Dairy Waste Management: Today and Tomorrow

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PRO-DAIRY
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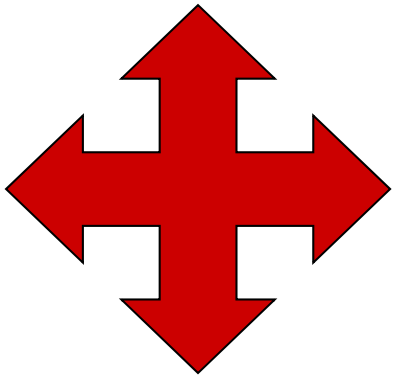
Production Model

MAKE Babies

GROW Crops



PRODUCE Milk

MANAGE Waste

→ Manure

→ Milk House Wastewater

→ Silage Leachate

How do we change the Perception of Waste?

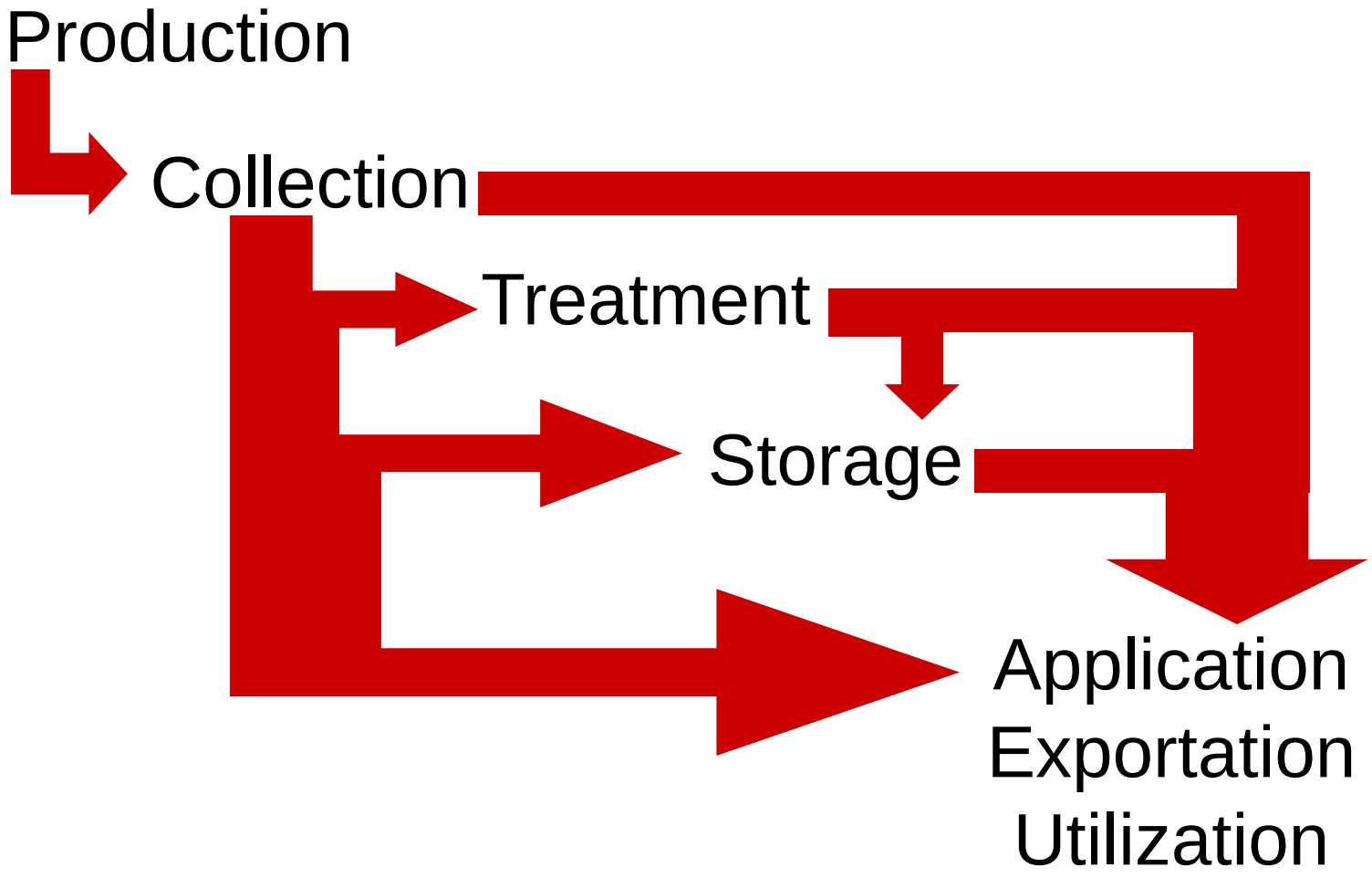
Changing the Perception of Waste:

