CAFO'S - WHAT DO THEY MEAN FOR MY COUNTY?

DR. BOB THALER
EXTENSION SWINE SPECIALIST
OUTLINE

▪ Extension’s role

▪ Protecting water and the environment

▪ Odor

▪ Economics
WHY ISN’T SDSU EXTENSION AT HEARINGS???

- As state employees, we are prohibited, by South Dakota Board of Regents policy, from providing expert testimony at public hearings. SDBOR policy 4-35 provides that ruling.

- SDSU Extension, based on land grant principles, provides un-biased, science based education and technical information. However, being summoned or requested to provide the information at a hearing now lends that information to be perceived as being requested/used on behalf of one side or the other, or is perceived as such.

- Therefore, the time to obtain information from Extension is at the public information gathering stage. It needs to funnel into the process long before the hearing stage where decisions become legally binding.

- PLEASE utilize us
PROTECTING WATER AND THE ENVIRONMENT

- SD Dept of Environment & Natural Resources
- All CAFOs must annually sample manure & soil, and only apply as much manure as the crop needs
- Operations < 1,000 AU are not regulated
- Application of commercial fertilizer is not regulated
Humans can detect over 10,000 different odors

No direct correlation between individual gases & odor

MN uses hydrogen sulfide as a surrogate for odor

Human nose is still the best tool, but a great deal of variation
Normal Olfactory Sensitivity

People Detecting Odor

- Hyper-sensitive
- Normal
- Anosmic

Odor Detection Concentration

Low

High
SD Odor Footprint Tool: Starting Point for Discussion
DEVELOPMENT OF THE OFFSET MODEL FOR DETERMINATION OF ODOR-ANNNOYANCE-FREE SETBACK DISTANCES FROM ANIMAL PRODUCTION SITES: PART II. REVIEW AND EXPERIMENT

L. D. Jacobson, H. Guo, D. R. Schmidt, R. E. Nicolai, J. Zhu, K. A. Janni

ABSTRACT. The objective of the study was to develop a science-based model, OFFSET (Odor from Feedlots - Setback Estimation Tool), to estimate setback distances from animal production sites based on the use of an air dispersion model (INPUT-F). The actual odor emission rates and the actual odor concentration of these sites. Extended research was conducted to obtain representative odor emissions from existing animal facilities and to evaluate the air dispersion model. Odor emissions were measured from 260 animal buildings and moveable storage units on 81 farms in Minnesota during 1994 to 2001. The geometric means of the odor emission rates for each type of odor source were obtained from the air dispersion model. The geometric means of some odor control technologies were summarized. The air dispersion model was evaluated for short-distance (<9.8 km) odor dispersion prediction against the odor pleasantness measured using trained field assessors on 26 farms and also for long-distance (6.4 km) odor dispersion prediction against the odor concentration measured against odor control technologies. The sensitivity of the air dispersion model was measured in calibration and validation studies. The relationship between odor receptor threshold and the odor concentration was obtained for receptors in different directions, from the predominant wind direction. The dispersion model was used to determine odor occurrence frequencies in 16 all 16 directions at six weather stations in Minnesota were obtained. The occurrence frequencies of these weather conditions were used to determine odor occurrence frequencies in the OFFSET model.

Keywords: Animal, Dispersion, Distances, Emission, Odor, Separation.

Critical Setbacks for Odor Control

The objective of the study was to develop a science-based model, OFFSET (Odor From Feedlots - Setback Estimation Tool) model, to estimate setback distances from animal production sites based on the use of an air dispersion model that uses actual odor emission rates.

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LITERATURE REVIEW

SETBACK DISTANCES DETERMINATION GUIDELINES OR MODELS

Odor emissions from animal production facilities are a function of many variables including species, housing type, feeding methods, manure storage and handling methods, size of odor sources, and weather conditions. The impact of the odor on the surrounding environment depends on the amount and character of odor emitted from the source, the distance between the neighbor and the source, weather conditions, topography, and the odor sensitivity and toler-


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## Comparison of odor setback/odor footprint estimation tool

