Total Quality Manure Management

How Attentive Management Shows Up in Superior Fuel and Fertilizer Value
Total Quality Manure Management

- Published in 1995

- Major topic areas
  - Manure stockpiles
  - Manure collection methods
  - Cattle performance vs. pen surface condition
  - Manure quality and economics
  - Manure quantity
Manure Stockpiles

- “Manure is a perishable commodity that generally loses value with residence or storage time.”
- “Manure needs to be harvested frequently to preserve nutrient value, with the best quality manure collected preferentially.”
- “Manure should be used in a timely manner to preserve nutrients and prevent environmental losses.”
Manure Harvesting Methods

- “Manure collection methods should minimize admixing the underlying soil and incorporating debris.”
- “Soil or debris that is mixed with manure reduces the value per ton through reduced nutrient content and higher tonnage.”
- “Manure contractors and workers should adopt an attitude of harvesting manure rather than cleaning pens.”
Muddy conditions in feedlot pens increase a 900-lb steer’s daily net energy requirement for maintenance by 45% and can reduce gains by 25-35%.

Cost of gain may increase by $0.14-0.18/hd/d under muddy conditions.

“Lot surface management that results in fewer muddy days would improve the feed-to-gain ratio.”
Manure Quality and Economics

- The largest variables affecting nutrient content are water and ash.
- Ammonia emission rate nearly triples during the drying cycle after a rainfall event.
Manure Quantity

- Mounding results in loss of up to 30% of dry matter
- Poorly built mounds that take up too much space in the pen and are unusable by the cattle:
  - Reduce the effective animal spacing; and
  - Concentrate both manure and moisture excretion
- Soil and debris increase mass of manure collected
Fresh Manure Composition

- Water: 82%
- K$_2$O: 13%
- Other: 13%
- N: 1%
- Ash: 3%
- P$_2$O$_5$: 3%
<table>
<thead>
<tr>
<th>Manure Type</th>
<th>Fresh</th>
<th>As-Collected</th>
<th>Stockpiled</th>
<th>Composted</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>0.68</td>
<td>1.29</td>
<td>1.48</td>
<td>1.42</td>
</tr>
<tr>
<td>Ash</td>
<td>2.60</td>
<td>36.37</td>
<td>48.28</td>
<td>35.57</td>
</tr>
<tr>
<td>P$_2$O$_5$</td>
<td>0.42</td>
<td>0.89</td>
<td>1.11</td>
<td>1.32</td>
</tr>
<tr>
<td>Water</td>
<td>83.00</td>
<td>35.40</td>
<td>24.20</td>
<td>30.80</td>
</tr>
<tr>
<td>K$_2$O</td>
<td>0.51</td>
<td>1.32</td>
<td>1.93</td>
<td>2.33</td>
</tr>
<tr>
<td>Other</td>
<td>12.79</td>
<td>24.74</td>
<td>23.00</td>
<td>28.57</td>
</tr>
</tbody>
</table>
Fertilizer Value of Manure
Irrigated Corn; Fresh Manure; K required

![Graph showing the value of fertilizers per acre and wet ton in relation to application rate.](chart.png)
Benefits of a Conscientious Manure-Harvesting Program

- Higher fuel value
- Higher fertilizer value
- Reduced metabolic maintenance requirements
- Improved pen drainage
- Reduced dust, odor, flies and ammonia potential
Summary: Objectives of a Conscientious Manure-Harvesting Program

- Hard, smooth, well compacted, well drained corral surface
- No exposed mineral soil or caliche
- No disruption of interfacial layer
- Well constructed, well maintained mounds (if needed)
- No wallows; no uncompacted mounds