



Who Wants to be a

CAFO?





A

For \$10,000 .
Which nutrient management component has historically been regulated?



B



C



For \$100,000

**What is a new addition
to the proposed
NPDES regulations?**





For \$1,000,000

Which nutrient management component has the biggest environmental impact?

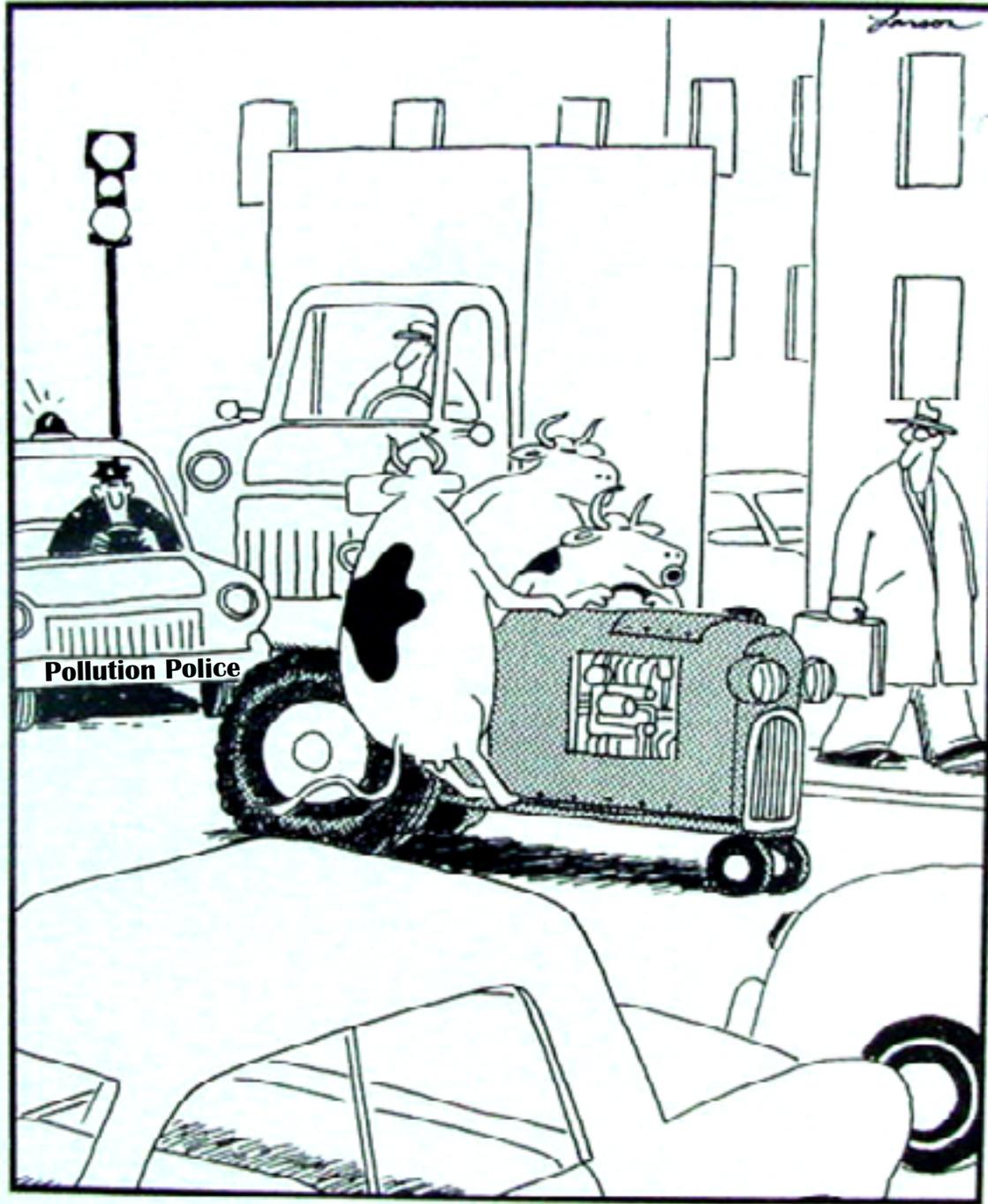


Tools for Integrating Feeding Program into CNMP's



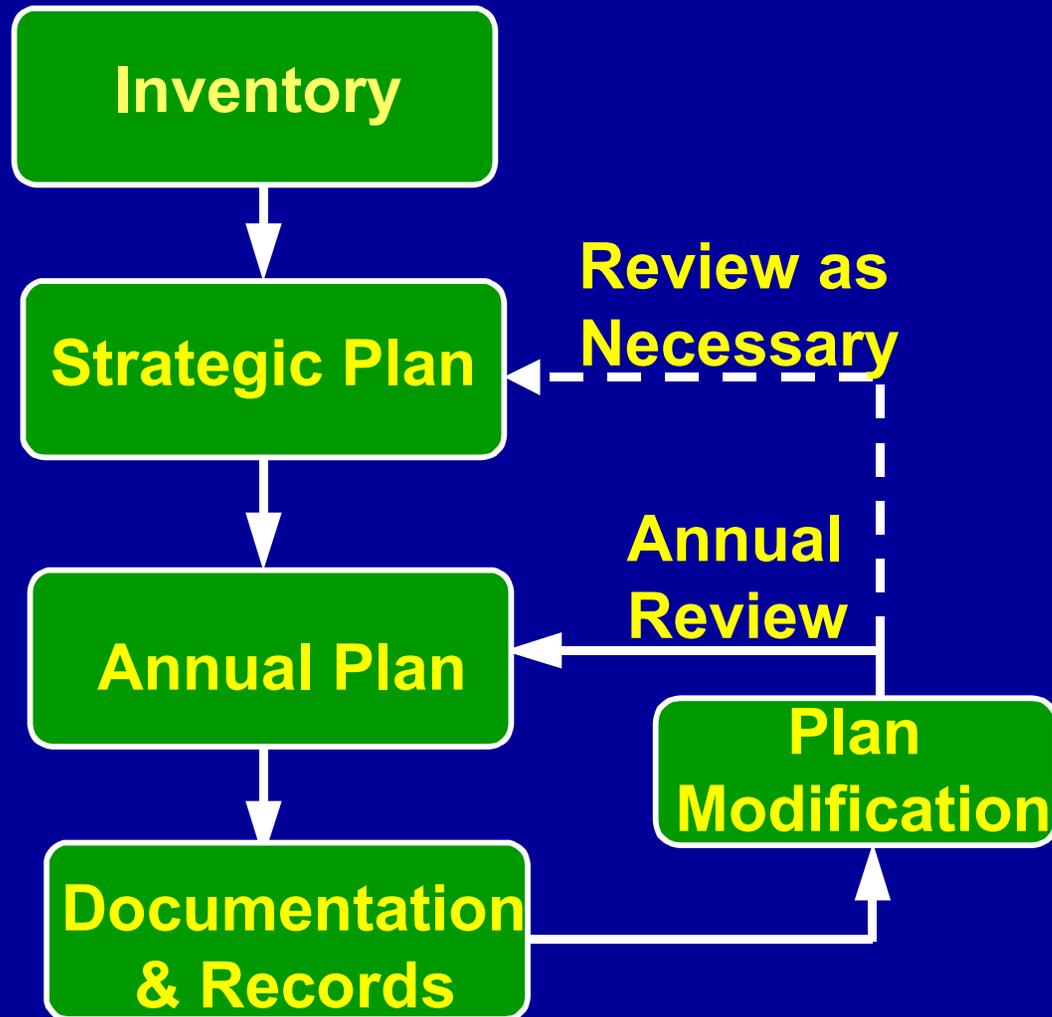
Nebraska CNMP Program





Pollution Police

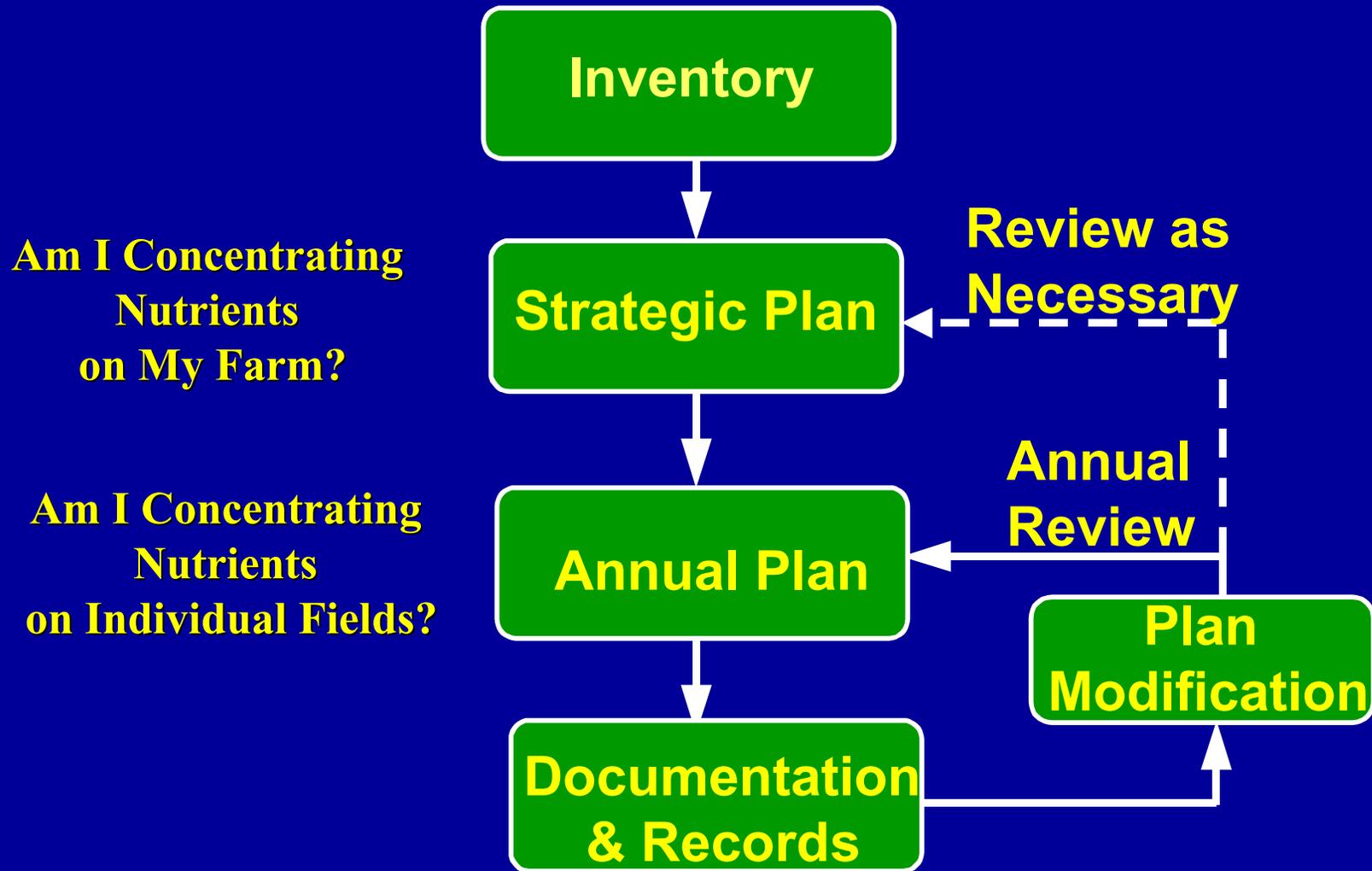
Nebraska CNMP Program



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Nebraska CNMP Program

¥ Stakeholder input

¥ Three workbooks

—Nutrient Management

—Manure storage management

—Odor management

¥ Spreadsheet tools

—Whole farm balance

—Nutrient Inventory

—Manure/fertilizer use plan

¥ Nine-hour class



Nebraska CNMP Land Application Class

¥ Meeting 1 - Strategic Planning

- Whole Farm Nutrient Balance
- Land Requirements for managing nutrients

¥ Meeting 2 - Annual Planning

- Activities Plan - sampling, records, etc.
- Crediting manure nutrients
- Field nutrient balances

