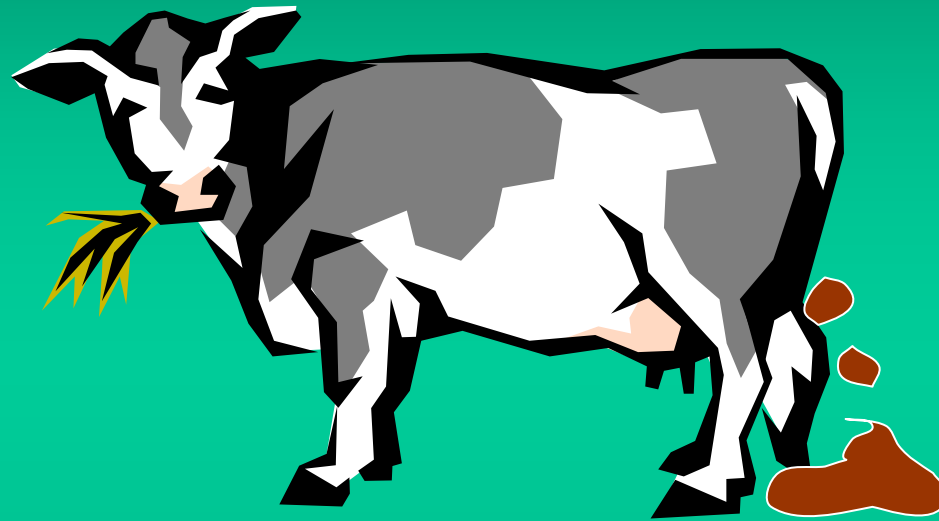


The Role of the Private Sector in Manure Management



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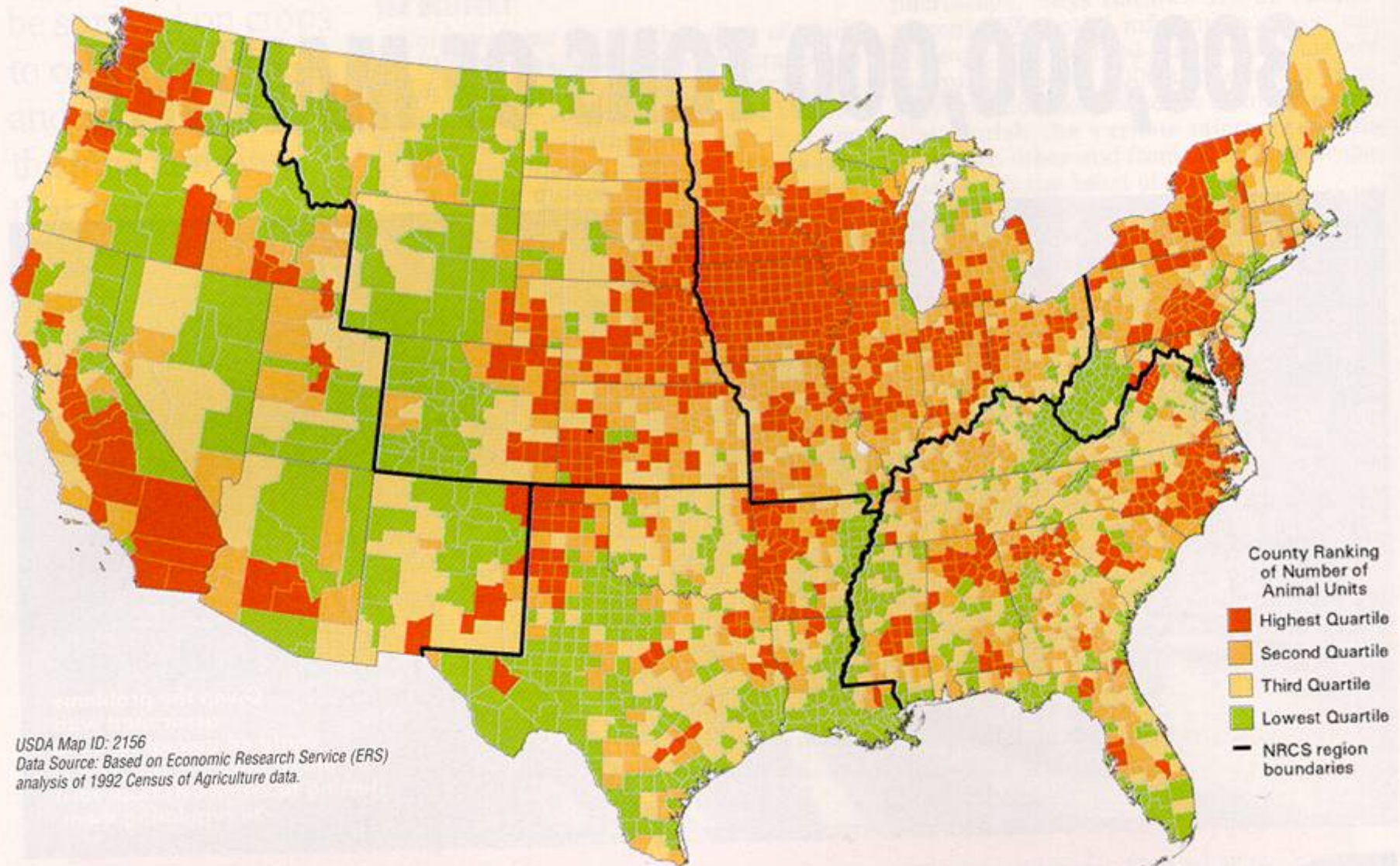
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The “Issues”

- Drive for increasing animal production efficiency has led to increase in size of animal production units.
- Livestock farmers are in business of producing milk or meat, yet 50-80% of feedstock that goes into animal unit is not sold as product.
- Increasing farm size has also reduced productive use of “waste products” on farm.
- Excess amounts of manure being built up in certain areas of WI.

