

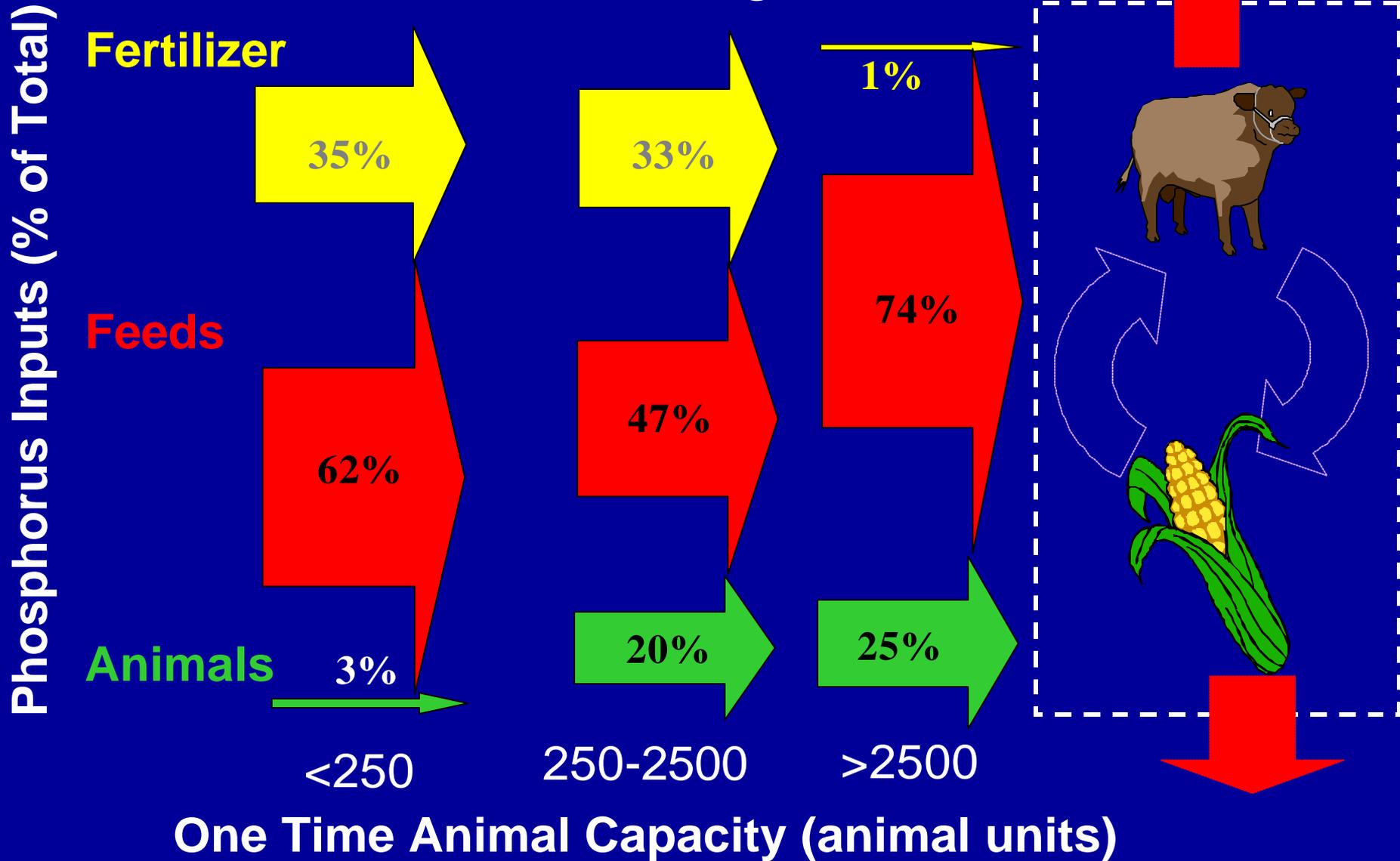
Tools for Integrating Feed Program into NMP or CNMP



Rick Koelsch
University of Nebraska

Nebraska CNMP Program

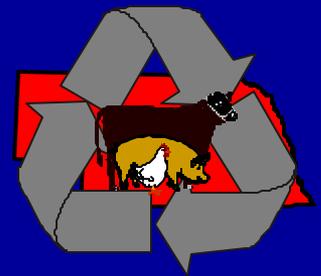
Phosphorus Inputs to Livestock Systems



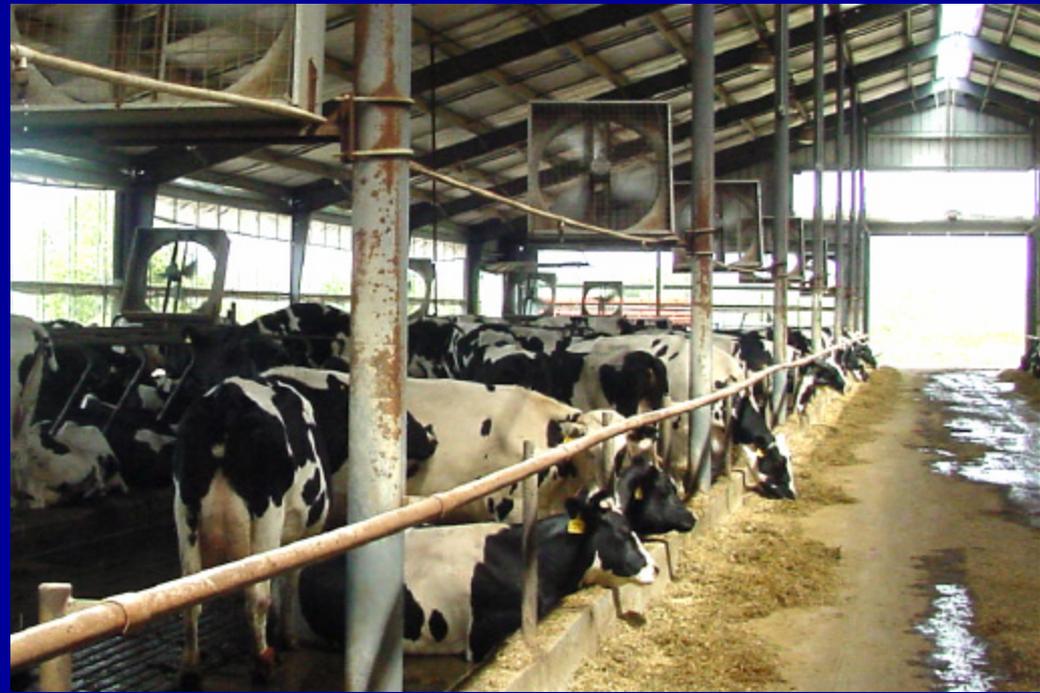


Take Home Message

- Is “Feed” of “Fertilizer” the 800 lb gorilla in our NMP/CNMP?
- Best nutrient strategy will depend on answer.