¥ Meeting 3 - Mapping & Rules

- Inventory & mapping of land application sites
 - Nebraska regulations
-



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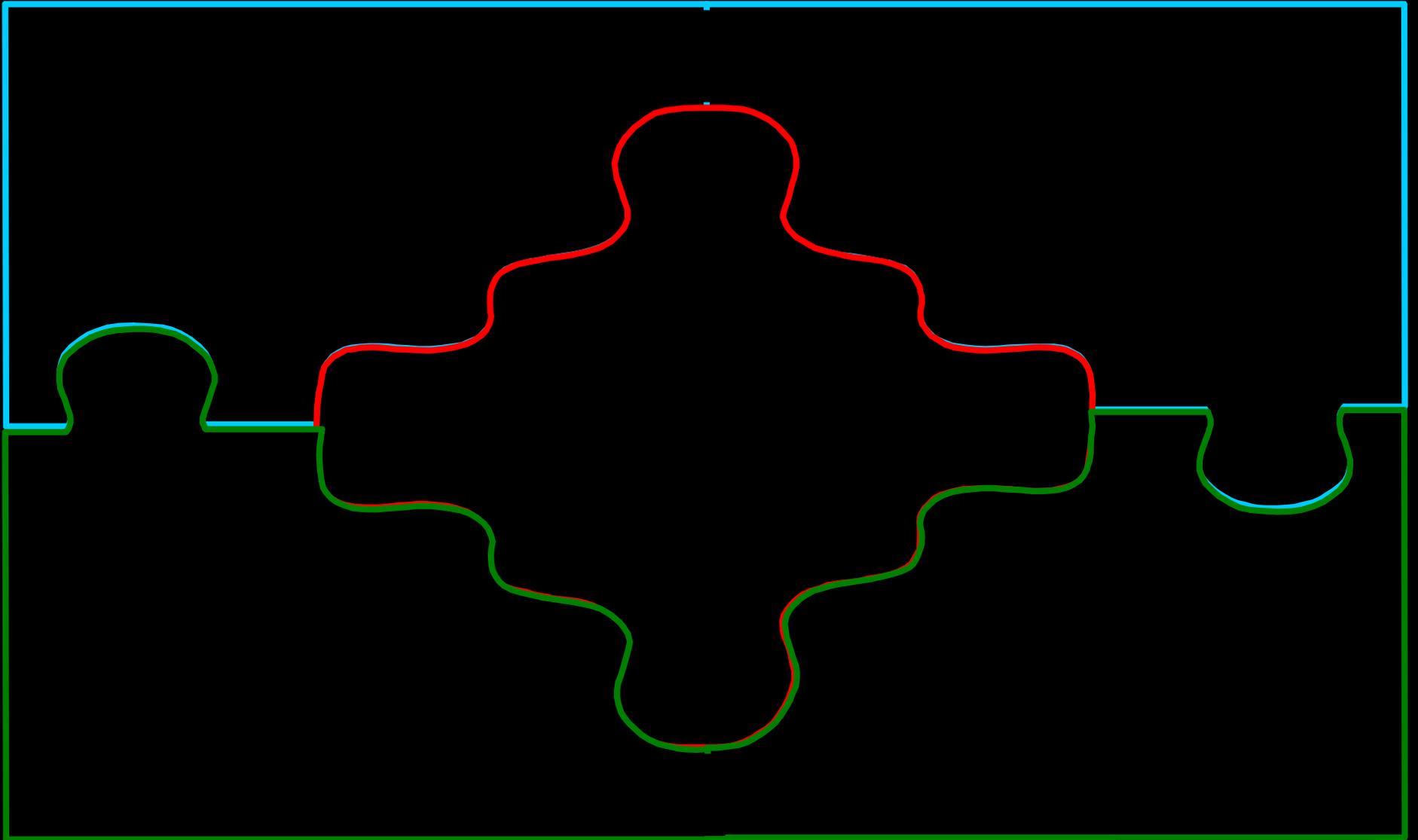
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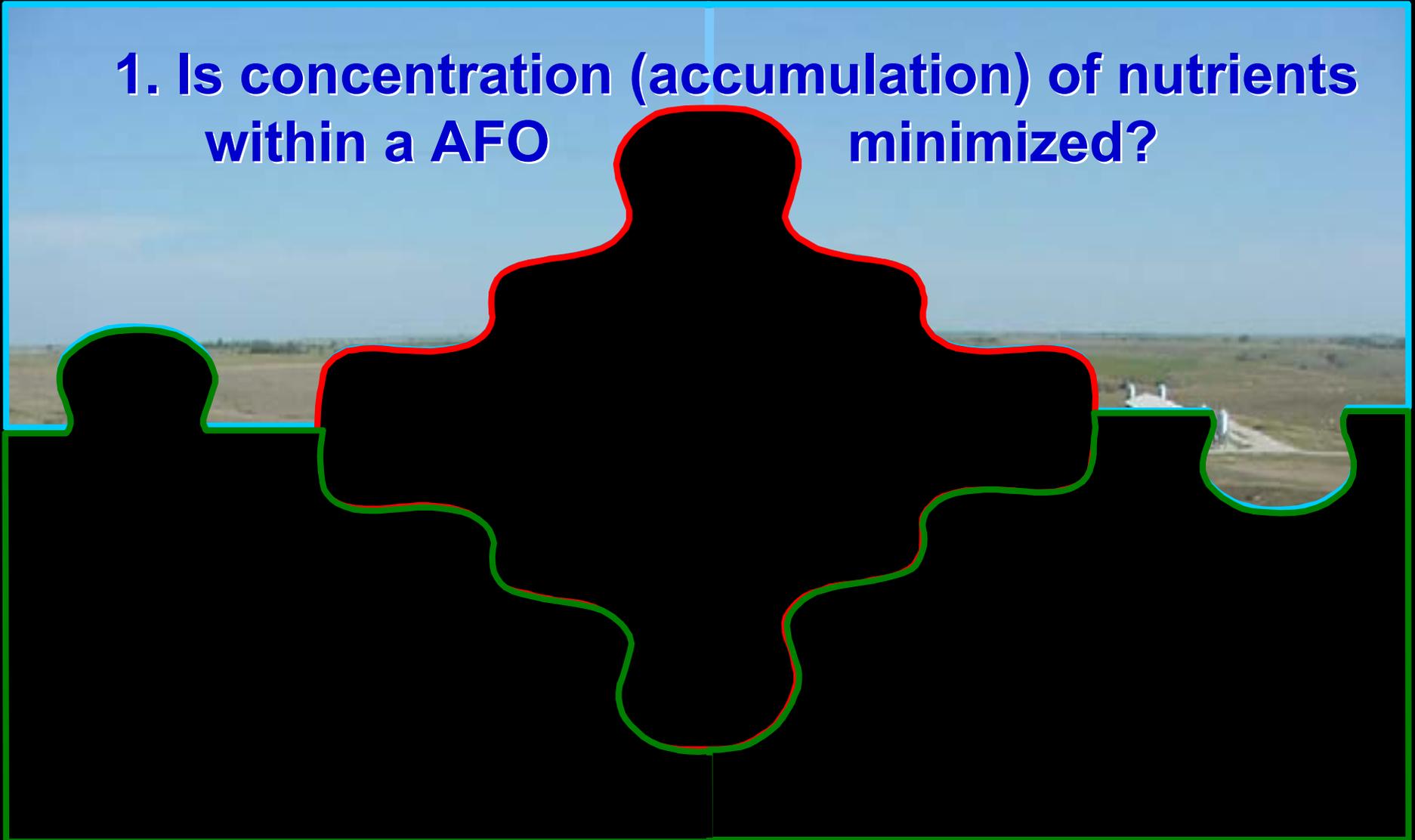


Fundamental outcomes of a nutrient management plan:



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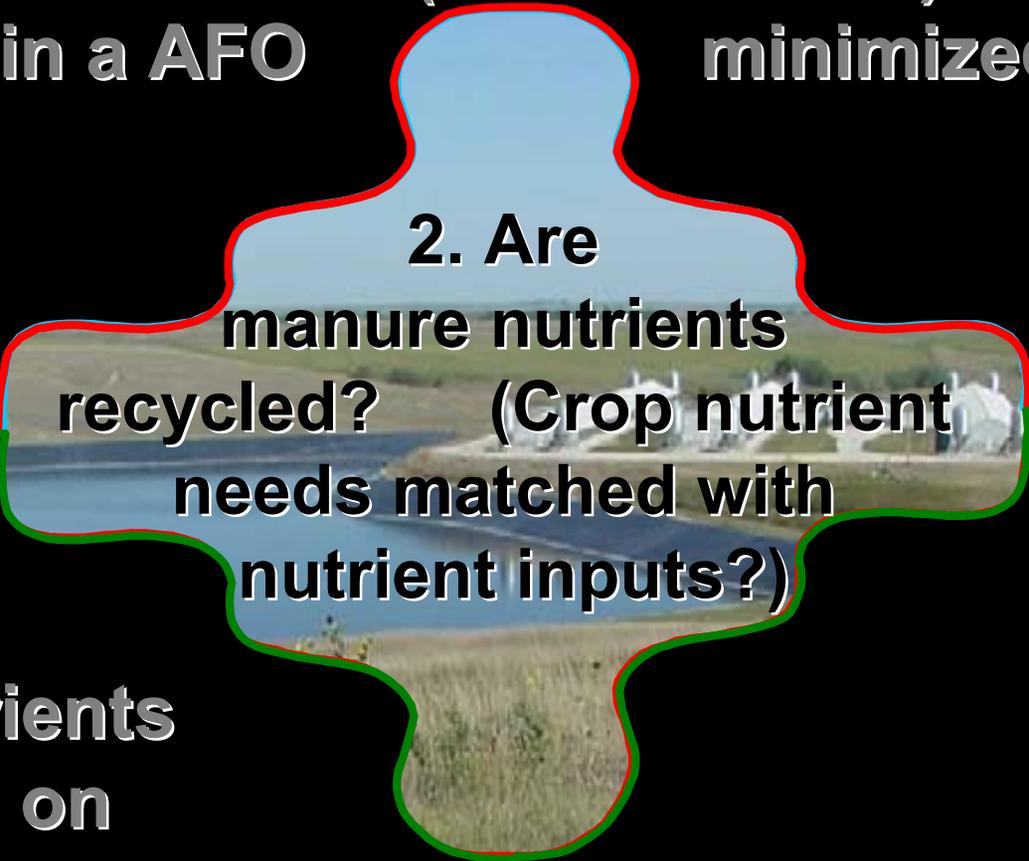
3. Are nutrients retained on land application site?

Conservation Plan?

NDEQ Regulatory Focus

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2. Are manure nutrients recycled? (Crop nutrient needs matched with nutrient inputs?)

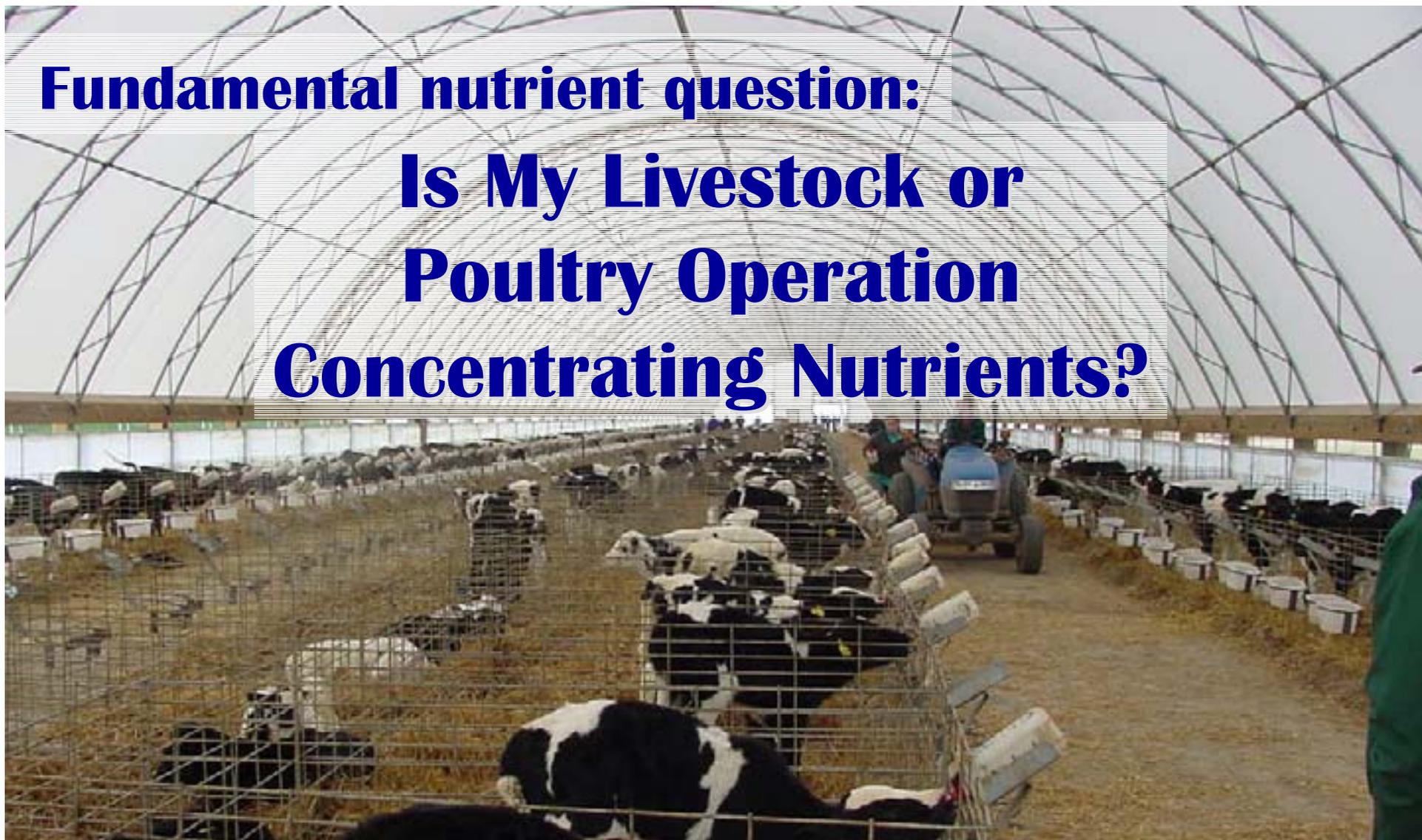


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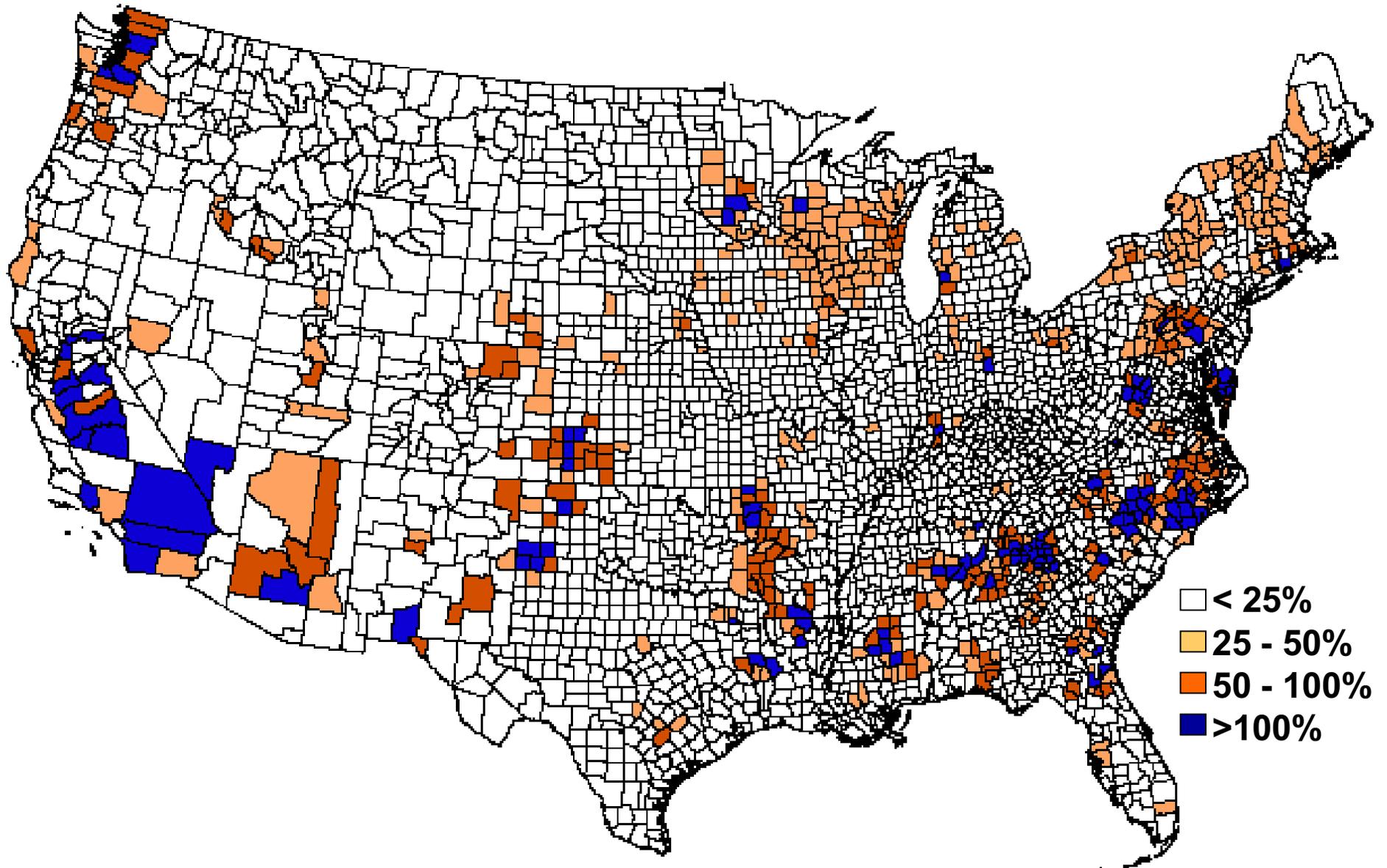
Conservation Plan?

