On April 25, a one-day conference held at Michigan State University addressed innovative manure management and related technologies and animal agriculture in Michigan. Sponsored by the Michigan Agri-Business Association (MABA), Michigan State University (MSU), the Michigan Departments of Environmental Quality (MDEQ) and of Agriculture (MDA), the Natural Resource Conservation Service (NRCS), Private Sector Consultants and Michigan Farm Bureau (MFB), the speakers discussed costs, performance, and regulatory requirements associated with livestock, poultry and dairy production, and the environment. Some practical solutions were highlighted.

Wayne Wood, President of MFB, described the economic, social, and environmental impacts of the State’s livestock industry. Sales of livestock products totaled $1.4 billion in 2002, representing 40% of total agricultural cash receipts. Livestock enhances crop production—the greatest cost to the livestock industry is feed. Feed costs in the dairy industry alone amounted to $378 million in 2003. While the manure from animals can be a resource because it can offset the use of commercial fertilizers, the environmental considerations and neighbor relations likely represent the greatest challenge currently facing the livestock industry.

Balancing science, public perception, and economics will be important as the livestock industry positions itself for the future. As pointed out by Jeff Armstrong, Dean of MSU’s College of Agriculture and Natural Resources, Michigan’s land grant university has a responsibility to enhance interactions within multi-disciplinary groups of scientists and stakeholders. These teams, using a systems approach, must integrate existing and emerging technology for profitable and sustainable production. Safe and secure production must be sustainable — economically, environmentally, socially, and ecologically.

The NRCS will continue to offer incentive-driven, lo-
ally-led, voluntary programs aimed at implementation of conservation practices. Jack Bricker, NRCS State Conservationist, described i) the Environmental Quality Incentives Program (EQIP) that provides incentive and cost-share payments to implement conservation practices; and ii) the Conservation Security Program that recognizes and rewards past performance in achieving conservation objectives, emphasizing comprehensive conservation practices. The NRCS will continue to deliver technical and financial assistance to farms of all sizes and species of livestock/poultry.

Dan Wyant, former MDA Director, outlined MDA’s responsibilities regarding air, water quality, and livestock production. The Right-To-Farm Program has enhanced the development of the livestock industry by providing relief from nuisance complaints and lawsuits. More recently, MDA, as a partner in the Michigan Agriculture Environmental Assurance Program (MAEAP), is playing an important role in providing education related to environmental protection. This is followed by verification and recognition that farmers have in place sound plans for managing manure and other risks to the environment.

Steve Chester, MDEQ Director, and Steve Jann, of the US Environmental Protection Agency Region 5, explained regulatory strategies related to preventing water pollution by animal feeding operations. States have a responsibility to ensure that national minimum conditions and standards are included in requirements for National Pollutant Discharge Elimination System (NPDES) permits for Concentrated Animal Feeding Operations (CAFOs). Recently, EPA issued an Animal Feeding Operation (AFO) clean-air strategy covering i) emission estimation methods (short-term); ii) process-based emission model (long-term); iii) regulations and/or guidance; and iv) control practices and technologies.

Michigan must address policies related to animal manure if dairy, livestock, and poultry production are to continue to thrive as pointed out by Jim Byrum, MABA President. Producers are perplexed by the uncertainties in what is acceptable today compared with what will be required tomorrow and are looking for guidance and assurance. Fertilizer shortages and increasing energy costs demand policies that encourage developments that view manure as a resource. Byrum argued that the future of the livestock industry will be in the hands of larger operations. Niche operations will find increasing importance. But only larger operations will have the resources to implement those new technologies essential to protecting the environment while maintaining their ability to produce the majority of the nation’s food. Faced with too many constraints and a lack of policies that assist with profitability, these larger operations will move off-shore.

An integrated manure management system, a system for treating manure based on synergistic components and designed to produce the desired output streams, is essential. Moreover, as pointed out by Bill Bickert, MSU Biosystems and Agricultural Engineering Professor, connections of such systems to renewable energy and to biomass demand the broadest view of the issue, as broad as agriculture and the environment. In this context, the farmer wishing to take the initiative in developing an integrated system faces a bewildering array of choices and decisions, few of which are aided by policies, programs, or assistance currently in place at the state level.