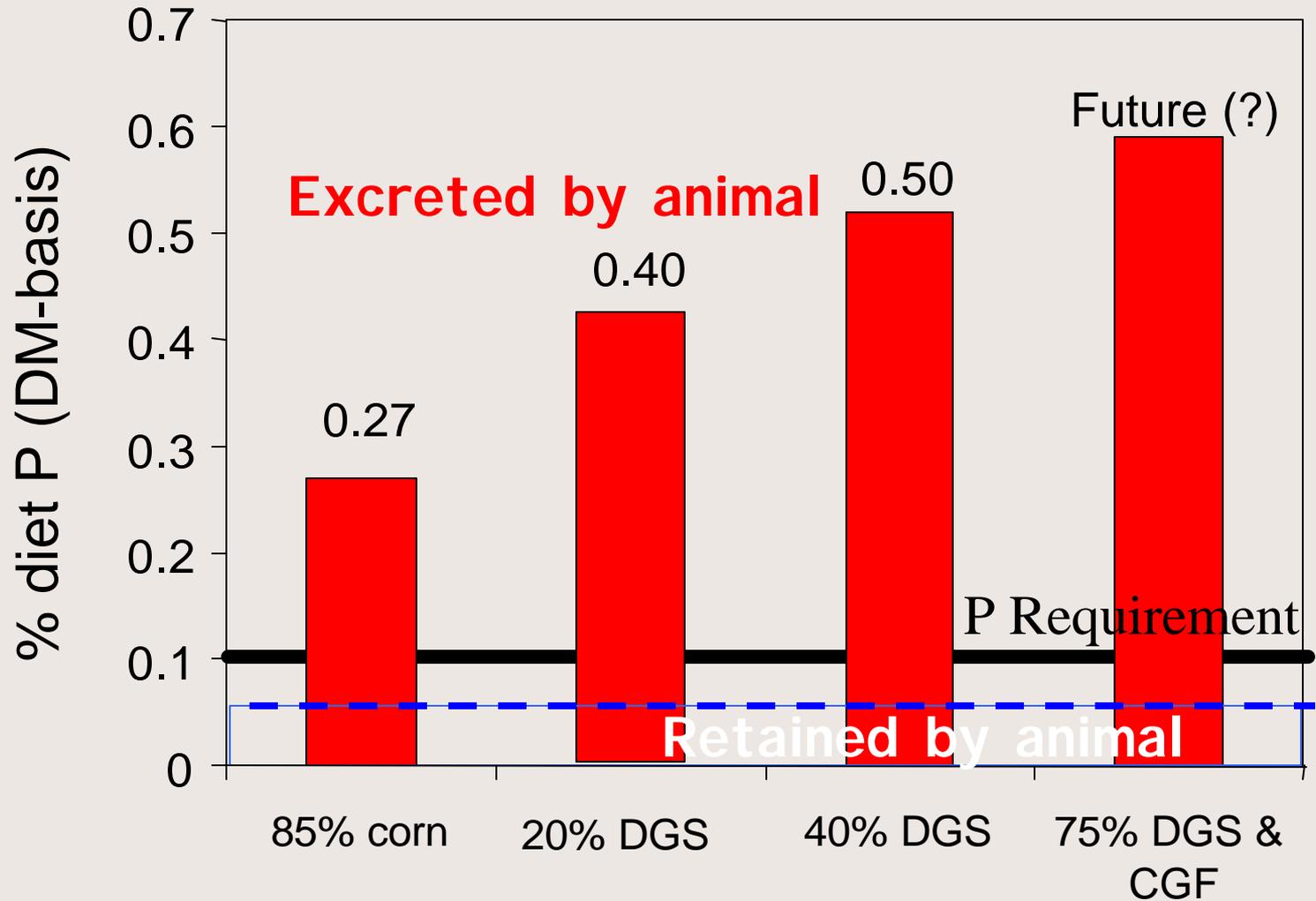
New ASABE Standard:



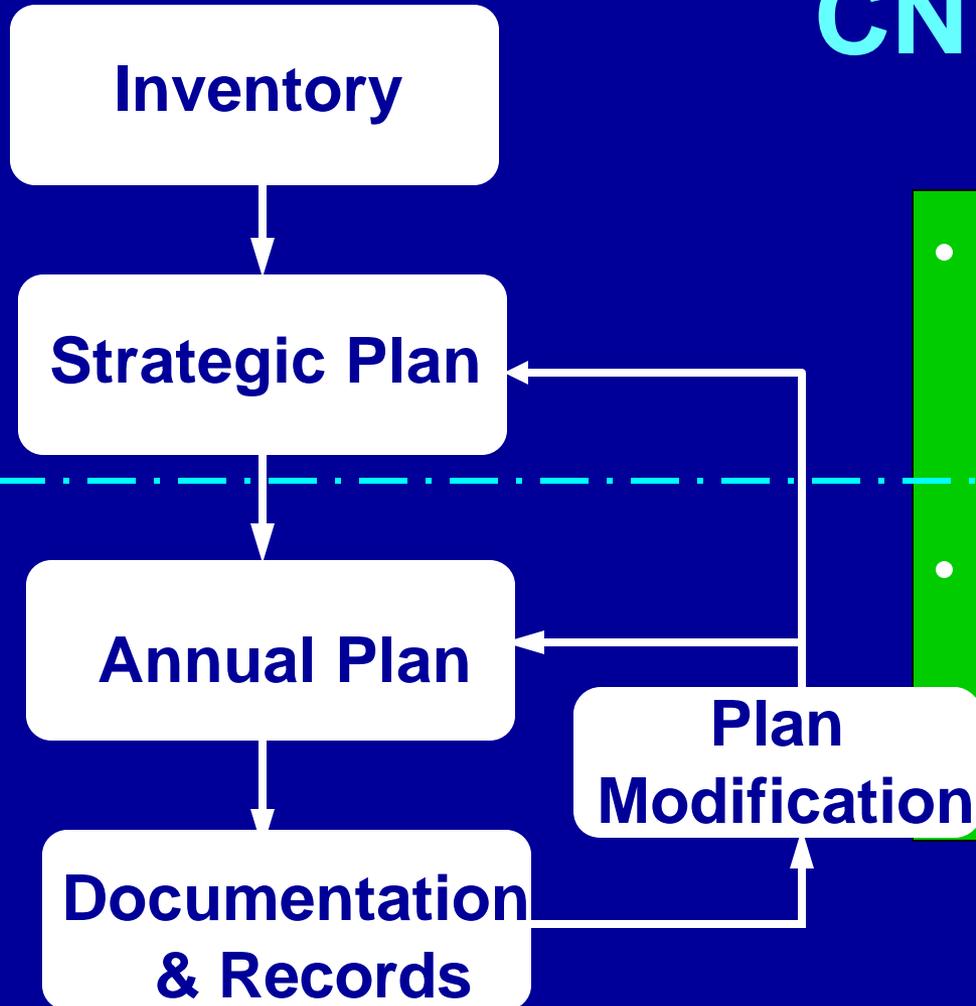
- Bases excretion on diet and animal performance.
- Provides equations for estimating excretion.
- Provide a tool that will adapt as animals and diets change.



Dietary P in Feedlot Diets



Role of ASABE Equations in CNMP processes



- Most valuable in long-term or strategic planning processes.
- On-farm data needed for annual planning processes.



