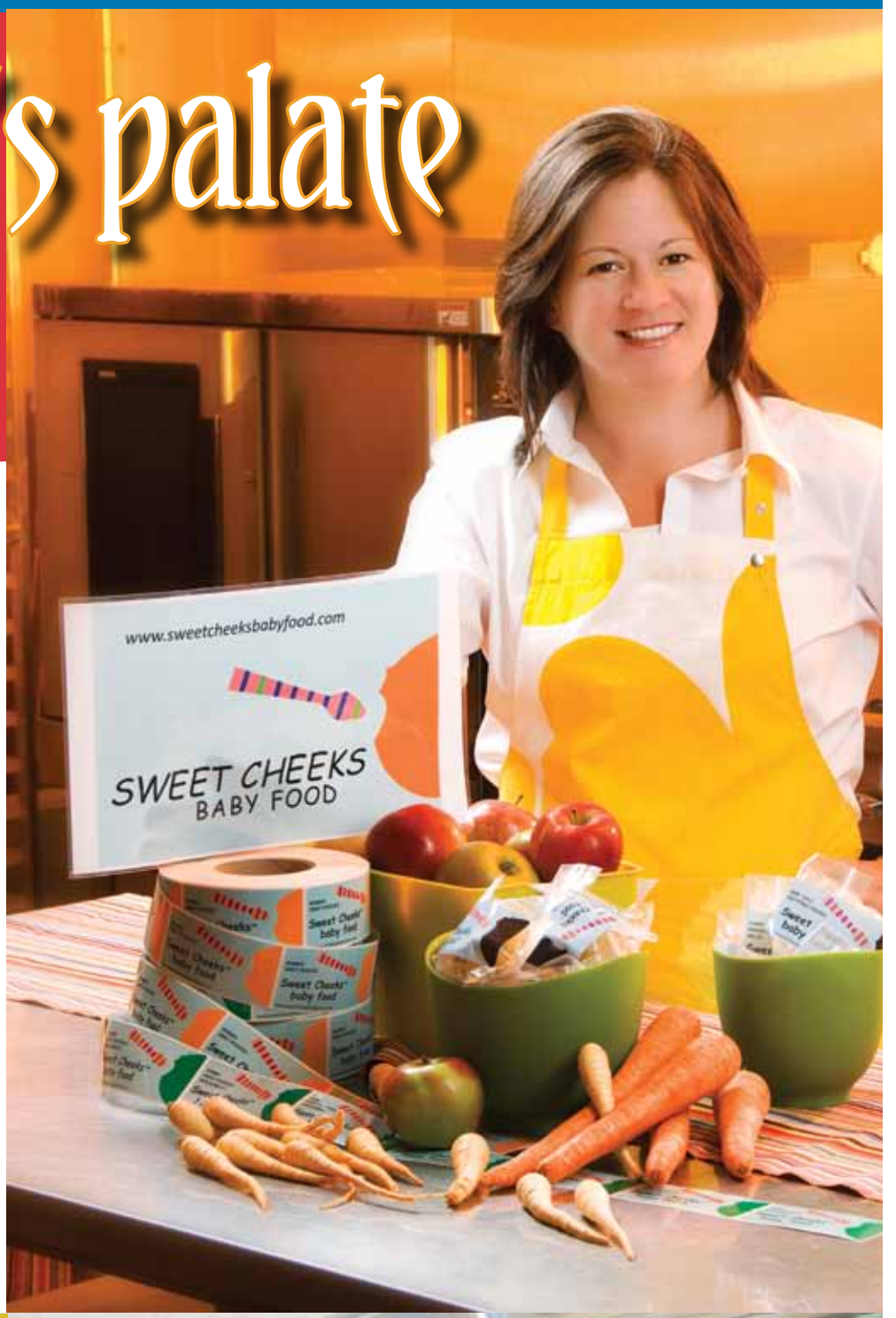
The portal will also be valuable to people outside the Roundtable. "There will be information about strategies that are being developed on issues like green-power jobs, curriculum development, research and public policy that will affect people who don't directly participate in the Roundtable," says AURI's Valerie Gravseth, Roundtable coordinator. "Our hope is that it becomes a credible source of information and a go-to place to learn about what's going on in renewable energy."

Those who access Facebook, My Space, LinkedIn and other web networks will be familiar with the MNRER portal concept. But it's user friendly for the novice too.

"We envision the site to be a one-stop communications portal for both the public and those who are 'churning the butter,'" DeMuth says. ■

Training baby's palate

FORMER NANNY MARKETS **FRESH-FROZEN, ORGANIC** BABY FOOD



BY DAN LEMKE

St. Paul, Minn. — Lori Karis is helping babies develop better taste.

