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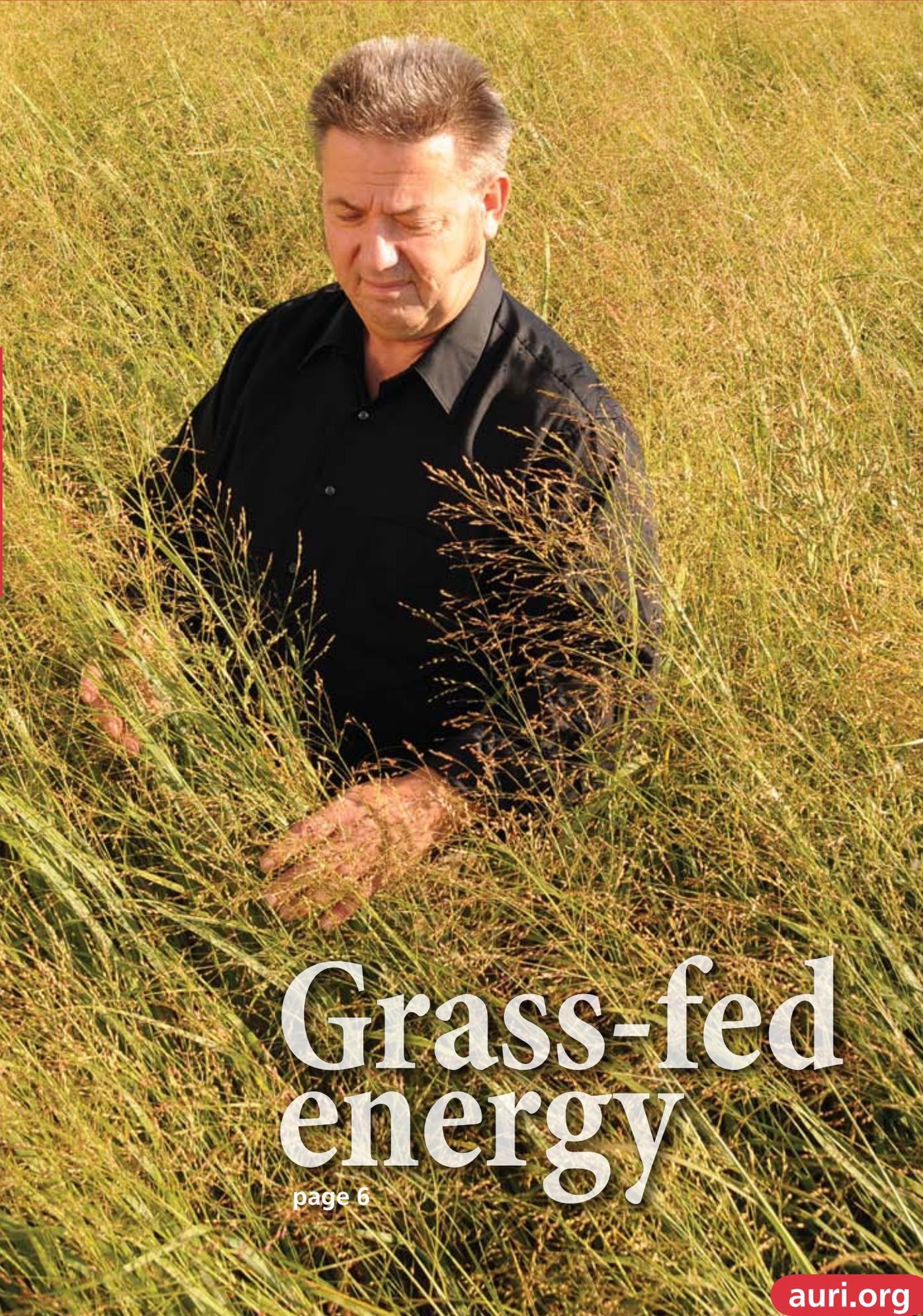
The newspaper of the Agricultural Utilization Research Institute



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screen savers

PHOTO BY ROLF HAGBERG

Minnesota native-grass seed company explores new uses for seed chaff

BY LIZ MORRISON

Cottonwood, Minn. — Jon Mohn is working on a new “screen-saver” program.

He has a warehouse full of grass-seed chaff and screenings — material he once threw away. Now he’s hoping to convert this biomass into pellets.

The southwest Minnesota entrepreneur and his wife Melissa grow, harvest and process native grass and wildflower seeds. Their seven-year-old company, Prairie Wild Enterprises, produces 6,000 acres of native prairie grasses and flowers, mainly for conservation plantings. Prairie Wild’s seed-cleaning plant generates about 350,000 pounds of screenings each season. The company has been trucking the waste to landfills or burning it — expensive and time-consuming burdens.

One day when Mohn was burning a load of seed chaff behind his 100-year-old farmhouse in Lyon County, he was thinking about his high home-heating bills and the irony of burning material that generates so much energy. “I thought, there’s got to be something I can do with it instead.”

Growing numbers of Minnesota ag processors are thinking the same thing, says Al Doering, head of AURI’s coproduct utilization program in Waseca. “They are generating a waste product that’s a burden or cost to get rid of.” Yet, that burden “is also an opportunity.” Today, all kinds of biomass materials are finding new uses as renewable fuel, fertilizer, feed and consumer products, Doering says.

For example, AURI is working with several businesses around the state that are burning or gasifying agricultural fibers to generate heat or electricity. Other Minnesota manufacturers are making livestock feed from biodiesel coproducts. Also in development: methane from thin corn stillage and fertilizer from ash.

New uses for seed screenings

Prairie Wild is exploring the feasibility of using pelleted seed chaff in home heating stoves. Mulch pellets — used in hydroseeding — are another potential new use. Last year, Mohn experimented with both pellet types. Seed-chaff pellets worked well as a wood substitute in home pellet stoves, Mohn says. “One of my employees heated his home all winter.” Hydroseeding pellets look promising, too, he says.