Nutrient & Land Estimator (required during NE permit process)

Manure Nutrient and Land Requirement Estimator

Last Updated on December 30, 2005

Instructions

Project Team

Getting Started

Purpose:

Purpose:

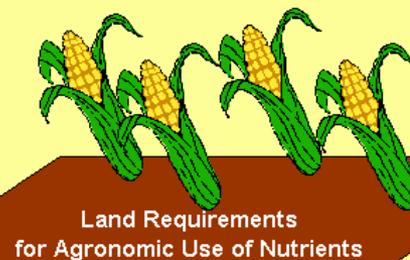
- Estimates ***farm-specific*** nutrients excreted by livestock.
- Estimate ***farm-specific*** land required for agronomic application of manure nutrients

Available at <http://cnmp.unl.edu>

Feed Nutrient Intake



Nutrient Excretion



Contact Information:

Rick Koelsch, University of Nebraska, rkoelsch1@unl.edu, 402/472-4051

Clear Data Inputs -

SPREAD Tool

Ration &
Performance

Excretion
Model

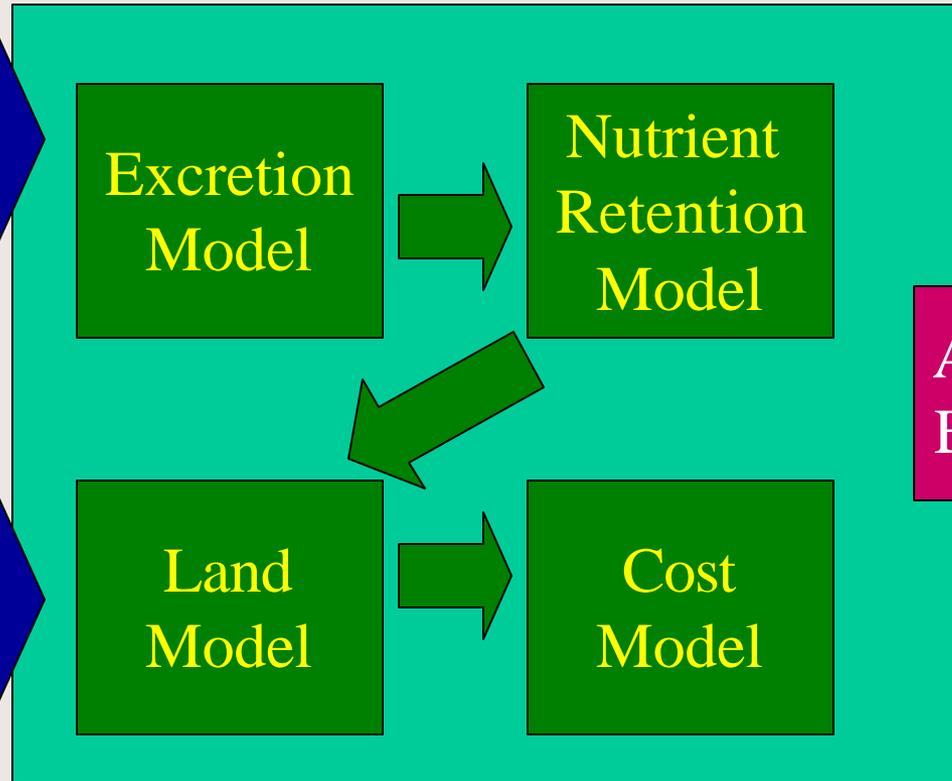
Nutrient
Retention
Model

Management
Info

Land
Model

Cost
Model

Acres, Time,
Equipment, \$



Spread Tool

| | A | B | C | D | E | F | G | H | I | J | K | | | | | | |
|---------------------|---|----------------|---|---|---|---|---|---|---|---|---|--------|---------------------|---------------|-------|-------|----------------|
| 1 | Manure Nutrient and Application Cost Estimator (Preliminary Draft) | | | | | | | | | | | | | | | | |
| 2 | Version - Preliminary Draft Last Updated on January 17, 2007 | | | | | | | | | | | | | | | | |
| 3 | <div style="display: flex; justify-content: space-around;"> Instructions Project Team Clear All Worksheets </div> | | | | | | | | | | | | | | | | |
| 6 | Purpose: | | | | | | | | | | | | | | | | |
| 7 | This spreadsheet estimates the quantity of manure nitrogen, phosphorus, and solids excreted based upon user inputs of feed program and animal performance (based upon procedures contained within ASABE Standard D384.2). In addition, using procedures defined in USDA Natural Resources Conservation Service publication "Agricultural Waste Management Field Handbook", an estimate of harvested and crop available nutrients are estimated. This information is then used to develop an estimate of 1) land requirements for agronomic utilization of the manure, 2) time requirements for land application, and 3) costs associated with land application and potential nutrient value (N and P only) of manure. | | | | | | | | | | | | | | | | |
| 15 | Step 1. Will units be Metric or English English Will feeds be reported on a wet or dry basis? Dry Basis | | | | | | | | | | | | | | | | |
| 17 | Step 2. Enter farm contact information and sources of manure: Contact Info Farm Name: Prime Rib | | | | | | | | | | | | | | | | |
| 19 | Step 3. Enter farm specific information to estimate manure excretion | | | | | | | | | | | | | | | | |
| 21 | Animals - Head Capacity Beef, Feeder Cattle - 10000 head | | | | | | | | | | | | | | | | |
| 21 | <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> </div> <div style="margin-left: 20px;"> <table border="1"> <tr> <td>Beef</td> <td>Dairy</td> <td>Poultry - Egg</td> </tr> <tr> <td>Horse</td> <td>Swine</td> <td>Poultry - Meat</td> </tr> </table> </div> </div> | | | | | | | | | | | Beef | Dairy | Poultry - Egg | Horse | Swine | Poultry - Meat |
| Beef | Dairy | Poultry - Egg | | | | | | | | | | | | | | | |
| Horse | Swine | Poultry - Meat | | | | | | | | | | | | | | | |
| 28 | Excreted Nutrients: 1,653,549 lbs N/year 256,601 lbs P/year | | | | | | | | | | | | | | | | |
| 31 | Step 4. Enter manure management factors and view excreted and harvested manure | | | | | | | | | | | | | | | | |
| 36 | Harvested Nutrients 826,774 lbs N/year 243,771 lbs P/year Crop Available Nutrients 330,710 kg N/year 243,771 kg P/year | | | | | | | | | | | | | | | | |
| 43 | Step 5. Enter cropping system | | | | | | | | | | | | | | | | |
| 43 | <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> </div> <div style="margin-left: 20px;"> <table border="1"> <tr> <td>Manure</td> </tr> <tr> <td>View Manure Results</td> </tr> </table> </div> </div> | | | | | | | | | | | Manure | View Manure Results | | | | |
| Manure | | | | | | | | | | | | | | | | | |
| View Manure Results | | | | | | | | | | | | | | | | | |
| 43 | Start / Beef / Dairy / Horse / Poultry-Egg / Poultry-Meat / Swine / Manure / Crop System / Time & \$ / Summary / Lookup Tables / | | | | | | | | | | | | | | | | |

