The Scoop

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On Animal Agriculture and the Environment

ECONOMIST TO DISCUSS ANIMAL AG AFFECT ON REAL ESTATE

by Jordan Barnes

A discussion on animal agriculture's effect on real estate value will take place during the Balancing Animal Agriculture and Communities conference on Feb. 29. Hosted by Michigan State University Extension, the conference proposes to reach out to township, county and state policy-makers as well as environmentalists, farmers and residents throughout the Great Lakes state.

The discussion on real estate value will be led by Glynn Tonsor, an assistant professor of agricultural economics at Michigan State University. The hot topic will hit close to home for many policy-makers and residents in Michigan.

By summarizing the literature and existing research on the effects of animal agriculture in the real estate market, Tonsor aims to equip policy-makers and residents to make better informed, science-based decisions influenced by how animal agriculture affects a community's economic situation. He says many decision makers are well aware of the topic but are perhaps underinformed about many existing studies.

"When a new farm comes into town or an existing one wants to expand, people's perception is that there's always a negative impact on real estate valuations," Tonsor said. "Though there is some research that confirms that, there is some that says that's not necessarily the case, and the majority of research suggests many factors, unique to a given situation, ultimately determine real estate impact."

The early bird registration fee has been extended until Jan. 28, but hurry! Seating is limited.

Balancing Animal Agriculture and Communities

February 29, 2008
8 a.m. - 4 p.m.

Kellogg Hotel and Conference Center
55 South Harrison Road
Michigan State University
East Lansing, MI 48824-1022

For overnight accommodations and directions, call (800) 875-5090.
Register online at **www.animalagteam.msu.edu**, or by calling Faye Watson at (517) 353-3174.

Though there are no one-size-fits-all answers, Tonsor believes the information he will present can improve future policy discussions.

Other speakers will address topics ranging from the environmental effects of animal agriculture to sustaining ecosystem integrity. The conference will also look at improvement of livestock production technology, community response to livestock production and tradeoffs within the animal agriculture domain, among other things.

Welcome to the ***The Scoop***, a bimonthly newsletter designed to keep you informed about the exciting new changes in animal agriculture as it relates to the environment. Every other month you'll get a healthy dose of timely information you can use on your farm, in your job or around the countryside. All this and more, brought to you by the MSU Extension Animal Agriculture and the Environment Team.

The Scoop is produced every other month by the MSU Extension Animal Agriculture and the Environment Team.

Want to make sure you're notified when the next issue of ***The Scoop*** hits the Internet? Send an e-mail to stuever@msu.edu, and write "Subscribe to The Scoop" in the subject line.

Learn more about MSUE's focus on animal agriculture and the environment at **www.animalagteam.msu.edu**.

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MICHIGAN STATE UNIVERSITY EXTENSION

Large CAFOs: get to know that permit!

While the rest of the state was singing Auld Lang Syne, large CAFO operators were wondering if the new year would challenge their record-keeping ability.

by Natalie Rector

Natalie Rector is the nutrient management educator for MSU Extension. You can reach her at ***rector@msu.edu****.*

When the clock struck midnight on Dec. 31., it marked a new beginning of an old situation for large livestock farmers in Michigan. It started the countdown to the due dates of numerous forms, plans and reports — all of which require top-notch record-keeping skills. Unless you're one of the handful of farms that have special circumstances on their certificate of coverage, it's time to begin adhering to the guidelines set forth by MIGO19000, the National Pollutant Discharge Elimination System (NPDES) permit that covers large confined animal feeding operations (CAFOs). Start preparing now so these dates don't slip by you.

July 1, 2008. Your comprehensive nutrient management plan (CNMP) is due. Sample CNMPs can be found under the Regulatory tab on **www.animalagteam.msu.edu**. Reviewing these documents will help you and your plan provider understand the type of data and format that will increase your chance of success with the Michigan Department of Environmental Quality (DEQ). But even before the CNMP is due, you need to begin a rigorous record-keeping system.

Visit **www.animalagteam.msu.edu** and click on the Record Keeping tab to find examples of record-keeping forms. Review these forms NOW so you will have the correct data recorded when it comes time for submission. Note that the permit does not specify a particular form or format, but makes it clear what the information is requested.