Fundamental nutrient question:

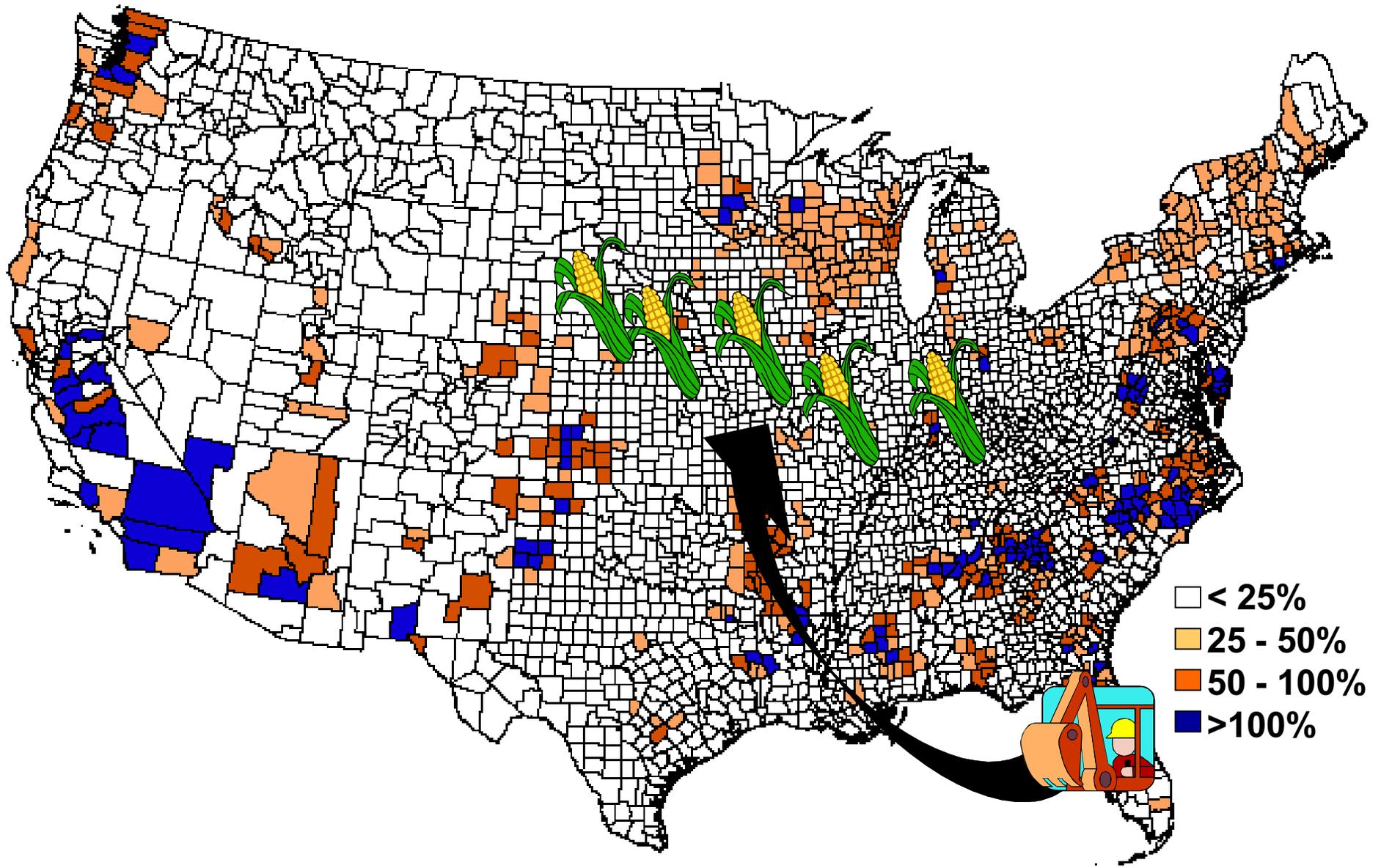
**Is My Livestock or
Poultry Operation
Concentrating Nutrients?**



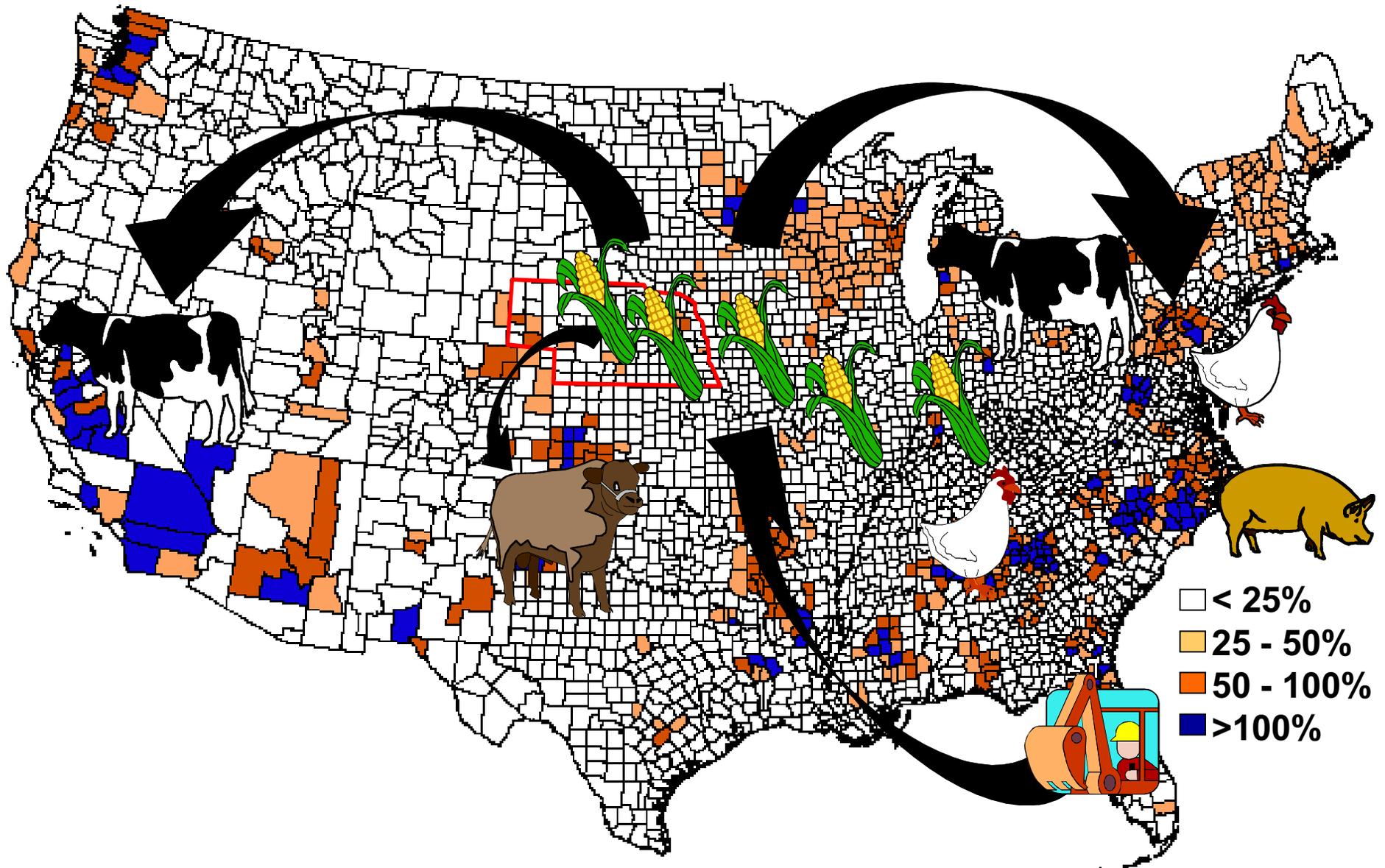
Manure P vs. Crop Land P Use



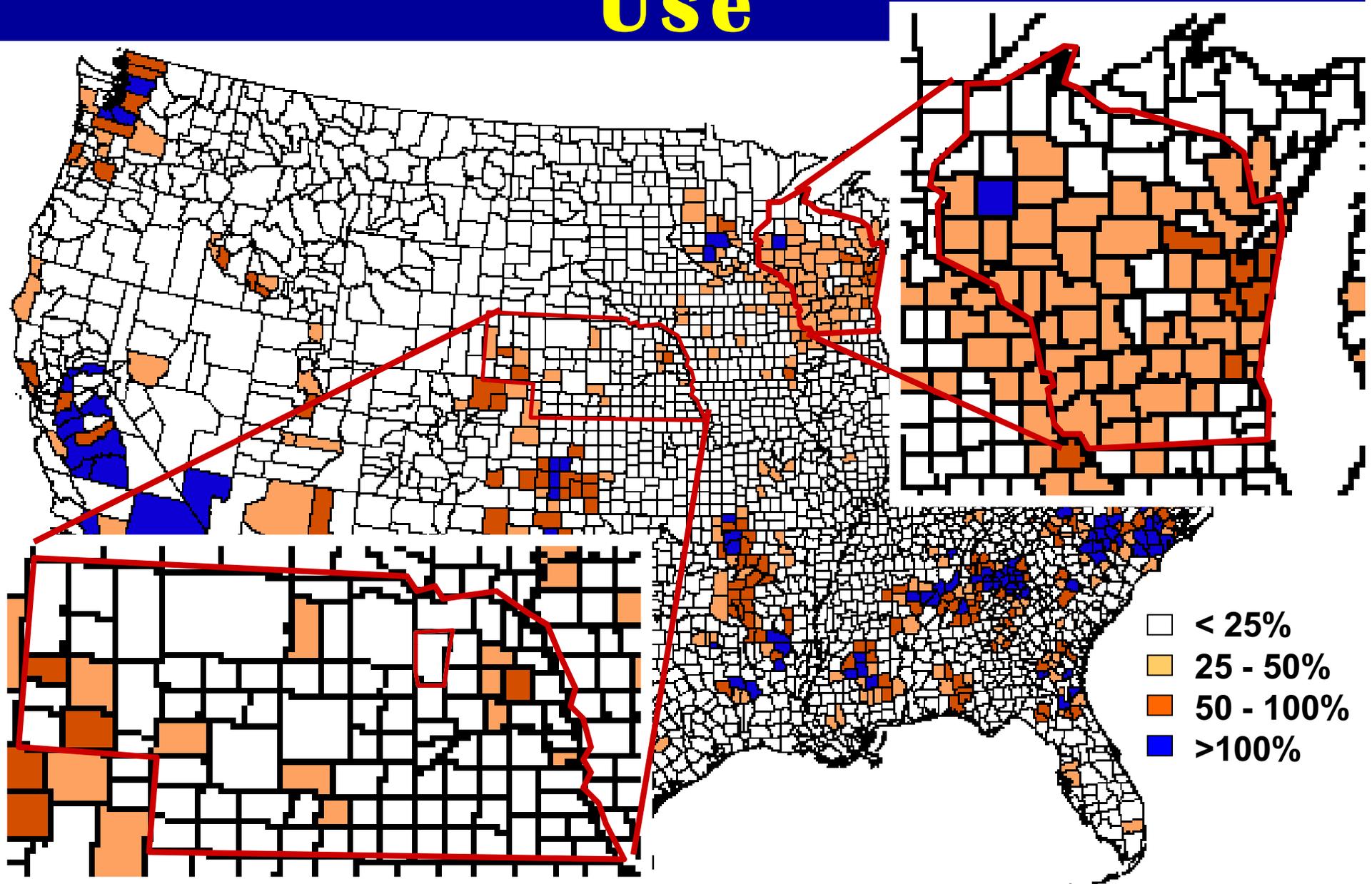
Manure P vs. Crop Land P Use



Manure P vs. Crop Land P Use

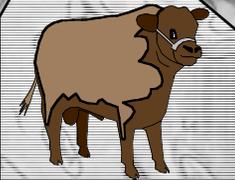


Manure P vs. Crop Land P Use





**Nutrient concentration
is common for many
Nebraska livestock
operations.**





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is common for many
Nebraska livestock
operations.**



**Often caused by separation of
ownership or distance
between crop and livestock
production.**

Case Study Dairy Farm

Species/Housing: A 400 head dairy in freestall facility operates near Plainview, NE. Facility is scrapped daily to a reception pit and earthen storage.

Dairy Performance Indicators:

Rolling Herd Average: 20,000 lbs/cow, 3.8% fat, 3.4% protein

<i>Ration Information:</i>	<u>Hi Group</u>	<u>Lo Group</u>	<u>Dry Cows</u>	<u>Feed Use</u>	
				<u>Total</u>	<u>Purchased</u>
Intake (lbs DM/d)	54	49	27		
% CP	20.8%	17.2%	12.7%		
% P	0.58%	0.49%	0.43%		
Haylage (ton/yr)				846	491
Corn Silage (ton/yr)				890	0
Corn (ton/yr)				441	375
Cottonseed (ton/yr)				248	248
70% soy/30% DDG (ton/yr)				709	709
Mineral (ton/yr)				117	117

Case Study Dairy Farm

Land Base: 2 pivots (130 acres each) are in continuous corn with the pivot corners in alfalfa Irrigation water contains 9 ppm nitrate-N

Pivot number 1. The soil texture is a sandy loam with 1 to 2% slope. Soil samples follow:

Pivot number 2. The soil texture is a. silt loam with 0 to 1% slope. Soil samples follow:

<u>Soil Test Summary</u>	<u>Pivot 1</u>	<u>Pivot 2</u>	<u>Pivot Corners</u>
Crop	Corn (160 bu/ac) Silage (22 t/ac)	Corn (160 bu/ac)	Haylage (5 ton/ac)
Soil Nitrate Nitrogen	6.0 ppm	2.0 ppm	
Phosphorus (Bray #1)	134 ppm	8.7 ppm	14 ppm
Organic Matter (Percent)	2.4 %	1.6%	0.8%
UNL N recommendations:	140 lbs/ac	181 lbs/ac	
UNL P ₂ O ₅ recommendations	0 lbs/ac	40 lbs/ac broadcast 20 lbs/ac as starter	30 lbs/ac broadcast

Manure Application: Manure is land applied through 2 - 4000 gallon slurry tank wagon. It can be surface applied or directly incorporated. Manure in land applied in November and April.

Current Fertilizer Use: Annual fertilizer purchase is 22 tons of anhydrous ammonia and 20 tons of concentrated super phosphate.