The St. Paul entrepreneur is drawing on her two decades of experience as a professional nanny to produce Sweet Cheeks baby food made with local, organic ingredients.

"I've always made food for the babies I've cared for," Karis says. "I do a lot of research to make sure a child in my care gets proper nutrition."

With her passion for children's health and a little encouragement from her clients, Karis started marketing Sweet Cheeks baby food this past summer. She makes the food fresh, with fruits, vegetables and grains direct from Minnesota farms, then she freezes individual portions to preserve the nutrition and taste.

Sweet Cheeks dinners come in three categories: Newbies, for introducing babies to solid foods including squash, sweet potatoes and apples; Combos, blends of vegetables and whole grains for babies eight months and up; and Baby 'roles, chunky casseroles for toddlers moving off baby food.

"People have been conditioned to buy canned baby food," Karis says, but she's hoping Sweet Cheeks will help train babies' palates so they appreciate better food. "This tastes like real people food."

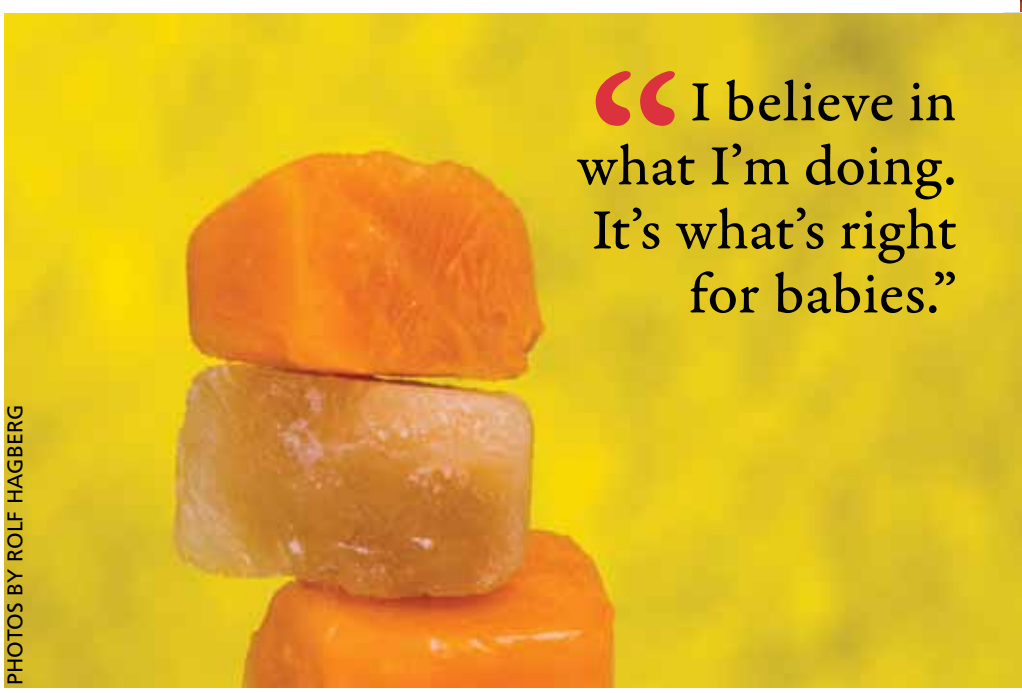
Karis says children today are the first generation predicted to have a shorter life span than their parents because of increases in ailments such as heart disease and diabetes. Karis hopes early introduction to healthy, whole foods will condition babies to crave healthier options as they age, reducing some preventable health concerns.

Karis took advantage of AURI scientist Charan Wadhawan's expertise to help with FDA compliance, nutritional analysis, labeling and nutrition facts.

"Using fresh ingredients and preserving them in a more natural form retains more of the nutrients because it's not treated with extremely high temperatures," Wadhawan says, adding that Karis' product may be an AURI first. "I don't believe we've ever had a baby food project before."

Karis first marketed Sweet Cheeks at the St. Paul Farmers Market, using the venue to expose consumers to her products. She now markets her baby meals at several metro food co-ops, delis and natural food outlets. Karis is forgoing nanny work to devote fulltime attention to the venture.

"I believe in what I'm doing," Karis says. "It's what's right for babies." ■



> "I believe in what I'm doing. It's what's right for babies."

PHOTOS BY ROLF HAGBERG

KEEPING CHEESE IN THE HEARTLAND

A Litchfield dairy plant may be the Midwest's biggest but it needs to expand to compete with western states

PHOTOS BY ROLF HAGBERG

Clint Fall, president of First District Association, says the dairy plant is at capacity with milk from 1,050 member-farmers. To expand Minnesota dairy processing, AURI is helping the plant improve whey protein and lactose extraction systems so it is more efficient and expandable.

