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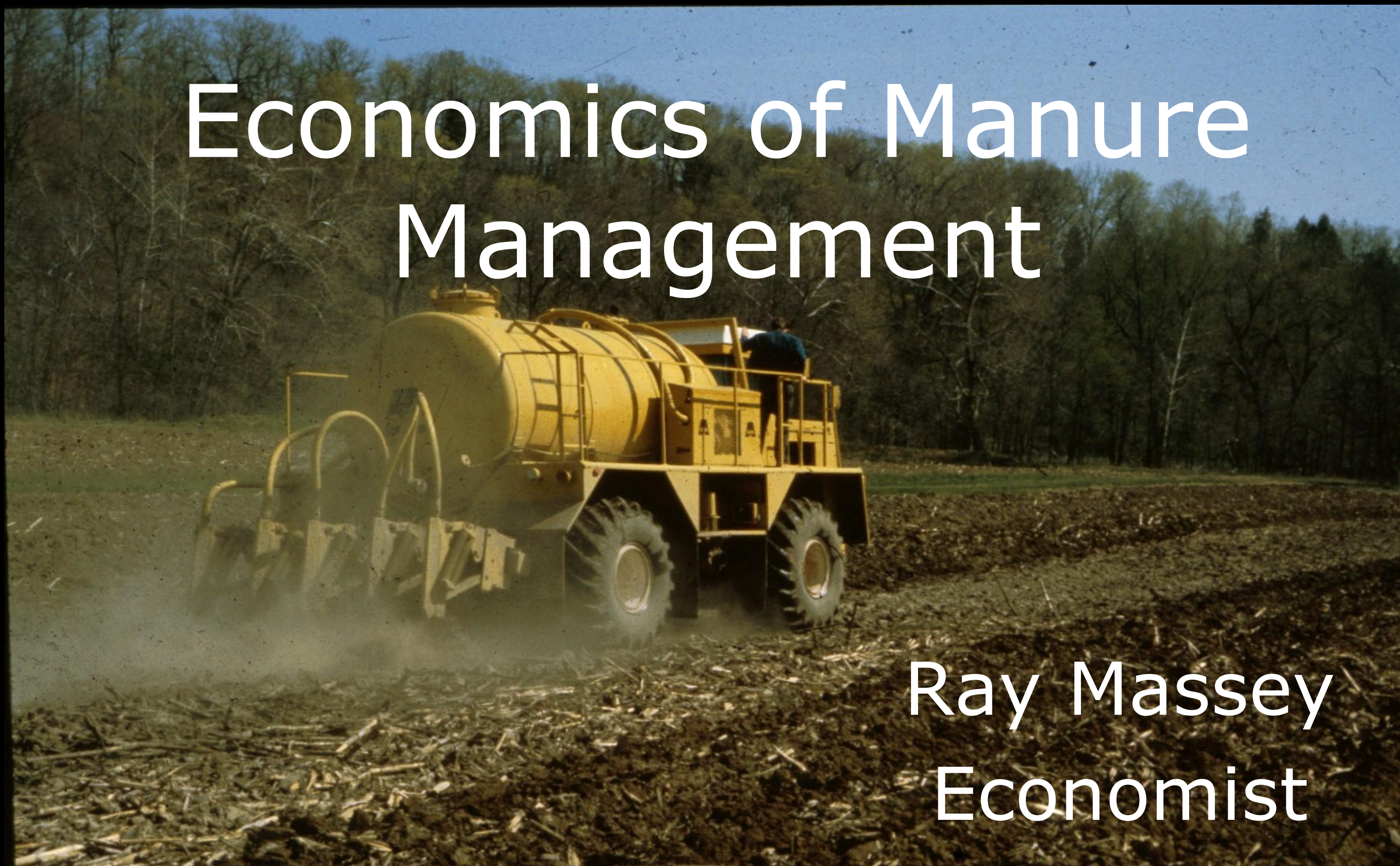
Extension
COMMERCIAL AGRICULTURE

Economics of Manure Management



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Economic Decisions Consider NET VALUE

Gross Value

\- Cost

Net Value

Value can be revenue or a cost offset

Critical Costs

- Financial Costs
  - Application Costs
  - Storage Costs
- Time Requirements
- Land Requirements

Managing Manure Cost

- Objective: minimize the cost of storage and land application.
- Decision: store in an inexpensive structure that dissipates nutrients – lagoon.
- Result: lose valuable plant nutrients while increasing volume.
- Ask your boss for a pay cut so you won't have to pay as much tax!

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Managing Manure Costs

- Objective: Minimize transportation cost.
- Decision: apply manure to the closest land.
- Result: P and K overloading so that the value of P and K is lost.
- Drive 1 mile to the track to jog 1 mile.

