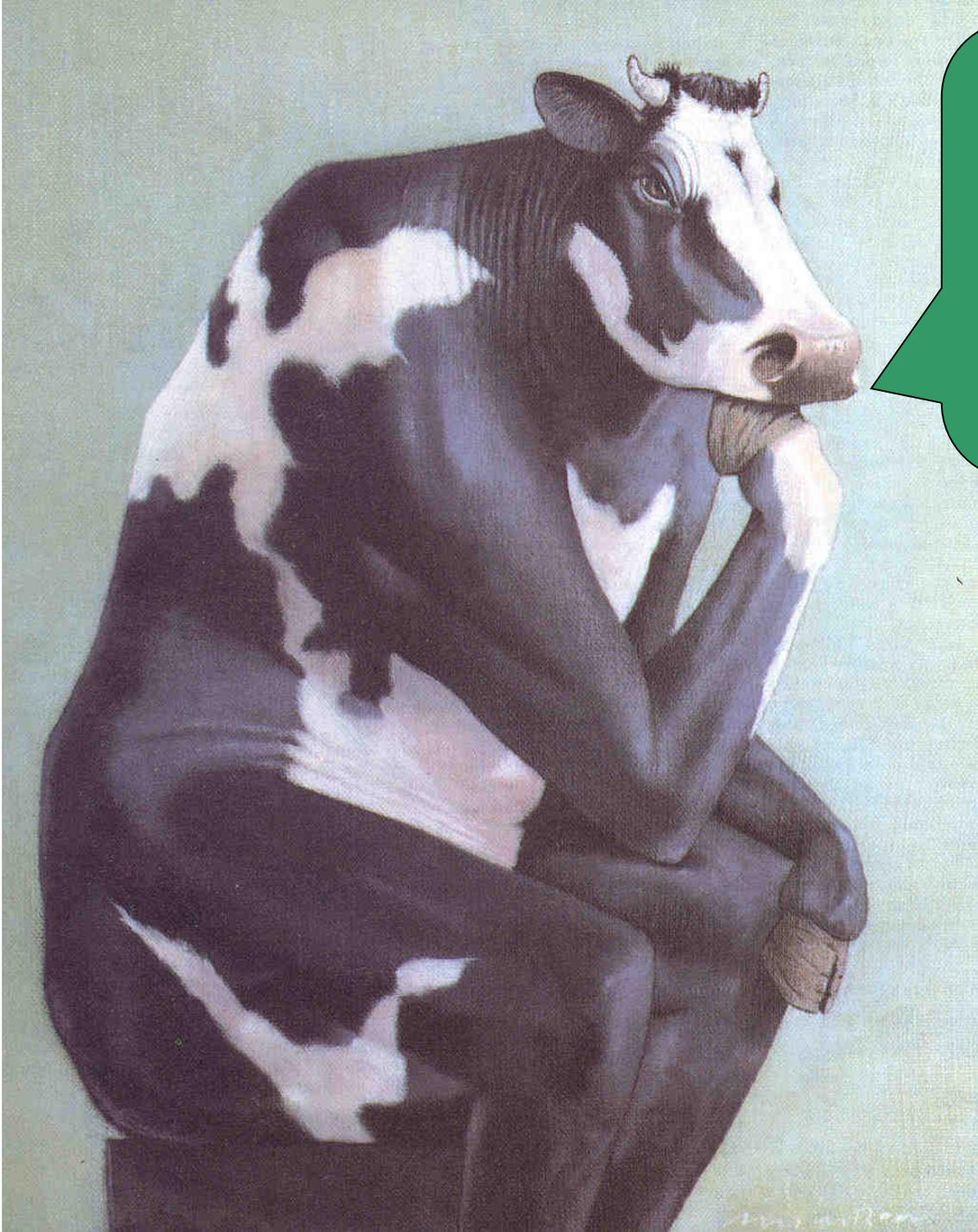




DAIRY NUTRIENT MANAGEMENT TOOLS WORKSHOP

Free workshop for producers, growers and advisors. Get nutrient management tools you can use to best manage your nutrients... and your money! *Lunch provided.*