1. Understand Benefits
2. Identify Value
3. Determine Cost
4. Define Options

OPTIMIZE the system to insure

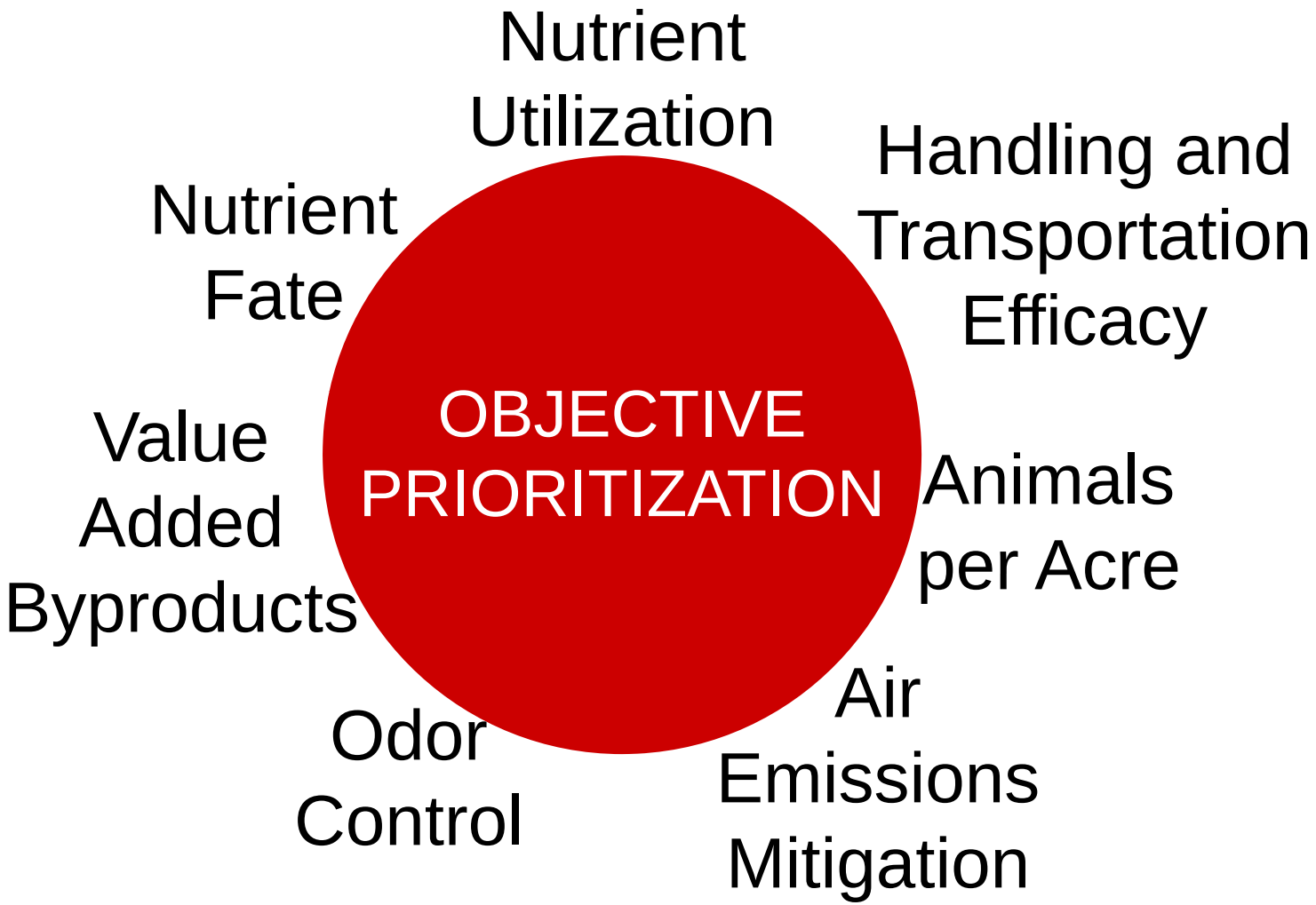
that it works FOR you

Management Model(s)

