NY Pollution Discharge Elimination Permits for CAFOs, Management Adjustments and the Environment

Dolapo Enahoro, Todd M. Schmit and Richard N. Boisvert
Applied Economics and Management, Cornell University


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Introduction
• NY’s 2009 CAFO regulations may exacerbate pressure on dairy farm operating margins
• NY’s Pollution Discharge Elimination for CAFO
  ✓ Set manure application rates consistent with Cornell’s nutrient recommendations
  ✓ Prohibits application where soil P is excessive
  ✓ Limits application where soil P test is high
• Reduced opportunities for manure application will increase off-farm disposal costs
• Feed costs are below 2008 record high, but remain well above historic levels
• NY dairy producers look for cheaper feeds
  ✓ Existing DDGS supplies in Western NY
  ✓ More to come if second plant reopens
• New OME Group’s DDG contract may help manage feed cost risk

A Three-county Study Region in Western New York
• A concentration of Dairy CAFOs
• A major portion of the Genesee River Watershed, draining into Lake Ontario
• Finger Lakes to the east natural barrier to transport manure for disposal

Some Regional Data

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Ave./farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Dairy CAFOs</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>No. Dairy Cows</td>
<td>81,034</td>
<td>734</td>
</tr>
<tr>
<td>Cropped in CAFOs (ac.)</td>
<td>1,377,485</td>
<td>1,419</td>
</tr>
<tr>
<td>Live Crop (ac.)</td>
<td>1,377,785</td>
<td>1,420</td>
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A regional mathematical programming model that:
Maximizes expected income over variable costs for dairy CAFOs

Key Components of the Model:
• Livestock:
  ✓ Rations: lactating cow, dry cow, replacement heifers (CPM-Dairy program, Cornell & U of Penn)
• Forage bases: 60/40 & 40/60 corn silage/hay crop silage
• DDGS products: 8% and 12% fat
• Milk and manure production (incl. levels of N & P) differ by ration
• Crops (with rotation restrictions):
  ✓ Alfalfa, orchardgrass, corn silage, corn grain (grow, buy, sell)
• Manure must be applied to cropland or disposed of off-site
• Different manure disposal costs to reflect different average distance to site
• Cropland assigned to three land classes based on
  ✓ Soil capability class
  ✓ Soil characteristics & silage yields (4.9, 5.3, and 5.9 t/acre, DM)
  ✓ From survey data:10%, 65%, & 25% high, medium, & low quality land, respectively
  ✓ CAFO Regulations: Apply N&P from manure/purchased fertilizer based on soil test P (STP)
• From county soil P test data:
  ✓ 7%, 53%, & 40% of cropland in HP, MP, & LP, respectively

Analytical Approach

Dairy Rations:
• For both scenarios rations for dairy cows include 10% DDGS & 8% DDGS for dry cows & replacements

Off-site disposal:
• Base = 0.0 t/cow
• Policy = 15.5 t/cow (53% of total)

Net Return: Initial drop (<10%) due to increased disposal cost
• Higher disposal cost (e.g., greater travel distance), 20% drop
• Corn acres fall by 20%, manure is spread on increased alfalfa acres

Environmental quality:
• P runoff (ROp) based on corn land using Vada, et al. (J. Environ. Qual. 2006) & differ by soils & weather

Ave. runoff:
• Base = 7.2 lbs/ac.
• Policy = 2.9 lbs/ac.

Safety-first: Drop in threshold runoff exceeded 10% of the time
• Base P (ROP), > 15.8 lbs/ac., 0.1
• Policy P (ROP), > 6.0 lbs/ac., 0.1

Implications & Conclusions
• Policy requires off-site disposal of half the manure
• Net revenue sensitive to availability of nearby land suitable for disposal
• CAFO land with low soil P has enhanced value for crop production and waste disposal
• Off-site disposal may require additional oversight to realize/ensure environmental improvements from CAFO permits

*Research supported in part by USDA Hatch funds NYC-121-6429

NYC Pollution Discharge Elimination Permits for CAFOs, Management Adjustment & the Environment

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