Manure Nutrient Inventory



Manure Nutrient Inventory Spreadsheet

Purpose: Assist producers in

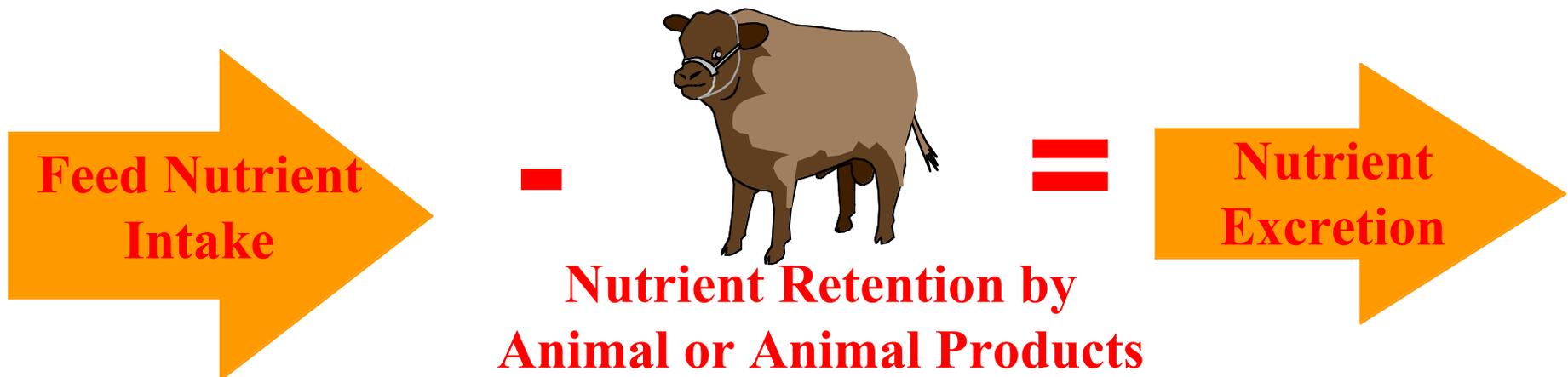
- ¥ **Estimating manure nutrient excretion and losses**
- ¥ **Evaluating land requirements for managing manure nutrients**



Manure Inventory Estimates

¥ Option 1: Book Values

¥ Option 2: Nutrient Balance



NRC Nutrient Requirements Series

NATIONAL RESEARCH COUNCIL

NUTRIENT REQUIREMENTS OF BEEF CATTLE

Seventh Revised Edition

1996



Land Requirements for Dairy

<u>Ration</u>	<u>N Excretion</u>	<u>Land Required</u>
Nutrient Balance	163,000 lb/yr	1,100 ac.
NRCS	87,000 lb/yr	600 ac.
	<u>P₂O₅ Excretion</u>	
Nutrient Balance		
Hi P	66,000 lb/yr	1,300 ac.
Low P	47,000 lb/yr	900 ac.
NRCS	31,000 lb/yr	600 ac.

400 cow dairy with manure storage &
immediate incorporation of manure



Nutrient Excretion for Beef*

<u>Procedure</u>	<u>N Excretion</u>	<u>P Excretion</u>
ASAE	105,000	30,000
NRCS	97,000	30,000
Nutrient Balance		
NRC Balanced Diet	134,000	13,000
Industry Average	161,000	24,000
Diet with Ethanol By-products	161,000	33,000

*1000 head feedlot



Strengths/Weaknesses of Inventory Spreadsheet

Strengths

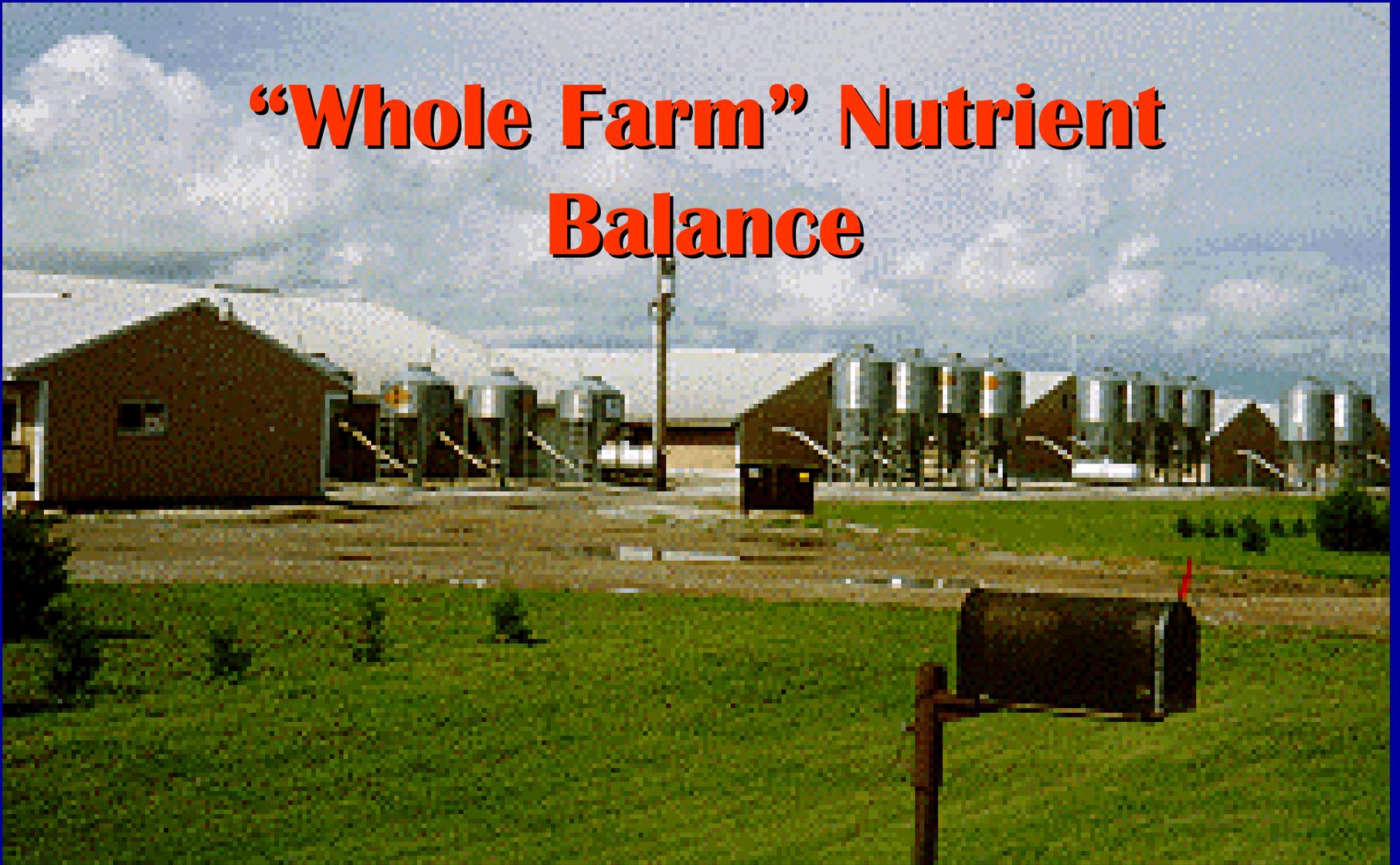
- ¥ Producer friendly easily understood
- ¥ Estimates land needs for managing N & P
- ¥ Assesses impact of dietary strategies

Weaknesses

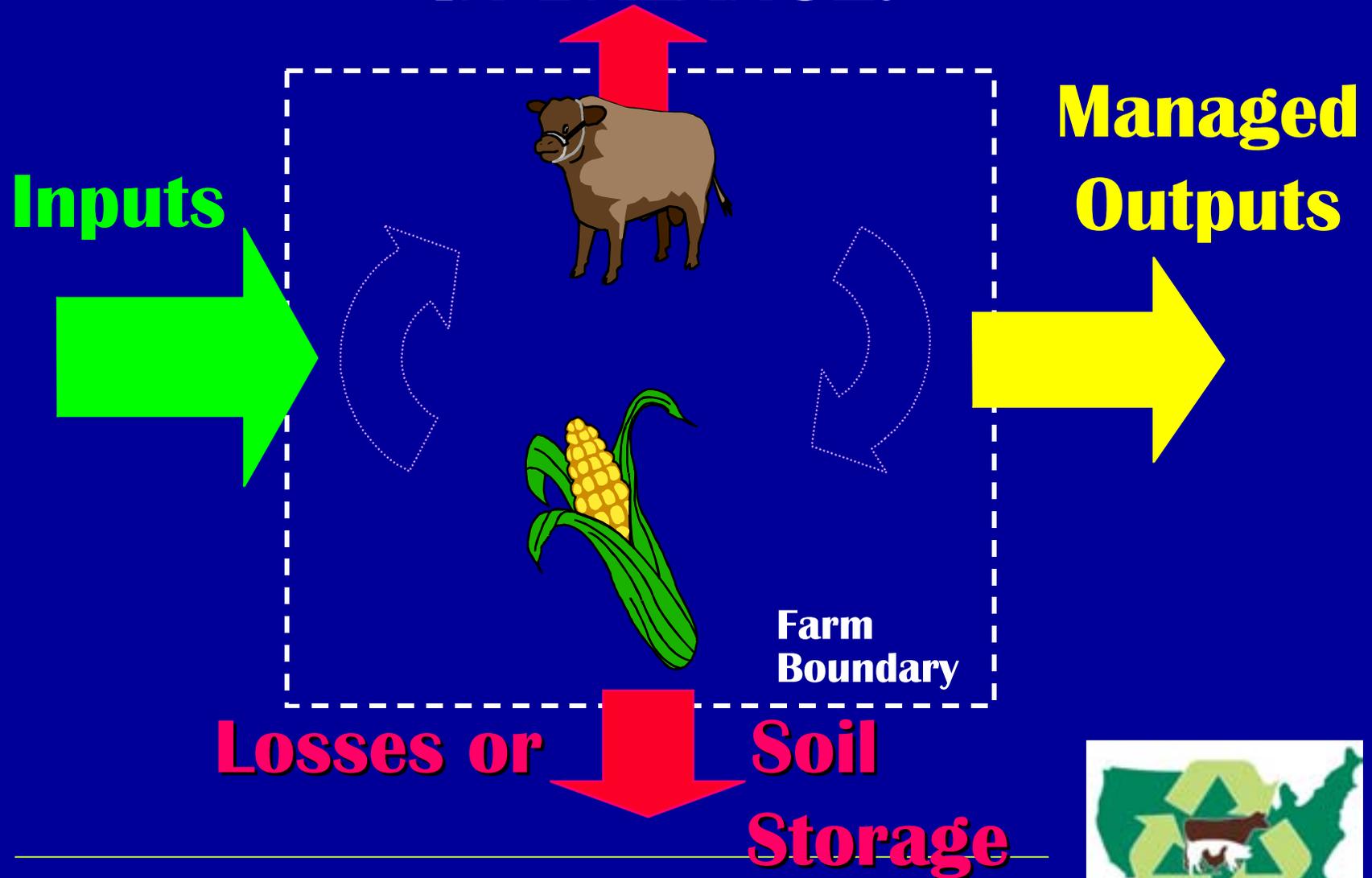
- ¥ Estimates of losses are questionable
- ¥ Confusion with annual crop nutrient plan



“Whole Farm” Nutrient Balance



ARE NUTRIENT INPUTS & OUTPUTS IN BALANCE?



ARE INPUTS & OUTPUTS IN BALANCE?

Water

In

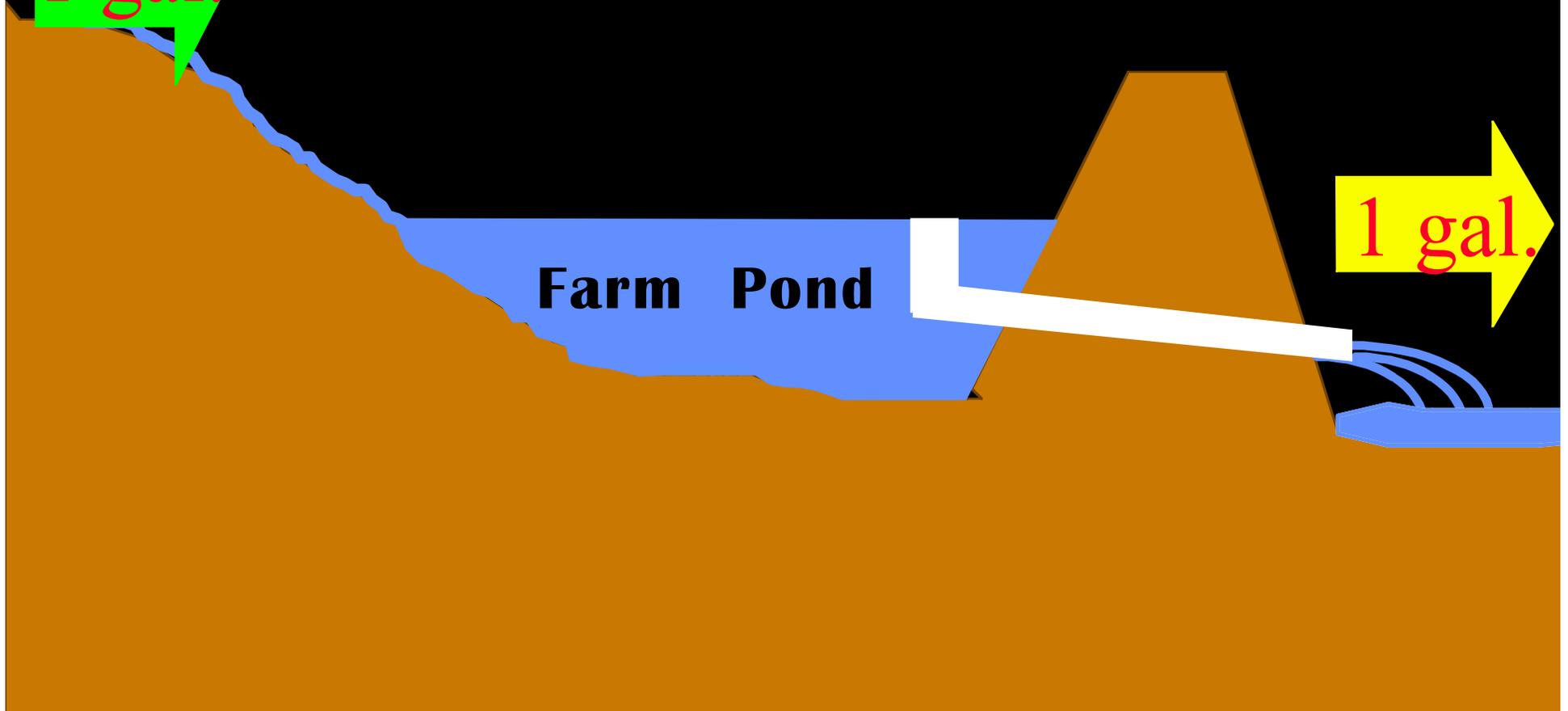
1 gal.

Water

Out

1 gal.

Farm Pond



ARE INPUTS & OUTPUTS IN BALANCE?