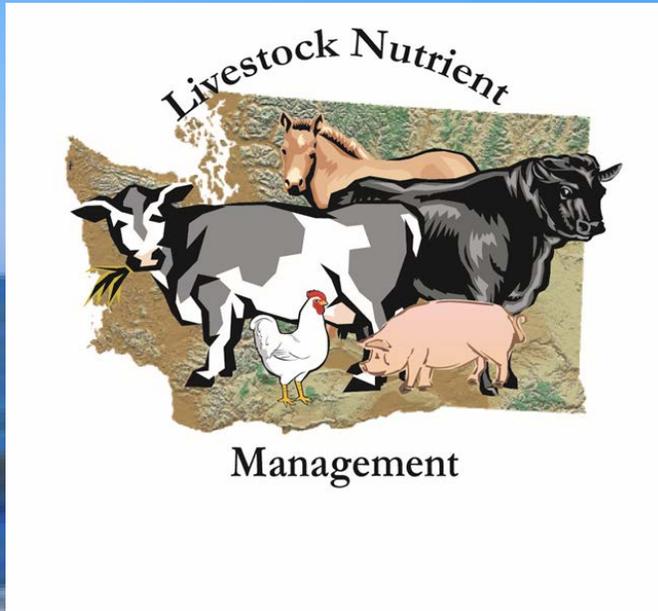
9:15 AM	Registration, Coffee and Pastries
9:30 AM	What Goes in Must Come Out: How to Reduce On-Farm Feed Imports of Nitrogen and Phosphorus <i>Joe Harrison, Livestock Nutrient Management</i>
10:00 AM	FNMP2.net: Connecting Feed Decisions with Crop Nutrient Management Plans <i>Joe Harrison, Livestock Nutrient Management</i>
10:30 AM	Turn your Compost Up a Notch with the Compost Mixing Tool Calculator. <i>Andy Bary, Crop & Soil Science</i>
11:00 AM	Tools for Practical Irrigation Scheduling <i>Troy Peters, Biological Systems Engineering</i>
11:30 PM	Lunch (provided)
Noon	Featured Precision Nutrient Management Video Story: J & K Dairy <i>Liz Whitefield, Livestock Nutrient Management</i>
12:30 PM	Lagoon Liners: Case Studies from Three Dairies <i>Joe Harrison, Livestock Nutrient Management</i>
1:00 PM	Food Safety Implications with Manure <i>Andy Bary, Crop & Soil Science</i>
1:30 PM	Depart Best Western for J & K Dairy
2:00 PM	Precision Nutrient Management Field Demonstration at J & K Dairy <i>Joe Harrison and Liz Whitefield, Livestock Nutrient Management</i>