U.S. Confined Livestock Concentrations, 1992 Ag. Census



Current Role of Private Sector in Manure Management

- Soil testing
- Nutrient management plan writing
- Animal nutrition, feeding rations
- Soil fertility recommendations, fertilizer sales
- Custom hauling and land spreading of manure

Entrepreneurial View of Manure Management (Galloway and Walker, 1997)

- Animal production can be viewed like other manufacturing systems: series of processing steps with by-products generated at each step.
- For e.g., animal digestion of feed is 1st step in refining grain.
- Extracts most labile fractions \Rightarrow milk & meat AND concentrates the less labile \Rightarrow manure.
- Manure is partially used resource that shouldn't be wasted.
- “What have we produced that someone else can use?”

Potentially Partitionable Fractions of Animal Manure for Industrial Uses

Fractions	Cattle (% DW)	Swine (% DW)	Poultry (% DW)
Protein	15-30	20-25	30-34
Ash (P, K, Ca, micros)	10-20	10-15	15-22
Ether extract	5-10	3-4	2-3
Lignin, Cellulose, Hemicellulos	50-70	56-67	41-53

^e from Galloway and Walker, 1997

When animal waste management no longer serves only on-farm, material handling functions, BUT includes waste reduction goals to sustain environmental quality, manure management costs rise accordingly.

Alternatives to land spreading
could be more economically
viable when pursued on a large
scale:

⇒ Economies of scale.

⇒ Linking processes and by-
products together to maximize
recovery of useable materials
and value of finished products.

Potential Integrator Role

- Converts low cost waste to higher value products.
- Responds to growing environmental pressures by negotiating practical solutions to environmental problems.

Role of Integrator

- Animal waste transport.
- Capital for waste recycling facility.
- Large, central storage and processing facilities with labor.
- Monitoring/improving operation of facility (increase intensity of in-house management).
- Markets for products.
- Farmer education about technical, economic and regulatory issues.

Processing Technologies Suitable for Private Sector Involvement

- Recycling nutrients for animal feed.
 - Poultry litter for cattle feed
 - Yeast, algae culture
 - Aquaculture
- Pyrolysis (conversion of manure to carbon black, heating oils and synthetic fuels).
- Anaerobic digestion or fermentation for biogas and energy generation.
- Composting to produce soil amendments.
- Dehydration & pelletizing for fertilizer production.

Producing Animal Feed from Poultry Manure



Screening Finished Products for Soil Amendment Markets



Case Study: Centralized Anaerobic Digestion of Manure in New York

- Up-state NY, community of 100 farms: 30,000 animals within a 20-mile radius.
- Compared on-site versus centralized manure processing.
- Examined technical and economic feasibility of collecting dairy waste, transporting to central location, digesting to produce/sell energy and returning digested manure to farms.

Centralized Manure Processing In NY: Findings

- Technical and economic feasibility studies suggest that centralized processing is feasible.
- Average cost of land spreading raw manure was \$77/acre (cost range: net return of \$37/acre- net cost of \$225/acre).
- Costs were higher for farms with <400 cows and those that didn't store manure.

Findings cont'd

- For dairies with < 200 cows, annual costs for break-even operation would be $<$ half costs of present manure management (mostly daily haul).
- Improvements in on-farm management and savings from not building storage should provide benefits to offset costs of centralized processing for dairies with < 600 cows.

Cooperative On-farm Composting

- Combination and processing of manure from livestock operations with residues from crop production farms.
- Production of soil amendment that would be returned to farm fields.
- Brings together livestock farmers and grain farmers as well as integrator.
- Alternative scenario is composting manure with municipal by-products (e.g., yard waste) and marketing compost to urban clients.

Centralized Composting Facility: Manure and Other Organic By- Products



Case Study: Pacific NW Custom Composters

- Lincoln & Assoc. is “Composter for Hire” in Washington and Oregon.
- Works with 3 dairies (450-750 cows): some of manure is bedded; some is solids separated.
- Provides windrow turning services, monitors temperature and moisture levels, markets finished compost for farmer.
- Farmer provides space and proper surface for composting.
- Dairy manure compost sold in bulk for \$12/cu yd. to landscapers.

Commercial Composting of Manure



Case Study: Hog Manure Processing in Netherlands

- 80 million tons of manure produced annually in Holland; <1% is processed.
- In 1995, government subsidized a \$30 million centralized manure processing plant in S. Holland to produce fertilizer pellets.

Netherlands Story, cont'd

- Project failed for several reasons:
 - Govt. tried to mandate surplus manure handling by a “Manure Center”—fierce farmer opposition.
 - Coalition of S. hog farmers sent surplus manure to private manure haulers to be spread on cropland in N.
 - Manure Center was unable to secure sufficient quantities of manure to process centrally.

Lessons Learned

- Government meddling in details of manure handling & processing ignored economics, farmer desires and behavior.
- Did not conduct feasibility study to evaluate all outlets for manure and likelihood of certain volume for centralized processing.
- Analysis of market opportunities for raw and finished products **MUST** be explored.

Needs to Promote Private Sector Involvement in Manure Management

- Research/demonstration or pilot projects in high priority regions.
- Measures to mitigate costs of compliance with federal and state regulations.
- If necessary, provide adequate assurance against economic losses if any single component of the production complex fails.

Needs cont'd

- Incentive systems: subsidies, tax credits, cost sharing, low-interest loans.
- Regulations and technical standards that best integrate environmental quality and agricultural production.
- Increased cooperation between integrators and livestock “trade” associations.