Making the most from manure

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Sustainability requires a balance of economic viability, environmental impact, and societal needs. No doubt, economic viability is always at the forefront of the decision making process on dairy operations.

Over the last few years, environmental compliance and analysis of environmental impact have opened a new language for many in the dairy business. In addition to ever-changing regulatory requirements, producers are faced with ever-increasing pressures from an expanding urban society and a global marketplace.

The volatility in production input prices (feed and fuel), combined with sinking prices received for milk and a particularly unstable banking market, make most dairy operators (and processors) very nervous. Financially, dairy operators are trying to figure out how to cut costs. Yet, various industries and food processors continue to initiate programs and/or respond to consumer groups’ concerns in order to inch toward greater sustainability for their supply chain and market outlets.

Evaluate your system

Managing manure to minimize costs and maximize revenue is important. Critically evaluate existing manure collection, storage, treatment, and utilization systems to determine if and/or where improvements are possible to reduce costs or increase revenue. Be sure that any alterations in manure management are acceptable to local and state regulatory agencies.

Step 1. Analyze the inputs to the waste stream.

There are numerous inputs into liquid/slurry/solid manure waste streams. It’s important to identify if simple management changes can reduce costs associated with handling waste (typically by reducing volume). Common sources of inputs to the waste streams are identified with suggested areas to consider in Table 1.

Step 2. Analyze alternative outlets for manure if the waste stream is modified.

Most operators are governed by a nutrient management plan of one form or another. It becomes increasingly important to...
minimize atmospheric losses of nitrogen from manure. This is important since atmospheric losses reduce the amount of plant available nitrogen in the manure. Nutrient excesses exist when manure nutrients exceed the capacity of the land application area to receive nutrients.

Address potential options for alternative composition to existing manure sources (Table 2) and determine if it is feasible to modify current manure collection/treatment practices to yield different compositional outputs (drier, higher N, etc.) and potentially increase income with the new product.

Step 3. Identify practice(s) or technology(ies) to achieve desired outcomes identified in Step 2 (establish a job description or goal).

Potential investment in technologies may be helpful if the desired modification to manure composition isn’t achieved through alternative management practices. As identified in previous Western Dairy Management Conferences (2003) it is best to identify the job description before selecting the technology. Once a job description is identified it is potentially possible to identify one or more technologies to achieve the desired outcome. Ideals of technologies that have no cross media impacts may be needed for producers in areas where water, air, and county regulatory requirements potentially conflict with one another.

There is no perfect technology to manage dairy manure and address both water and air quality concerns. A review of submitted technologies in 2005 by interested stakeholders in California identified that most technology providers were unable to provide data collected by an impartial third party to identify technology effectiveness. Technologies have a higher probability of being successful when the job description required is specific and simplistic.

It is easy for a vendor to imply that a technology will resolve all problems associated with manure management. Be sure you review actual data from research projects done with the technology on dairy farms. It’s critical that the testing process occur on a facility with similar management practices to your facility if you are interested in transferring findings to your operation. Contact the dairy operator where the research was conducted. Ask specific questions to find out if they are satisfied with the technology, if they’re still using it, and find out if they paid for it or received it at minimal cost. Point blank ask if they would do it again, and if they recommend that others pay full price for it.

The value in writing down your job description needs and comparing it to the potential technology is to save you from installing something that will not accomplish what you need. As an example, the standard anaerobic digestion methodology remains effective to reduce organic fraction in materials. However, it does nothing to salts or P and it causes more of available form of Nitrogen (ammonium form) while reducing the organic fraction of N. If the biogas is burned through a combustion engine to generate electricity you should reduce methane emissions. Depending on your air district and your engine, you may violate emissions of NOx, and potentially emit small amounts N2O (a very potent greenhouse gas).

Cash in on new sources of revenue

Cap and trade systems for water and air emissions will provide new opportunities for new revenue on dairies. Depending on the location of a dairy, credits for reductions in phosphorus, nitrogen or sediment (erosion) may be available. In other locations, attention to criteria pollutants (particulate matter, NOx) or select greenhouse gases (methane, nitrous oxide, carbon dioxide) may have value. There are market opportunities to obtain greenhouse gas emissions credits for use by companies in the U.S. or abroad.

In areas where air quality is poor there may also be opportunities to implement management practices/technologies to reduce emissions. This is the real, quantifiable, and permanent. Reductions must be proven to have occurred. This requires a third party analysis to confirm reductions and must be documented by the regulatory and/or emission credit agency specifications. Accepted methodology must be available and employed when measuring emission reductions. Reductions are intended to be permanent. (Note: It is probable that offsets would need to be purchased and used by companies in the U.S. or abroad.)

### Table 2: Potential modification of existing manure to find if alternative markets exist for manure.

<table>
<thead>
<tr>
<th>Desired outcome for manure</th>
<th>Potential methods to assist in achieving objective</th>
</tr>
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<tbody>
<tr>
<td>Increase N, P, and/or K in manure</td>
<td>Scrape manure onto surface for air drying (instead of flushing).</td>
</tr>
<tr>
<td>Modify solid manure characteristics (drier, weed seed free, or has a reduced pathogen load)</td>
<td>Collect as slurry instead of liquid; collect more frequently to reduce N losses.</td>
</tr>
<tr>
<td>Specific particle sizes or density</td>
<td>Dry sewtreat via compost to reduce weed seeds and pathogens; use anaerobic digestion as pathogen reduction technology.</td>
</tr>
<tr>
<td>If liquid manure has more/less solids.</td>
<td>Select mechanical separation screen to meet requirements; improve separation of sand or earthen components.</td>
</tr>
<tr>
<td></td>
<td>Use processing centers to concentrate materials; reduce water inclusion in stream.</td>
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</tbody>
</table>

### Western Dairy News

*Published as a service to people interested in the health and welfare of the Western dairy industry. Archives of this publication may be found at http://animalscience-extension.tamu.edu/dairy/wdn.html*

*For further information contact: Dr. Ragan Adams, Editor, 300 W. Drake Road, Fort Collins, CO 80523; 970-297-0371; radams@lamar.colostate.edu*

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Potential methods to assist in achieving objective:

- Scrape manure onto surface for air drying (instead of flushing).
- Collect as slurry instead of liquid; collect more frequently to reduce N losses.
- Dry waste treat via compost to reduce weed seeds and pathogens; use anaerobic digestion as pathogen reduction technology.
- Select mechanical separation screen to meet requirements; improve separation of sand or earthen components.
- Use processing centers to concentrate materials; reduce water inclusion in stream.

This article is excerpted from a presentation at the 2009 Western Dairy Management Conference in Reno, Nevada.