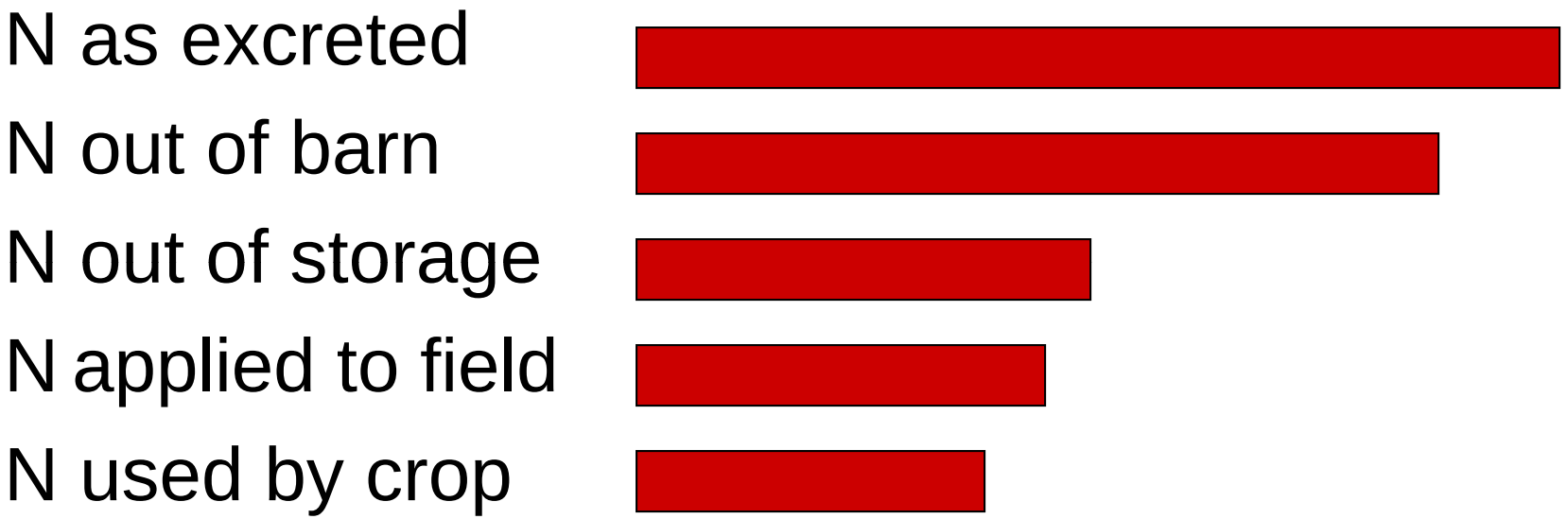


OPTIMIZE Individually or Systematically

Management Matrix



A Closer Look at Nitrogen



What would you do if 50% was lost between milking and the CHECK?

Production

- Manure
  - Feed Rations and Nutrients
  - Bedding Reclamation or Reduction

- Milk House Wastewater
  - Treatment and Reuse → Large
  - Dedicated Spray Fields → Small-Medium
  - Vegetative Treatment Areas → Small-Medium