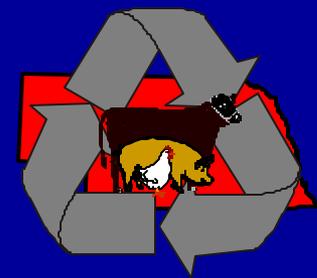
Ne

Animal Inputs

| Manure Nutrient and Solids Excretion by Beef Feeder Cattle - Data Inputs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------------------------|--|-----------------------------------|-------------------------------------|--|--------------|-------------------------------------|----------------------------------|------------------|-----------|--------------|-------------------------------------|----------------------|-------|------|----|-----------------------------------|--------|----------|---------------------------------|--|--------------------------------|-------------------------------------|----------------------------------|-------------------------------------|--------|--|---------------|----------------------|-----|-----|------|--------------------|-----|-----|-------------|---------------------|-------|-------|-------------------|---------------------------|---------|-----------------------|--|--|--|--|--|--|--|--|--------------------------|--|--|--|--|--|--|--|--|
| Farm Name: <i>Prime Rib Ranch</i> | | | View Calculations | | Print Data Inputs | | START | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Clear Data Inputs | | Printout Setup | | Producer's Name: John Doe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step 3a: Describe Farm or Conditions to be Evaluated: | | | | | Step 3c. Enter ration information for each distinct feed program. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step 3b: Enter animal performance characteristics or click on Default for typical characteristics (feed and performance) | | | | | <table border="1"> <thead> <tr> <th rowspan="2">Ration ID</th> <th rowspan="2">Days on Feed</th> <th rowspan="2">Feed Intake (lb dry wt. /head /day)</th> <th colspan="6">Feed Characteristics</th> </tr> <tr> <th>No Input</th> <th>Dry Matter Digestibility (% DB)</th> <th>Organic Matter Digestibility² (% DB)</th> <th>Ash² (% Dry Basis)</th> <th>Dietary Crude Protein (% Dry Basis)</th> <th>Dietary Phosphorus (% Dry Basis)</th> </tr> </thead> <tbody> <tr> <td colspan="9">Finishing Diet(s)</td> </tr> <tr> <td>A</td> <td>153</td> <td>20.00</td> <td>---</td> <td>80.0%</td> <td>83.0%</td> <td>4.0%</td> <td>18.7%</td> <td>0.49%</td> </tr> <tr> <td colspan="9">Receiving Diet</td> </tr> <tr> <td colspan="9">Finishing Diet(s)</td> </tr> </tbody> </table> | | | | | Ration ID | Days on Feed | Feed Intake (lb dry wt. /head /day) | Feed Characteristics | | | | | | No Input | Dry Matter Digestibility (% DB) | Organic Matter Digestibility ² (% DB) | Ash ² (% Dry Basis) | Dietary Crude Protein (% Dry Basis) | Dietary Phosphorus (% Dry Basis) | Finishing Diet(s) | | | | | | | | | A | 153 | 20.00 | --- | 80.0% | 83.0% | 4.0% | 18.7% | 0.49% | Receiving Diet | | | | | | | | | Finishing Diet(s) | | | | | | | | |
| | | | | | Ration ID | Days on Feed | Feed Intake (lb dry wt. /head /day) | Feed Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No Input | Dry Matter Digestibility (% DB) | Organic Matter Digestibility ² (% DB) | Ash ² (% Dry Basis) | Dietary Crude Protein (% Dry Basis) | | | | Dietary Phosphorus (% Dry Basis) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finishing Diet(s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | 153 | 20.00 | --- | 80.0% | 83.0% | 4.0% | 18.7% | 0.49% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Receiving Diet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finishing Diet(s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th></th> <th>Your Value</th> <th>Default</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Entering Feedlot</td> <td>745</td> <td>660</td> <td>lb</td> </tr> <tr> <td>Exiting Feedlot</td> <td>1,220</td> <td>1210</td> <td>lb</td> </tr> <tr> <td>Targeted Grade for Marketed Beef:</td> <td>Choice</td> <td>Choice</td> <td></td> </tr> <tr> <td>Number of Cattle (Single Turn):</td> <td>10,000</td> <td></td> <td>1 beef feeder</td> </tr> <tr> <td>Number of Cattle Finished per Year:</td> <td>20,000</td> <td></td> <td>1 beef feeder</td> </tr> <tr> <td>Average Days on Feed</td> <td>153</td> <td>150</td> <td>days</td> </tr> <tr> <td>Average Daily Gain</td> <td>3.1</td> <td></td> <td>lb gain/day</td> </tr> <tr> <td>Feed Use Efficiency</td> <td>6.4</td> <td></td> <td>lb feed / lb gain</td> </tr> <tr> <td>Facility Housing Animals?</td> <td>Feedlot</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | Your Value | Default | Units | Entering Feedlot | 745 | 660 | lb | Exiting Feedlot | 1,220 | 1210 | lb | Targeted Grade for Marketed Beef: | Choice | Choice | | Number of Cattle (Single Turn): | 10,000 | | 1 beef feeder | Number of Cattle Finished per Year: | 20,000 | | 1 beef feeder | Average Days on Feed | 153 | 150 | days | Average Daily Gain | 3.1 | | lb gain/day | Feed Use Efficiency | 6.4 | | lb feed / lb gain | Facility Housing Animals? | Feedlot | | | | | | | | | | | | | | | | | | |
| | Your Value | Default | Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Entering Feedlot | 745 | 660 | lb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Exiting Feedlot | 1,220 | 1210 | lb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Targeted Grade for Marketed Beef: | Choice | Choice | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Cattle (Single Turn): | 10,000 | | 1 beef feeder | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Cattle Finished per Year: | 20,000 | | 1 beef feeder | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Average Days on Feed | 153 | 150 | days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Average Daily Gain | 3.1 | | lb gain/day | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feed Use Efficiency | 6.4 | | lb feed / lb gain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Facility Housing Animals? | Feedlot | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feeder Cattle Group 2: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Live weight of Cattle... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Entering Feedlot lb | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Animal Performance Inputs

Feed Ration Inputs



Spread Outputs

| | | Comparisons | | | | | |
|--|----------------------------|---|----------------|---|----------------|--|----------------|
| | | Option 1 | | Option 2 | | Option 3 | |
| Description of Options | | 0% inclusion of Distillers Grains in Diets. Ration nutrient concentration of 13% CP and 0.29% P. 4 year P-Based Application Rate. | | 40% inclusion of DG. Ration nutrient concentration of 18.7% CP and 0.49% P. 4 year P-Based Application Rate. 8% of Land Available | | 40% inclusion of Distillers Grains in Diets. Ration nutrient concentration of 18.7% CP and 0.49% P. 4 year P-Based Application Rate. | |
| | | Feedlot | Swine Finisher | Feedlot | Swine Finisher | Feedlot | Swine Finisher |
| Manure Nutrients Available | | | | | | | |
| Nitrogen | | | | | | | |
| Excreted (lbs/year) | | 1,653,549 | | 1,653,549 | | 1,653,549 | |
| Crop Available (lbs/year) | | 330,710 | | 330,710 | | 330,710 | |
| Phosphorus (P₂O₅) | | | | | | | |
| Excreted (lbs/year) | | 256,601 | | 256,601 | | 256,601 | |
| Crop Available (lbs/year) | | 243,771 | | 243,771 | | 243,771 | |
| Manure Application | | | | | | | |
| Land Required (acres) | | 11,064 | | 11,064 | | 11,064 | |
| Land Required (acres/year) | | 2,766 | | 2,766 | | 2,766 | |
| Average Haul Distance (miles) | | 2.0 | | 2.9 | | 4.3 | |
| Maximum Haul Distance (miles) | | 2.9 | | 4.3 | | 6.2 | |
| Selected Application Rate (?/acre) | | 11 tons/ac | | 11 tons/ac | | 11 tons/ac | |
| Percent of Land Available for manure | | 100% | | 50% | | 25% | |
| Manure Application Equipment | | | | | | | |
| Application Equipment Selected | | Truck Mounted 20 ton spreader | | Truck Mounted 20 ton spreader | | Truck Mounted 20 ton spreader | |
| Method of Delivery to Field | | No Nurse Tank/Truck | | No Nurse Tank/Truck | | No Nurse Tank/Truck | |
| Total Time (hours/year) | | 977 | | 1,077 | | 1,218 | |
| Field Time (hours/year) | | 617 | | 617 | | 617 | |
| Road Travel Time (hours/year) | | 204 | | 304 | | 445 | |
| Loading/Unloading Time (hours/year) | | 155 | | 155 | | 155 | |
| Manure Management Economics | | | | | | | |
| Nutrient Value | Total (\$/year) | \$ 192,062 | | \$ 192,062 | | \$ 192,062 | |
| | Total (\$/ton or 1000 gal) | \$ 6.18/ton | | \$ 6.18/ton | | \$ 6.18/ton | |
| | Total (\$/loaded mile) | \$ 62.71 | | \$ 62.71 | | \$ 28.77 | |
| | Total (\$/year) | \$ 56,351 | | \$ 64,186 | | \$ 75,815 | |
| Application Cost | Total (\$/ton or 1000 gal) | \$ 1.81/ton | | \$ 2.07/ton | | \$ 2.44/ton | |
| | Total (\$/loaded mile) | | | | | | |
| Net Value | Total | \$ 135,711 | | \$ 127,876 | | \$ 116,247 | |
| | Total (\$/ton or 1000 gal) | \$ 4.37/ton | | \$ 4.11/ton | | \$ 3.74/ton | |