BY CINDY GREEN

Litchfield, Minn. — It's not surprising that California and Texas have dairy-processing plants twice the size of Minnesota's biggest. But Arizona, New Mexico, Idaho? They all have plants that process at least six to seven million pounds of milk a day — twice the capacity of First District Association, the Midwest's biggest processor of milk, cheese, whey protein and other dairy coproducts.

"We need more capacity if we want to compete with other areas of the country and the world," says Clint Fall, First District Association president. To keep Minnesota milk from heading west and build markets for local farmers, AURI is helping First District with pre-engineering plans to make the plant more efficient and expandable.

"Wisconsin has reached capacity for their processing capacity and they're talking about Minnesota as being in danger of the same scenario," says AURI project director Jen Wagner-Lahr, who grew up on a central Minnesota dairy farm. "For AURI to be involved, we're sending a good signal to our state's dairy producers."

"Right now we're in the position where we're not able to take on any new dairy producer's milk," Fall says. "To plan for the future and remain sustainable and viable … with the ability to provide our dairy farmers with a good market for their milk long term, our goal is to continue pursuing smart growth."

"The challenging part is to develop equipment that can operate very efficiently" and is expandable to handle growth five to 10 years from now.

Cheese that First District distributes to food manufacturers is processed into slices, sauces, balls, dips and flavorings for snack foods.

Whey more than cheese

First District processes more than 3.5 million pounds of milk into 160,000 pounds of cheddar cheese and other products daily. Milk comes from First District's owners — 1,050 member-farmers, from as far as 100 miles away, and nine member-creameries. "This company is one of the most true-to-life grassroots cooperatives — members are very involved," Fall says.

Besides selling milk to Midwest bottlers, the plant churns out 131 million pounds of cheese a year. First District markets 500-pound barrels and 40-pound blocks of cheddar to major food manufacturers, including its original customer Land O Lakes (see sidebar story). The cheese is used in processed products such as slices, sauces, spreadable cheese, balls, dips and shredded cheese. The cheese on your favorite snack foods —nachos, cheese curls, potato chips — likely came from First District.

The co-op also sells its own Fieldgate brand, but it's minimal. "Our company is not so focused on branding as on producing a very high-quality food ingredient," Fall says.

When milk comes to the cooperative, it is first pasteurized "then we remove a portion of the water that's in the milk – that helps us process more milk with a smaller footprint."

The concentrated milk then goes to the cheese plant where curds of protein and fat are separated from whey. "From 100 pounds of milk, you get 10 pounds of cheese and 90 pounds of whey."

"Years ago, farmers made butter out of the (milk) fat, then they dumped the whey or fed it to pigs," Fall says. "In today's world, whey is a very valuable component … the actual dollar value goes up and down just like cheese."

From whey liquid, First District extracts out whey protein concentrates — used in protein powders, bars and other nutritional foods and supplements. The plant produces 1.5 to 2 million pounds monthly of various powder-concentrate varieties, with up to 50 percent protein. "From a nutritional standpoint, whey protein concentrate is more nutritious than cheese."

Sugar from milk

After whey protein concentrate is extracted, the liquid leftover is called permeate; about 95 percent is water, the rest minerals and lactose or milk sugar. "We take a significant portion of the water out" until only slurry remains "with the viscosity of a cold pancake syrup." It is cooled in large tanks with agitators and "the sugar actually crystallizes out of the solution."

"This sugar has a lot of very valuable characteristics. When you look at baby formula, lactose is the closest thing to mother's milk from a carbohydrate standpoint," Fall says. Besides infant formula, lactose is used in pharmaceuticals and "by nearly every confectionary company or chocolate manufacturer" for making milk chocolate and other candies. "It provides the right type of creamy taste."

"After you take the lactose out, you have a product that is, for the most part, minerals with some lactose left in there" that is used primarily for dairy cow feed.

Throughout the extraction process, "the only waste is water that comes off in the very beginning," before butterfat is extracted, Fall says.

Although it's called "cow water," it is potable – "very pure and soft distilled water coming out of the evaporation process" that is used to clean "massive amounts of equipment every day."

Get better and expand

First District is a "very automated high-tech plant" that employs 150 and "85 to 90 percent of those are highly-skilled jobs," Fall says.

While First District processes valuable coproducts with little waste, each extraction step takes "a tremendous amount of energy," Falls says. The co-op has been working on new evaporator technology for two years. "We know we have an evaporator that is a very complex system — retrofitted to meet our needs. It's a good piece of equipment but it's the heart of our entire production … and is approaching 30 years of age. We're nervous about any flaw in that equipment that could impair our ability to produce our product."

The AURI-supported pre-engineering project looked at technologies, costs, feasibility and specifications of a system "that will be more efficient," Fall says. New equipment "would be strictly customized to this plant … more than likely the first of its kind."