Collection – Manure Tubes

- 2” Slot Above ~18” Tube
- Liquids Drain Freely
- Solids Forced by Scraper

Project of the Future

Urine-Feces Isolation

Back to the Barn Floor Basics

→ Limit Liquid and Fiber Mixing

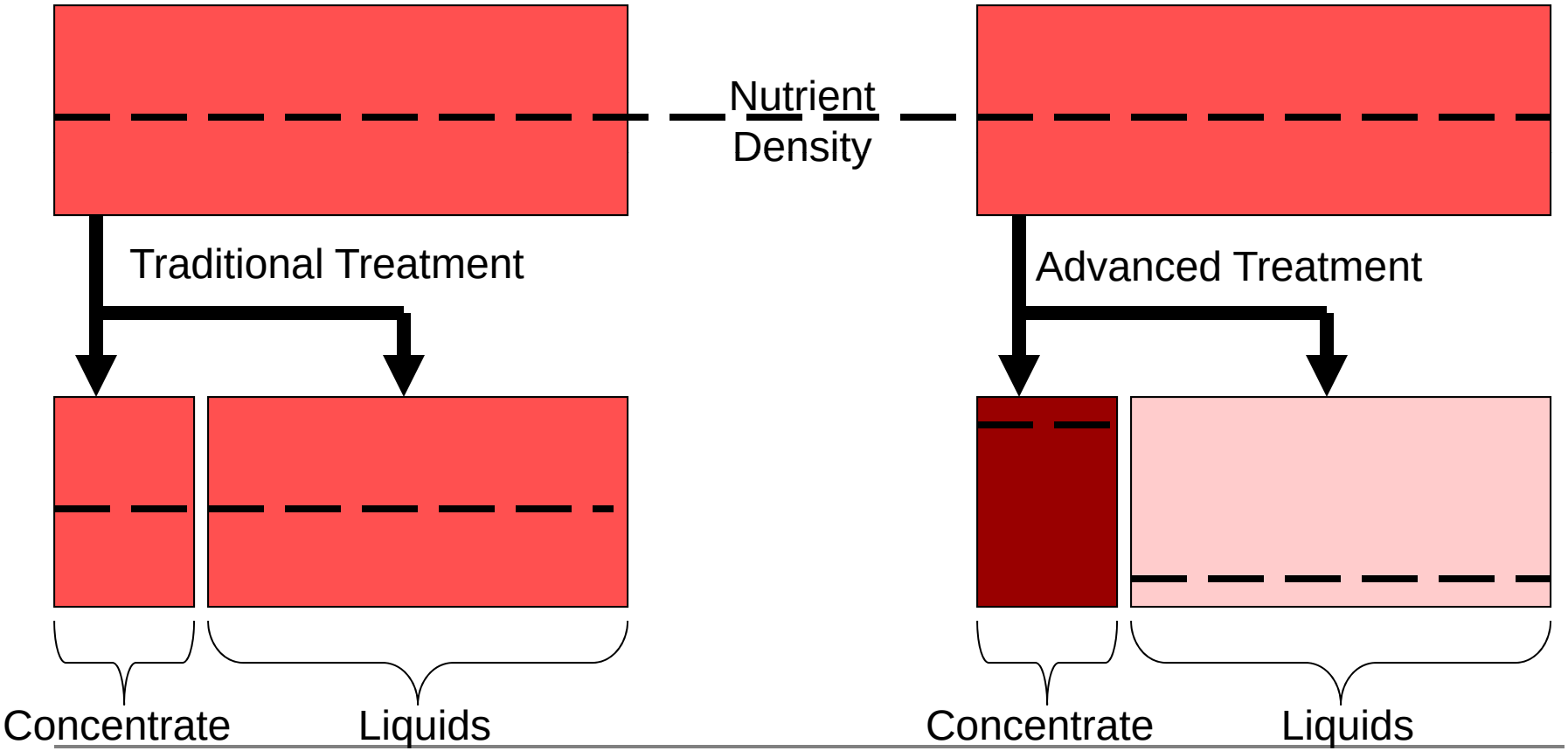
- Liquid System
  - Limited Fiber
  - Nitrogen as Urea
  - Low P(Feces contains all P)
- Fiber System
  - Lower Moisture
  - Organic Nitrogen
  - Majority of P
- Possibly Reduce Ammonia Emissions

Traditional Treatment Systems

- Manure Solids Separation
  - Compost
  - Bedding
  - Volume Reduction
  - Nutrient Neutral
- Anaerobic Digestion
  - Energy Production
  - Odor Control
  - Nutrient Neutral