Excreted Nutrients

Land Needs and Travel Distance

Time for Land Application

Economic Costs & Benefits

1. Base Scenario (Corn Diet)

Traditional Corn Based Diet

10,000 head feedlot

13% CP and 0.29% P Diet

Corn/soybeans crop rotation

40% land availability for spreading

Manure applied at 4-year phosphorus rate

Spread with 20 ton truck spreaders

1. Base Scenario (Corn Diet)

| | |
|-----------|-----------|
| | (1) |
| N (#/yr) | 219,000 |
| P (#/yr) | 127,000 |
| Acres | 5,800 |
| Time (hr) | 910 |
| Haul (mi) | 2.0 |
| Value | \$108,000 |
| Cost | \$52,000 |

40% WDGS Scenario

40% WDGS Diet

10,000 head feedlot

18.7% CP and .49% P Diet

Corn/soybeans crop rotation

40% land availability for spreading

Manure applied at 4-year phosphorus rate

Spread with 20 ton truck spreaders

2. 40% WDGS Scenario

| | (1) | (2) |
|-----------|-----------|-----|
| N (#/yr) | 219,000 | |
| P (#/yr) | 127,000 | |
| Acres | 5,800 | |
| Time (hr) | 910 | |
| Haul (mi) | 2.0 | |
| Value | \$108,000 | |
| Cost | \$52,000 | |

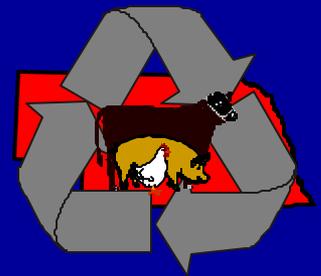
Can I afford
100 to 400 hours
added labor?

and \$7,000
to \$23,000
higher costs?

Can I find
5,400 acres?

Impact on Manure Nutrients (40% inclusion of DG in Diet)

- 50% increase in N Excretion
 - 50 to 80% increase in ammonia volatilized
- 90% increase in P Excretion and Manure P

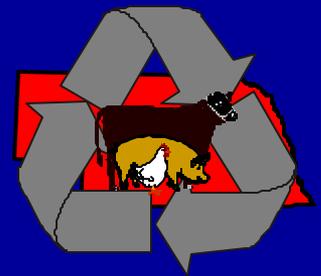


Summary of Economic Factors...

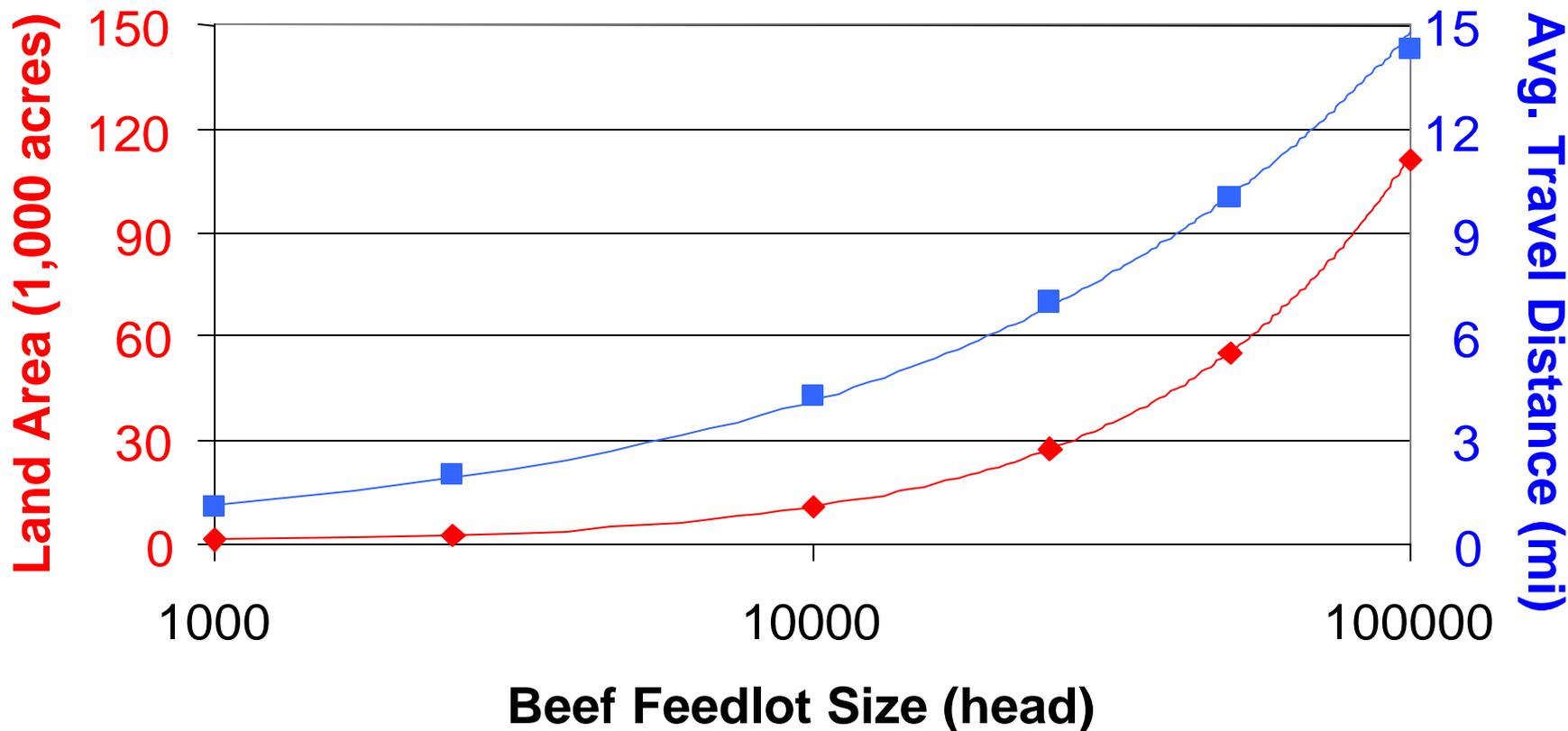
0 vs. 40% Inclusion of DGS

- Costs of DGS use:
 - \$7,000 to \$24,000 to manure application costs
 - 100 to 350 hours to labor & equipment requirements
 - 5,700 acres to land access requirements
- Benefits of DGS use:
 - \$83,000 in gross manure nutrient value
 - \$500,000 to \$800,000 in reduced feed costs