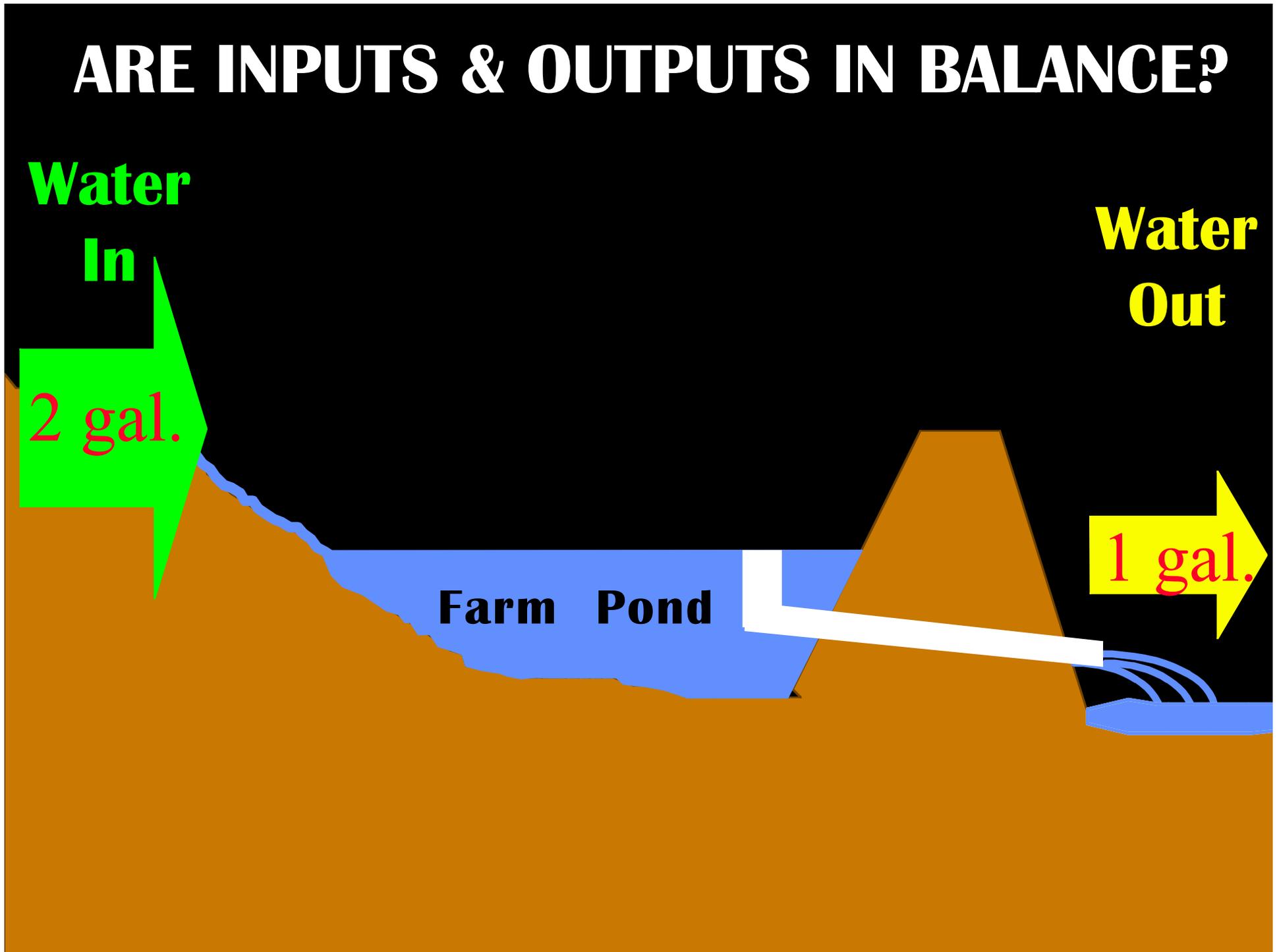
**Water
In**

2 gal.

**Water
Out**

1 gal.

Farm Pond



ARE INPUTS & OUTPUTS IN BALANCE?

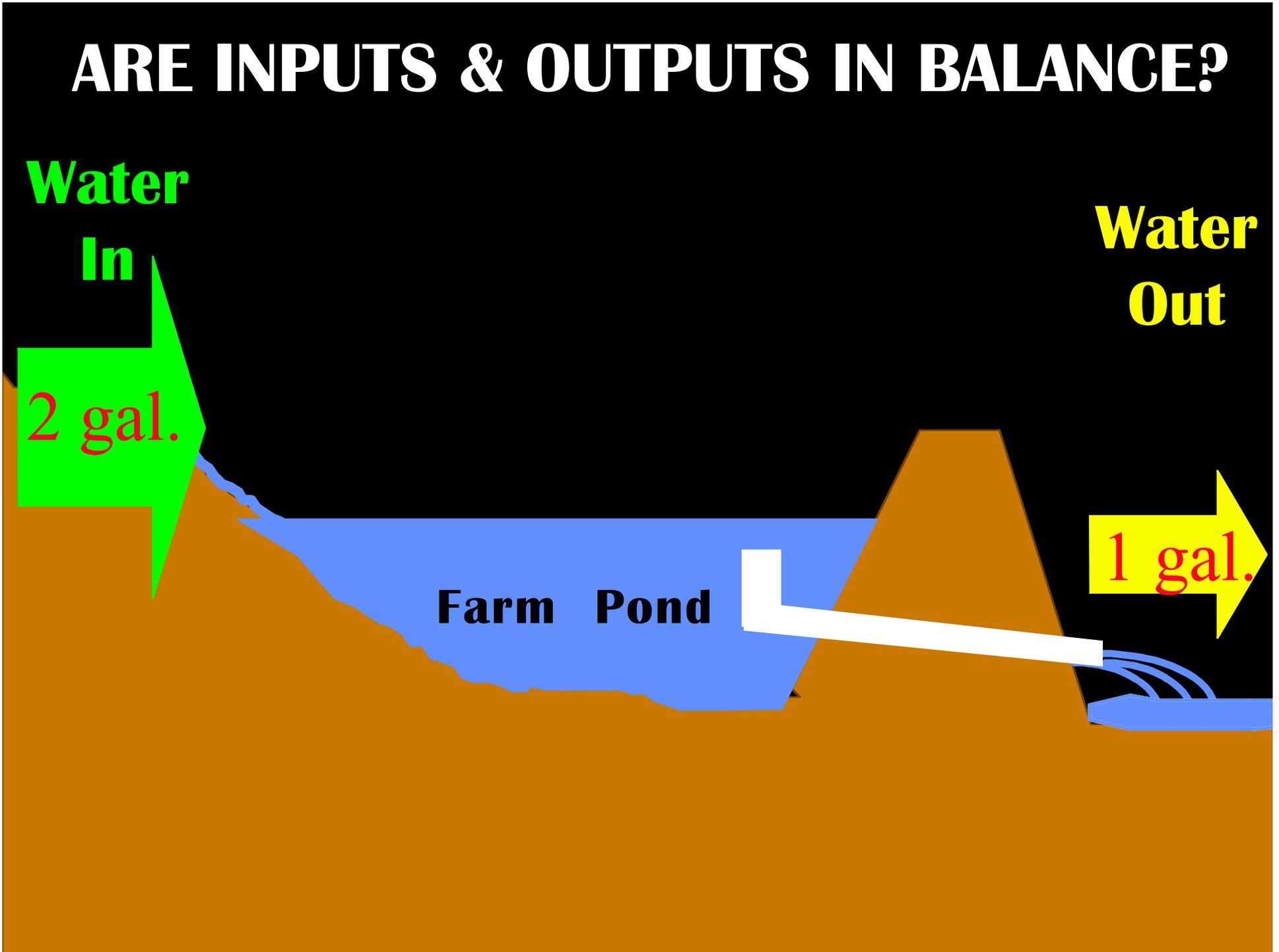
**Water
In**

2 gal.

**Water
Out**

1 gal.

Farm Pond



ARE INPUTS & OUTPUTS IN BALANCE?

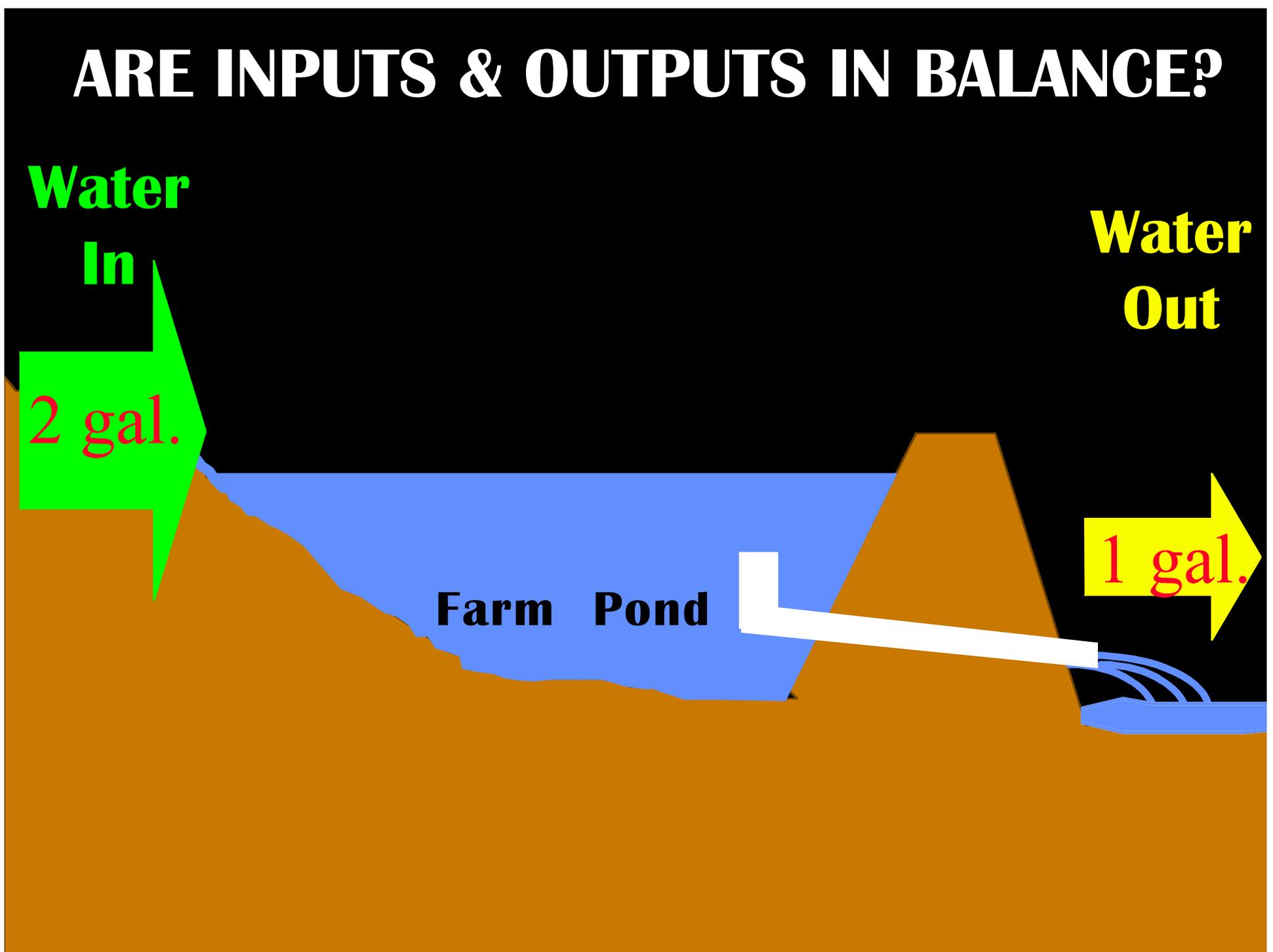
**Water
In**

2 gal.

**Water
Out**

1 gal.

Farm Pond



ARE INPUTS & OUTPUTS IN BALANCE?

**Water
In**

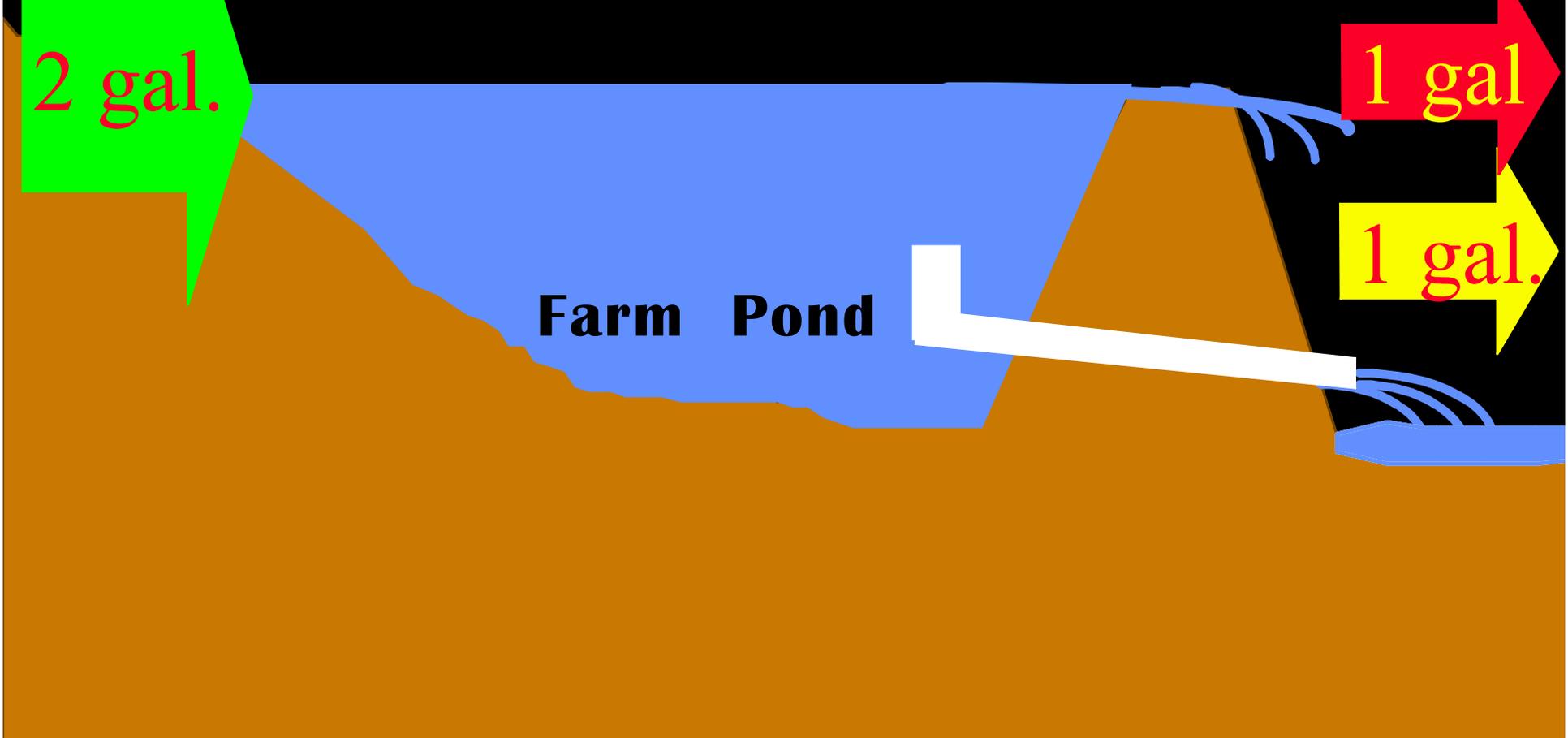
2 gal.