"When it comes to rural economic development, the money is going to support many, many jobs in these rural communities," Fall says. "Other states in the country are truly capitalizing on an industry that, some would say, belongs here and not there."

First District Association's plant in Litchfield, Minn. processes 3.5 million pounds of milk daily into cheddar cheese, whey protein, lactose, feed and other products.

Litchfield dairy plant made first Land O' Lakes butter

First District Association, the Midwest's biggest dairy processor, built its reputation on Land O' Lakes butter.

The association, based in Litchfield, Minn., traces its roots to the 1920s when rural creameries started consolidating to better compete in the U.S. butter market, unify standards and save transportation costs. "There were little creameries in almost every town; they combined to capitalize on efficiencies," says Clint Fall, First District president.

The Minnesota Cooperative Creameries Association was incorporated in 1921 and represented dozens of rural Minnesota creameries. The association's first production unit — 24 creameries formerly known as the Meeker County Creamery Association — eventually became First District Association, an independent cooperative. John Brandt was president of both the Minnesota and Meeker County associations.

In 1924, the Minnesota Cooperative Creameries Association began marketing its sweet cream butter under the "Land O' Lakes" brand. Two years later, the Minnesota cooperative was renamed Land O' Lakes Creameries Inc. and First District Association continued to produce butter for Land O' Lakes, but it was a separate co-op.

"In the 50s, First District converted to cheese and, even at that time, sold most of its cheese and whey products to Land O' Lakes. Sometime later, First District became more diverse."

The cooperative now daily processes 3.5 million pounds of milk into cheddar cheese, whey protein, lactose, feed and other dairy coproducts.

"To this day, Land O' Lakes is a good customer of First District — not the largest, but significant … The two organizations over the years have grown more independent of each other," but at the same time, have a shared history.

Home-heating pellets now made in Minnesota

A central Minnesota company is the first to manufacture biomass pellets for commercial heating

BY DAN LEMKE

Bird Island, Minn. — Sunrise Agra Fuels has given an old pellet facility new life and is now Minnesota's first commercial producer of ag-based biomass fuel pellets.

The Bird Island company is leasing a Kensington, Minn. pellet mill to produce Island Pellets, a blend of agricultural residues, such as soybean straw and sunflowers hulls, with forestry waste. Sunrise Vice President Bob Ryan says the plant should produce 3,000 to 4,000 tons of pellets a year for home heating. The company's long-term goal is to build a pellet facility than can produce up to 100,000 tons per year.

Since October, Sunrise has been delivering pellets to hearth-and-stove and farm-and-feed stores. "We're establishing a dealer network and working to educate people," about heating with pellets made from regional and renewable products.

Ryan and company partner Russ Koopman began working with AURI in 2006, developing their pellet blend while assessing market potential. They jumped in with small-scale production but quickly realized they had entered the market too soon and withdrew. Ryan says it was a good lesson learned.

Sunrise has since widened its focus from simply producing fuel pellets to raising awareness about systems that use bio-based fuels.

"It's important to educate people not only about our products, but also about equipment that is available to burn blended fuels," Ryan says.

"Sunrise is very proactive in promoting biomass for residential or industrial applications," says Alan Doering, AURI scientist, "from identifying potential fuels to the end use." ■

U.S. companies take a look at European technology

In September, 13 European companies showcased their biomass systems for heating and cooling at the International Bioenergy Days in Mankato. The event was designed to educate consumers and policy makers about biomass-utilization technologies in other parts of the world, particularly Sweden.

Bob Ryan, vice president of Sunrise Agra Fuels who chaired the event's organizing committee, says he would like to see these systems — that use biomass for everything from room heating to whole-house heating and air conditioning — replicated in the United States. "It's extremely high-efficiency equipment … it's unbelievable," Ryan says.

Much of Sweden's technology and innovation comes from small companies that design and manufacture equipment, install it, then provide support for the system, Ryan says.

Three of the European companies at the conference have already formed alliances with U.S. companies for possible manufacturing and distribution in this country. And several U.S. universities are testing European technologies.

While transportation fuels have captured much of this country's attention, more than 70 percent of the nation's energy need is for heating, cooling and electrical generation, Ryan says.

"It's a slow process. Ethanol, biodiesel and wind energy get a lot of attention, but thermal isn't really talked about." Given the Great Plains biomass resources, "it's one of the biggest opportunities I've ever seen." ■

Feeding frenzy no longer

The biofuels industry workforce demand has changed, but opportunities still exist

BY DAN LEMKE

Explosive growth in the biofuels industry has cooled, reducing once optimistic numbers for careers in renewable energy. But that doesn't mean opportunities don't exist.

In June 2007, the biofuels industry was enjoying a huge surge in growth. An AURI-sponsored study revealed the potential for thousands of jobs in ethanol and biodiesel. The Russell Herder marketing firm of Brainerd, interviewed representatives of nearly 80 renewable energy enterprises throughout the Midwest.