Now AURI will help Prairie Wild do a more comprehensive evaluation. Doering and the Mohns will look at seed-chaff pellet qualities, manufacturing methods, production costs and potential markets.

A biomass-pelleting operation could be a nice niche for the young company, Doering says. Bulky, low-value biomass can’t be transported long distances at a profit. That opens the door for small-scale, local ventures — especially those that use biomass generated on-site, Doering says. “They don’t have to purchase the biomass or spend money to collect and transport it.” Prairie Wild already has a warehouse that could accommodate a pellet mill, he adds. And the processing could be done during the company’s slow season.

Mohn won’t commit to a pelleting expansion until he takes a hard look at manufacturing costs. “I’m convinced there is a market,” he says, but the economics are less certain. This isn’t the first biomass opportunity he’s investigated. “A few years ago, we looked at different uses for switchgrass” straw, including fiberboard.

Growing fast

Mohn, 34, grew up in Cottonwood and worked in his family’s grass-seed business from a young age. He studied aviation and electrical engineering in college, but his first love was conservation.

In 1999, Mohn began doing custom planting and maintenance for landowners enrolled in federal and state conservation programs, such

as the Conservation Reserve Program and Reinvest in Minnesota.

“There was a real need for custom services” such as seeding, mowing, weed management and prescribed burnings, he says. Mohn also started an erosion-control business, seeding road right-of-ways and installing mulch blankets, constructing berms and inlet barriers and other erosion-control measures — “a nice sideline,” he says. Mohn sold that business last year.

Prairie Wild’s seeding business took off in 2002. “We grew really fast,” Mohn says. That year they kept 13 grain drills running, planting 16,000 acres of Conservation Reserve Enhancement Program acres in western and southern Minnesota. Prairie Wild has seeded more than 70,000 acres of conservation plantings, Mohn says.

In 2002, Prairie Wild also began raising native grass and wildflower seeds. “We were having a hard time finding good quality seed for our area,” Mohn says. “We wanted to be able to guarantee all our plantings,” but that’s difficult “without knowing exactly where the seed comes from.”

Prairie Wild added a seed cleaning and packaging facility in 2003. Today, native grass-seed production and sales are the company’s main focus. The Mohns grow about two dozen warm- and cool-season perennial-grass varieties and about four dozen prairie-wildflower varieties.

This season, Prairie Wild raised 6,000 acres of native prairie plants in Minnesota, Iowa and the Dakotas. The company’s four combines harvest from July 15 to November 1. The combines are equipped with 20-foot stripper heads, which leave nearly all the residue in the field for erosion control and wildlife habitat.

Prairie Wild, which employs 13 workers, still does some custom seeding and maintenance. But most of those services have been transferred to about 40 seed dealers around the Midwest. “Our main focus now is raising locally-grown seeds for this area and climate,” Mohn says. The company is also working to expand its dealer network.

The Mohns have expanded their product line, too, adding more grasses and wildflowers, “especially flower mixes for yards and gardens.” Prairie Wild sells 45 varieties of prairie grasses and more than 300 varieties of wildflowers, shipping seed throughout the Northern Great Plains and Canada.

The native seeds are used for buffer strips, filter strips, grass waterways, prairie restorations, wildlife habitat and food plots, pasture renovations, wetland and lakeshore restorations, green manure and cover crops, and specialty gardens.

Prairie Wild helps landowners understand the welter of government conservation programs. “We show people what they can do and what they can get paid for.” Mohn is active in volunteer conservation efforts, too, serving on the Lyon County SWCD board and a southwest Minnesota feedlot-improvement board. He also serves on the Minnesota Crop Improvement Association’s native grasses and forbs committee.

Conservation his passion

Mohn’s newest conservation venture is a multi-media, environmental education program on wheels. It’s a revamped 53-foot show trailer equipped with computers, flat-screen video and hands-on demonstrations.

The project, a cooperative effort with the Minnesota Department of Natural Resources and several environmental groups, will travel to schools, fairs and trade shows to teach people about prairie ecology, erosion control and soil and water quality. Kids can design a native prairie, and adults can learn how to plant rain gardens, green roofs and other vegetation to protect the environment.

“This is my passion,” Mohn says, “creating habitat areas and working for clean water.”

For more about Prairie Wild Enterprises, go to www.prairiewild.com ■

A future in cob farming



PHOTO BY ROLF HAGBERG

The lowly corn cob could fuel an ethanol plant

BY DAN LEMKE

Benson, Minn. — Minnesota corn farmers may soon become cob farmers too — if Bill Lee has his way.

Lee, general manager of the Chippewa Valley Ethanol Cooperative, is investigating cob's potential to fuel a gasifier the co-op started operating this spring. The gasifier supplants nearly 90 percent of the plant's natural gas use.

CVEC, a diverse 980-member producer-owned co-op, operates a 48 million gallon-per-year ethanol plant and distills Shakers vodka. This fall, CVEC will conduct in-field harvest trials on two different systems for collecting corn cobs.

"We've been in the ethanol business for 12 years and now we've made the commitment to gasification," Lee says. "We're always looking for ways to lower cost through biomass. There may be some cost advantages with cobs. They're about the most plentiful and available biomass we have in our area."

CVEC, with support from AURI, Minnesota Corn Research and Promotion Council and Minnesota Commerce Department, will harvest cobs from 5,000 acres of corn or an estimated 4,000 tons of cobs. Two different technologies will be used in the one-pass process designed to collect cobs and corn at the same time.

Besides testing collection systems, the project will also evaluate storage systems and address handling and transportation issues.

"Some of the biggest hurdles for any type of large-scale utilization of biomass are densification, handling, storage and transportation," says Alan Doering, head of AURI's coproduct utilization program in Waseca. "Every time you handle biomass or have to do something to it, it adds cost. Having a one-pass collection system would improve the economics."

Lee says CVEC is interested in proactively reducing its carbon footprint as carbon regulations may be coming. But "we need to understand the economics of cob removal, transportation and storage so we can develop cobs as an economically viable biomass source," Lee says.

