What’s New in Manure Equipment and Management

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Objectives

- New equipment vs. new management
- Removal of sludge from lagoons
- The 2014 Manure Expo at Springfield
- Improvement potential and opportunity
- Take home messages
My Question to you:

- Is manure management a challenge?
Implications

• 2014 Dairy Farmer survey results
  – Missouri Dairy Producers Needs Assessment, conducted by Commercial Ag. team
  – What did we learn about the manure management?
What do dairy producers in your area need to be more successful?

Source: Joe Horner & Ryan Milhollin
What is your greatest challenge on your dairy farm?

- Labor: 45
- Animal health: 15
- Forage issues: 15
- Weather: 20
- Input costs: 10
- Time management: 10
- Profit margins: 10
- Other production issues: 5
- Access to land & capital: 5
- Farm infrastructure needs: 5

Source: Joe Horner & Ryan Milhollin
Rate the quality of dairy infrastructure in your area

<table>
<thead>
<tr>
<th>Service</th>
<th>1- Excellent</th>
<th>2- Ok</th>
<th>3- Could be better</th>
<th>4- Worried about future</th>
<th>5- Big problem now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manure/lagoon spreading contractors</td>
<td>5%</td>
<td>30%</td>
<td>34%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>Dairy equipment sales and service</td>
<td>16%</td>
<td>35%</td>
<td>28%</td>
<td>14%</td>
<td>7%</td>
</tr>
<tr>
<td>Dairy quality forage contractors</td>
<td>6%</td>
<td>31%</td>
<td>43%</td>
<td>8%</td>
<td>12%</td>
</tr>
<tr>
<td>Veterinary service with dairy expertise</td>
<td>37%</td>
<td>36%</td>
<td>17%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Dairy nutrition/ration consulting</td>
<td>19%</td>
<td>42%</td>
<td>29%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Extension dairy advice</td>
<td>21%</td>
<td>54%</td>
<td>16%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Milk hauling</td>
<td>41%</td>
<td>42%</td>
<td>8%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Cooperative field service</td>
<td>22%</td>
<td>49%</td>
<td>23%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>General farm supplies and fertilizer</td>
<td>29%</td>
<td>56%</td>
<td>10%</td>
<td>4%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Average: 1.93

Source: Joe Horner & Ryan Milhollin
Farm Expansion or New Farm

- Expansion or starting a new operation
- Need to consider the amount of manure or additional manure per year
- Need to consider the storage system, is it appropriate, enough for extra rain water?
- Land application:
  - Equipment and labor to pump 10% of storage volume in one (1) working day
  - Enough area for the nutrients
New Regulations

- 10 CSR 20-8.300 Manure Storage Design Regulations?
- Only for permitted operations, class I.
- Class II for dairy = 210 to 699 head
- **No Discharge Requirement**
- Design Storage Period
  - Recommend 365 day storage period
  - Minimum 180 day storage period for land application manure
New Regulations

• For uncovered liquid manure storages with <365 day storage capacity, does AFO have:
  – At least 50% ownership of land application equipment
  – At least 50% of annual land application area
  – At least 50% annual land application area in permanent, perennial vegetation
  – Equipment and labor to pump 10% of storage volume in one (1) working day

• For anaerobic lagoons without an impermeable cover, 365 day design storage period.
Figure 1. Probability of weather favoring completion of fieldwork in Missouri within a specified number of days during an April-May period and a September-October period.

Source: MU Guide G362, Days Suitable for Fieldwork in Missouri
Reasons to Consider Custom Application

• Efficiency
• Experience and expertise
• Follow NMPs
• Insurance
  – Accident
  – Runoff, spill, discharge, fish killed …
• Investment of equipment and personnel
New Equipment/Management?

- Recycle sand
- Solid/liquid separation
- Recycle water, byproduct production
- Anaerobic digestion
Consider Upgrading Equipment?
Consider Upgrading of Equipment?

Free-stall barn manure scraping

Flushing in the milking center
Consider Upgrading Equipment?

Automated cable pulled scraper

V-shaped mechanical blade
Sand/Solid Separation?
The Right Equipment/Management?
The Right Equipment/Management?
How to Remove Solid/Sand in Storage?

- Sand or solid build up over the years
- Working volume of lagoon or storage decrease
- Problems?
- How to reclaim the design storage?
Solid in the Lagoon?
Using a Lagoon Agitator?

What we demonstrated at the 2014 Manure Expo
What we demonstrated at the 2014 Manure Expo
Using a Lagoon Dredge?

Photo credit: David Paisley
How Does Lagoon Dredge Work?

Photo credit: http://merrellbros.com/
Draghose and Surface Application
Side-dressing Manure
Large Scale Anaerobic Digester

• Manure removed by scraper
• Manure from holding barn flushed
• Biogas provide electricity for the farm
• Manure is irrigated/injected into land
• Separated digested solids (SDS) used as bedding in freestall barns
• Odor control
• What’s the right size farm for AD?
• Compatible with my farm?
Methane Generation

Electricity Generators
Anaerobic Digester System at MU
Flaring of AD Biogas
Take Home Messages

• Pay enough attention to manure storage and management, especially when expanding and starting new
• Consider hiring professionals
• Before improving/upgrading system, consider budget and local services
• Every farm is different, consult with folks before making decision
• Let’s improve manure management, and minimize nutrient losses
Thank you!

Questions?

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