* 10,000 head beef feedlot (40% land available)

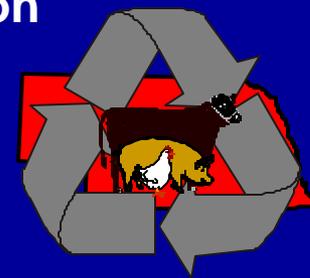


Impact of Size on Total Land Required and Travel Distance

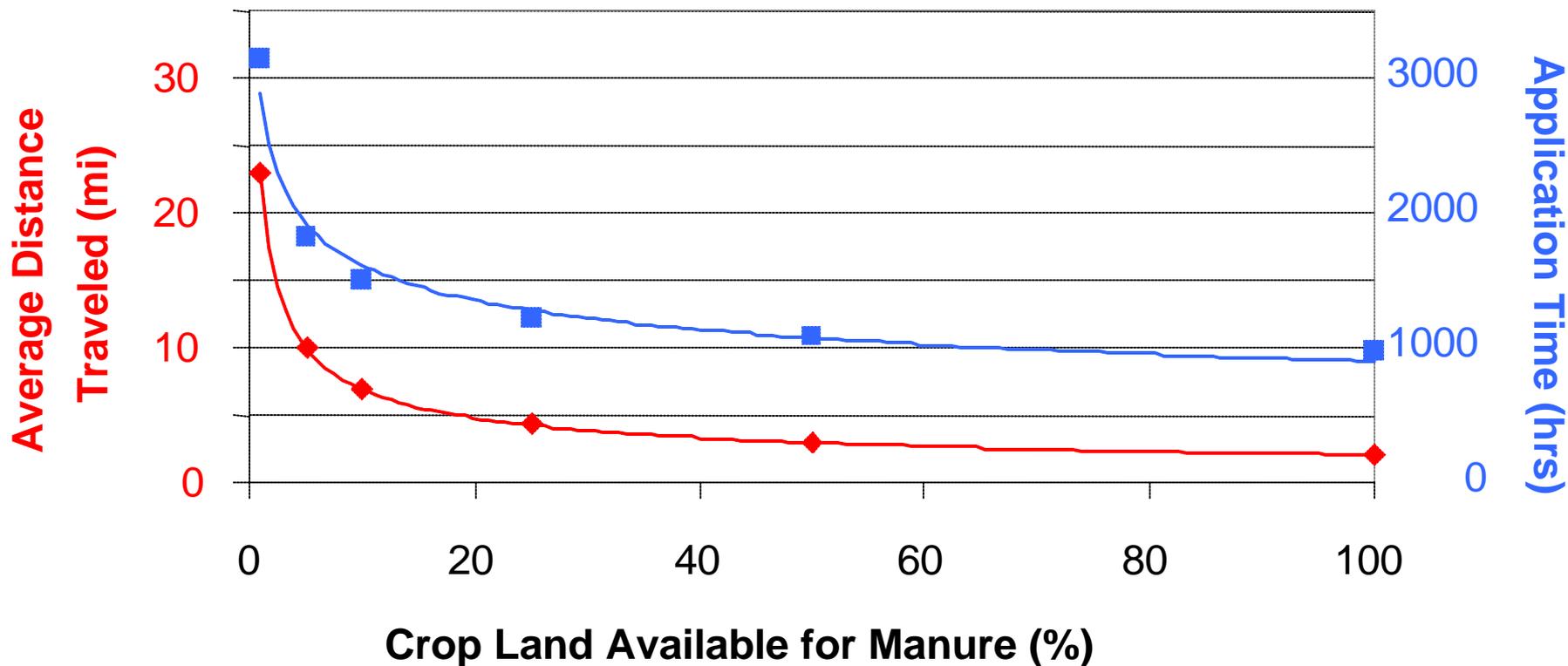


Assumptions: Corn (175 bu/ac) & Soybean (60 bu/ac) rotation
40% of land available for manure
DGS Included at 40%

Nebraska CNMP Program



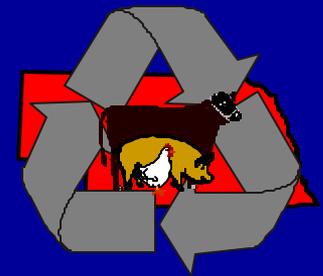
Impact of Land Availability on Average Travel Distance and Application Time



Assumptions: Corn (175 bu/ac) & Soybean (60 bu/ac) rotation
10,000 head of finishing cattle
DGS Included at 40%

Take Home Message

- Ration impacts manure nutrients & N volatilization
- Nutrient Plan must change with diet changes
- Economic benefits of DGS are greater than costs
- Nutrient Inventory & Spread tools integrate ration into NMP / CNMP



10% Land Availability (Corn Diet)

Traditional Corn Based Diet

10,000 head feedlot

18.7% CP and .49% P Diet

Corn/soybeans crop rotation

10% cropland availability for spreading

Manure applied at 4-year phosphorus rate

Spread with two 20 ton truck spreaders

3. 10% Crop Land Availability (DDG diet)

| | (1) | (2) | (3) |
|-----------|-----------|-------------------------|----------|
| N (#/yr) | 219,000 | 331,000 | 3311,000 |
| P (#/yr) | 127,000 | 243,000 | 243,000 |
| Acres | 5,800 | 11,100 | |
| Time (hr) | 910 | 1,000 - 1,300 | |
| Haul (mi) | 2.0 | 2.9 | |
| Value | \$108,000 | \$192,000 | |
| Cost | \$52,000 | \$59,000 to \$72,000 | |

Hand Calculator for Excretion

Worksheet 1. Total manure nutrients excreted by a livestock operation based on feed rations.

This worksheet only considers feed intake and not feed disappearance. If excess feed ends up in the manure, then the amount of excess feed and its nutrients needs to be added to the nutrient excreted values for an accurate estimation.