Renewed interest

Cobs used to be widely available — when the whole corn ear was harvested and the kernels separated later. Among other uses, cobs were burned for fuel or used as animal bedding. But as combines simplified the process into a single step, cobs were returned to the field along with other corn waste or stover.

In recent years, interest in cobs for chemical extraction and biomass energy has reignited,

but there isn't a commercially-available technology for harvest and collection. The two systems CVEC is testing this fall could soon be commercially available. In fact, Lee expects one major materials-handling manufacturer to have a system available next year.

Corn-cob removal will not harm soil health. While stover is important for erosion control and organic material builds soil structure, cobs have little value. But as a biomass fuel, it is one of nature's only perfectly-densified feedstocks.

"When it comes to the corn stover, cobs are the least functional ingredient," Lee says. "But they do have about one-third to one-fourth the ash of stover, they are more dense than stalks and can be handled in bulk like wood chips."

CVEC currently uses wood chips to power its gasifier, which it wants to replace with cobs collected from its own producer-shareholders. 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 acres of corn needed for the co-op's ethanol production would provide 75 percent of the plant's thermal energy needs.

Sharing the info

While CVEC is conducting the trials, its intent is to share results with others to build the industry.

"The state stands to benefit from this work, as does our company," Lee says. "We want this information out there. We want corn farmers to be cob farmers as well."

"A big hindrance to the widespread development of things like green ethanol, gasification or cellulosic ethanol is logistical systems," says Michael Sparby, AURI project director in Morris. "So it is very valuable to be able to test cob collection on this large of a scale."

Lee says the CVEC project will include demonstrations, field days and a video of the process. Researchers from the U of M West Central Research and Outreach Center and the North Central Soil Conservation Research Lab in Morris will be involved in agronomic research.

Lee says the effort will help develop better tools for developing the biomass industry — tools that could move corn cobs to prominence. ■

Finding hidden treasure

2009 AURI Initiatives

By Dan Lemke

Opportunities are often disguised as problems — a need for something new or improved.

Every year, AURI staff meet with leaders in agriculture, business and economic development to understand their challenges, priorities and needs. If a need matches AURI's mission, an initiative may be designed.

"This is our means of addressing industry-wide concerns," says Michael Sparby, AURI project director. AURI initiatives "help us to stay up-to-date and on the cutting edge of development."

In 2008, AURI staff held 47 stakeholder meetings, more than any other year. These face-to-face discussions help build relationships and identify value-added opportunities. The resulting initiatives aren't tied to any commercial partner.

"Given the current high crop prices, this year's initiatives reflect an increase in livestock and dairy activity," along with helping processors add value to their products, Sparby says.

"These industry-wide initiatives have become increasingly important," says AURI Executive Director Teresa Spaeth. "In striving to be innovative, we partner with our stakeholders to see around corners and be proactive in identifying the next opportunity."

Unlike proprietary projects with existing or emerging businesses, knowledge gained through AURI initiatives is available to the public. The information is disseminated through reports, meetings and presentations. ■



PHOTOS BY ROLF HAGBERG

EXTENDING SHELF LIFE OF WET CAKE AND WET SUGAR BEET PULP

Explore extending the shelf life of distiller's grain wet cake and wet beet pulp through a non-chemical process to kill bacteria and extend the feed product's usefulness.

COLLABORATIVE OPPORTUNITIES IN FORESTRY

With the Natural Resources Research Institute and DNR, develop a strategic-planning process to identify forestry and renewable-energy opportunities.

BIOFILTERS FOR DRAINAGE WATER

Evaluate using ag residues to remove nitrates from drainage water and conduct test trials to evaluate effectiveness.

ASH AS BEDDING

Evaluate potential use of gasification and biomass char ash in dairy bedding systems. Analyze ash's value in a variety of bedding systems and determine effects on wood shaving, compost, bacterial populations and cow comfort.

FEEDING WET CAKE TO SWINE

Explore the value of feeding wet cake in swine facilities. Assess the feed value, flowability and feasibility of wet cake in modern automated feeding systems.

MINNESOTA ALTERNATIVE FEED INVENTORY

Develop an inventory of alternative feed stuffs for the Minnesota livestock industry, including their feed value and availability to producers.

CHEESE PROCESSING AND COPRODUCTS

Evaluate process and market opportunities for dairy processing whey and derivatives to stabilize price and develop new uses.

UPDATE MANURE DIGESTION SYSTEMS

Update information on new digestion technologies and provide an up-to-date self-evaluation tool and checklist.

REGIONAL REFINING CAPACITY

Assess the region's refining capacity for food-grade oil; identify opportunities and bottlenecks.

BIO-OIL FUEL FOR TURBINES AND STERLING ENGINES

Process and evaluate bio-oil fuels in micro-turbine and sterling engines. Generate data on energy content, fuel-use, stability and air emissions.

SUSTAINABLE PRAIRIE CORDGRASS

Replicate field-fertilization trials on established prairie cordgrass fields and test plots. Determine optimum fertilization requirements and planting guidelines for prairie-cordgrass biomass production.

ETHNIC CUTTING AND PROCESSING TECHNIQUES FOR BEEF AND PORK

Assist Minnesota Association of Meat Processors members with cutting and processing requirements of the Hispanic market, which consumes about 25 percent of the state's beef and pork.

ADVANCED BIOMASS BURNER IDENTIFICATION

Identify and perform an engineering assessment of improved biomass-burner designs. The biomass-pelleting industry has not found a ready market because of a lack of burner units able to use pellets.

ENERGY AND CARBON-FOOTPRINT ASSESSMENT OF USING SWINE WASTES ON CROPLAND

Analyze liquid swine-waste application to cropland in relation to reducing natural gas and providing nitrogen.

NUTRACEUTICALS IN MILK

Assess opportunities for milk as a nutraceutical and functional ingredient, which may lead to further research and development.

OPPORTUNITIES FOR FUNCTIONAL FOODS IN CEREAL AND OTHER MINNESOTA GRAINS

Identify opportunities for wild rice as a nutraceutical and functional-food ingredient.

