



The Many Faces of Land

Destination 2025 Special Series

The BioBusiness Alliance of Minnesota (BBAM) is working on implementing 11 recommendations from the Destination 2025 roadmap.

To help explain the significance of these 11 recommendations, BBAM has put together a special newsletter series, highlighting specific examples that align with the recommendations, to provide our stakeholders with a better understanding of what is to be accomplished.

This newsletter is part four of a four part newsletter series.

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Convergence of Food, Renewable Energy, and Renewable Materials - Food, Renewable Energy, and Renewable Materials are inextricably linked by one common denominator: LAND. The source of prosperity in each, and for the state of Minnesota, can be rooted in the state's hearty farmland and the towering forests that provide fiber and feedstock for diverse products. Increasingly, industry and individuals recognize that plants have value in all three industries and can begin to maximize the value of plants by understanding all three end markets.

For example, a kernel of corn can be fractionated at the front end of an ethanol plant and continue to convert the starch product to ethanol. The corn oil can be made into food grade oil, converted into biodiesel, or transformed into a wide range of oleochemicals, cleaning supplies, or polymers. The by-product of the corn that has passed through the ethanol conversion process results in high quality animal feed, preserving the protein value that corn would otherwise provide to livestock operations. Furthermore, the corn stover can be taken through a number of processes to produce biofuels or bio-based chemicals or used as a fiber filler in a range of biocomposites.



Above: Soybeans, one of the many resources that can be used for food and renewable energy.

Another example is the waste streams from food processing plants and animal waste. These wastes can incorporate an anaerobic digester to convert the products into a mixture of methane and carbon dioxide, leaving behind an effluent used for fertilizer that can help keep land usable for future generations. The resulting biogas can then be used directly to produce energy or converted into a wide range of products that are methane-based.

With the wide range of uses for the products produced from the land, investors and producers need help managing the conflicting demands with the food, renewable energy, and renewable materials industries. Establishing a decision-making model in Minnesota can guide the development of policies, programs and tools that help investors make sound and economically viable decisions that shape these industries. If Minnesota's policy makers put in place the mechanisms to drive the integration of these industries, Minnesota can have a balanced and economically sustainable system for land management.

BioFact: IRETI Ground Breaking

Earlier this month legislators, and Minnesota State University Mankato (MSU) administrators broke ground at MSU for a \$1.8-million, 6,300-square-foot Center for Renewable Energy Research and Technology Transfer. For more information contact interim director John Frey at john.frey@mnsu.edu.



Expertise in Animal Health Benefits Human Health

Convergence of Animal and Human Health - Minnesota is in a unique position to benefit from the convergence of the animal health and human health industries. With Minnesota's world-class research capability and manufacturing resources, the opportunities that could develop from this overlap are significant. An example of these two industries coming together to create successful outcomes is at the University of Minnesota. Departments at the university are working together to develop treatments that will be important for animals and humans. In the past year, two canines have received experimental treatments that could benefit not only man's best friend, but man as well.

Approximately one year ago, Batman, a 10-year-old German shepherd mixed breed dog, was diagnosed with an aggressive and relatively common brain tumor, a glioma. Without treatment, Batman would have likely died from his cancer months ago. Now, one year after his initial treatment, Batman has achieved national recognition for having survived an aggressive cancer and has become the poster dog for a breakthrough treatment. The implications for the treatment of brain cancer in animals and humans could be extensive.

Dr. G. Elizabeth Pluhar, a veterinary surgeon at the College of Veterinary Medicine's Veterinary Medical Center, and Dr. John Ohlfest, head of the neurosurgery gene therapy program at the Masonic Cancer Center have become the university's own dynamic duo. The team developed the new three-pronged treatment regimen consisting of surgical removal of the tumor, treatment of the surgical site with a form of gene therapy



to attract immune cells to destroy remaining tumor cells, and administration of an anti-cancer vaccine made from the dog's own cancer cells to prevent tumor recurrence. Eventually, Ohlfest hopes to develop a similar vaccine for humans that is both effective and cost-efficient.

Gizmo, a canine from Pensacola, Florida, made the trip to the University of Minnesota Veterinary Medical Center (VMC) to treat her ductus arteriosus (PDA), the most common congenital cardiovascular defect of dogs, which leaves an opening between the pulmonary artery and the aorta. Without the procedure offered in a clinical trial at the VMC, the 6-month-old dog would likely die of heart failure within a year.

The two-and-a-half-hour procedure was performed by Dr. Janet Olson, Dr. Anthony Tobias, and the Cardiology Service team on Octo-

ber 6, and an energetic Gizmo was released the next day—a quick, pain-free recovery that would not have been possible if she had undergone an invasive, “open-chest” procedure. Instead, Gizmo went home with just a few sutures in her upper hind leg and a life-saving device fully occluding her PDA.

The procedure involved the insertion of an occluder introduced through an extremely thin catheter. Inserted in the femoral artery in Gizmo's leg. The catheter was advanced along the aorta to the PDA, where the occluder was deployed. This minimally invasive procedure for PDA occlusion was researched and developed by the VMC Cardiology Service in collaboration with a local company.

This convergence area between animal health and human health is one that can have immediate impact on the delivery systems of health care in the near future.