<table>
<thead>
<tr>
<th>Calculation Type</th>
<th>Factors</th>
<th>SDOFT</th>
<th>NOFT</th>
<th>OFFSET</th>
<th>POSM</th>
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</thead>
<tbody>
<tr>
<td>Odor emission</td>
<td>Species</td>
<td>Beef, Dairy, Swine</td>
<td>Dairy, Swine, Poultry</td>
<td>Beef, Dairy, Swine, Poultry</td>
<td>Beef, Dairy, Swine, Poultry</td>
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<td></td>
<td>Emitting area options</td>
<td>Rectangular</td>
<td>Rectangular and circular</td>
<td>Rectangular</td>
<td>Rectangular and circular</td>
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<td>Odor dispersion</td>
<td>Dispersion model</td>
<td>AERMOD</td>
<td>AERMOD</td>
<td>INPUFF 2</td>
<td>Austrian and German model</td>
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<tr>
<td></td>
<td>Terrain</td>
<td>Flat only</td>
<td>Flat and others</td>
<td>Flat only</td>
<td>Flat and others</td>
</tr>
<tr>
<td></td>
<td>Meteorological data</td>
<td>Built-in historical data for three regions in South Dakota</td>
<td>Built-in historical data for eight regions in Nebraska</td>
<td>Built-in historical data for Minnesota</td>
<td>Wind frequency data can be manually entered</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Setback</td>
<td>Setback distances from the operation at different odor annoyance-free level in four directions (NE, SE, SW, NW) for two different sets of odor management</td>
<td>Setback distances from the operation at different odor annoyance-free level in four directions (NE, SE, SW, NW)</td>
<td>Odor annoyance-free distance for various sources from the operation regardless of wind direction</td>
<td>Individual setback distance for various sources within an operation in eight wind directions (N, NE, E, SE, S, SW, W, NW)</td>
</tr>
</tbody>
</table>

Akter, S. 2018. MSc Thesis, SDSU
• Is it perfect – NO

• It is a science-based estimate, and the best science available

• Topography (hills, valleys, trees, buildings, etc.) also affects odor dispersion

• During very stable meteorological conditions with cooling temperatures, odorous air may travel long distances along low lying areas

• Some counties are using 97% odor annoyance free (11 days/yr)
HEALTH IMPACTS

- Physiological and psychological symptoms have been reported in various studies

- Systematic study of available literature by O’Connor et al. (2010)
  - A weak and inconsistent association between self-reported disease in people with allergies or familial history of allergies
  - No consistent dose-response relationship between exposure and disease
ECONOMIC DEVELOPMENT FROM LIVESTOCK

▪ Labor in barns
  • 13-15 full-time people in a 5,400 sow barn
  • 2,400 hd wean-to-finish barn = 2 hrs/day

▪ Taxes
  • 5,400 sow barn = $13-15 million
  • 2,400 WF barn = $750,000

▪ Manure = $25,000/yr from 2,400 hd WF barn
## ECONOMIC BOOST

<table>
<thead>
<tr>
<th>Company</th>
<th>Role</th>
<th>Town &amp; Population</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS</td>
<td>Equipment</td>
<td>Parkston – 1,497</td>
<td>65</td>
</tr>
<tr>
<td>SDI</td>
<td>Equipment</td>
<td>Alexandria – 635</td>
<td>73</td>
</tr>
<tr>
<td>Hogslat</td>
<td>Equipment</td>
<td>Salem – 1,277</td>
<td>21</td>
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<tr>
<td>Ethan Lumber</td>
<td>Barn Construction</td>
<td>Ethan – 321</td>
<td>56</td>
</tr>
<tr>
<td>Subcontractors</td>
<td>Barn Construction</td>
<td>Ethan area</td>
<td>27+</td>
</tr>
<tr>
<td>Summit Contracting</td>
<td>Barn Construction</td>
<td>Platte – 1,272</td>
<td>16</td>
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<tr>
<td>Subcontractors</td>
<td>Barn Construction</td>
<td>Platte area</td>
<td>10</td>
</tr>
<tr>
<td>Reaves Buildings and Subs</td>
<td>Barn Construction</td>
<td>Sioux Falls – 176,888</td>
<td>23</td>
</tr>
<tr>
<td>D&amp;D Construction</td>
<td>Barn Construction</td>
<td>Marion – 771</td>
<td>10</td>
</tr>
<tr>
<td>Parkston Grain &amp; Feed</td>
<td>Feed Suppliers</td>
<td>Parkston – 1,497</td>
<td>11</td>
</tr>
<tr>
<td>Parkston Grain &amp; Feed</td>
<td>Feed Suppliers</td>
<td>Kaylor – 47</td>
<td>19</td>
</tr>
<tr>
<td>Stan's</td>
<td>Feed Suppliers</td>
<td>Alpena - 283</td>
<td>17</td>
</tr>
<tr>
<td>Central Farmers Cooperative</td>
<td>Feed Suppliers</td>
<td>Montrose - 442</td>
<td>9-10</td>
</tr>
</tbody>
</table>
IMPACT OF LIVESTOCK ON CORN PRICES ($/BU)