FLAT DIE-PELLET MILL EVALUATION FOR BIOMASS

Research the efficiency and product-quality difference of producing ag-based fiber pellets with a traditional ring-die pellet mill versus a flat-die mill.

ANAEROBIC DIGESTION INCORPORATING NOVEL BACTERIA FOR H2S REDUCTION

Test anaerobic digestion incorporating cyanobacteria and/or purple sulfur bacteria to determine if these bacteria increase efficiency or reduce hydrogen sulfide.

BIOMASS FERTILIZER COST-SENSITIVITY ANALYSIS

Evaluate biomass residue and dedicated energy-crops value in relation to fertilizer costs. Establish the cost of removing ag residue and dedicated energy crops from fields.

A constant adjustment

Environmental Dust Control tries new ingredients as renewable energy ups the demand for crop oils

Editor's note: This series updates readers on entrepreneurial ventures featured in past issues of Ag Innovation News. Where are these businesses now? What challenges have they faced? What have they added, deleted and learned about bringing new value-added products to the market?

BY DAN LEMKE

Currie, Minn. — For the past 12 years, Howard Hamilton, Arland Moger and Bob Nelsen have settled more dust ups than Judge Wapner. But in their case, the dust was real.

The owners of Environmental Dust Control have been using vegetable-oil processing coproducts to fight dust since 1996. EDC produces Dustlock, a thick, natural biodegradable liquid used to suppress dust on roads and around construction and

industrial sites.

“Our goal is to provide environmentally-safe dust control by using renewable, agriculturally-based, biodegradable resources for dust control and soil stabilization,” says Hamilton, EDC president.

Dustlock has been used on roads and construction sites in Minnesota, South Dakota, Wisconsin and Iowa. EDC has even shipped product to Tennessee and Missouri and applies about half a million pounds of Dustlock a year.

When Dustlock is applied to prepared gravel roads or work sites, it penetrates the surface to form a pavement-like crust that lasts for at least a year. Since it is biodegradable, Dustlock has been popular to use in environmentally-sensitive areas.

During 12 years in business, the EDC owners, who also farm in southwest Minnesota, had to adjust to changing times and ingredients. When they started producing Dustlock, soybean soapstock was the key ingredient. AURI chemist Jerry Crawford, who's now retired, worked closely with EDC to test and develop formulations. Rising prices and ingredient demand has forced EDC to look at other vegetable-oil coproducts that make economic sense. Since they use commodity-based raw materials, crop-price fluctuations impact their business.

“The high cost of commodities has driven up the cost of what we have to buy,” says Arland Moger. Determining a product's value is difficult. “We have to analyze the raw products that are offered to see how they will work.”

Hamilton says energy production has changed the market. Acidulated corn and soybean oils, key ingredients in their proprietary formula, are now in high demand. “Suppliers used to almost beg us to take it, now it's hard to find,” Hamilton says.

That's not the only thing that has changed since EDC's start. An on-line presence has increased calls to their business and they do more work on industrial sites than roadways, primarily for economic reasons. But the entrepreneurial farmers have learned to be flexible.

“It's been an education at the school of hard knocks,” Bob Nelsen says. Because of continual changes to markets and feedstock supplies, “we'll always be experimental.” ■



PHOTO BY DAN LEMKE

Environmental Dust Control has been using vegetable-oil coproducts since 1996 to make Dustlock, applied to roads and construction sites.

Green grass gas

Making methane education center

BY CINDY GREEN

Cecil Massie wants to skip the cow.

Cow manure is getting notice as a methane source for generating electricity. But Massie, a chemical engineer, is looking ahead at making methane from haylage — “to green chop the grasses, ensile them in bunker silos and use that as feedstock in an anaerobic digester.”

“It’s analogous to what is done on dairy farms with cow manure except we skip the cow. We’re making methane from grass,” Massie says. “When cow manure is the feedstock, cows get the good stuff. When you skip the cow, you get the good stuff.”

Educators seek renewables

Massie’s work is funded through an AURI renewable-energy initiative. “AURI has \$150,000 from the Xcel Renewable Energy Fund to provide three grants to school districts to assess opportunities for replacing or minimizing energy costs,” says Dennis Timmerman, AURI project director in Marshall. Last year, AURI issued an RFP for the funds and set up review panels in each region to assess proposals.

Eagle Bluff Environmental Learning Center in Lanesboro was awarded one of the grants. “Eagle Bluff wanted to utilize biomass or switch grass or other residues like wood waste from the logging industry,” Timmerman says. “They knew they wanted to convert biomass to gas – they just didn’t know how they were going to do it.”

“Eagle Bluff is a large campus with dormitories, meeting halls and other facilities that can accommodate up to 300 students,” who stay for three to five day environmental-education experiences, Timmerman says. “They are interested in something that reduces their carbon footprint.”

Two other grants were awarded to Lac qui Parle Valley High School in west-central Minnesota for a windpower and biodiesel-backup power system and to Warroad High School in northern Minnesota for assessing a biodiesel power-generator system.

The Eagle Bluff funds were used in part to hire Massie who has three decades of experience designing energy systems and “has done a lot of work related to biomass utilization,” Timmerman says.

“The original concept was to gasify biomass and use syngas to fire a boiler,” Timmerman says. But Massie came up with a different concept, “to use a small digester, capture methane and use it as natural-gas replacement in winter. In the summer, they can use the same gas to fire an evaporative absorption unit — like a camper frig that’s run on gas.”

6Solutions

Massie is executive vice president of 6Solutions LLC, which he founded in 2005 with partner Derek Miller “to develop renewable energy projects as a means to rural economic development” and find eco-friendly solutions to air and water pollution, states the company’s Web site.

While Eagle Bluff is “exploring various options for reducing its greenhouse-gas emissions and environmental footprint,” Massie says there is broader interest in “whether or not we can divert sensitive HEL (highly-erodible lands) to perennial crops that could be used to produce biomass for energy.

“There are a number of parallel efforts ... I’m working on one very narrow one — whether it’s technically feasible and, secondly, economically practical to produce enough electricity from gasses to offset electrical consumption of the facility.

