Taking Steps To Reduce Air Emissions From Livestock Farms

Determining how to reduce emissions is a complicated task. Universities across the United States are collaborating to develop a tool that will help producers make those determinations and become even better neighbors.

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Air emissions from livestock operations come from three main sources: animal housing, manure storage and land application. In some cases, feed storage also may contribute to overall emissions, depending on the type of feed and the storage method. The relative contribution of each source is site-specific and highly dependent on the livestock species and the type of housing, manure storage and land application method. Variations exist within farm system and livestock species, too.

For example, a pull-plug swine nursery barn will have different odor and gas emissions than a deep-pit swine finishing barn because of the way the building and manure within the building are managed. The two facilities also will have very different relative contributions from the manure storage area, largely because the finishing barn may not have additional storage. Similarly, a tie-stall dairy barn with only winter manure storage facilities may have vastly different mitigation strategies from that of a free-stall dairy facility that has manure storage under the free-stall area and in a concrete tank. And, the turkey or broiler chicken grower who raises multiple flocks on the same litter has still another completely different set of considerations.

With limited resources available to devote to reducing air emissions, livestock producers are faced with the daunting task of deciding where to invest. To make a wise investment, you need to establish objectives. What do you want to control—odor or a specific gas, such as ammonia or hydrogen sulfide? Or do you want to reduce emissions of particulates (dust) or a group of gases, such as volatile organic compounds (VOCs). Once the objective is established, you need to know how much control is necessary. In some cases, established guidelines, rules or regulations may set the benchmark. But in many cases, there are no established benchmarks—you need to make your own decision on how much emission control you want to have.

Once the emission control benchmarks are set, you need to decide which mitigation strategies to employ. To get the biggest return for your investment, assessment tools should be used to identify problem areas that should receive priority attention. If most odor concerns arise when you’re cleaning...
out the concrete manure storage area, for example, don’t start with a strategy that would be used in the barn. If complaints arise from neighbors nearest the fields where manure is applied, then invest in your land application method, not in a manure storage cover.

After the high priority area or areas have been identified, it is time to select a mitigation strategy. This can be a difficult and costly decision. Take care to ensure that the strategy is compatible with current management and will result in meeting the reduction targets. A tool available through Iowa State University, the Air Management Practices Assessment Tool (AMPAT), provides assistance in making this decision. AMPAT, found at <http://www.extension.iastate.edu/airquality/practices/homepage.html>, asks a series of questions designed to help narrow the options of strategies available on the basis of the current management system. The remaining options all have corresponding reduction for odor, ammonia, hydrogen sulfide or dust, and a relative cost associated with their implementation. AMPAT also provides a list of additional resources for more information about any particular strategy.

New Tool

AMPAT helps narrow mitigation strategy options, but it does not help identify priority areas for implementation. To fill this gap, the USDA Natural Resources Conservation Service recently awarded a grant to 11 universities to develop a national air quality site assessment tool that will enable livestock producers to make decisions about how best to reduce air quality concerns. Michigan State University is the lead institution. The result of the 2-year project will allow a producer to walk through his or her farm site and determine where a mitigation practice can have the greatest impact on air quality. Producers will be able to select a gas of interest or odor as their primary reduction objective and from there decide where to implement a mitigation strategy as well as estimate the benefit of any strategy considered. Following development, this multispecies tool will be available to all producers who are considering a new operation or an expansion, or who simply want to reduce emissions from their existing operations.

States involved in the project are California, Colorado, Georgia, Indiana, Iowa, Maryland, Michigan, Minnesota, Nebraska, Oregon and Texas. In many states, the Extension Service has partnered with state livestock associations to develop and field test the tool. The geographical distribution of project partners will allow for a tool to be developed that meets the needs of dairy, beef, swine, turkey, laying hen and broiler chicken growers across the country.