April 1, 2009. An annual report with records of all manure applications, inspections and maintenance conducted in 2008 is due to the DEQ. The DEQ does not have prescribed reporting forms, but MIGO19000 indicates the items that are required. Some of the items are required to be recorded but do not have to be submitted to the DEQ. Remember, this is your responsibility. Do not rely on your CNMP provider to record information. This is your farm's future, and no one cares about your farm more than you do. Make sure you and your employees have a process in place to record this information throughout the year.

You can find a sample annual report under the Regulatory tab on **www.animalagteam.msu.edu**. Here is a quick breakdown of some of the information requested in the annual report. This is by no means a complete list.

- The average number and the maximum number of animals.
- Whether the livestock are kept in open confinement or under a roof.
- Estimated amount of animal waste generated, in tons or gallons.
- Estimated amount of animal waste transferred to other persons.
- Total acres identified in the CNMP for land application of animal waste.
- Total number of acres identified in the CNMP that were used for land application of animal waste.
- List of all discharges, if any, including date, time and approximate volume.
- A copy of the spreading plan for the next 12 months, including fields, amount of water to be applied to each field and when the animal waste will be applied.

A land application log is referred to numerous times in the permit. This log must accompany the annual report. Again, there is no specified format, but for each land application, you must record the date, time, quantity of manure, source of manure, yield goal, total N and P applied, weather conditions within 48 hours before application, weather conditions at time of application and weather conditions within 24 hours after application.

In addition, you must record equipment used for land application, time of incorporation, acres spread, number of loads, percent of residue cover, soil conditions, state of tile outlets, temperature, wind and hauler's name. These data, however, do not have to be submitted with the annual report.

Other information that must be recorded but does not have to be submitted includes land application equipment inspections, mortality records, weather forecasts, weekly inspections of manure storage integrity and volume, daily inspection of water lines and information regarding any manure that is sold or given away.

2008 will surely have some bright spots, but record keeping will just have to be endured. Read your permit, work with your plan provider and visit the MSU Extension Animal Agriculture and the Environment Team Web site at **www.animalagteam.msu.edu** to find resources to help sort the necessary information from the chaff.

MONITORING FOR WATER QUALITY AND HEALTH

by Rachel McNinch, Irene Xagoraraki, Phanikumar Mantha and Joan Rose

Water is one of the world's most precious natural resources, used for drinking and food supply, cleaning, industrial and recreational purposes. Michigan is water-rich, yet the water quality of Michigan's Great Lakes shoreline, the many inland lakes, rivers and streams, and groundwater is constantly threatened.

Michigan has 3,288 miles of Great Lakes shoreline and 11,000 inland lakes and ponds, which attract millions of visitors each year. Michigan supports diverse urban and rural populations in agricultural and industrial developments, all of which rely on clean water. Protecting water resources has always been extremely important to Michigan residents, but sewage discharges from combined sewer systems, accidental sewer overflows, septic tank leaks, animal wastes and other sources of contamination periodically render Michigan waters unfit for use. Currently, many segments of streams, rivers and lakes are not meeting water quality goals for designated uses. These water pollution problems threaten the health of Michigan's population. To provide safe water, standards and monitoring are needed for both protection and remediation of any water quality problems.

The Environmental Microbiology Laboratory and the Center for Water Sciences (CWS) at Michigan State University are working on new tools and techniques to assess the numerous threats to water quality in the state and assist communities in identifying the future investments needed for maintaining safe water.

Michigan's *E. coli* database

CWS collaborated with the Michigan Department of Environmental Quality (DEQ) for the past year to study Michigan's *E. coli* database. Michigan monitors *E. coli* as a part of numerous regulatory and research programs and, over time, has amassed a large amount of information about *E. coli* in surface waters across the entire state. The goal of the project was to examine the database for trends, examine alternative statistical tests and research microbial source tracking tools that would be useful for the state. ArcGIS software was used for mapping the locations for which *E. coli* data exist. The project, which was only recently completed, is awaiting approval from the DEQ.

Pathogens and source tracking methods

Key pathogens of concern associated with polluted water include parasites such as *Cryptosporidium* and *Giardia*, bacteria such as *E.coli 0157:H7* and *Campylobacter*, and viruses, including adenoviruses. Studies on the occurrence of pathogens along with new fecal indicators are helping to address pollution levels and the associated risks to public health. In particular, the pathogen *Cryptosporidium* has been found in surface waters located near several confined animal feeding operations (CAFOs) across Michigan, suggesting inappropriate application of untreated animal manure, and *Giardia* has been detected in untreated sewage sources.