Financial Objective: Increase Net Value

Gross Value	↑	↔	↓	⇈
- Cost	↔	↓	⇊	↑
Net Value	↑	↑	↑	↑

Critical Value Factors

- Valuation Choice
- Marketing Strategy
- Soil Fertility
- Cropping System

Valuation Choice: Dollars/Acre

	Manure Supplied Nutrients		Commercial Fertilizer $/acre[1]
Nutrient	$/1000 gallons	$/acre @ 4K gallons/acre	
Available N	$20.00	$80.00	$80.00
P_2O_5	$18.88	$75.52	$32.45
K_2O	$11.60	$46.40	$18.00
Total Value	$50.48	$238.80	$130.45

1. N = 160 lbs. @ $.50; P2O5 = 50 lbs. @ $.59; K20 = 40 lbs. @ $.40

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Marketing Strategy: Mult-year Fertility

Nutrient	Manure Supplied Nutrients: $/1000 gallons	Manure Supplied Nutrients: $/acre @ 4K gallons/acre	Commercial Fertilizer $/acre[1]
Available N	$20.00	$80.00	$80.00
P_2O_5	$18.88	$75.52	$32.45
K_2O	$11.60	$46.40	$18.00
Total Value	$50.48	**$238.80**	**$130.45**

1. N = 160 lbs. @ $.50; P2O5 = 50 lbs. @ $.59; K20 = 40 lbs. @ $.40

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Transportation Cost

Transportation Cost ($/hr)	$180
Road travel speed (mph)	10
Tank Capacity (gallons)	6000
Cost/1000 gallons/mile	$3.00
Application rate (gal/ac)	4000
Cost/acre/mile	$12.00

Valuation Choice: Dollars/Acre

Nutrient	Manure Supplied Nutrients: $/1000 gallons	Manure Supplied Nutrients: $/acre @ 4K gallons/acre	Commercial Fertilizer $/acre[1]	**Difference**
Available N	$20.00	$80.00	$80.00	$0.00
P_2O_5	$18.88	$75.52	$32.45	$43.07
K_2O	$11.60	$46.40	$18.00	$28.40
Total Value	$50.48	$238.80	$130.45	**$71.47**

1. N = 160 lbs. @ $.50; P2O5 = 50 lbs. @ $.59; K20 = 40 lbs. @ $.40

Capture Full Value:
$71.47 ÷ $12/acre-mile = 6 miles

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Valuation Choice: Dollars/Acre

Nutrient	Manure Supplied Nutrients $/1000 gallons	Manure Supplied Nutrients $/acre @ 4K gallons/acre	Commercial Fertilizer $/acre[1]	**Difference**
Available N	$20.00	$80.00	$80.00	$0.00
P_2O_5	$18.88	**$75.52**	$32.45	$43.07
K_2O	$11.60	$46.40	$18.00	$28.40
Total Value	$50.48	$238.80	$130.45	$71.47

1. N = 160 lbs. @ $.50; P2O5 = 50 lbs. @ $.59; K20 = 40 lbs. @ $.40

Capture P Value (if current land needs no P):
$75.52 ÷ $12/acre-mile = additional 6.3 miles

Increase Net Value by Selecting Soils that Need P

Gross Value	↑	↔	↓	↑↑
- Cost	↔	↓	↓↓	↑
Net Value	↑	↑	↑	↑

Cropping System

- Apply to crops needing N.
- Apply all needed N to eliminate commercial N fertilizer application cost.
- Apply multiple years of P and K. Don’t reapply until P and K needed again.
- Apply to cropping systems that remove lots of nutrients and have high value.

Increase Net Value by Selecting Soils that Need P

Gross Value	↑	↔	↓	⇈
- Cost	↔	↓	⇊	↑
Net Value	↑	↑	↑	↑

Storage Costs - Lagoon

- Least cost of construction
- Least cost of application – irrigation
- Fewest nutrients to apply
- Stores P for later application
- Ideal for predominately pork producer; not necessarily ideal for integrated crop/pork producer.

Increase Net Value by Selecting Soils that Need P

Gross Value	↑	↔	↓	⇈
- Cost	↔	↓	⇊	↑
Net Value	↑	↑	↑	↑

Storage Costs - Slurry

- Greatest crop nutrient value
- Higher application costs – tanker or dragline
- Ideal for integrated crop/swine producer

Increase Net Value by Selecting Soils that Need P

Gross Value	↑	↔	↓	↑↑
- Cost	↔	↓	↓↓	↑
Net Value	↑	↑	↑	↑

Cost Reduction Stategies

- Reduce bulk from water
  - Wet-dry feeders
  - Water management
  - Cover storage
- Reduce travel by piping or larger tankers.

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Opportunity Cost - Time

- Machinery
  - Custom hire or Owned
  - Single or multiple pieces
- Integrated crop/livestock producer can spread costs of equipment over more enterprises.
- Livestock producer is constrained by the willingness of crop producer to accept manure.

Opportunity Cost - Time

- Machinery: Pipe or tanker
- Machinery: Speeds and application rates
- Cropping system adoptions
  - Delay spring planting?
  - Wheat?
- Application limits and resulting rates.