PHOTOS BY ROLF HAGBERG

Power from fresh hay is one way an environmental learning center could reduce its carbon footprint



"It's not been done with grass before — although pipeline-quality gas from cow manure with a conventional anaerobic digester" in Wisconsin is being transferred several hundred miles through a pipeline.

"Eagle Bluff's project is technically feasible, but the economics are very challenging," Massie says.

He is investigating three questions: "One, what is the capital investment, which requires a flow sheet, equipment costing, installation costs, and site plan development. Then, what is the market value of the electricity we're displacing?" Finally, Massie says he's determining, "What can we afford to pay the farmer for the haylage to be competitive — or some higher electricity price that we determine?" The study has been underway since April and is being completed this fall.

"If my instincts are right, even if this turns out to not be economically attractive, it will have defined the point where we might get a successful project. Even finding out it's not a good idea sets us down a different path."

Path to 25/25

Massie is on the Minnesota Renewable Energy Roundtable, working on Gov. Tim Pawlenty's 25/25 goal where Minnesota would produce 25 percent of its own energy by 2025. Meeting the goal requires more than 5,000 megawatts of renewable energy.

"It will take \$20 billion in capital investment for 25 percent renewables by 2025," Massie says.

"Engineering will account for 10 percent," or \$2 billion in engineering fees between now and 2025, Massie says, adding that he has spoken with the Minnesota State Colleges and Universities system about strengthening engineering and technology programs.

"There is also \$8 billion in construction labor. Having skilled labor to install all this equipment and then run these facilities will put a demand on our educational and technical-training capabilities."

He consults with individual counties to lay out renewable-energy plans. "Boards look at these things and say, 'We're suffering a population decline because there are no jobs. There is a grave concern that people will not be able to pay their heating bills and the county tax base is not expanding fast enough to keep up with demand for social services.'"

"We need a battle plan for renewable energy ... a means to re-invigorate rural Minnesota." ■



Cecil Massie, a chemical engineer, is investigating the feasibility and economics of making methane from haylage to power an environmental learning center in southern Minnesota.

Power of methane

Almost anything that rots can be used to make methane.

Methane comes from biogas — a product of anaerobic digestion, which is an oxygen-free process using bacteria to break down waste from plants, animals and humans. It has primarily been used by food-processing, ethanol and other industries to clean wastewater.

Biogas is highly volatile with 60 to 70 percent methane and 30 to 40 percent carbon dioxide. Methane can be captured and used to produce

electricity or fuel gas-fired engines and equipment. It is a renewable alternative to natural gas, which is mined from underground wells. Purified methane can even be transported in natural-gas pipelines.

Anaerobic digesters for power generation are common in Europe, and increasing in Asia, South America and Mexico. The United States has been slow to build anaerobic digesters for energy production but more than 30 have been constructed by large dairy farms, capturing biogas from cow manure. ■



AURI's new faces

Business, technology and consumer-relations experts join staff

Carmen McEwen Deputy director

Carmen McEwen, AURI's new deputy director of science and technology, brings an international flair, strong interest in innovation, and experience developing food, cosmetic, oral care and nutraceutical products to the Institute.

A native of Venezuela, McEwen previously worked in innovative solution development at Nine Sigma, Inc. of Nashville, Tenn. She has business-development experience in the United States, Latin America and Pacific Rim and was a lecturer at Massey University in New Zealand. She has also worked for Cargill and FMC Corporation.

McEwen holds a Ph. D. in food technology and engineering from the University of Washington and an MBA from the University of Minnesota Carlson School of Management. At AURI, she will oversee technical staff and direct projects from AURI's Marshall office.

AURI attracted her because of "the variety of projects and the opportunity to apply technology to help business," McEwen says. "We have the capability to apply that knowledge and technology in service to the public."

"Dr. McEwen comes to AURI with a tremendous amount of experience that we can draw from to help build solid value-added projects that make a difference in Minnesota,"



says AURI Executive Director Teresa Spaeth. "Her focus on innovation and finding creative solutions will be very valuable to AURI and our clients."

Katherine Beyer Project director

Katherine Beyer has joined AURI as project development director serving southeast Minnesota. The Willmar, Minn. native will also be involved with government relations.

Before joining AURI in September, Beyer was the Minnesota House of Representatives agriculture, rural economies and veterans affairs committee administrator. She previously served the Minnesota Attorney General's office, providing consumers with information and resolving complaints. She served as a mediator who negotiated agreements between consumers and companies.

"I want to continue to be involved in issues related to rural vitality, agriculture and renewable energy," Beyer says. "AURI's philosophy on growth and innovation appeal to me. I am excited to become a member of the team."

Beyer earned her bachelor's degree in English and environmental studies from the University of Minnesota - Morris.



Carissa Nath Meat technologist

Minnesota meat processors have a new resource: Carissa Nath, a meat technologist who recently joined AURI's animal products laboratory.

A Canyon, Texas native, Nath holds a master's degree in animal science from South Dakota State University where she was coach of the SDSU meat-judging team. She earned her bachelors degree from Texas Tech.

"Research and development was something that really attracted me to this position," Nath says. "I'm looking forward to helping develop new products."

Nath is working with turkey processors on a taste panel and with pork producers on new value-added products.

"The animal product industry is very important to Minnesota and to AURI," says AURI Executive Director Teresa Spaeth. "Her expertise and enthusiasm for working with the state's processors will be very valuable."



Minnesota's Renewable Energy Roundtable

More than money



Roundtable team looks at incentives and tools needed for renewable-energy ventures

BY DAN LEMKE

Money is key to a renewable-energy venture's success. But it's not the only factor.

Energy projects need to be "technically-viable, market-driven and able to attract investor and creditor financing," says Jim Boerboom, Minnesota Department of Agriculture deputy commissioner.

Boerboom leads the Minnesota Renewable Energy Roundtable economics and financing team. The Roundtable is a statewide, multi-organizational effort coordinated by AURI to address barriers to Minnesota renewable-energy development.