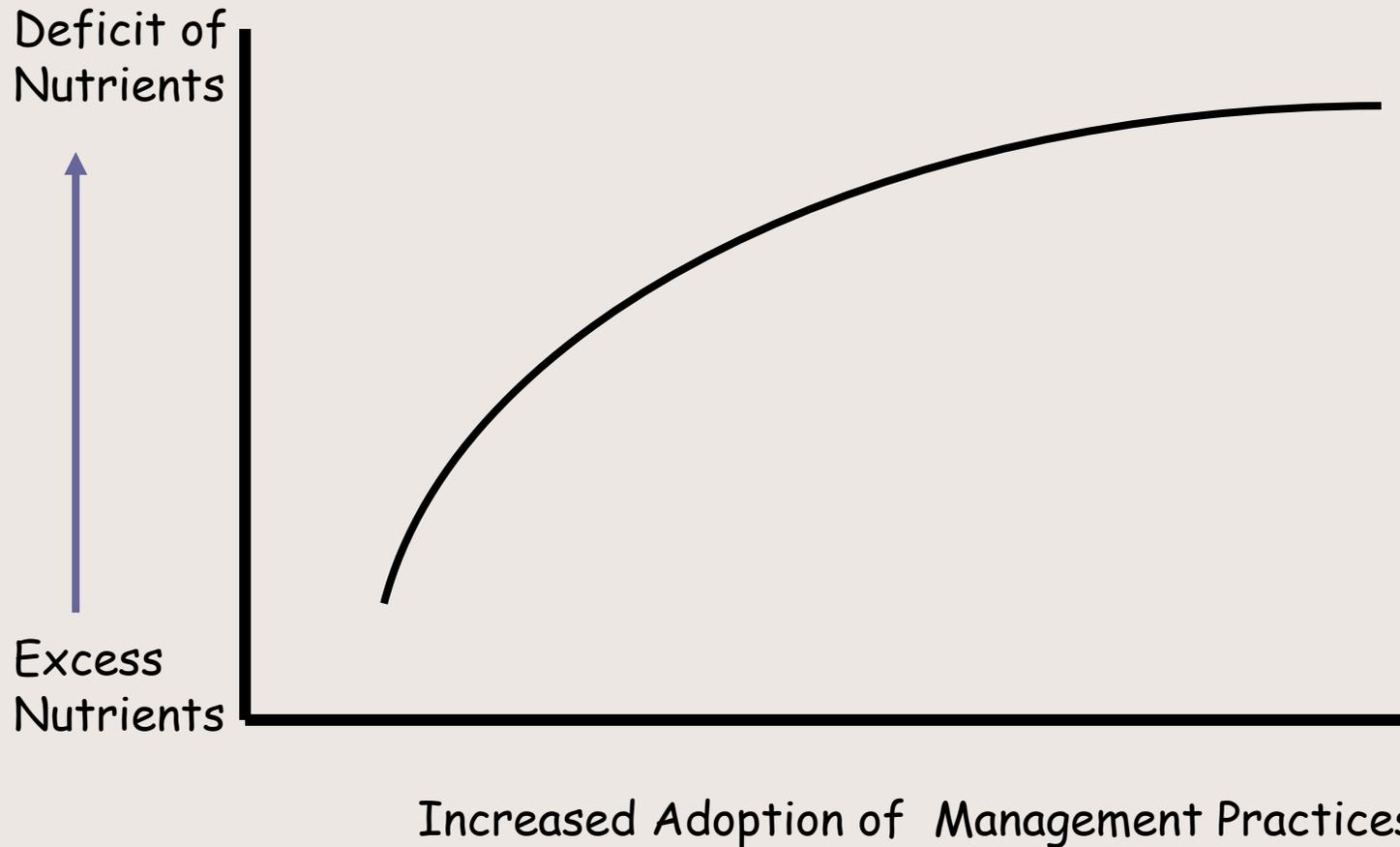
What Goes in Must Come Out:
How to Reduce On-farm
Imports of Nitrogen and
Phosphorus