**Water
Out**

1 gal

1 gal.

Farm Pond



Sustainable Solutions?

Are BMP's that Plug the Leaks Sustainable?

**Water
In**

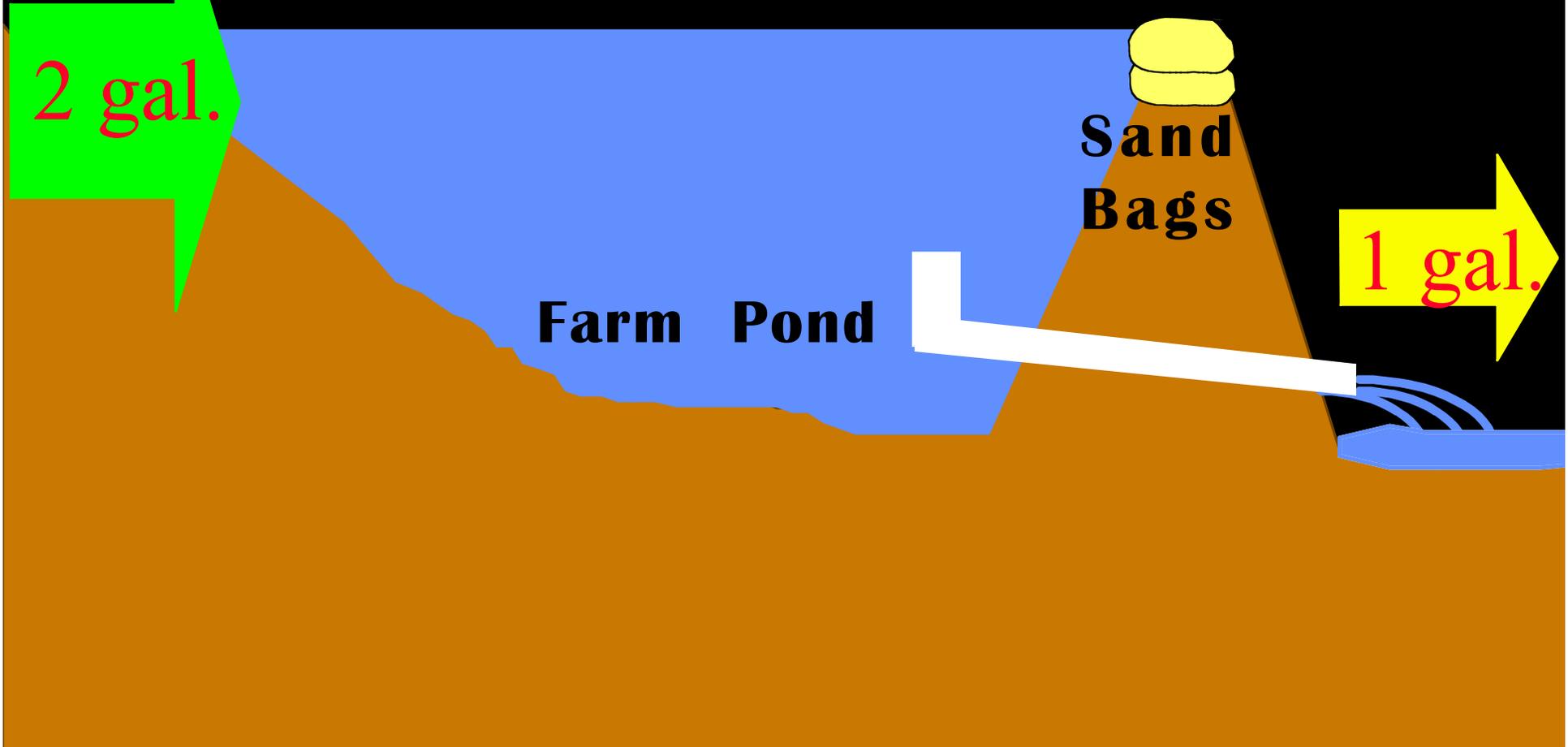
2 gal.

**Water
Out**

1 gal.

**Sand
Bags**

Farm Pond



Sustainable Solutions? Must Correct the Imbalance!

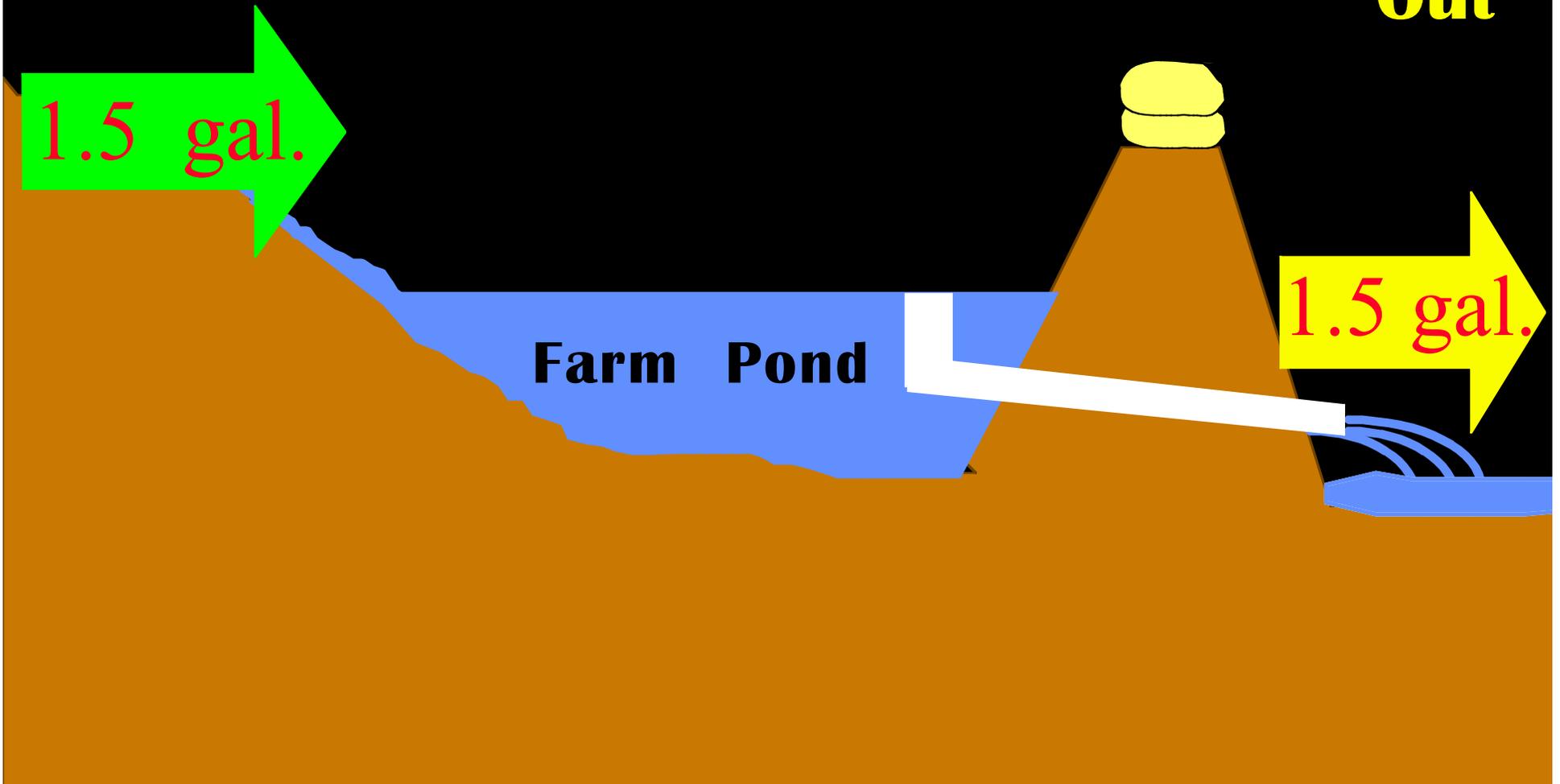
**Water
In**

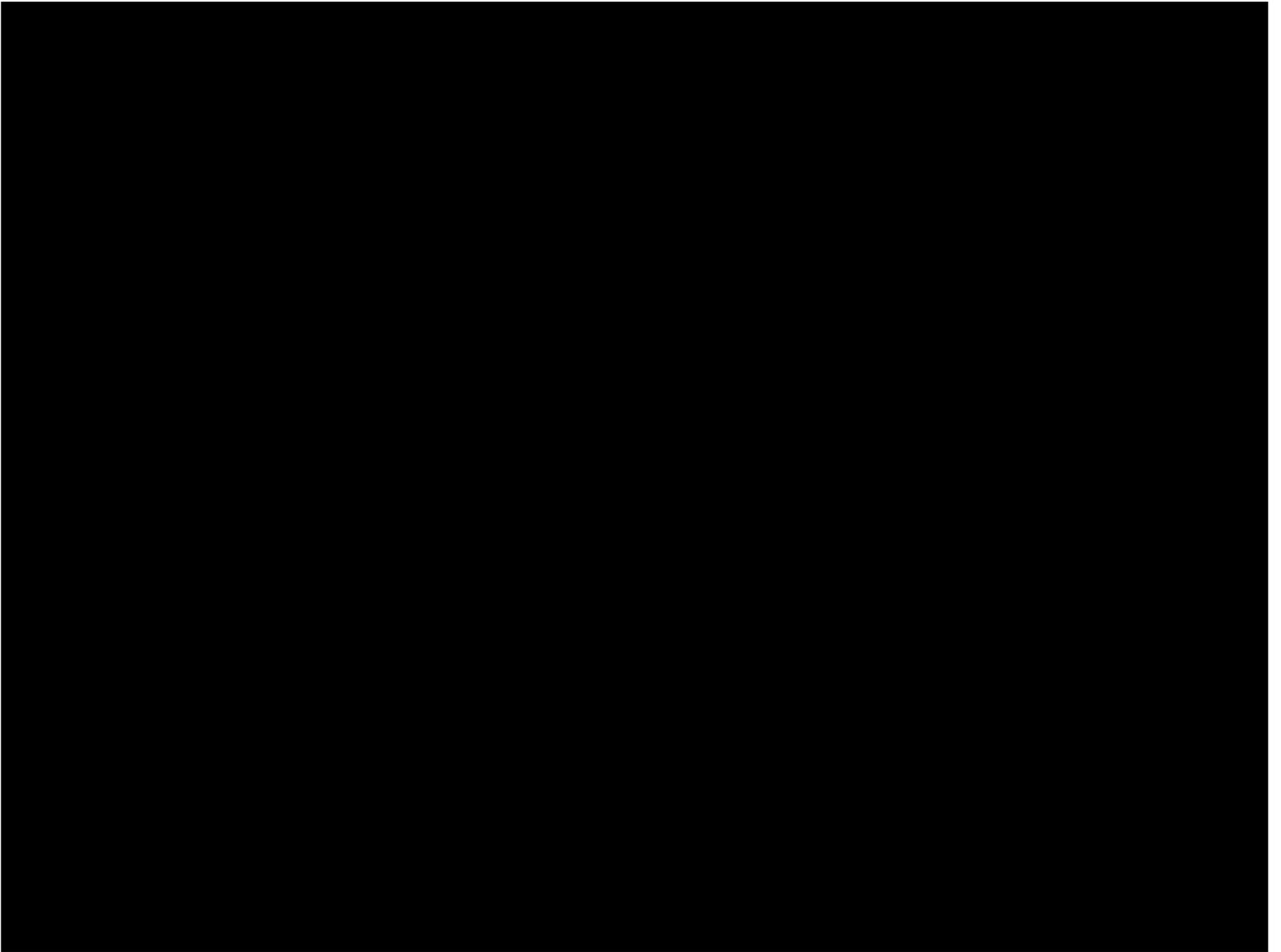
1.5 gal.

**Water
Out**

1.5 gal.