"The team's focus is to evaluate the current menu of (financial) incentives and tools to see if they match the needs of next-generation projects," Boerboom says.

The team recognizes that Minnesota has proactively established programs

and funds to support renewable-energy development, Boerboom says. But a "one-stop shop" is needed to guide project managers through the maze of what's available.

The economics and financing team is working on three key initiatives. First is to gather project information from state and federal sources and evaluate available resources. Second is to establish a renewable-energy investment fund, a low-cost, public-private financing partnership that does not compete with local lenders. The third initiative will examine ways to create incentives for small-scale, locally-owned projects.

"There are so many influences on projects," Boerboom says. "All the pieces have to be in place" before construction begins.

Boerboom says the Roundtable's value is having teams in place to address critical issues. Beside economics and financing, other Roundtable teams are addressing renewable-energy infrastructure, talent development, public policy and awareness, and basic and applied research.

More than 300 people from 100-plus organizations have participated in Roundtable gatherings. ■



Farmfest 2008

Gilfillan, Minn. — AURI showcased value-added agricultural innovations to thousands of visitors to Minnesota's premier farm show, Farmfest 2008, in August. The three-day outdoor event near Redwood Falls annually draws more than 30,000 people, primarily from Minnesota, Iowa and South Dakota.

Comfortable, sunny and dry weather greeted exhibitors and visitors who checked out farm implements and seed plots. Daily Farmfest forums included debates between U.S. Senate and Congressional candidates and discussions on ag-related issues. Minnesota's farm families of the year were also recognized.

AURI hosted an exhibit tent featuring clients and value-added ventures. Thousands streamed through the tent to sample products or gather information.

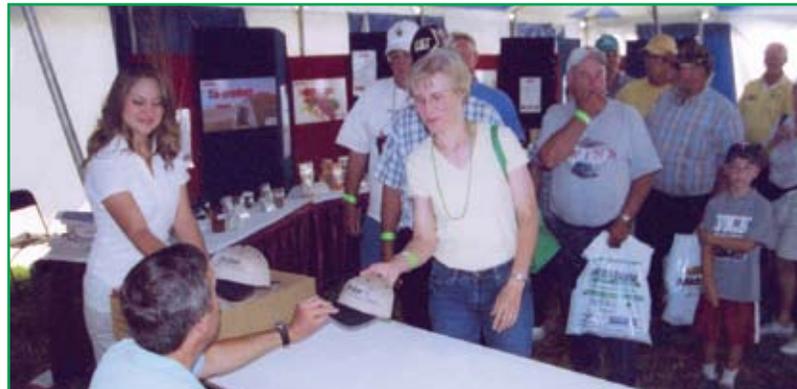
Top photo: Farmfest visitors wait in line to sample barbecue sauce produced by Westbrook-Walnut Grove High School students. Prairie Smoke sauce has become a favorite at AURI's tent and draws a hungry following. The sauce's four flavors are sold throughout southwest Minnesota.

Lower left: Linder Farm Network radio personality Lynn Ketelsen drew a crowd to AURI's tent as he autographed commemorative hats. The well-known farm broadcaster also hosted the daily noontime ag jamboree at the forum tent.

Lower right: From the left, Bob Nelsen, Howard Hamilton and Arland Moger of Environmental Dust Control showcased Dustlock, a vegetable-oil based dust suppressant. (see story, page 5.)



PHOTOS BY DAN LEMKE



Minnesota cooks

Falcon Heights, Minn. – The Great Minnesota Get-Together may be all about food – but it doesn't have to come deep-fried on a stick. With AURI's support, hundreds of State Fair visitors this year were treated to gourmet fare grown by Minnesota farmers and prepared by some of the state's top chefs.

For six years, the Minnesota Cooks program has promoted locally-grown food through State Fair demonstrations by chefs and panels featuring farmers, sponsors and celebrities. This year's August 26 event started with a breakfast show and continued with new presentations every hour.

While chefs prepared specialties, farmers who produced the ingredients talked about their operations and how they connect with local restaurants. The interest in Minnesota Cooks reflects a heightened awareness among consumers about the source of their food, says Dennis Timmerman, AURI project director. Fairgoers identify with farmers and how their food is produced.

On the right, J. P. Samuelson of jP American Bistro in Minneapolis, caramelizes sugar on a roasted butternut squash creme brulee. Below, Peter Ravinski and Jillian Forte from Chester Creek Cafe in Duluth prepare a roasted chicken and grilled plum salad. Students from Southwest Minnesota State University's culinary program in Marshall helped with food preparation and giving out samples.

Minnesota Cooks was presented by the Minnesota Farmers Union in cooperation with Food Alliance Midwest and Renewing the Countryside, with major sponsorship by AURI. For information, visit www.minnesotacooks.org



PHOTOS BY CINDY GREEN

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.

Palm power

Brazilian researchers are attempting to use palm-oil biodiesel to produce electricity in remote regions of the country. In the Amazon, dense stands of tucuma palm produce a widely-consumed fruit. But the pit, which is 80 percent of the fruit's weight and contains 40-percent oil, is thrown away. A project is underway to separate the pit from the fruit, then extract its oil to produce biodiesel for power generators. Palm-oil biodiesel could bring round-the-clock electricity to villages where power lines are not viable.

From: Global Information Network, July 31, 2008

Open Sesame

Sesame-seed extract may protect against some strains of E. coli and salmonella bacteria, a study shows. Researchers at Wageningen University and Research Centre in the Netherlands found that sesame extract binds bacteria and keeps it from attaching to cells in the host, offering protection against infection or reducing severity of E. coli and salmonella symptoms.

From: Soyatech.com, August 5, 2008

Hemp milk

Milk from hulled seeds of the cannabis sativa plant is gaining popularity on the West Coast.

Produced from industrial hemp strains, the beverage doesn't contain THC, the compound found in its disreputable cousin. But it does contain protein, vitamins and Omega-3 and Omega-6 fatty acids. Living Harvest of Portland, Ore. produces the hemp milk, expected to generate about \$6 million in sales in 2008. Hemp milk sales are growing at an explosive rate compared to soy and rice milk.