Advance Treatment Principle

Concentrate or Partition Nutrients into a Small Package



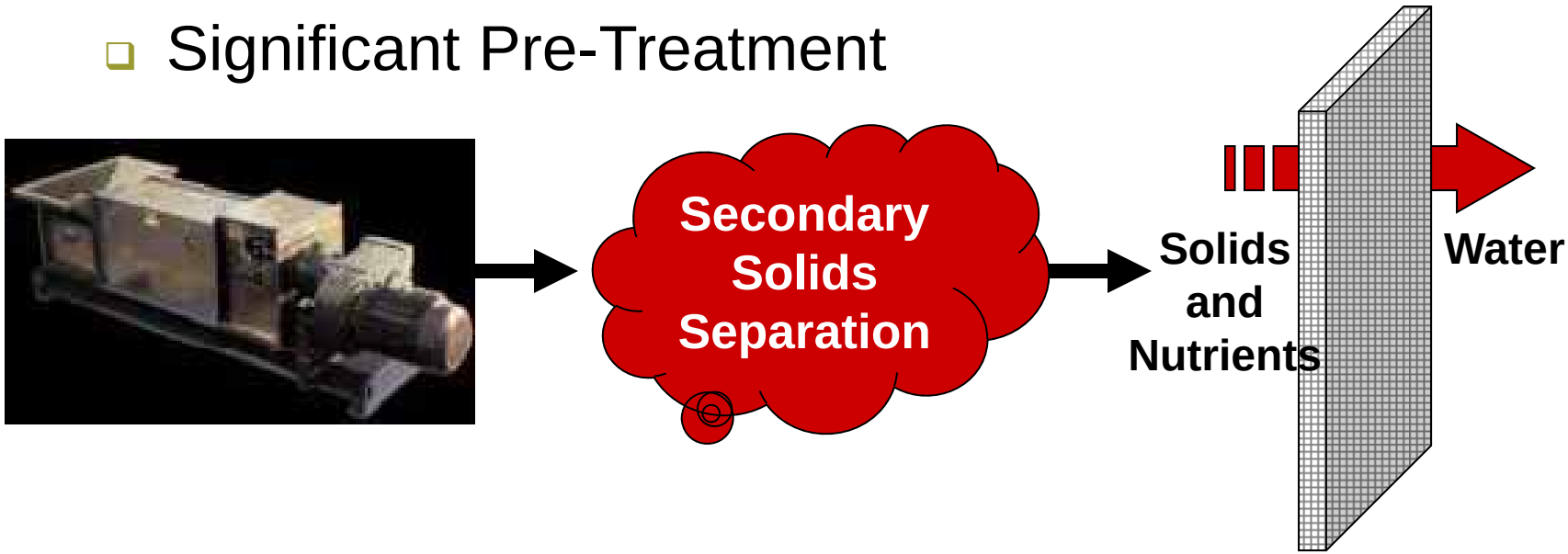
Advance Treatment Systems
Promising Systems

- Chemically Aided
  - Mechanical Separation
  - Dissolved Air Flotation
  - Passive Separation

- When Optimized
  - 80% to 95% P in Fiber Fraction
  - 30% to 40% Nitrogen in Fiber Fraction
  - Low Nutrients and Solids in Liquid Fraction

Advance Treatment Systems
Promising Systems

- Sequenced Mechanical Separation
  - End Goal → Membrane Separation
  - Limits Chemical Requirement
  - Significant Pre-Treatment



Manure Storage

Compost Barn

- Fits Small Dairies
- Limits External Manure Storage
- Excellent Cow Comfort
- High Bedding Management
- High Bedding Demand
  - Dry Sawdust
  - Finely Chopped Wheat Straw?

Manure Storage

Impermeable Covers

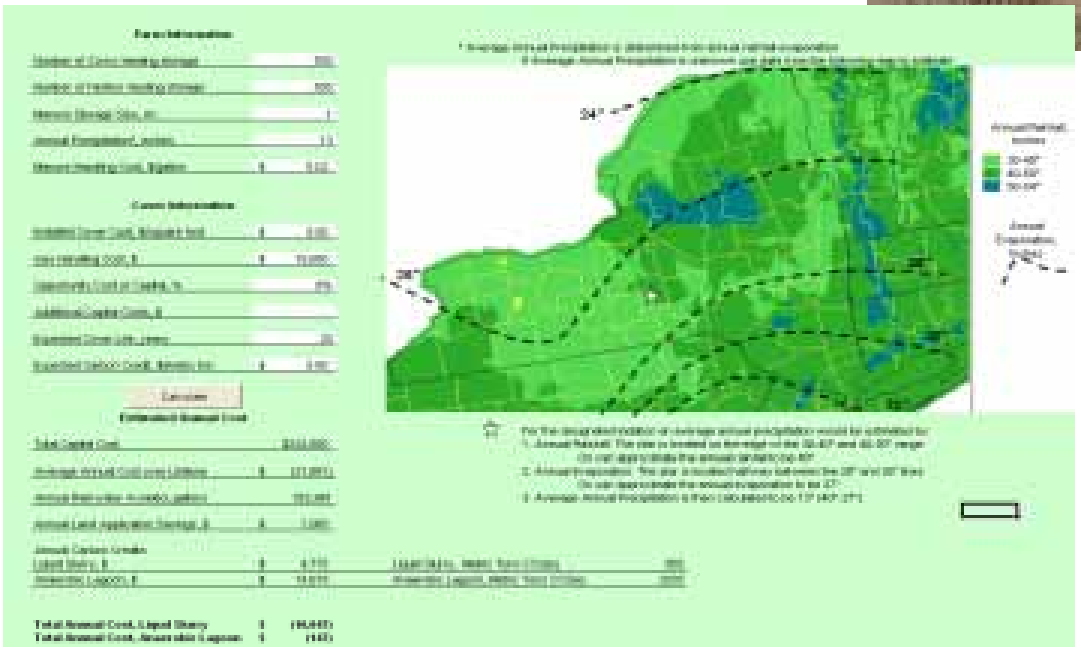
- Odor Control
- Air Emissions Mitigation
- Nutrient Retention
- Rainwater Avoidance
- Biogas Collection