Farm Pond

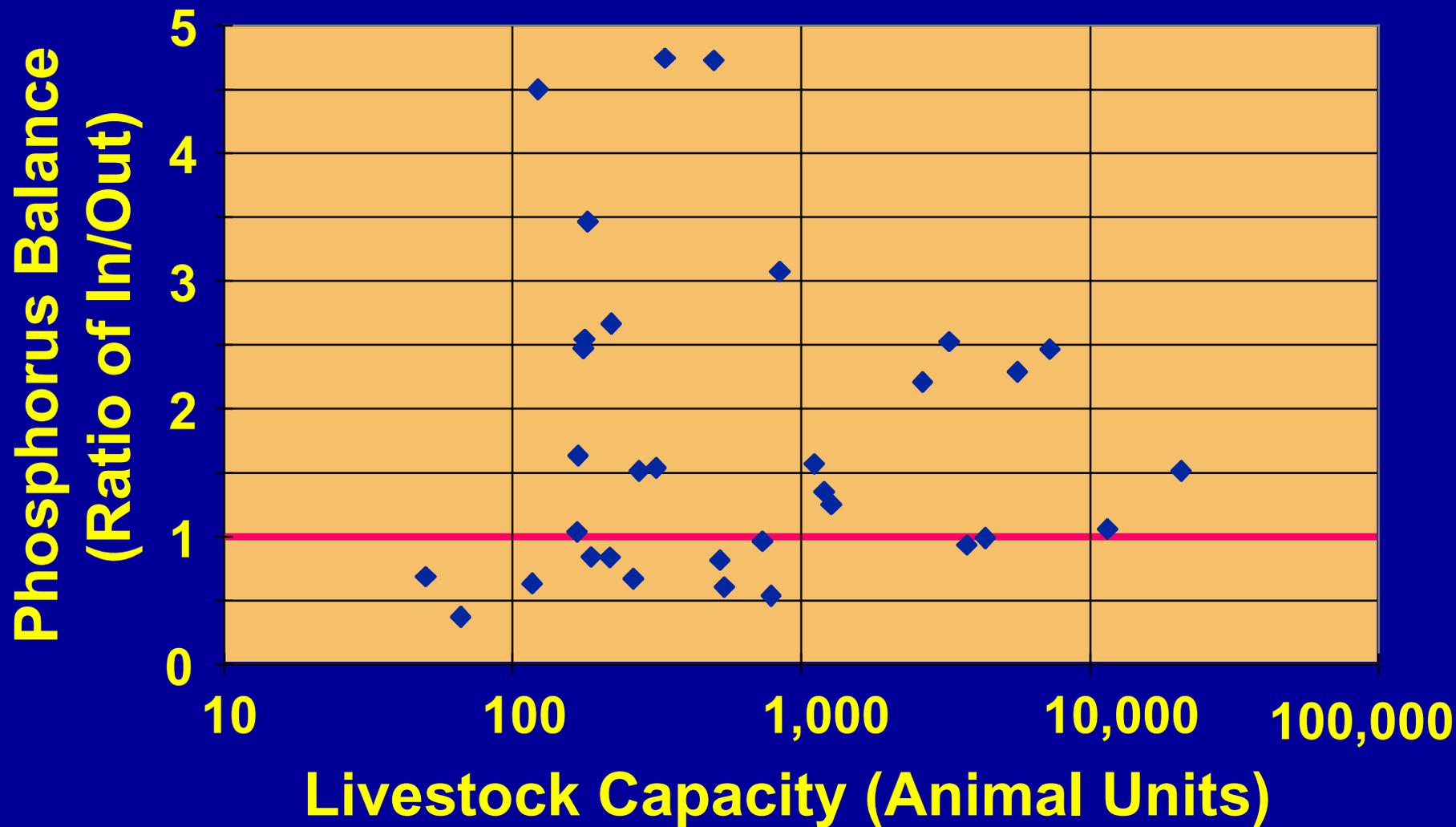




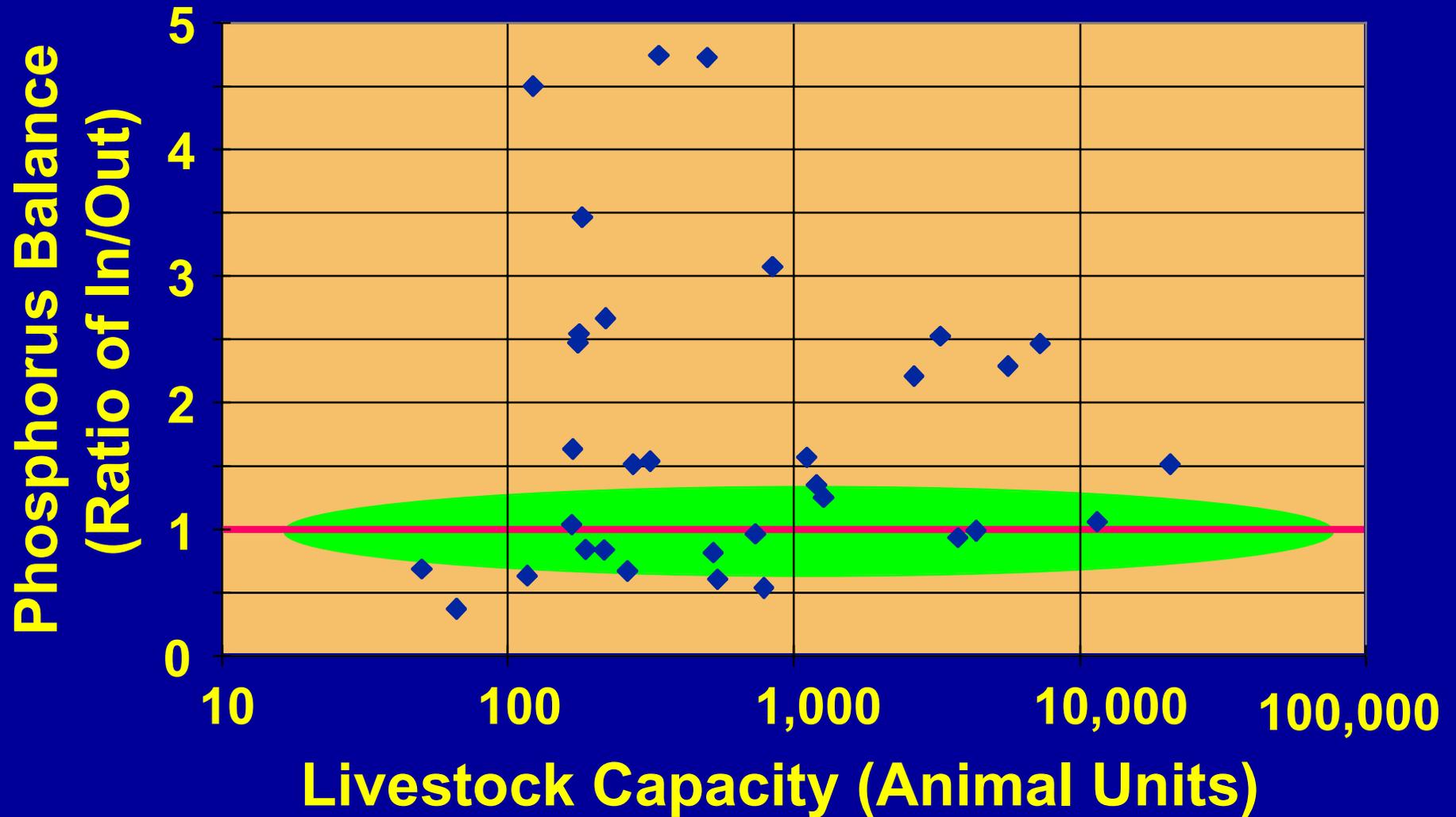
Typical Nutrient Balance on AFO's



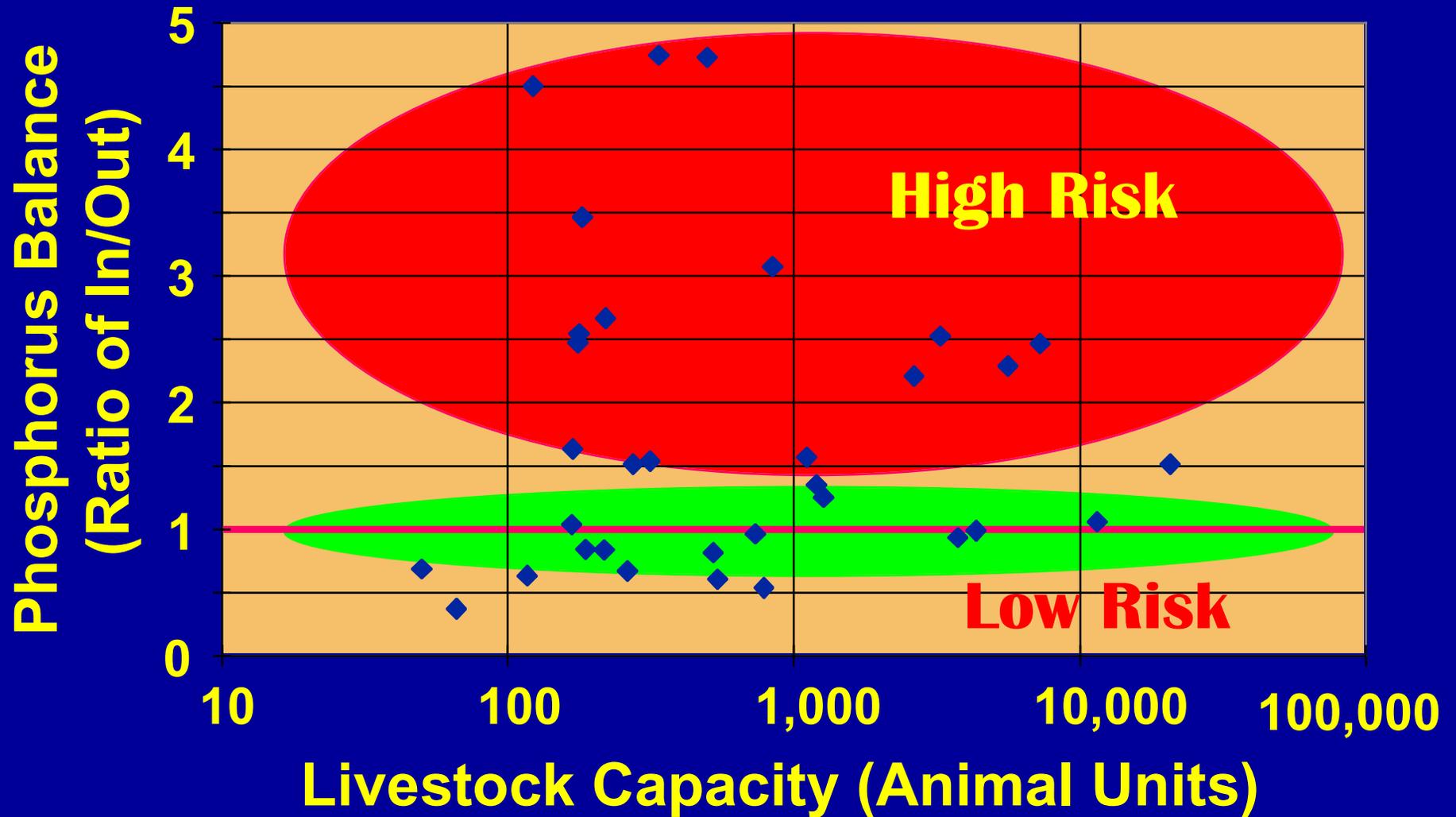
Livestock Capacity vs Phosphorus Balance



Livestock Capacity vs Phosphorus Balance



Livestock Capacity vs Phosphorus Balance

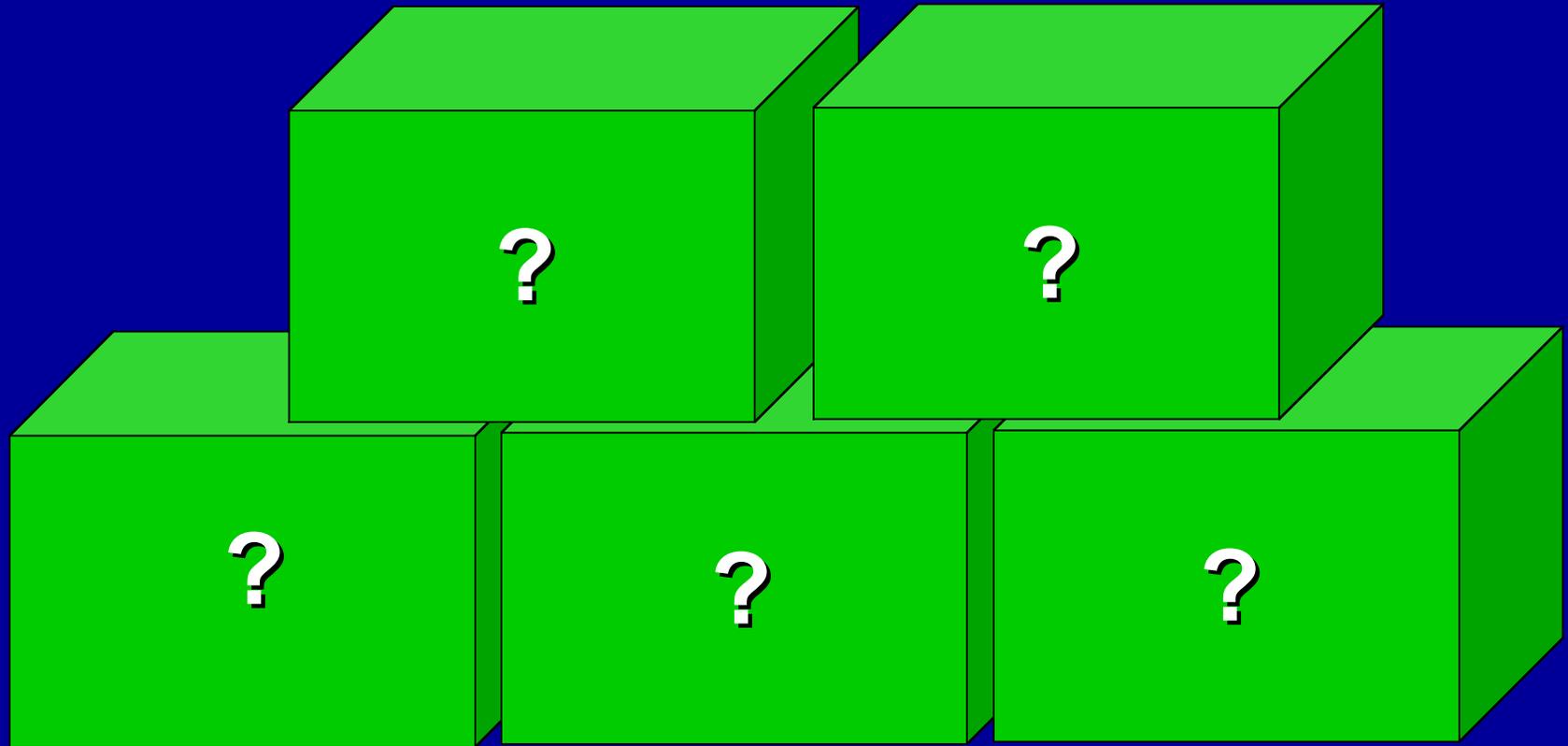




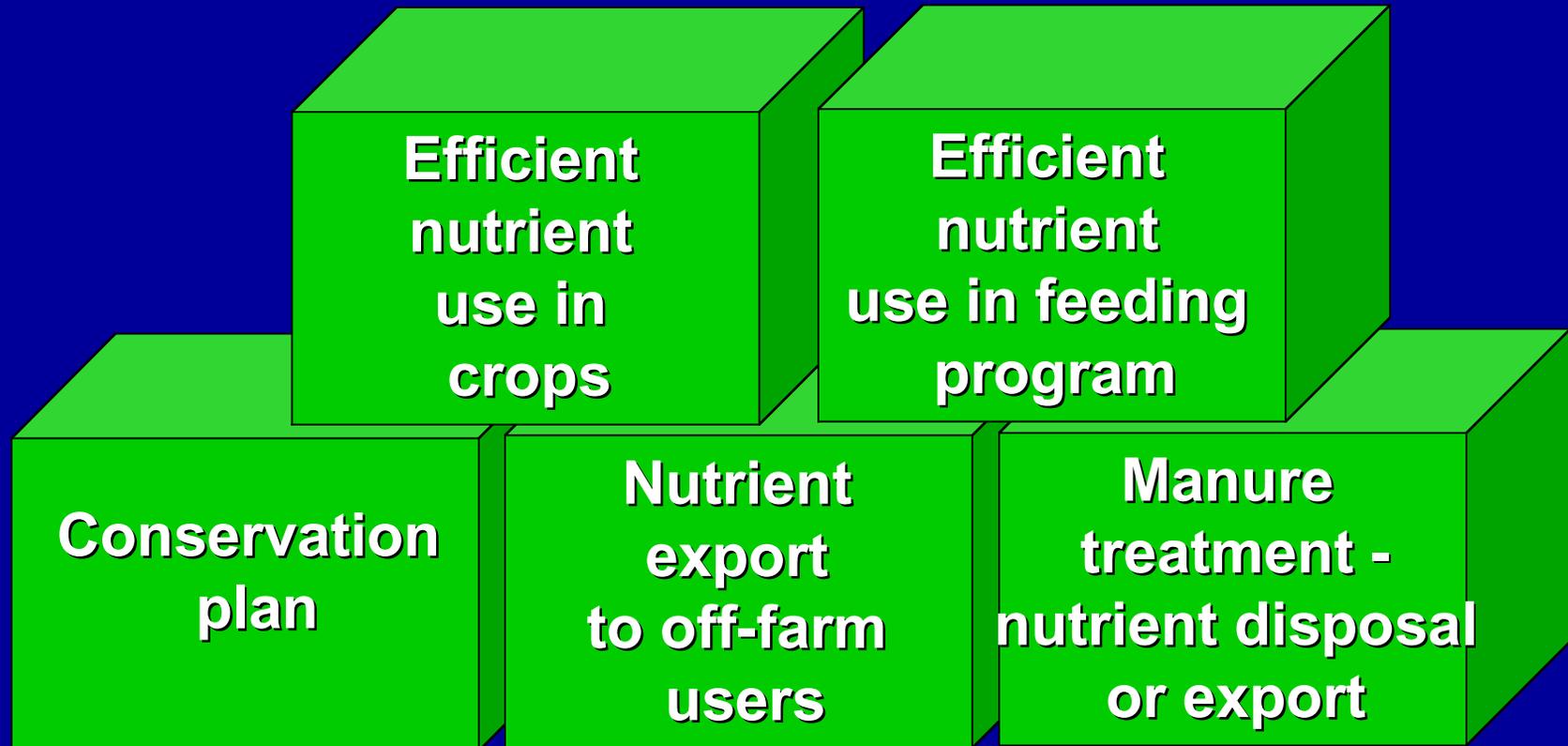
**What are Appropriate
Strategies for Managing
Nutrient Imbalances?**