From: Soyatech.com, July 27, 2008

Praise the peanut

Fat-free peanut flour, whole peanuts and peanut oil all may have cardio-protective properties, a study suggests. ARS scientists fed four groups of hamsters high-fat and high-cholesterol diets, with one containing peanut products. The animals fed the diet with peanuts showed significantly lower levels of LDL "bad" cholesterol, while the HDL or "good" cholesterol levels held steady.

From: Soyatech.com, June 30, 2008



woundedcoot.com

Switchgrass for soils

Soils covered with native plants such as switchgrass have higher levels of a key soil component, glomalin, than soils planted with non-native species, according to ARS researchers. Glomalin is a sugar-protein compound that could trigger soil's formation. The more present, the better and less-erodible the soil appears to be.

From: USDA-ARS, July 17, 2008

Pining for fewer bugs

A naturally-occurring compound in pine oil may repel ticks and prevent mosquito bites. Discovered by ARS scientists, the patented compound repelled mosquitoes more effectively than DEET and deterred ticks equally as well. The plant-based compound can be extracted inexpensively and in large quantities, making it an attractive option for insect protection, particularly in areas of the world where malaria, dengue fever and typhus are major problems.

From: USDA-ARS, June 23, 2008

Nuts to you Bessie

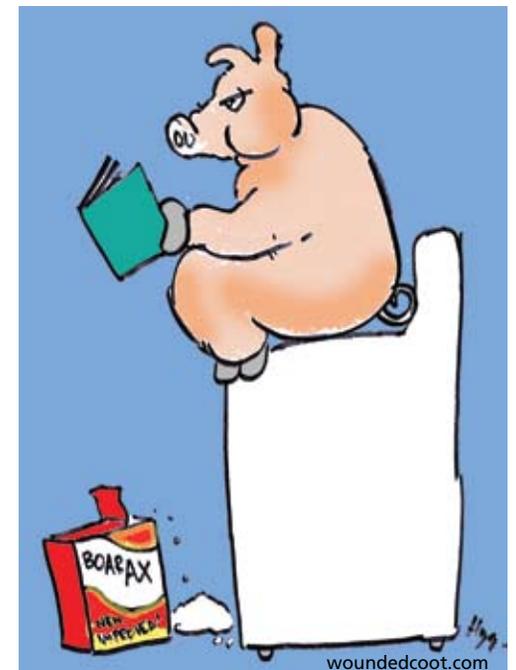
The cast offs from cashew snacking may help battle bovine belches. Tests in Japan show that oil from cashew shells may slash up to 90 percent of methane emissions from belching cows when added to feed, according to oil refiner Idemitsu Kosan Company. Some claim that livestock methane emissions are contributing to climate change.

From: Reuters, June 15, 2008

Laundering piggy poo

Hog farms stink because microbes in manure storage pits release hydrogen sulfide and other smelly compounds. Borax, a natural mineral used in laundry boosters, was shown to neutralize up to 99 percent of the offending microbes in tests by ARS and the National Center for Agricultural Utilization Research. Results included dramatic air-quality improvement.

From: USDA-ARS, June 3, 2008 ■



woundedcoot.com

Farming, food and football

Southwest Minnesota State University held the second annual Ag Bowl on September 6. The event marked the grand opening of the Regional Event Center and celebrated agriculture as well as the inaugural SMSU football game held at the new \$16 million multi-purpose facility.

The day's events included an antique tractor show, farmer's market, football clinic, Ag Olympics, live entertainment and a tent dedicated to local foods, pictured at right. The AURI-sponsored Minnesota Cooks program (see story page 9) presented locally-grown beef, pork, apples, potatoes, butter, cheese and pastries — prepared and served by SMSU culinary students. Minnesota-grown wine and beer were also available.

"This was another opportunity to promote local foods to consumers and connect them with producers," says Dennis Timmerman, AURI project director. "The SMSU culinology department did a tremendous job preparing food and catering an event that emphasized the products' quality."



PHOTOS BY SOUTHWEST MINNESOTA STATE UNIVERSITY

More than creativity

BY TERESA SPAETH

AURI strives for innovation — not just creativity but making something the world can use.

We are always looking for the next big thing, recognizing trends, helping our clients design value-added uses for Minnesota ag products. That's AURI's mission — and we never know exactly where or when those opportunities will arise.

We also know true innovation is more than identifying a possibility.

It's been said that innovation without implementation is merely creativity. While creativity is important, it does little good without a real-world application. It's like possessing the world's best smoke detector but leaving it in the box. It doesn't do any good until put to use.

Likewise, Minnesota's economy won't benefit if a promising development is identified but never put into practice. That is why AURI's hands-on services and applied research are so important.

Basic research is vitally important to developing value-added uses for ag products. Every scientific breakthrough can lead to a new opportunity. Educational and research institutions churn out research that has the potential to improve a process, streamline a technology or create an entirely new product.

Our job, at AURI, is to further opportunities that will make it to the marketplace. We are the hands-on resource that helps innovators implement. ■



Spaeth.

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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AURI ag innovation quiz

1. How much prairie-grass seed screenings does Prairie Wild produce annually?

- a. 42 tons
- b. 350,000 pounds
- c. 8,000 pounds

2. What is the name of Environmental Dust Control's dust suppressant?

- a. Dust Bunny
- b. Dust Magnet
- c. Dustlock

3. Engineer Cecil Massie wants to produce methane gas from grass, thereby skipping what?

- a. To my lou
- b. The cow
- c. School

4. What State Fair event educates consumers about their food and the farmers who produce it?

- a. Minnesota Cooks
- b. Minnesota Cleans
- c. Minnesota Fats

5. What is unique about potato chips that will be made in Mahanomen?

- a. They are baked and stackable
- b. They're made from soybeans
- c. They taste like chicken

6. What is the largest component of biogas produced from anaerobic digestion?

- a. Octane
- b. Cetane
- c. Methane

7. What makes AURI initiatives such unique projects?

- a. The information discovered is shared publicly
- b. They seek further understanding of emerging opportunities
- c. Many were identified by AURI stakeholders
- d. All of the above