To learn more about Batman and Gizmo visit
www.cvm.umn.edu/newsandevents/braintumortrials and
www.cvm.umn.edu/cic/current/cardiology

Functional Foods for Animals and Humans

Plant Engineering and Functional Foods - The food and animal health industries are both experiencing growing markets for nutraceuticals or “functional foods” – supplementing foods or feed with nutritional, vitamin, mineral, or other naturally occurring food ingredients to gain pharmaceutical benefits. For example, in the food industry, Cargill, a Minnesota manufacturer, has created functional beverages to deliver consumer benefits like soluble fiber for heart health and prebiotic fiber for digestive health. In the animal health industry, functional foods are added to animal feeds to reduce the need for antibiotics and promote health in both companion and food producing animals.

Another convergence link between the food and animal health industries is a growing niche market for organic, hormone-free, antibiotic-free animal products. While antibiotics and other traditional methods will likely continue to have a strong role in animal pro-

duction agriculture, research from the Destination 2025 project uncovered an increased demand for a category of functional foods called probiotics within the animal health industry. Probiotics, or “good” bacteria, are sometimes already present in foods, and are increasingly being added to foods and feed to promote health. Probiotics are playing an increasing role in several industries, including animal health operations, with an estimated value in 2007 of \$185 million in the food and beverage market, \$1 billion in the dietary supplement market, and \$9 billion in the animal feed market.

Researchers within several departments at the University of Minnesota are examining the effects of functional foods, especially probiotics, in both food producing animals and foods for the retail market. The University of Minnesota’s Southern Research and Outreach Center (SROC) in Waseca conducts cross-disciplinary research in several areas, including Agronomy and

Plant Genetics and Animal Science.

For example, swine research conducted at Waseca and the other research and outreach centers in Minnesota is focused on evaluation of novel feedstuffs and management strategies in swine production, and the pig is used as a model for solving human disease challenges such as diabetes. An additional example of the convergence of the food, the animal health and human health industries comes out of USDA-sponsored research at the University of Arkansas. Researchers are exploring candidate probiotics for managing chemotherapy induced diarrhea and are also assisting the poultry industry with the treatment of similar problems.

In summary, there are strong indicators that matching specific foods or food choices with human and animal health needs will be important in the future of the nutrition practice and food industry. Topics like these will likely be considered by the BBAM Destination 2025 Food Advisory Committee.

BBAM Goes to Sweden for IBED 2009

The BioBusiness Alliance of Minnesota (BBAM) was a platinum sponsor of International Bioenergy Days 2009 held September 28-30 in Trollhättan and Lidköping, Sweden. Dale Wahlstrom, Gregg Mast and Melissa Kjolsing represented the organization and joined more than 170 conference delegates in attendance from the U.S., Sweden, and other European countries. This year’s conference focused on three primary areas within bioenergy: Biofuels for vehicles, Bioenergy for heating and electricity, and Politics and Society.

As part of the conference’s opening session, Dale Wahlstrom, CEO of BBAM, and Dr. John Frey, Interim Director, International Renewable Energy

Technology Institute (IRETI) based at Minnesota State University, Mankato, provided details on IRETI’s public-private partnership focused on accelerating the adoption and implementation of renewable energy technologies across the globe.

BBAM also participated in the Bio-business Café, a unique business match-making concept held throughout the event, allowing individuals to meet with organizations in small groups to connect and solidify contacts. On the final day of the conference, fellow Minnesotan Will Steger provided the delegation with a closing keynote highlighting the effects climate change has had on the Polar ice cap.

An exciting addition to this year’s IBED conference was the opportunity to offset BBAM’s carbon footprint while in Sweden.



Above: Melissa Kjolsing (BBAM), Bengt-Erik Lofgren (ÅFAB), and Pascal Tshibanda (The Association of Local Authority in Skaraborg) at the Nobel Inspired dinner in Lidköping, Sweden.

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The process used to offset this carbon was through Biochar Carbon Sequestration provided by Ecoera's BIOS-FAIR™.

Biochar is a stable form of carbon that sequesters and "locks away" CO₂. It provides a traceable, transparent and sustainable way to manage carbon. Using biochar carbon sequestration as a CO₂ offset gives additional positive outcomes:

- The biochar sequestered in agricultural soil serves as an inert structure - just like a sponge - with high nutrient and microbe holding capacity that increases soil fertility significantly.
- It reduces waste and, subsequently, a methane emission from the agricultural sector, as the biochar is made from decaying ag-residue biomass.

- It is a reliable method to store carbon in a safe, sustainable and simple way for at least millennia to come.

To learn more about this method of offsetting carbon go to www.ecoera.se or check out BBAM's Destination 2025 Renewable Materials White Paper at www.biobusinessalliance.org/destination. For information on next year's conference in Rockford, Illinois, go to www.biobnergdays.com.



Above: John Frey (IRETI) and Rolf Birketvedt (Marten) discuss conference topics.



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8th Annual LifeScience Alley
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December 9, 2009
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www.lifesciencealleyconference.org/




Above: Minnesota IBED attendees: (from Left) Cathy Diers, Randy Diers, Gregg Mast, Ben Skjold, Mike Davis, Will Steger, Dale Wahlstrom, Bob Ryan, John Frey, Dave McNertney, and Melissa Kjolsing.

Questions?

If you have any questions about The BioBulletin or know of anyone interested in receiving our newsletter, please contact:

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BBAM works to improve the future of Minnesota by stimulating growth in the bioscience industries. If you value Minnesota's quality of life and/or work within its bioscience industries, please contact Jeremy Lenz to discuss the ways you can support BBAM's mission.

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