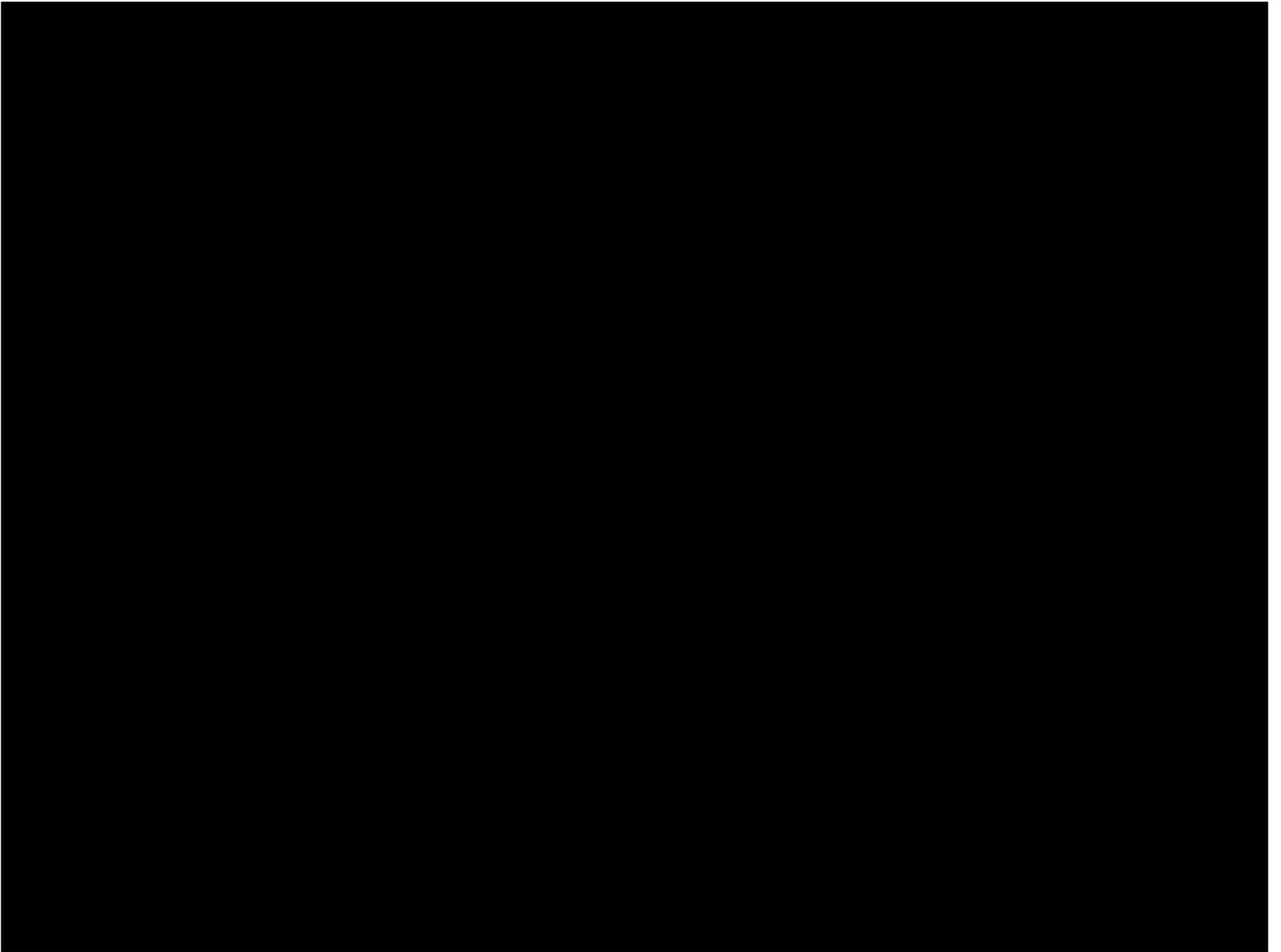


Nutrient Management Strategies:



Nutrient Management Strategies:





Phosphorus Inputs to Livestock Systems

Phosphorus Inputs (% of Total)

Fertilizer

Feeds

Animals

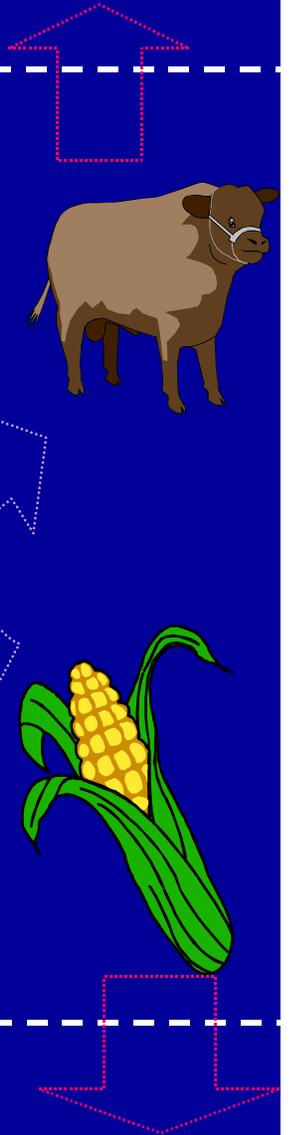
Which P input is largest?

<250

250-2500

>2500

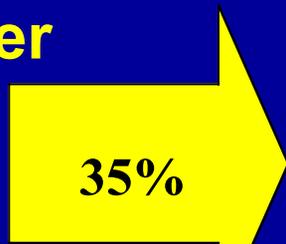
One Time Animal Capacity (animal units)



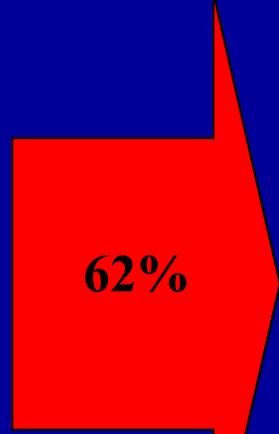
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Feeds



Animals

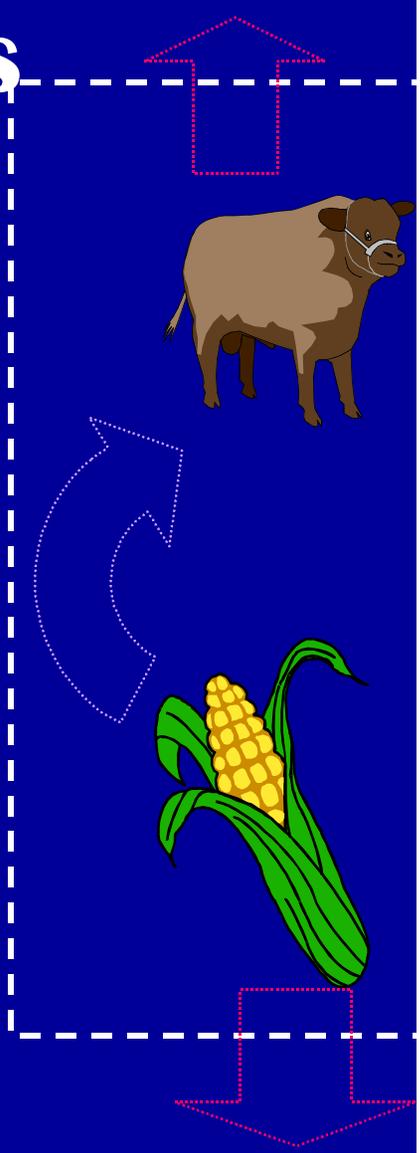


<250

250-2500

>2500

One Time Animal Capacity (animal units)



Phosphorus Inputs to Livestock Systems

Phosphorus Inputs (% of Total)

Fertilizer

35%

33%

Feeds

62%

47%

Animals

3%

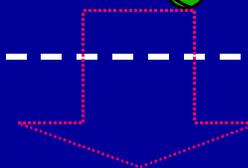
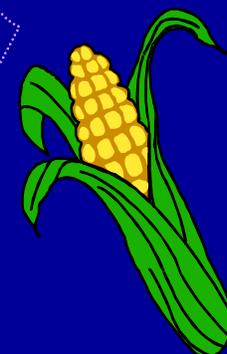
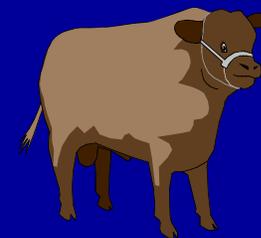
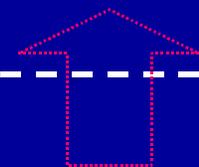
20%

<250

250-2500

>2500

One Time Animal Capacity (animal units)



Phosphorus Inputs to Livestock Systems

Phosphorus Inputs (% of Total)

Fertilizer

Feeds

Animals

35%

33%

1%

62%

47%

74%

3%

20%

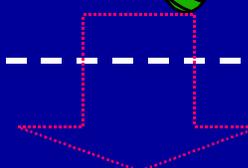
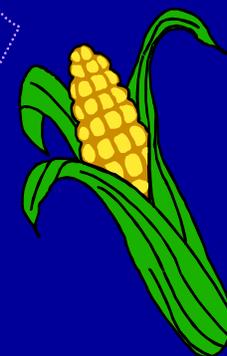
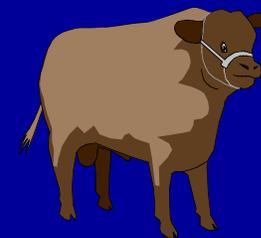
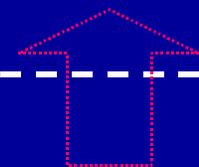
25%

<250

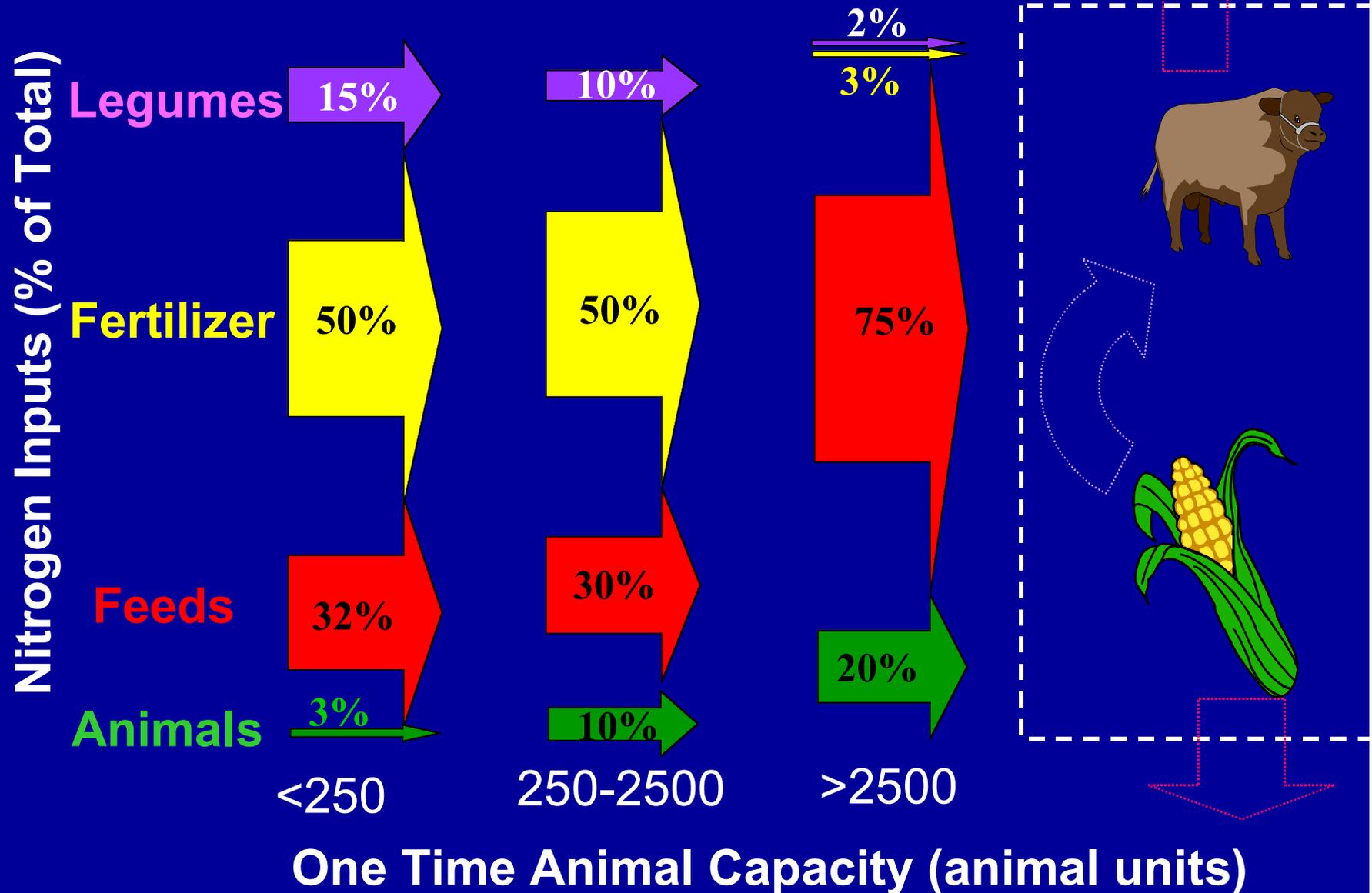
250-2500

>2500

One Time Animal Capacity (animal units)



Nitrogen Inputs to Livestock Systems



Whole Farm Nutrient Balance

Strengths

- ¥ Looks at big picture including feeding program
- ¥ Yardstick for nutrient concentration & comparing alternative solutions
- ¥ Identifies primary nutrient sources

Weaknesses

- ¥ Difficult concept for some producers
 - ¥ Difficult to define target especially for N
 - ¥ Indirectly addresses manure issues
-



Take Home Message





A

For \$1,000,000

Which nutrient management component has the biggest environmental impact?



B



C



Additional Planning Tools for CNMP:

¥ Define degree of nutrient concentration on whole farm basis,

¥ Identify primary source of nutrients arriving on farm,

¥ Estimate impact of feeding program decisions, and

¥ Identify strategies most likely to succeed.



Whole Farm Nutrient Balance Spreadsheet

Nebraska's Manure Matters web site

www.ianr.unl.edu/manure