Date: _____

I. Feed Nutrient Intake

| Animal Group | A. Daily Feed Intake (lbs DM/day) | B. Feed Nutrient Concentration | | | C. Total Nutrient in Feed (lbs) = A X B | |
|---------------------|-----------------------------------|--------------------------------|--------|--------|---|---------|
| | | Protein | N* | P | N (lbs) | P (lbs) |
| <i>Beef Example</i> | 27,000 | 0.135 | 0.0216 | 0.0035 | 583 | 94.5 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

II. Nutrients Retained

a. Animal

| Animal Group | D. Number of Animals | E. Average Daily Gain | F. Live Weight Nutrient Concentration | | G. Nutrients Retained by Animal (lbs) = D x E x F | |
|---------------------|----------------------|-----------------------|---------------------------------------|--------|---|---------|
| | | | N | P | N (lbs) | P (lbs) |
| <i>Beef Example</i> | 1,000 | 4.08 | 0.016 | 0.0070 | 65.3 | 28.6 |
| Beef | | | 0.016 | 0.0070 | | |
| Dairy | | | 0.012 | 0.0070 | | |
| Pork | | | 0.023 | 0.0072 | | |
| Hens | | | 0.022 | 0.0060 | | |
| Broilers | | | 0.026 | 0.0060 | | |
| Turkeys | | | 0.021 | 0.0060 | | |

b. Animal Products

| Animal Product | H. Production (lbs/day) | I. Animal Products Nutrient Concentration | | J. Nutrients Retained by Animal Products (lbs) = H x I | |
|-------------------------|-------------------------|---|--------|--|---------|
| | | N | P | N (lbs) | P (lbs) |
| <u>Milk^a</u> | | 0.0050 | 0.0010 | | |
| <u>Eggs^b</u> | | 0.0166 | 0.0021 | | |

III. Nutrients Excreted

| Animal Group | K. Days Fed per Year | L. Animal Nutrient Excreted in Elemental Form = K x (C - G) or = K x (C - J) | | |
|---------------------|----------------------|--|------------|---|
| | | N (lbs/yr) | P (lbs/yr) | P ₂ O ₅ ^c (lbs/yr) |
| <i>Beef Example</i> | 350 | 181,195 | 23,065 | 52,358 |
| | | | | |
| | | | | |

MWPS-18-S1
Manure
Characteristics
(Section 1)

<http://www.mwps.org>



Nutrient Mgmt. Strategies

If fertilizer is big input:

- Crop nutrient balance.
- Land treatment practices.

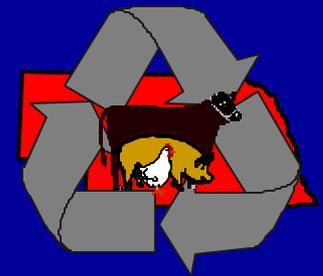
If feed is big input:

- Export manure
- Reduced purchased feeds.
- Alternative cropping systems – grow more protein.

SPREAD EXAMPLE

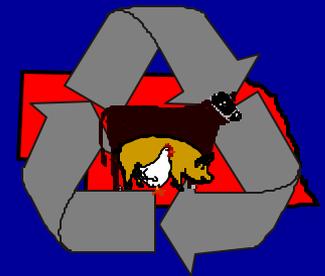
NMP Strategies (producer/advisor)

- NMP or CNMP must recognize DGS inclusion
 - More land with more DGS
 - Lower application rates with more DGS
 - More time and costs
- Value recycled manure over imported fertilizer nutrients (export manure)
 - Reduce N volatilization
 - Reduce manure nuisance issues
 - Recognize environmental benefits of manure
 - Modify public policy & public perceptions



Public Policy Response

- Nutrient Management Plan
 - Recognize NMP differences with feed program
- Recognize value of using recycled manure nutrients over imported fertilizer
 - Importance of manure export
 - End public policy preferences for fertilizer
 - Recognize environmental value of manure



Preference to Imported Fertilizer over Recycled Manure Nutrients

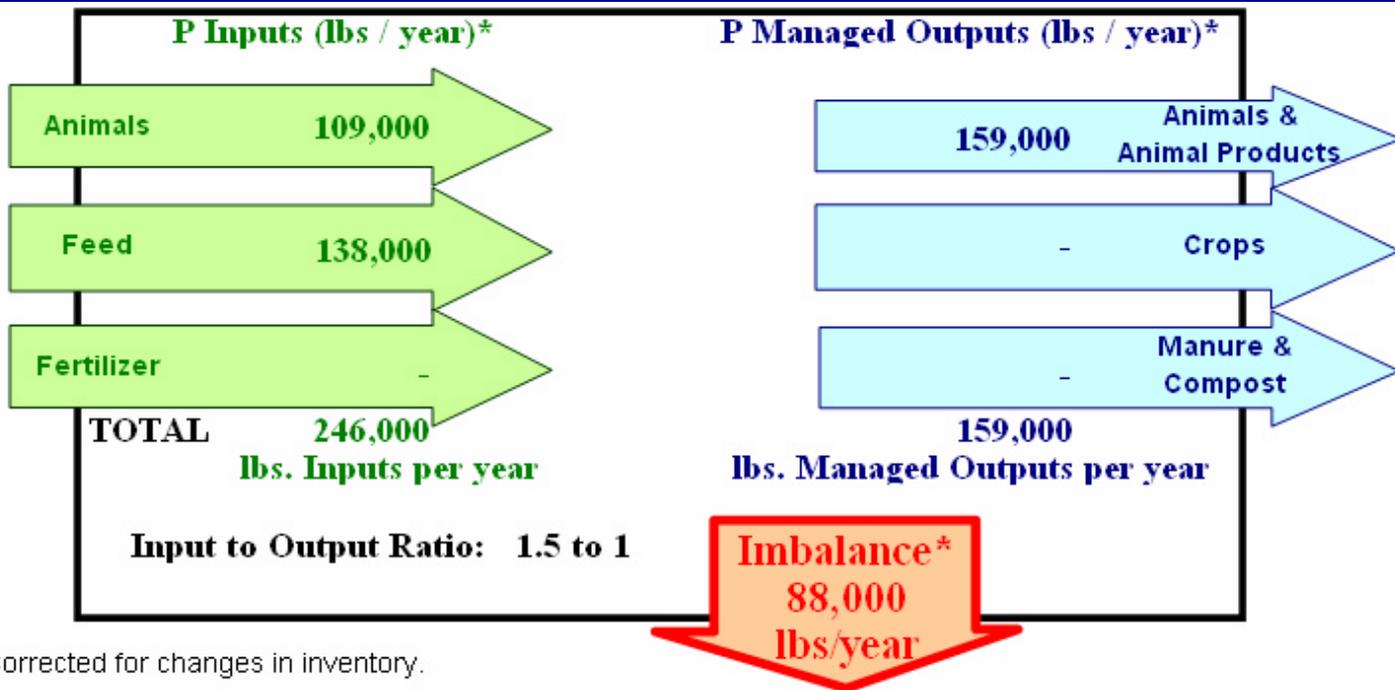
| <u>County</u> | <u>Existing Animals</u> | <u>Equivalent Animals from Imported Fertilizer</u> |
|---------------|-----------------------------|--|
| Cuming | 229,000 cattle* | 110,000 cattle* |
| Dakota | ? Layers | 5,800,000 layers** |
| Dawson | 142,000 cattle* | 490,000 cattle* |
| Scottsbluff | 84,000 cattle* | 252,000 cattle* |