Application Limits – Time Costs

Application Limit	Cost	Application Time	
	Dollars per 1000 gallons	Minutes per AU	Hours per 1000 AU
Annual N Removal	$13.04	10.6	175
Annual P Removal	$18.54	15.0	250
4-year P Removal	$15.02	13.1	220

Land Cost - Slurry

- Corn-Soybean rotation – N supplied in corn year; P for both corn and soybean
  - 4800 head wean-finish operation needs 800 to 1200 acres
  - 4800 head grow-finish operation needs 1000 to 1600 acres

Land Tenure and Net Income

- Fertilizer value is optimized when put on land the producer controls (owns or rents).
- Implication: animal production will become reintegrated with crop production

Summary:
Focus on Net Value

Gross Value	↑	↔	↓	⇈
- Cost	↔	↓	⇊	↑
Net Value	↑	↑	↑	↑

New Resources

- Extension website: www.extension.org/pages/Manure_Value_and_Economics_Articles
  - Business Arrangements for Manure Offsite Transfer
  - Cost of Manure Application and Transport
  - Manure as a Source of Crop Nutrients and Soil Amendment
  - Value of Manure as an Energy Source

Manure Spreadsheets

- Manure Worth Spreadsheet
  - www.apec.umn.edu/faculty/wlazarus/interests_manureworth.html
- Feed Nutrient Management Planning Economics
  - www.puyallup.wsu.edu/dairy/nutrient-management/software.asp

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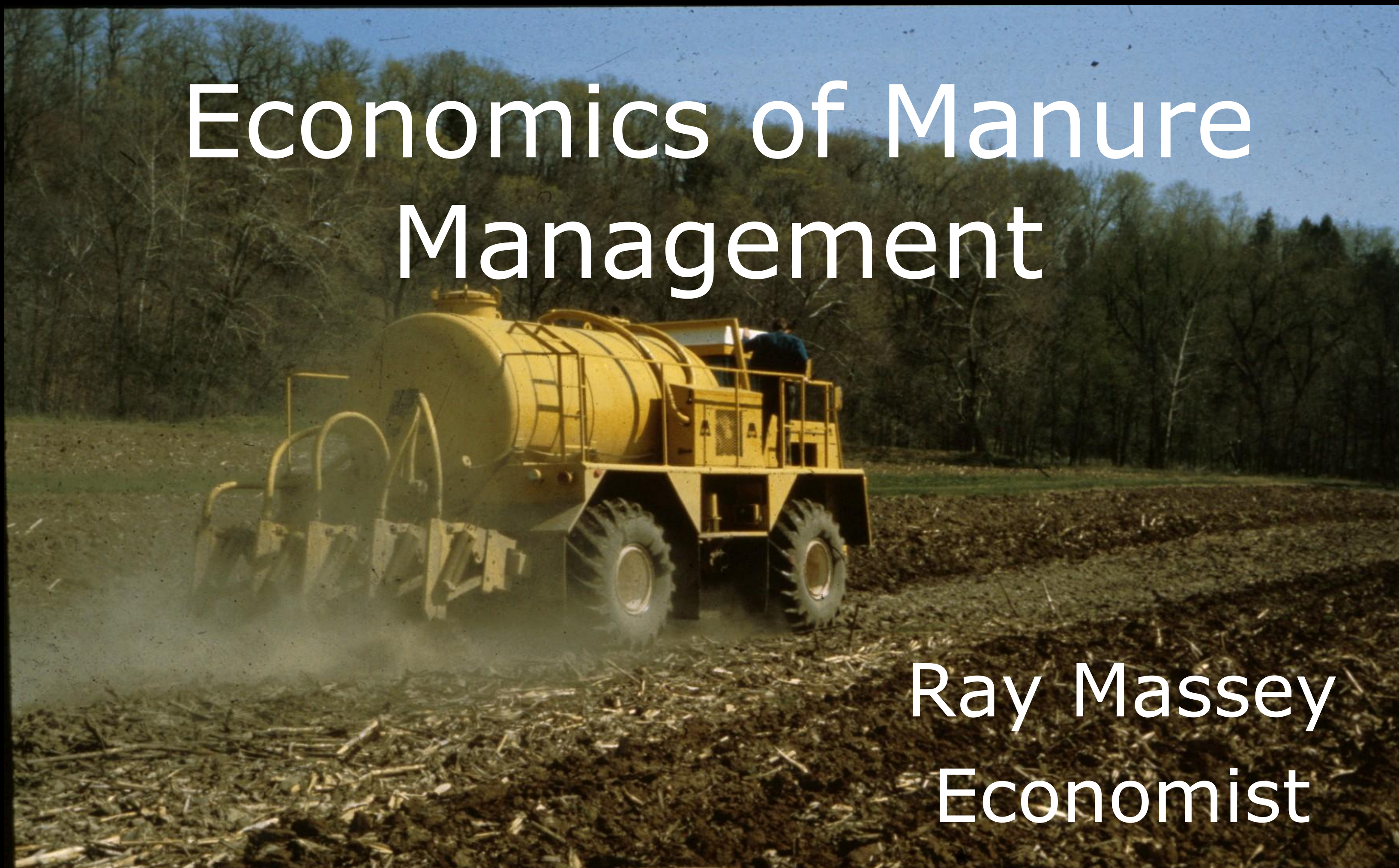

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