Permeable Covers

- Odor Control
- Air Emissions Mitigation
- Nutrient Retention

Covers for Manure Storages

- Fact Sheet Series
  - Introduction
  - Economics



- Design
- Gas Handling
- Manure Handling

Available on-line at: www.manuremanagment.cornell.edu

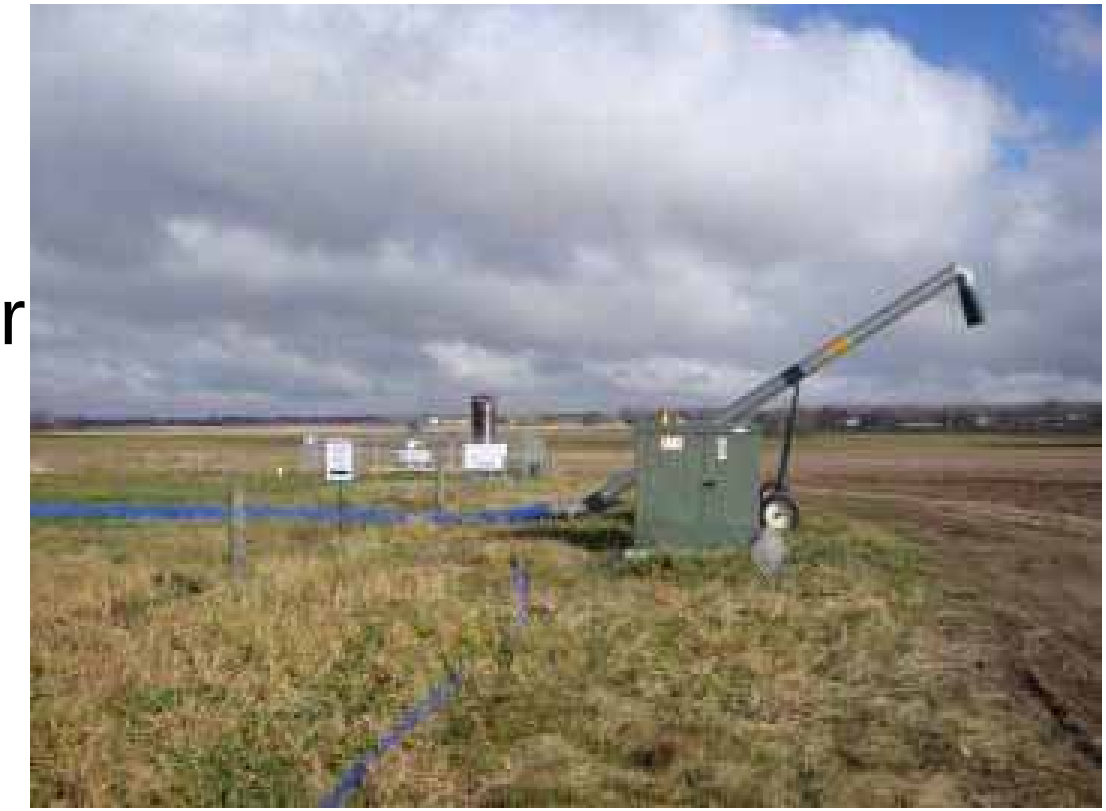
Covers for Manure Storages

- Monitoring Installed Covers
  - On-farm Management
    - Nutrient Impact
    - Solids Fate
  - Gas Production
    - Quantity/Quality
    - Trends
    - Utilization