Joe Harrison
jhharrison@wsu.edu

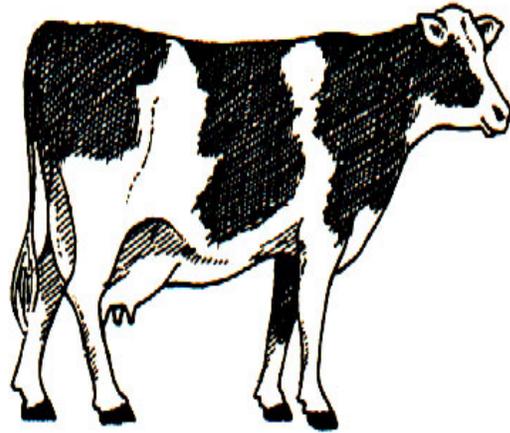
Nutrient Balance Does it Exist



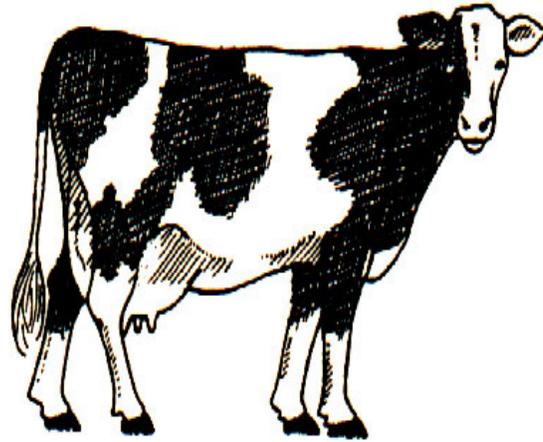
Improvement in Whole Farm Nutrient Balance



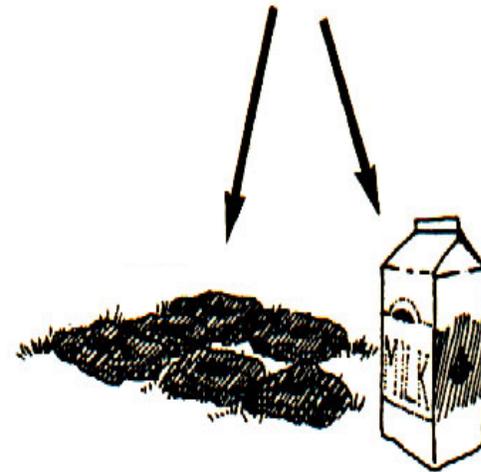
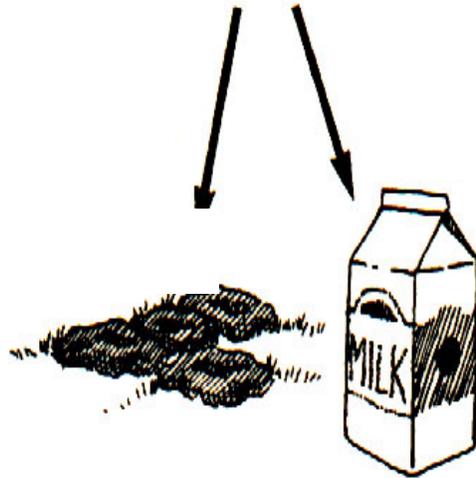
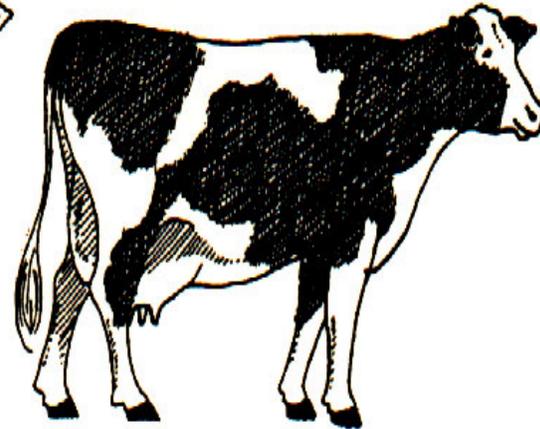
Nitrogen
20% maintenance



Phosphorus
13% maintenance

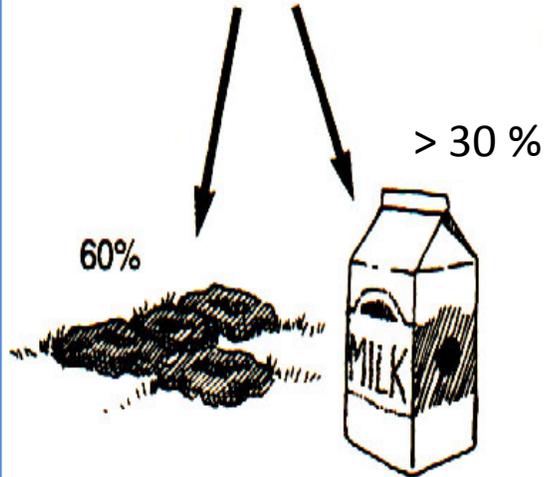
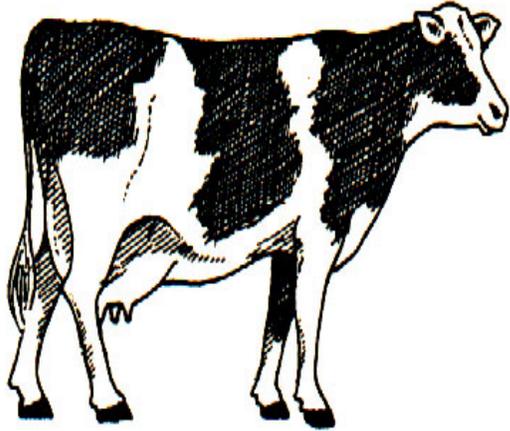