But shortly after the analysis was completed, biofuels operations faced double trouble. The cost of primary feedstocks — corn and soybeans — soared to historic levels, partially driven by increased demand for biofuels. Record energy costs also squeezed the industry, tightening margins.

"We used to see new biofuels projects announced on virtually a weekly basis," says Geoff Cooper, Renewable Fuels Association director of research. "But market forces, availability of credit and other factors have had the effect of slowing down what was an extremely rapid rate of growth."

An updated biofuels-industry analysis by Russell Herder in September 2008 found that career opportunities still exist, but the climate has changed.

According to the report, lack of funding for new plants has caused some layoffs and decreased demand for new talent. That eased workforce problems for some plants that had difficulty attracting enough talent, while others report losing qualified employees because of economic uncertainty in the biofuels industry.

Biofuels advancements, however, open up some career opportunities. New technologies, such as gasification or cellulosic conversion to biofuels, will require specially-trained employees. Opportunities are also likely to move outside traditional agriculture as woody biomass, grasses and other nontraditional crops become renewable-energy feedstock.

Industry leaders still expect that by 2015 the biofuels industry will create nearly 250,000 fulltime jobs in all related sectors as the industry matures.

"Biofuels are not the answer to all of our domestic energy challenges – but they are part of the answer," says Duane Kristensen of Chief Ethanol Fuels in Hastings, Nebraska. "This is an industry that is not going to go away." ■

Gas to fertilizer

City of Roseau will try gasifying grass-seed and crop reside to make ammonia

BY DAN LEMKE

Roseau, Minn. — Gasifiers can turn crop waste into electricity, but can they turn waste into fertilizer? A project in Minnesota's northland will find out.

The City of Roseau is sponsoring a demonstration project to gasify biomass, creating syngas. Hydrogen from the syngas will be precipitated through a catalyst to produce ammonia, which could be used as a nitrogen soil amendment. Gasification has converted coal to ammonia, but it's not been done commercially with biomass.

Michael Sparby, AURI project director, says the 100-kilowatt test gasifier will burn about 1,500 tons of biomass per year — relatively small, but large enough to prove the concept works. Feedstock will come from local sources such as grass-seed screenings and rye, wheat and barley straw.

"If we can prove it works technically and efficiently on a smaller scale, we could increase the size to provide fertilizer to a regional area," Sparby adds. A one-megawatt unit could consume more than18,000 tons of biomass per year and produce more than 8,000 tons of ammonia.

"It would then be feasible to place similar units around the state to provide nitrogen … a fertilizer source from locally-produced materials that is equal to or cheaper than fossil-fuel based fertilizer, and it would be carbon neutral."

Mayor Jeff Pelowski and others in the Roseau economic development authority became interested in gasification when Sparby gave a presentation about a system being installed in Williams, Minn. to produce electricity from grass-seed screenings. The group asked about the potential for something similar in Roseau.

"Michael saw the fit for us," Pelowski says. "We have the feedstock, we have a new industrial park and we have end users for either electricity or fertilizer."

Minnesota Turfseed Council President Richard Magnusson says there are several grass-seed screening facilities in the region producing low-value leftovers that currently are trucked to a disposal site and burned. "We have a waste stream that's not being used," says Magnusson, who grows several varieties of grass seed on 4,000 acres near Roseau.

"We generate about 160 pounds of screenings per acre of seed," and 2,000 to 4,000 pounds of straw, Magnusson says. "Screenings are an easy first step (for gasification) but with a viable production plant, straw is the big potential."

Once the project's demonstration phase is complete, and the concept's engineering and economic feasibility is determined, the gasifier will be used to power Roseau area schools.

Roseau received a grant from the Minnesota Department of Employment and Economic Development for the project. Other supporters include AURI, U.S. Department of Energy, Farmers Union Foundation, Minnesota Wheat Research and Promotion Council, Minnesota Turf Seed Council, Minnesota Barley Growers Association, Roseau Electric Co-op, Farmers Union Co-op of Roseau and University of North Dakota Energy and Environmental Research Center.

"We are looking at this as an economic development project — the beginning of something larger," Pelowski says.

Sparby expects the gasifier test burns will start by November 2009. ■

PHOTO BY ROLF HAGBERG

Elsewhere in ag utilization

BY DAN LEMKE
CARTOONS © UNCLE HYGGLY

Editors note: *Elsewhere provides news from around the globe on new uses for agricultural products. Please note that ARS is the research arm of USDA.*

woundedcoot.com

Sentinel fish

Purdue University researchers have harnessed fish-embryo sensitivity to create a tool to detect harmful chemicals. By measuring oxygen-use rates in developing fish, which are sensitive to contaminants and stressful conditions, the technology could reveal minute levels of toxic substances before they are obvious. Researchers say the technology's ability to identify otherwise undetectable changes will be an early-warning system for potential contamination.