* Cattle on Feed

** 50% of all layers in Nebraska

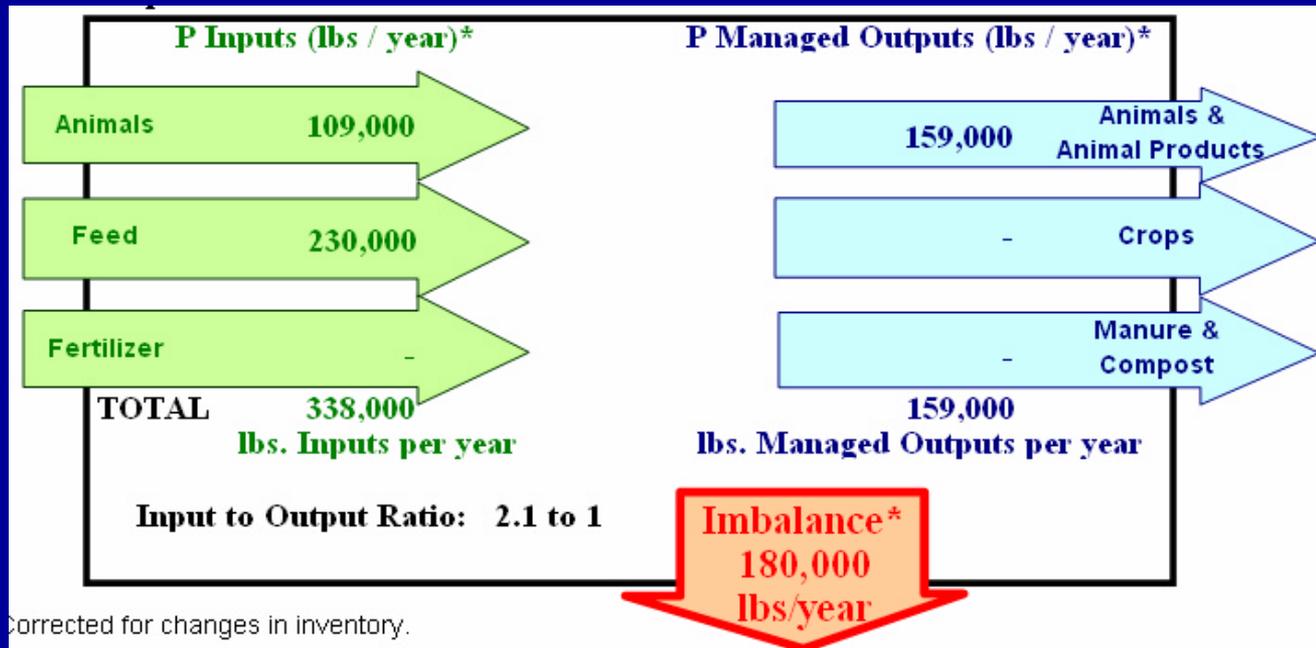


Whole Farm P Balance



No DG Inclusion

40% DG Inclusion



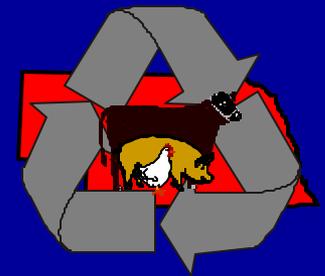
Assumes 75% of feed is purchased

Whole Farm Nutrient Balance

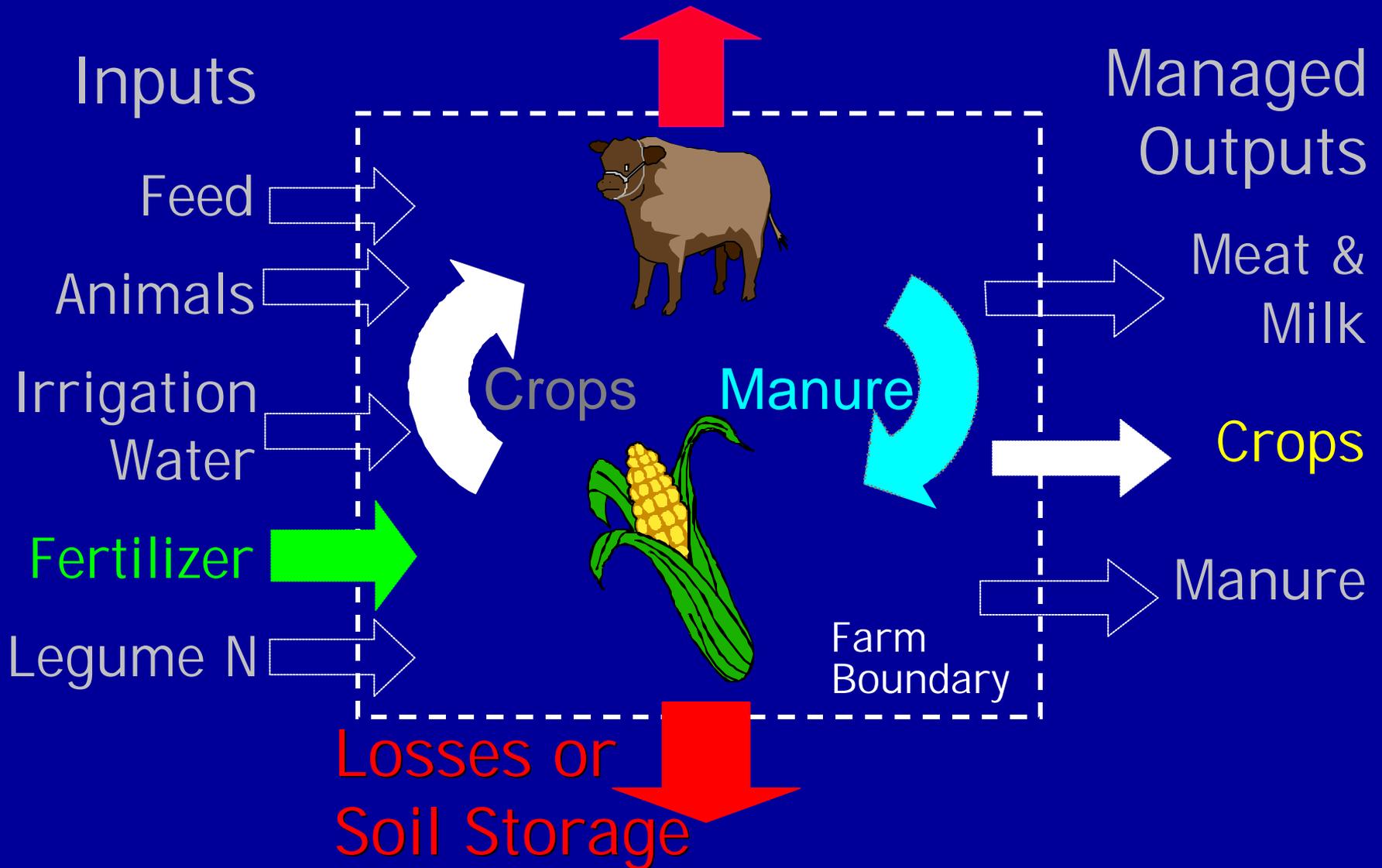
0 vs. 40% Inclusion of DGS

- P Inventory within farm increases at rate of 88,000 vs 180,000 lb P/year faster.
- Short Term - P Risk Assessment will...
 - Erosion control practices will allow banking of excess P for some period of time...
 - Bank will be filled more quickly with DGS.
- Long Term - P Risk Assessment will...
 - Reduce fields receiving manure to meet N needs
 - Increase fields receiving manure to meet P needs
 - Increase fields ineligible for manure application

* 10,000 head beef feedlot (40% land available)



Public Policy Focus



Our Ultimate Goal...

Balance of inputs & managed outputs