8. About how many corn cobs will be harvested this fall in a western Minnesota energy experiment?

- a. 800 bushels
- b. 4,000 tons
- c. 8,000,000 pounds

9. What is the harvest window for Prairie Wild's native grass operation?

- a. July 15 — November 1
- b. The month of September
- c. October 1 — December 15



Answers: 1.b, 2.c, 3.b, 4.a, 5.a, 6.c, 7.d, 8.b or c, 9.a

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NEW CHIP ON THE BLOCK

Mahnomen company is the nation's first to produce baked, stackable potato chips

BY DAN LEMKE

Mahnomen, Minn. — Companies vying in the competitive snack-food market won't succeed with half-baked ideas. A new Minnesota



CONTRIBUTED PHOTO

Kangas.

venture is eager to show its fully-baked potato chip will fit consumers' taste and provide a big economic boost to an underserved area.

Mahnomen Baked Chips, LLC's new 30,000-square-foot plant will be the nation's first to produce baked, stackable potato chips

when it's fully operational this fall.

"This has never really been done before," says project consultant John Smart, who is supplying technology and equipment for the venture. The baked-chip market is one of the fastest-growing in the food industry, but until now, all stackable chips have been fried.

In late 2006, Smart and others approached AURI scientist Charan Wadhawan to help formulate a recipe for baked, stackable chips. After several attempts, they made a prototype that would appeal to potential buyers.

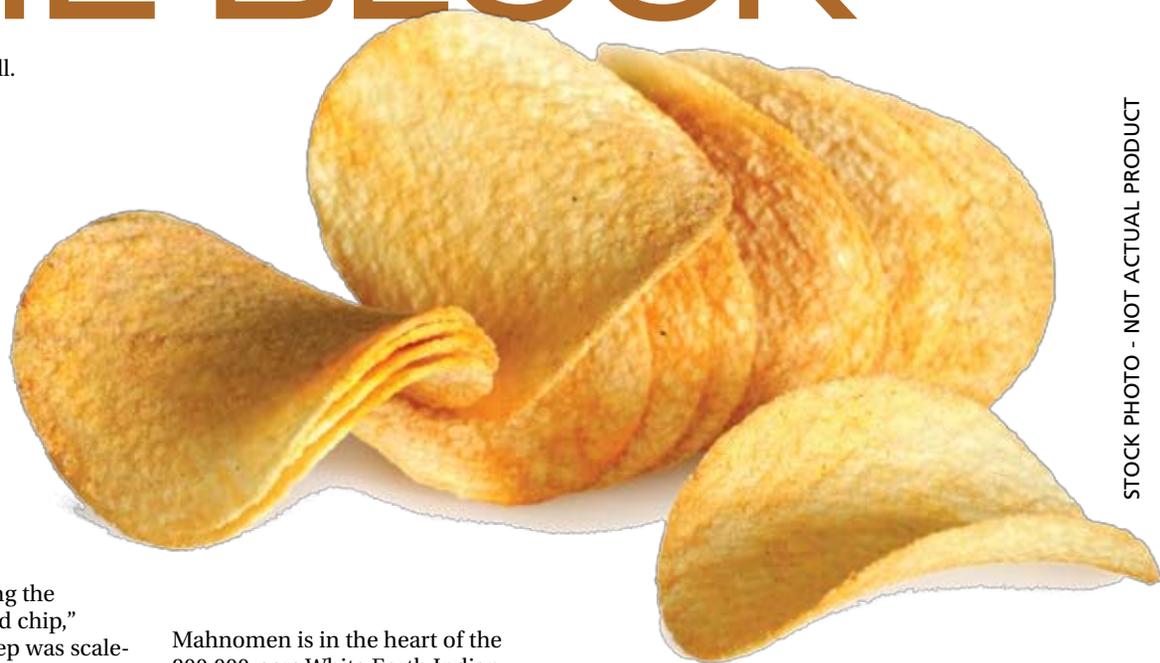
"We were successful in developing the basic formula for a baked, formed chip," Wadhawan says. "But the next step was scale-up."

Before food distributors will commit to marketing the chips, they must be produced on a large scale. Since no other food manufacturer is making this type of chip, investors decided to build a plant.

A community investment

Mahnomen Baked Chips is a limited liability company formed by the Midwest Minnesota Community Development Corporation, a nonprofit organization that provides capital for community and business development. MMDC, majority owner of Mahnomen Baked, invested \$8.5 million in the concept.

"More than anything, we wanted to demonstrate that a private enterprise can succeed in areas where people aren't often willing to take a risk," says MMDC President Arlen Kangas.



STOCK PHOTO - NOT ACTUAL PRODUCT

Mahnomen is in the heart of the 800,000-acre White Earth Indian Reservation. MMDC is committed to investing \$20 million in projects on the reservation by 2020.

"We are making this investment in the community, and we're hoping others will follow," Kangas says. "This can give confidence to others to locate on the reservation."

Potatoes and people

The Mahnomen Baked Chips plant will provide needed jobs as well as value-added markets for the region's potatoes.

The chip-making process begins with potato flakes that are mixed with other ingredients to make dough. The dough is then formed into sheets of uniform thickness. Chips, called blanks, are cut from the dough sheet, placed on a mold and sent to 90 x 280 foot ovens. Once baked, the chips are salted, seasoned,

packed, sealed, then are ready to be shipped.

The plant will produce up to 3,600 canisters of baked chips per hour or 27 million per year. Kangas says about 55 employees will be needed to run the plant.

"This is definitely good for Mahnomen's economic growth and ... will also, hopefully, provide value-added opportunity for locally-grown potatoes," says Wadhawan, who adds that she is helping "develop other types of baked chips with superior-nutritional values."

Kangas says Mahnomen Baked Chips hasn't determined if it will private label chips or be a contract producer for a major marketer. Either way, many northern Minnesotans hope the sweet taste of success comes with a little salt.