Under Michigan's Natural Resources and Environmental Protection Act, indicator bacteria *E. coli*, total coliforms and fecal coliforms are used to judge the safety of recreational waters, drinking water and wastewater treatment, respectively. These indicators, however, do not identify the full extent of pathogen contamination or all of its sources. Therefore, alternative indicators, actual pathogen testing and microbial source tracking are now being used to assist in addressing the source and preventing further contamination of groundwater or surface waters. Currently, one bovine and two human markers are being used to examine various waters in Michigan.

ArcGIS software has been used by CWS to map water quality sampling sites for several of these projects across Michigan, including those in the Saginaw Bay and Grand River watersheds.

Adenovirus and enterovirus testing

Viruses offer a unique opportunity to study water quality and health because they are very host-specific, survive well in the water environment, do not regrow, and represent actual pathogens and disease risks. Virus testing of sewage and animal wastes has led to rapid methods for evaluating viruses in Michigan waters. When beaches along Lake Michigan were tested for virus contamination, 40 percent of the samples were positive. Advances in water treatment methods to remove viruses are being examined by teams within CWS, addressing both animal and human wastewater.

Continued involvement

The faculty members involved in water science at MSU are engaging in community-based research and are beginning to make a difference in Michigan. Future projects will begin to evaluate in more detail the quality of groundwater in the state as well as investigate rural water quality.

The authors are MSU researchers affiliated with the Center for Water Sciences, the Departments of Fisheries and Wildlife, Crops and Soil Sciences and Environmental Engineering.

NEW RULES FOR NEW COMPOSTING SYSTEMS

By Dale Rozeboom

Dale Rozeboom is an associate professor specializing in pork production at MSU. He helped write the new BODA rules in hopes of giving Michigan farmers more composting options. You can reach him at ***rozeboom@msu.edu****.*

Farmers and animal processors who compost mortalities now have new options, thanks to the new rules outlined in the Bodies of Dead Animals Act.

That act, which was filed by the Michigan secretary of state last fall, describes alternative and possibly less expensive composting methods. For the first time, these rules allow animal processors such as butcher shops, slaughtering facilities, taxidermists, road commissions, veterinary clinics and market collection points an opportunity to use composting to manage business animal tissue byproducts. Previously, farmers could compost their on-farm mortalities only in roofed structures with at least three sides. Processors were not allowed to compost at all.

The new rules allow four composting methods: in bins; in open piles on bare soil without floor, roof or walls; in windrows; and in large containers (in-vessel composting). With any of these methods, aeration of the compost material may be forced (mechanized with fan and ductwork), active (mechanical turning of material) or passive (air exchange within the composting material occurs as fresh air is pulled into the lower portion of the pile when heat takes gases out of the upper portion).

The two new options — open pile and windrow systems — are the first to allow composting on bare soil without a surrounding structure. These two systems decrease composting costs but are allowed only on smaller farms with no more than 20,000 pounds of animal tissue annually. In either case, open composting must be done on land used for crop production. And though collection of compost leachate is not required, the compost areas must not violate any other federal, state or local laws. The site for open composting may be used for only two years, with new additions made only in year one, and year two being allowed just to finish the composting process. An open composting site may not be reused for composting for 10 years.

So what systems may be used on larger farms? All of them could be. However, for farms with more than 20,000 pounds of mortality annually, open piles or windrows must be on an approved concrete pad or liner. On large farms, all leachate must be managed by reintroducing it into the compost pile, diverting it to a treatment system, and/or collecting and storing it in a storage facility with an approved liner.

Processors may compost using any of the systems, but like large farms, they must conduct open composting on a concrete pad or liner.

New tool helps ease decision process

These methods vary in their speed of composting, labor required, environmental risk, expense and aesthetics. All of the methods require the systematic formation, identification and management of compost batches. *Spartan Compost Sizer* is an Excel spreadsheet tool that determines the proper size and number of batches, whether kept in bins, open piles, windrows or larger containers. The program considers the length of time it will take to complete the composting process using animal inventory, the greatest mortality rate or death loss in any one season, average animal weight and a volume factor (also called the volume coefficient or bulking agent to animal tissue ratio in pounds per cubic foot).