Land Application

Take a Page from Analyzing Milking Systems

- Labor Efficiency
- Capital Efficacy
- Quality Control
- Impacts on Exterior Operations



Land Application

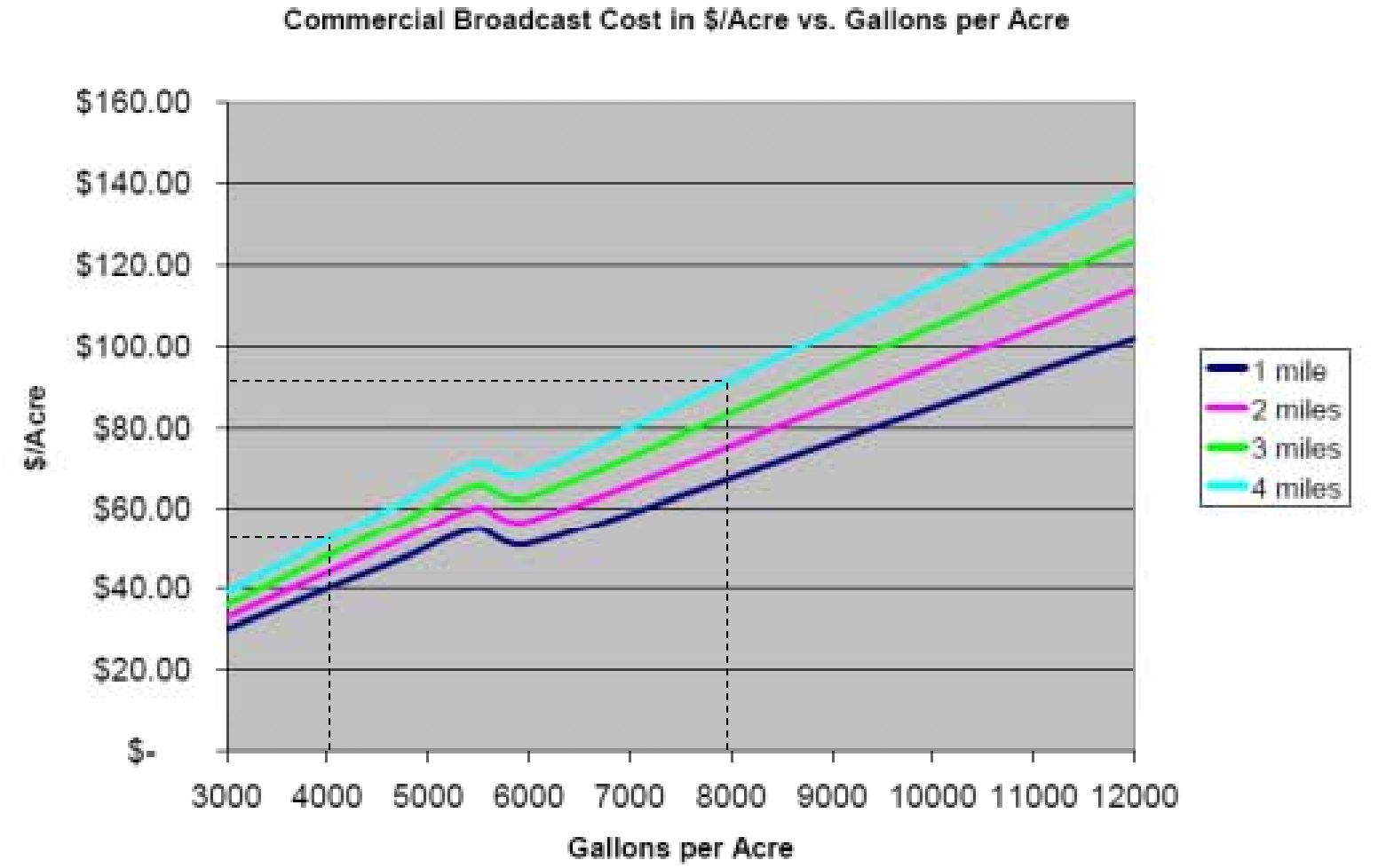


Figure 2. Commercial broadcast cost for drag hose application (Puck, 2008).

Questions

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