Potassium
12% maintenance



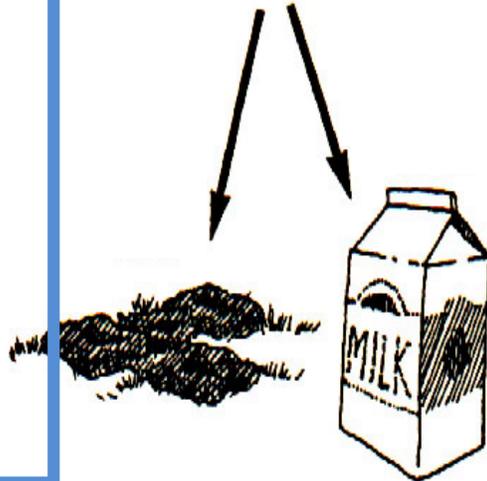
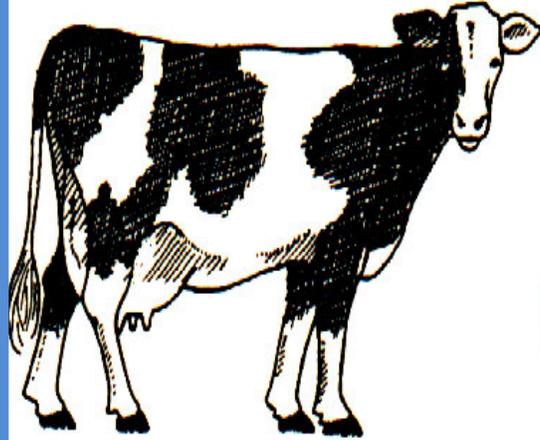
Nitrogen

20% maintenance



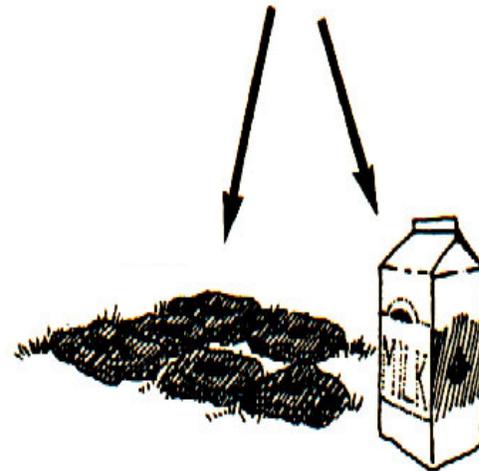
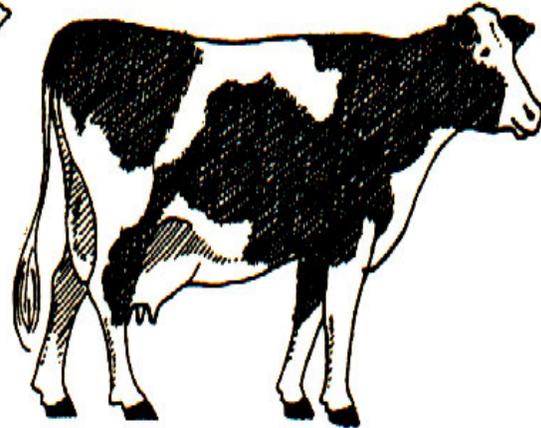
Phosphorus