For a copy of the new rules and a document explaining those rules called the *Michigan Animal Tissue Compost Operational Standard*, go to **http://www.msu.edu/~rozeboom/**. The *Spartan Compost Sizer* program is also available at that site.

What we've been up to ...

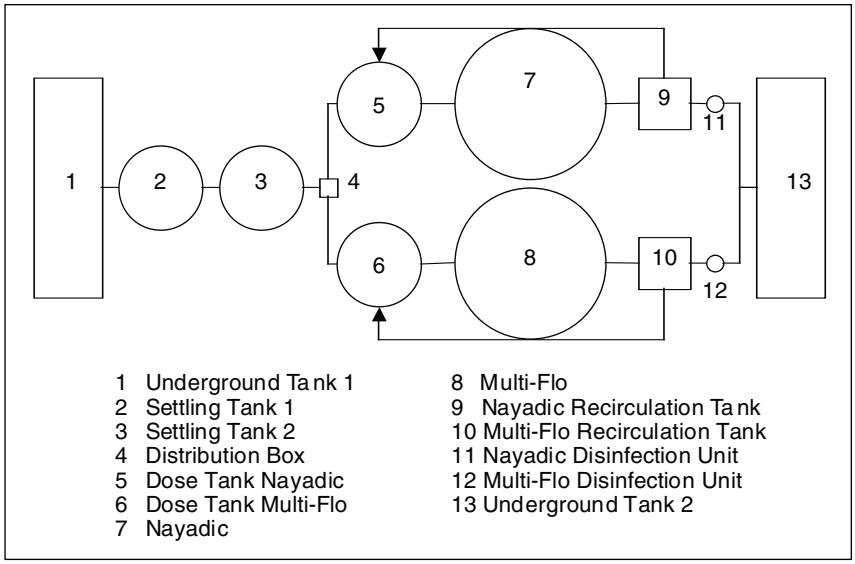
The Scoop will periodically share information about recent research at Michigan State University. Much of the research that takes place at MSU is directed by farmer advisory groups. Here, Becky Larson, a Ph.D. candidate in biosystems and agricultural engineering (BAE), shares results of her 2007 master's degree project, conducted under the watchful eye of Steve Safferman, associate professor of BAE.

MSU STUDIES DAIRY WASHWATER REUSE

by Becky Larson

The wastewater from washing dairy milking equipment and the milking parlor after each milking contains milk waste, animal waste and cleaning products. This water can be problematic for dairy farmers without a suitable disposal method. The high oxygen demand and large amounts of nutrients, fats, oils and grease could pose an environmental risk if not taken care of properly.

In Michigan, disposal of dairy milking facility washwater is typically limited to lagoon storage and land application. This lack of treatment and disposal options has dairy farmers looking for alternatives.



In 2007, researchers at MSU investigated two aerobic treatment units — Nayadic and Multi-Flo — installed at the MSU Dairy Teaching and Research Facility to determine if they were capable of treating the washwater from the farm's 150 cows. The goal was to reduce contaminants to a level at which the water would be suitable for reuse.

Each treatment unit was preceded by a 500-gallon settling tank and a dosing tank to provide flow control. Recirculation tanks diluted washwater prior to treatment. Each unit provided suspended growth, continuous aeration and constant mixing to maintain an environment suitable for the aerobic biological activity required to degrade the pollutants.

The Multi-Flo unit included physical solid-liquid separation via 30 filter socks within the unit. The Nayadic unit relied on a gravity-driven solid-liquid separation. Solid-liquid separation was a key feature in the design because a high solids concentration was the most significant variable in treatment performance.

Both systems successfully decreased the amounts of excess nutrients, fats, oils and grease, and oxygen demand. The Multi-Flo system reduced these pollutants to concentrations suitable for reuse in a first-flush scenario at a flow rate of 50 gallons per day for up to a month before becoming clogged with solids and malfunctioning. Treatment was not consistent for the entire period, however, and the treatment flow rate was not sufficient to keep up with washwater production. Extensive monthly maintenance, including minor repairs and cleanouts, was required to keep the system functioning.

Further investigation is warranted for the Multi-Flo unit, which appears to be particularly well-suited to a smaller farm with more vigorous solids management or a more extensive solid-liquid separation pretreatment.

Aerobic treatment units have the capability to treat dairy washwater and the potential to provide another viable disposal option for farmers, but further research is needed.