

May / June, 2004

**AIR QUALITY AND AGRICULTURE:
CHALLENGES AND OPPORTUNITIES**

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Air Quality and Agriculture: Challenges and Opportunities was the title of a seminar held May 25 and 26, 2004. Sponsored by Michigan State University Extension Manure Management Team, the purpose of the seminar was to increase awareness about emissions from agricultural operations, to better understand the concerns about potential impacts of those emissions on health and to set the stage for future activities. Attendees included personnel from [MSUE](#), [MDEQ](#), [MDA](#), [NRCS](#) and ag organizations, as well as consultants.

Indoor and outdoor air quality are both of concern in agriculture. Indoor air quality impacts human and animal health as well as contributing to deterioration of equipment and building components. More recently, the increasing size and concentration of animal production units has given rise to concerns about the negative impacts that air emissions from these facilities might have on the earth's atmosphere—globally as well as locally. Air emissions of concern include odor, gases, and particulate matter.

Among air emissions from agriculture, odor is the major issue. Odor is also the most difficult to measure. Olfactometry, which uses trained individuals and standardized procedures to measure odor levels and describe odors, is a common approach. Efforts to correlate individual odorous gas concentrations have met with some success. However, there is no known relationship between the specific gas concentrations in a mixture and its perceived odor.

Agriculture's impact on greenhouse gases was discussed by [Dr. Phil Robertson](#), [Professor Ecosystem Science](#), Michigan State University. Carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄) are emitted to and/or removed from the atmosphere through agricultural activities. Because greenhouse gases have a potential role in promoting rapid and undesirable change in climate, mitigating emissions through improved agricultural practices is receiving increasing attention. Because mitigation of greenhouse gas emission in agriculture will not begin of its own accord, policies established at the national and international level will be necessary for changes to occur.

[Dr. David Beede](#), C.E. Meadows Endowed Chair and Professor, Michigan State University, examined the relations between animal nutrition and air emissions. Odor is of major concern on a local scale, while ammonia has significant impacts globally. In the latter case, nitrogen emissions, as ammonia, are a major nutrition issue. Overall, Dr. Beede recommends decreasing the animals' intake of all chemicals in order to reduce their concentrations in manure and using feedstuffs that animals may digest and metabolize more readily. Interestingly, some byproducts now fed to animals may become waste products because they contain high levels of certain chemicals. For example, distillers dry grain contains 0.8% P, well above the amounts required by a dairy cow.

Efforts to regulate air emissions from agricultural sources have been confounded by a lack of information. Indeed, air emission requirements in the Clean Air Act do apply to animal production facilities even though agriculture is not referred to in the act itself. But there have been no uniform studies to determine what size operations or what manure management methods produce air

emissions that exceed legal thresholds of regulated pollutants—ammonia, hydrogen sulfide, particulate matter, nitrous oxide and volatile organic compounds. [William Schrock, EPA](#), and [Carrie Monosmith](#) and Maggie Sadoff. [MDEQ](#), presented the regulatory perspectives. [Wayne Whitman, MDA](#), described experiences in Michigan with Right-to-Farm and air emissions

The Air Emissions Consent Agreement, negotiated between the livestock and poultry industry and the [Environmental Protection Agency](#), is an effort to find the required answers before regulations are formulated and imposed. . As described by [Carrie Tengman](#) of the [National Pork Board](#), the agreement provides for a nationwide emissions monitoring program, funded by the livestock and poultry industry, which will provide industry estimates of emissions from major types of animal feeding operations with various barns and manure handling and storage systems. These emissions data and accumulated best management practices and technologies will be used in formulating regulations for the future.

[Dr. Larry Jacobson](#) and [David Schmidt](#), Biosystems and Agricultural Engineering Department, University of Minnesota, brought to the seminar several years of experience related to air quality and agriculture. They provided experiential learning on measuring air emissions and odors and described the use of biofilters and other method of odor control was described. Along with [Dann Bolinger](#) and [Jerry May](#), Michigan State University Extension, the use of OFFSET (Odor From Feedlots Setback Estimation Tool) to site animal production facilities was discussed. Originally developed in Minnesota, OFFSET combines odor emission measurements with the average weather conditions to estimate the strength and frequency of odor events at various distances from a given farm. This information is especially useful when planning for expansion or siting new facilities.

Community interactions are an extremely important aspect of the air quality issue. Dealing with such controversial issues in the community, the subject of a discussion led by [Pat Norris](#) and [Beth Moore](#), MSU, requires participation by many segments of the community that view the issue very differently. Those with involvements and interests in agricultural have an opportunity to step forward, taking leadership roles in providing forums for discussion.

In the future, sound science must be the basis for policies and regulations related to air emissions from agricultural sources. A combined effort of the agricultural industry, the regulatory agencies and the scientific community will enhance these developments. In the meantime, an educational program for producers on the best management practices and technologies on air emission control, both short-term and long-term, both locally and globally, is essential. Encouraging the mitigation of air emissions from agricultural sources is the responsibility of all stakeholders.