From: Purdue University,
August 13, 2008

Pungent power

Spreading a little mustard is not just for sandwiches — it could battle weeds. ARS tests suggest sinalbin and other compounds released into the soil by adding white mustard-seed meal can kill or suppress some weedy grasses and annual broadleafs such as green foxtail, common lambsquarter and pigweed. The new research could provide an alternative to herbicides for conventional as well as organic farmers and open new value-added markets for mustard meal.

From: USDA-ARS,
December 2, 2008

Elsewhere's fuels roundup

Fatty fuels

A new refinery in Baton Rouge, La. will use non-food grade animal fats such as beef tallow, pork lard, chicken fat and grease to produce biodiesel and jet fuel. A joint venture between Tyson Foods and Syntroleum Corporation, the refinery's construction broke ground in October. Production is expected to begin in 2010 with an annual capacity of 75 million gallons of fuel.

From: Soyatech.com,
October 10, 2008

Camelina to biodiesel

Some Pennsylvania farmers will be planting camelina for biodiesel feedstock next spring. The knee-high oilseed plant, considered a weed by some, requires little maintenance, no fertilizer, and it could provide low-cost oil. A half-dozen farmers will grow 150 acres of camelina. The crops' tiny seeds — about 40,000 per pound — will be crushed to produce 66,000 pounds of oil that will make 8,500 gallons of biodiesel. It takes about 7.8 pounds of camelina oil to produce one gallon of biodiesel.

From: Pittsburgh Tribune-Review,
October 14, 2008

Weedy fuel

Field pennycress may go from bane to blessing. The weed, which produces an abundance of oil-rich seeds, is being cultivated by ARS researchers to evaluate the plant's potential as a biodiesel feedstock. Besides biodiesel, the plant oil could be used in products such as organic fertilizer and natural fumigants.

From USDA-ARS,
November 26, 2008

Corngrass ethanol

A little-known cornstalk variety may turn into tomorrow's cheaper, more eco-friendly ethanol. Corngrass has tender leaves with less lignin than conventional cornstalks' tough foliage. Lignin, cellulose and hemicellulose in cell walls are hurdles to efficiently producing cellulosic ethanol. ARS scientists are looking at corngrass traits that might be bred into other biofuels crops.

From: USDA-ARS,
November 3, 2008

woundedcoot.com

Energy canes

New sugarcane varieties adapted to the U.S. Gulf Coast region are being developed for two biofuels uses. These "energy sugarcanes" have tall stalks high in sugar and fiber. The sugar can be refined or fermented to produce ethanol, and the fiber could be used for cellulosic conversion to ethanol. While corn is the primary ethanol feedstock, Gulf Coast soils are more amenable to crops like sweet sorghum and sugar cane.

Scientists from the ARS, Louisiana Agricultural Experiment Stations and American Sugar Cane League have developed three energy-sugarcane varieties. Researchers estimate one acre of these varieties could yield nearly 1,240 gallons of ethanol when both the sugar and fiber are used.

From: USDA-ARS,
October 2, 2008

Fuel potatoes

North Carolina State University researchers hope sweet potatoes will become a viable biofuels crop. They developed a high-starch variety, which can be easily fermented for ethanol. Scientists estimate sweet potatoes could produce 700 gallons of ethanol per acre compared to 400 for corn. However, sweet potato production costs are high — about eight times more per acre than corn. NCSU researchers are testing planting methods that may reduce input costs.

From: North Carolina State University
November 18, 2008

Elsewhere's health roundup

Mushrooming bones

Fresh mushrooms can add more to food than flavor. USDA-ARS scientists have teamed up with a California mushroom company to boost the vitamin D content of white, brown and portabella mushrooms. An estimated 40 percent of Americans don't get enough vitamin D, essential to strong bones, a healthy immune system and properly functioning kidneys and liver. Three ounces of mushrooms, grown with UV-B light, provide 100 percent of the recommended daily intake of Vitamin D.

From: USDA-ARS,
November 12, 2008

woundedcoot.com

Easier to stomach

Soy may be a healthy addition to a diet, but side effects like bloating and cramping may offset the benefits. A University of Missouri researcher has developed a way to minimize side effects using selected probiotics, friendly bacteria that already exist in the human intestinal tract. The scientist encapsulated probiotics in a gel, freeze-dried the gel to make a powder, then added it to soy-protein energy bars. The probiotics in the bar may also ward of food-borne illnesses.