Farmer Panel

A panel of farmers—Bruce Barton, Barton Farm Co., Homer; Velmar Green, Green Meadow Farms, Elsie; Brian Geerlings, Herbruck Poultry Ranch, Saranac; and Ted Mathews, Matlink Dairy Farm, New York—described innovative strategies being used on their farms to handle animal waste with profit as a motive.

Bruce Barton views swine manure as a source of nutrients and profit center. He indicated that the value of the manure nutrients (N, P2O5, K2O) for fertilization from a 1200-head finisher unit is very significant. For example in terms of corn production, available manure nutrients meet the annual needs for 146 lb of N, 171 lb of P2O5, and 434 lb of K2O. Overall, Barton Farms saves $21,000 per year by applying manure and not having to purchase phosphorus fertilizer (no phosphorus purchased for 3,000 acres), and about $29,000 savings on nitrogen fertilizer (one-half the farm’s nitrogen needs).

Green Meadow Farms is separating phosphorus from the manure stream using chemicals in combination with a belt filter press. The dewatered cake from the belt filter press is composted. Developing markets for the composted material is an important endeavor. Because the farm uses sand for bedding the free stalls of approximately 3200 lactating cows, sand-manure separation equipment has been installed to facilitate movement of the manure stream through the remaining treatment system. According to Velmar Green, annual projected capital costs on a per cow basis amount to about $42. Annual operating costs are $164 and annual revenues $78 per cow. Thus, the annual cost of this system, from sand-manure separation through composting, is estimated to be $128/cow. Water conservation, reduced land area for liquid application, reduced application cost and pressure, and neighbor relations are cited as benefits. Greens is investigating technologies that will reduce chemical costs. Meanwhile, Green cited the need for regulatory stability and development of discharge standards for agriculture, assistance in marketing byproducts (e.g., compost), and both technical and financial assistance in application of innovative technologies (e.g., as related to renewable energy).

Poultry manure is being dried and marketed as a fertilizer at Herbruck Poultry Ranch. Brian Geerlings presented an analysis from December, 2002, based on nutrient and mineral content, that pegged the value of dried poultry fertilizer at $64.57 per ton. Yield results with corn, soybeans, and wheat generally have shown more favorable results compared with using commercial fertilizers. The next step is to explore packaging the product in bags for marketing to homeowners.
An anaerobic digester on Matlink Farms in Clymer, NY, processes liquid food wastes from four different sources, in addition to the manure from about 575 mature dairy cows. Ted Mathews said that a $200,000 grant from the New York State Energy Research and Development Authority (NYSERDA) assisted with initial construction of the digester. In fact, if a grant of this type would not have been available (as is the case in Michigan), Mathews would not have pursued the project. On an annual basis, the Matlink manure system has capital costs of $61,232, operating costs of $115,910 and benefits of $392,785. Thus, net annual income from manure is over $200,000 or about $300/cow per year. This positive result is enhanced by the $250,000 collected for taking liquid food wastes at the farm. Mathews listed the following ways that a state can help promote innovative manure management projects: i) offer new and creative ways for financing a revolving fund, creating a land or utility tax or assessment, or offering grants; ii) assist in negotiations with the utility company; and, iii) help the farm obtain carbon credits and renewable credits.

**Opinion: Farmers’ Needs**

Farmers are reluctant to invest in innovative manure management technologies. The investment generally results in a negative economic return. Moreover, the farmer receives little assurance that the investment will stand the test of time. Will the innovative technology being installed now be acceptable to regulators in the future?

Without a doubt, manure management has gone beyond the traditional view of manure system design—production, collection, storage, transport, and land application. The system is farm specific, integrating innovative technologies, maximizing byproduct use and coupling manure management with other enterprises. The farmer encounters a bewildering array of choices and decisions, few of which are aided by policies, programs, or assistance currently in place at the state level.

Farmers wishing to take animal manure management to the next level are looking for help from the State. They are seeking financial assistance and advice. They are looking for technical assistance in system design and evaluation of new technologies. They are asking for some measure of assurance that the risks they are taking will be reflected in policy and regulatory decisions in the future and that they won’t be left holding the bag!