Massive monitoring project to identify dairy air quality parameters

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Optimizing expertise and equipment to get solid answers both producers and government agencies can use was the goal of a massive two-week air quality monitoring project at an eastern New Mexico dairy, according to project researchers.

New Mexico State University, through federal initiative funding, spearheaded the operation involving four Texas entities - Texas AgriLife Research, Texas AgriLife Extension Service, West Texas A&M University and the U.S. Department of Agriculture-Agricultural Research Service at Bushland.

All the entities are members of the Southern Great Plains Dairy Consortium, which was formed over the past few years to meet the needs of the growing dairy industry in New Mexico, Texas, Arizona and Oklahoma.

Dr. Robert Hagevoort, New Mexico Extension dairy specialist in Clovis, said the consortium was successful in getting funding with the help of U.S. Sen. Jeff Bingaman, D-NM, and others.

Hagevoort said when members of the consortium sat down with producers to identify issues of concern -- Research and Extension work-wise -- this air quality research and environmental issues were priority items.

With air quality being regulated, or at least with the recent passing of the

cap-and-trade bill, air quality is a huge issue, he said.

Producers are not afraid to be regulated, Hagevoort said.

"But they definitely want it to be based on sound science and not on fiction as it is done elsewhere," he said.

"Producers want to know what the issues are, and at the same time learn what management practices they can implement to offset these issues, so they know they're doing the right thing, remain in compliance and contribute to sound and sustainable agricultural practices," Hagevoort said.

"Sound science needs to drive policy," he said. "And it's rare when you have an opportunity like this to gather the expertise and equipment already available and get the research teams and lab times for the money we received. We're leveraging research to the max, and that was the idea behind the consortium in the first place."

Dr. Brent Auvermann, an agricultural engineering professor with AgriLife Research and AgriLife Extension in Amarillo, said this all-at-once campaign collected information on coarse particulate matter, ammonia, hydrogen sulfide and methane. The campaign also collected data on a large class of compounds known as volatile organics, some of which are associated with potent, offensive odors, he said.

The main focus was to get baseline data on what is coming off a large open-lot dairy characteristic of eastern New Mexico and the Texas Panhandle, Auvermann said.

"We're looking specifically at air pollutants from an open-lot dairy we think is reasonably characteristic of this region of the country," he said. "This region differs a lot from other dairy-intensive regions, like

California. California is a winter-rainfall area and we are a summer-rainfall area."

Auvermann said they expect there to be a quite a bit of difference between New Mexico and California or Texas and California because of the different weather patterns.

"We are interested in how much of these different compounds are being emitted, what the concentrations are in air, what exposures are likely to be to humans and animals inside and downwind of an open-lot dairy," he said.

The research teams included: one headed by Auvermann monitoring dust emissions; another led by Dr. Ken Casey, AgriLife Research air quality engineer in Amarillo, tracking hydrogen sulfide emissions; another led by Dr. David Parker, professor at West Texas A&M in Canyon, measuring odorous volatile organic compounds; Dr. Rick Todd, USDA-ARS soil scientist at Bushland, monitored the ammonia and methane emissions; and Dr. Andy Cole, USDA-ARS ruminant nutritionist, ran a nitrogen mass balance.

Cole's nitrogen mass balance is a key method for validating the estimates achieved by other means, Auvermann said. Scientific validation - identifying the upper and lower limits of what emission rates are even plausible - is provided by tracking the nitrogen fed to and used by these animals.

"It's like a household checking account," Auvermann said. "If we know our income and our fixed expenses, we can figure out how much is available to be spent some other way. In this case, we're figuring out how much nitrogen is left over and available to be emitted after we've accounted for the nitrogen in the feed, milk and waste streams."

This project is the first step in developing strategies to reduce emissions of air pollutants and so-called greenhouse gases, Auvermann said.

"We want to know not only what the emissions are, but what it would cost to reduce the emissions and what the effectiveness would be once we implement those kinds of measures," he said.

Those considerations are important because eventually the government is going to get involved in some way to try to stimulate the adoption of abatement measures for emissions they think are of critical importance, Auvermann said.

Should the government decide to make cost-share monies available through, for example, the well-known Environmental Quality Incentives Program administered by Natural Resources Conservation Service, he said this study would provide scientific data on baseline emission rates.

Future work would then focus on which practices are worth cost-share or incentive payments to producers and which ones are not.

"And once we decide which ones are worthy of public investment, then we would want to be able to provide some guidance on how much money would be needed to achieve a certain level of emissions control," Auvermann said. "In the case of methane emissions, our findings will also lend scientific support to the carbon-trading schemes being discussed in Washington, D.C.."

The public really has an important stake in this research because some of the policy options are going to be expensive, he said.

"Getting good data on baseline emissions is the critical first step to ensuring that taxpayers have confidence in the policies we ultimately adopt," Auvermann said.

Source: Texas A&M AgriLife Communications