From: University of Missouri,
November 20, 2008

Soy for stroke patients

Isoflavones in soybeans and chickpeas could benefit stroke sufferers. University of Hong Kong researcher say these isoflavones are comparable to cholesterol-busting statin drugs and improve blood flow through the arteries. Soy isoflavones have also been shown to reduce cardiovascular disease risk as they inhibit cells forming artery-clogging plaque.

From: BBC,
September 26, 2008

AURI Executive Director's column

The left lane

BY TERESA SPAETH

We live in a world that asks, "What have you done for me lately?" Change occurs rapidly, and if we just enjoy past successes we can get caught in the slow lane while progress zooms by.

At AURI we always look for ways to stay in the left lane — and not just as passengers. We want to be in the front seat of progress, navigating the terrain. By collaborating and maximizing resources, AURI helps identify new opportunities for using agricultural products.

For more than two years AURI has facilitated the Renewable Energy Roundtable, a model of collaborative leadership. At the Roundtable's quarterly gatherings, dozens of organizations are represented — each with something to contribute and something to gain. By working together to move the renewable energy industry forward, we all win.

While we enjoy the advancements from our renewable-energy collaboration, we are also looking for the next big thing that will keep Minnesota in the left lane.

This issue showcases opportunities in bioproducts, new commodity uses and enhancing rural prosperity. For example, AURI is collaborating with the Metropolitan Council on reusing wastewater, with First District Dairy on increasing our state's dairy processing capacity, and with several agricultural organizations and cooperatives on producing fertilizer from biomass.

AURI brings unique resources to the table, but we don't undertake these endeavors alone. Collectively, we can keep Minnesota moving ahead in the fast lane. ■

Spaeth.

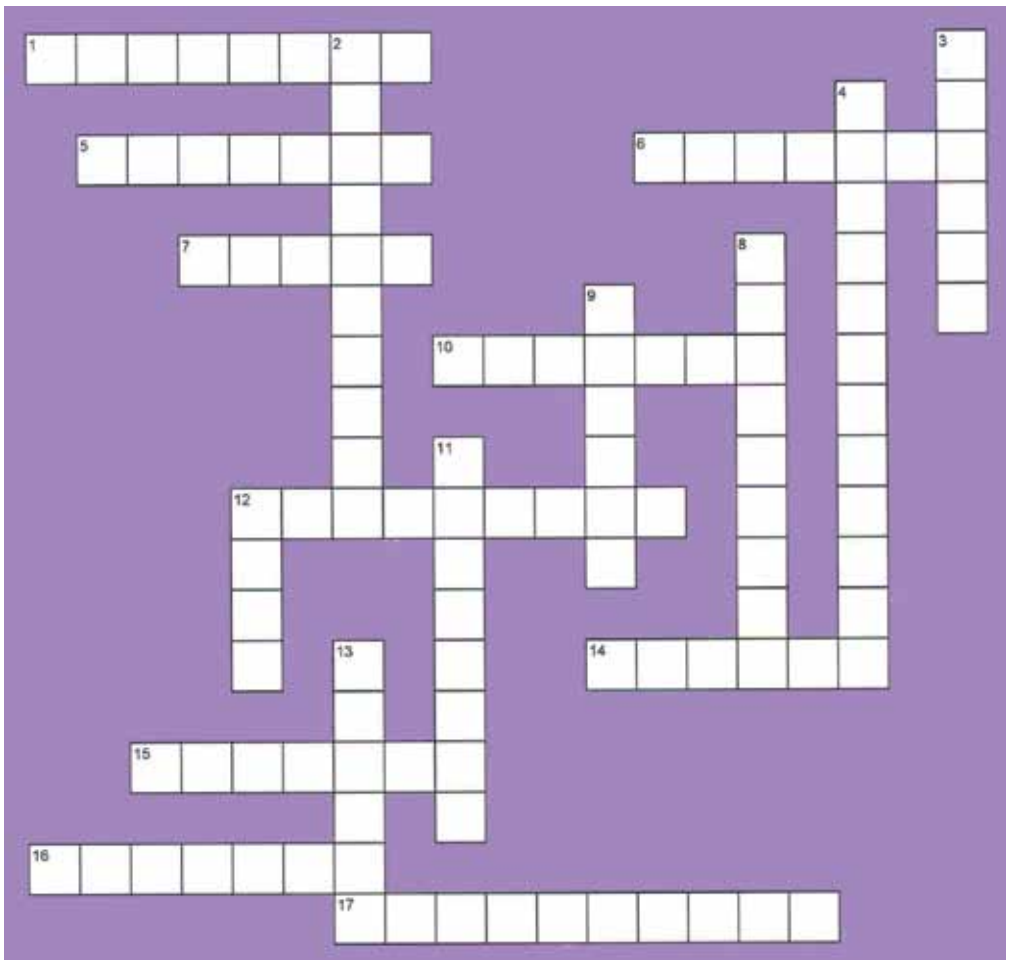
AURI ag innovation crossword puzzle

Across

1. Industry with demand for more trained workers
5. Kosher slaughtered animal's lungs are checked for these
6. Type of pellets produced in Kensington, Minn.
7. Noah's Ark Processors is the nation's only kosher processor of this
10. Certification of ingredients used in Sweet Cheeks baby food
12. City in North Dakota that is home to ethanol plant piping water 27 miles from Fargo
14. Country utilizing advanced biomass technologies
15. Jewish dietary law
16. Type of fertilizer that can be made from gasification
17. Home to First District Association's dairy processing plant