- Parkston, SD
- Sioux Center, IA

-$0.40/BU

-$0.12/BU
$56/acre increase
ECONOMIC IMPACT

▪ 5,000 Sow Barn (annually)
  • 190,714 bu of corn (1,090 acres)
  • 53,854 bu of soybeans (1,077 acres)
  • 6,250 tons of feed - 156 loads of feed
  • 1 trailer of piglets out/wk & 4 semis of gilts in

▪ 2,400 hd W-F Barn (annually)
  • 45,737 bu of corn (261 acres)
  • 13,340 bu of soybeans (267 acres)
  • 1,584 tons of feed – 40 loads of feed
  • Two trailers of piglets in
  • Twenty-nine semis of pigs out

▪ 5,000 sow produce 135,000 piglets/year
  • 1,215,000 bu corn (6,943 acres)
  • 375,188 bu soybeans (7,504 acres)

▪ 1 sow: $2,478

▪ 1 market hog: $202.67

▪ 1 dairy cow: $13,594
# ECONOMIC IMPACT OF A 3,100 DAIRY

**Roger Scheibe, Midwest Dairy Association**

<table>
<thead>
<tr>
<th>Item</th>
<th>$</th>
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<tbody>
<tr>
<td>Sales &amp; Use Tax</td>
<td>156,422</td>
</tr>
<tr>
<td>Excise Tax</td>
<td>9,566</td>
</tr>
<tr>
<td>Property Taxes &amp; Permits</td>
<td>40,570</td>
</tr>
<tr>
<td>Vehicle Licenses</td>
<td>4,187</td>
</tr>
<tr>
<td><strong>Total Taxes</strong></td>
<td><strong>210,745</strong></td>
</tr>
<tr>
<td>Payments Made to Local Vendors</td>
<td>16,142,041</td>
</tr>
<tr>
<td>Gross Payroll</td>
<td>2,377,392</td>
</tr>
<tr>
<td>Total Employee Count</td>
<td>62</td>
</tr>
</tbody>
</table>
It's not just about agriculture... It's a public policy debate to address the concerns of all state residents.

In February, 2006, Rodney Ditter and Dorothy Effert held a workshop at the South Dakota State University to discuss the impacts of climate change on agriculture. This was one of the first in a series of workshops held across the state. The goal was to gather information on the potential impact of climate change on agriculture and to develop strategies to mitigate its effects.

The workshops were organized by the South Dakota Agricultural Network (SDAN) and supported by the South Dakota Agricultural cooperative extension service. The workshops were open to all interested parties, including farmers, ranchers, students, and researchers.

The workshops were held in four locations: Yankton, Pierre, Rapid City, and Aberdeen. The focus of the workshops was on the potential impacts of climate change on agriculture, including changes in precipitation patterns, temperature, and extreme weather events.

The workshops were successful in raising awareness of the potential impacts of climate change on agriculture and in encouraging discussion among stakeholders. The participants were encouraged to share their experiences and to develop strategies to address the challenges they faced.

As a result of the workshops, the South Dakota Agricultural Network (SDAN) has developed a Climate Change Adaptation Plan for Agriculture. The plan includes strategies to help farmers and ranchers adapt to the impacts of climate change, such as improved crop and livestock management, diversification of crops and livestock, and improved irrigation practices.

The plan is a living document, and the South Dakota Agricultural Network (SDAN) continues to work with farmers, ranchers, and other stakeholders to develop and implement strategies to address the impacts of climate change on agriculture.

The plan is available on the South Dakota Agricultural Network (SDAN) website and is updated regularly to reflect the latest information on climate change and its impacts on agriculture.

The South Dakota Agricultural Network (SDAN) is a collaborative effort of the South Dakota Agricultural cooperative extension service and other organizations that support agriculture in the state. The network is dedicated to promoting sustainable agriculture and to developing strategies to address the challenges faced by farmers and ranchers in the state.

The network is supported by a variety of funding sources, including federal and state grants, and it is led by a steering committee that includes representatives from various sectors of the agriculture community.

The South Dakota Agricultural Network (SDAN) is committed to providing resources and support to farmers and ranchers to help them adapt to the impacts of climate change and to promote sustainable agriculture in the state.
“If you want to have jobs, you have to have chores”

Bill Even, former SD Secretary of Ag & current CEO of the National Pork Board
If not responsibly sited livestock operations, then what?
Please stop by for a visit
“We’re all in this together”