Down

2. Brand of butter first made by First District Association
3. Minnesota community looking to generate energy and fertilizer from biomass
4. Process for converting biomass to syngas
8. Another name for wastewater that's treated for nonpotable industrial uses
9. Home of Noah's Ark Processors
11. Liquid leftover after dairy whey protein is extracted
12. Corn byproduct harvested in western Minnesota demonstration project
13. A single Web site with multiple functions



ACROSS 1. BIOFUELS 5. LESIONS 6. BIOMASS 7. BISON 10. ORGANIC 12. CASSELTON 14. SWEDEN 15. KASHRUT 16. AMMONIA 17. LITCHFIELD **DOWN** 2. LANDOLAKES 3. ROSEAU 4. GASIFICATION 8. RECLAIMED 9. DAWSON 11. PERMEATE 12. COBS 13. PORTAL

ABOUT AG INNOVATION NEWS

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AURI GUIDE TO SERVICES

A nonprofit corporation created to strengthen rural Minnesota's economy, AURI helps businesses respond to market opportunities with new and value-added uses for agricultural goods. The Institute builds working partnerships with business innovators, agricultural groups and researchers, and provides technical support to clients conducting new product research and development.

AURI programs are available to legally-organized businesses or cooperatives with projects that have the potential to create new uses or new markets for Minnesota agricultural commodities. AURI assistance is designed for the early stages of a product's life cycle, while an element of feasibility is yet to be determined.

Project proposals are evaluated on the following criteria:
- Innovation/uniqueness
- Market viability
- Use of Minnesota commodities
- Number of farmer-producers impacted
- Amount of value added from further processing
- Economic impact
- Cost savings

Programs are designed to assist with:
- Identifying emerging value-added opportunities
- Developing innovative commodity-based products
- Developing production processes for feasible products
- Promoting products developed with AURI technical assistance
- Providing resources to bring new products and processes to the marketplace

Assistance may include:
- Access to AURI's scientific and business staff
- Access to laboratory and pilot plant facilities
- Product development and feasibility testing
- Process evaluation and improvement
- Technology transfer and applied research
- Business needs evaluation
- Links to available resources
- Potential for grant funds to qualifying applicants

AURI provides resources proportionate to the project's impact. Smaller-impact projects may be eligible for technical assistance only, while projects with industry-wide impact may be eligible for financial assistance.

AURI Facilities

AURI operates several laboratories:
- Coproducts Utilization Laboratory and Pilot Plant, Waseca
- Fats and Oils Laboratory, Marshall
- Meat Laboratory, Marshall

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cob collection technology tested

BY DAN LEMKE

Benson, Minn. — Specially-equipped combines chomped through several thousand acres of corn this fall — collecting cobs as well as grain.

The Chippewa Valley Ethanol Company in Benson collected cobs from its producer-shareholders to gasify and power its 47 million gallon-per-year ethanol plant. CVEC currently gasifies wood chips for power.

General Manager Bill Lee says about one ton of cobs can be collected from each acre of 200 bushel-per-acre corn. He estimates cobs from 108,000 corn acres, needed for the co-op's ethanol production, can meet 75 percent of the plant's thermal-energy needs.

Gene Fynboh, CVEC biomass collection coordinator, says the co-op held three demonstration events showcasing the cob collection. Two technologies were tested, including a self-contained unit pulled behind a combine and a system mounted on a combine. "We had a very good cross section of people who came to check out the collection — from government representatives to scientists and academics to farmers," Fynboh says. "You could tell the people who caught the vision and understood what we're trying to do."

AURI, the Minnesota Department of Commerce and Minnesota Corn Research and Promotion Council support the cob-collection project. U of M West Central Research and Outreach Center staff in Morris will analyze yields and monitor cob quality. Cobs will be gasified in the CVEC system and at a newly-installed system at the U of M Morris campus. A video and informational packet will be produced for corn farmers interested in cob harvesting. ■

During this fall's corn harvest, the Chippewa Valley Ethanol Company in Benson collected corncobs that will be gasified for power in an AURI-supported test project. Potentially, cobs from the co-op members' 108,000 corn acres could provide 75 percent of the ethanol plant's thermal energy.