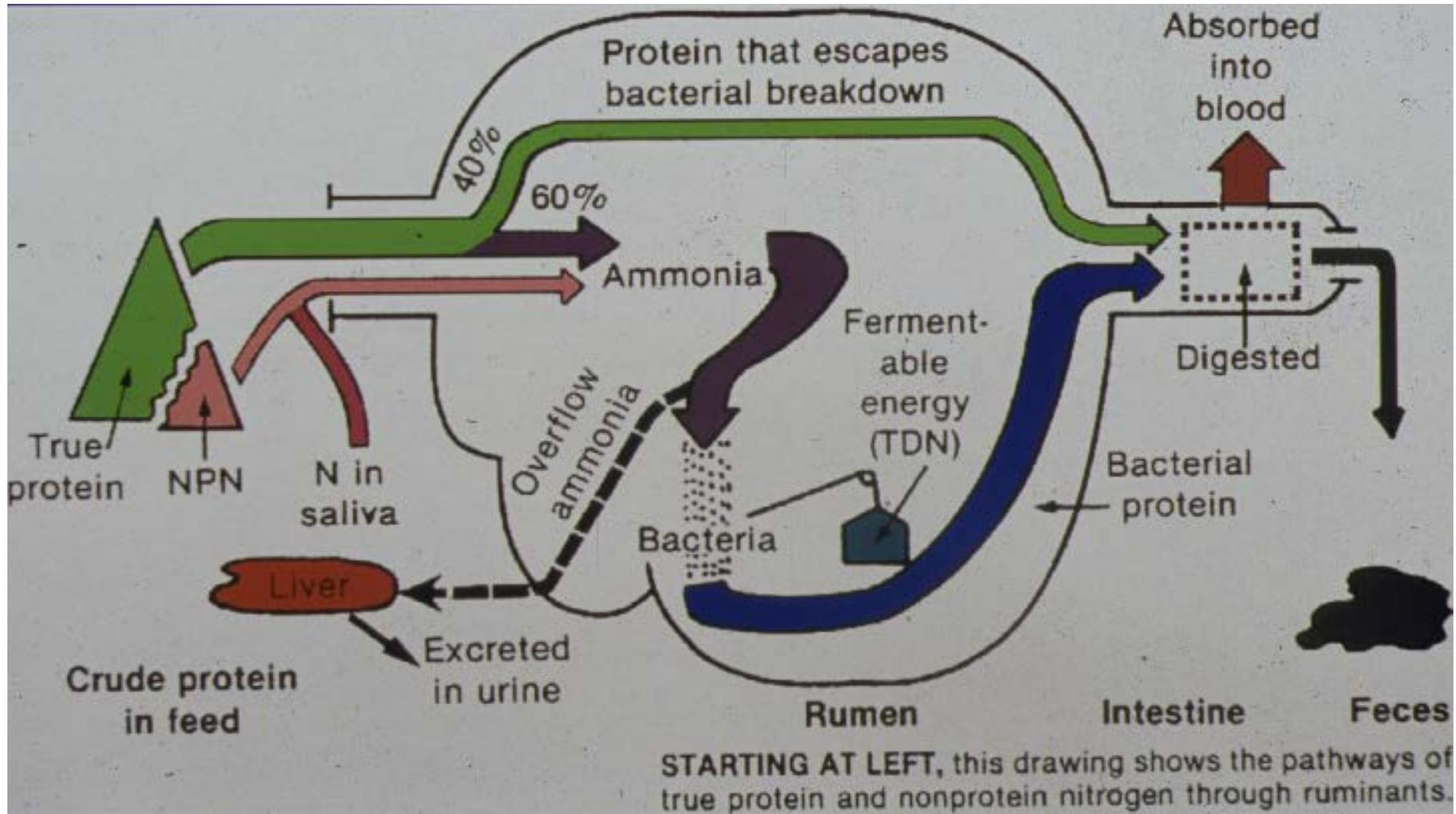
13% maintenance



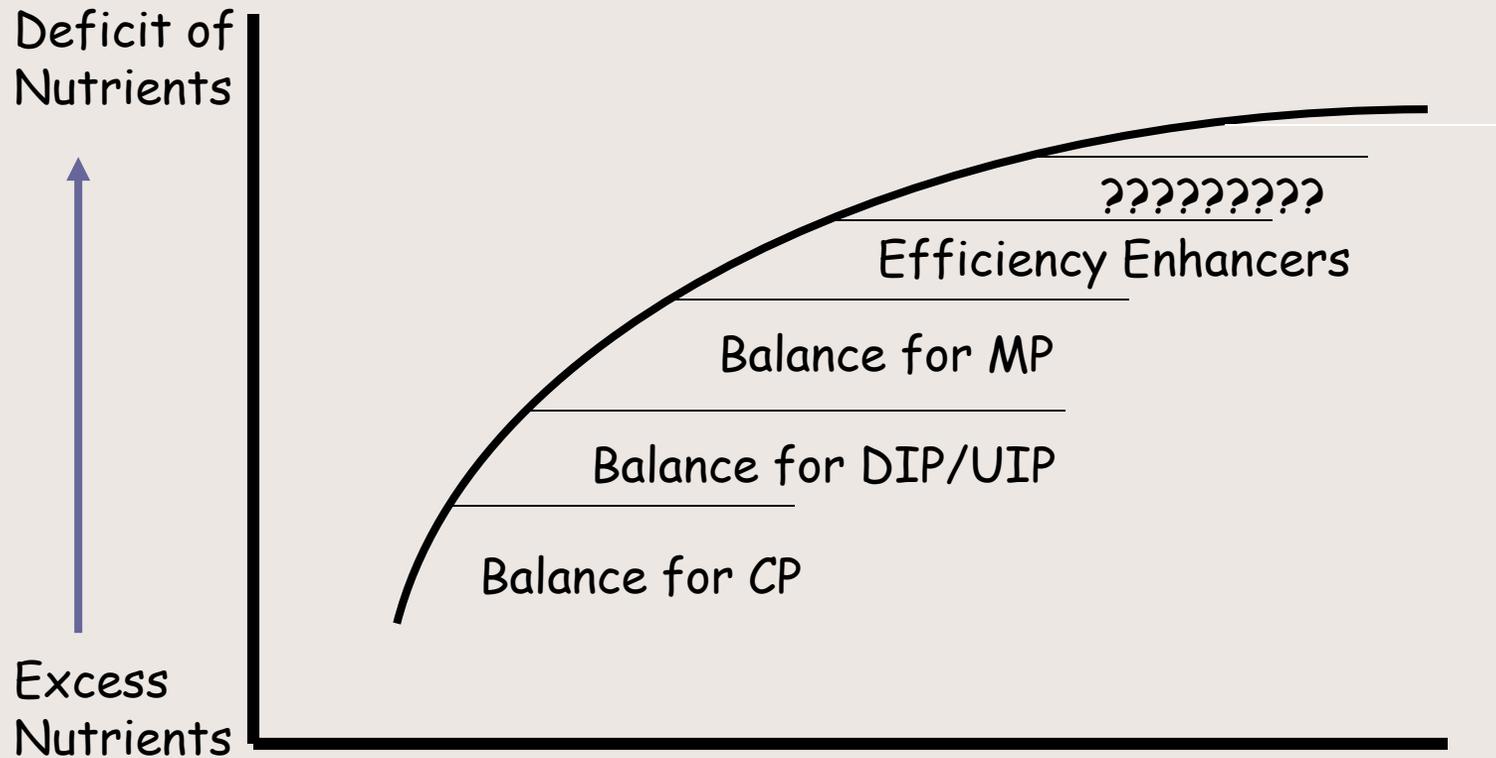
Potassium

12% maintenance





Improvement in Whole Farm Nutrient Balance

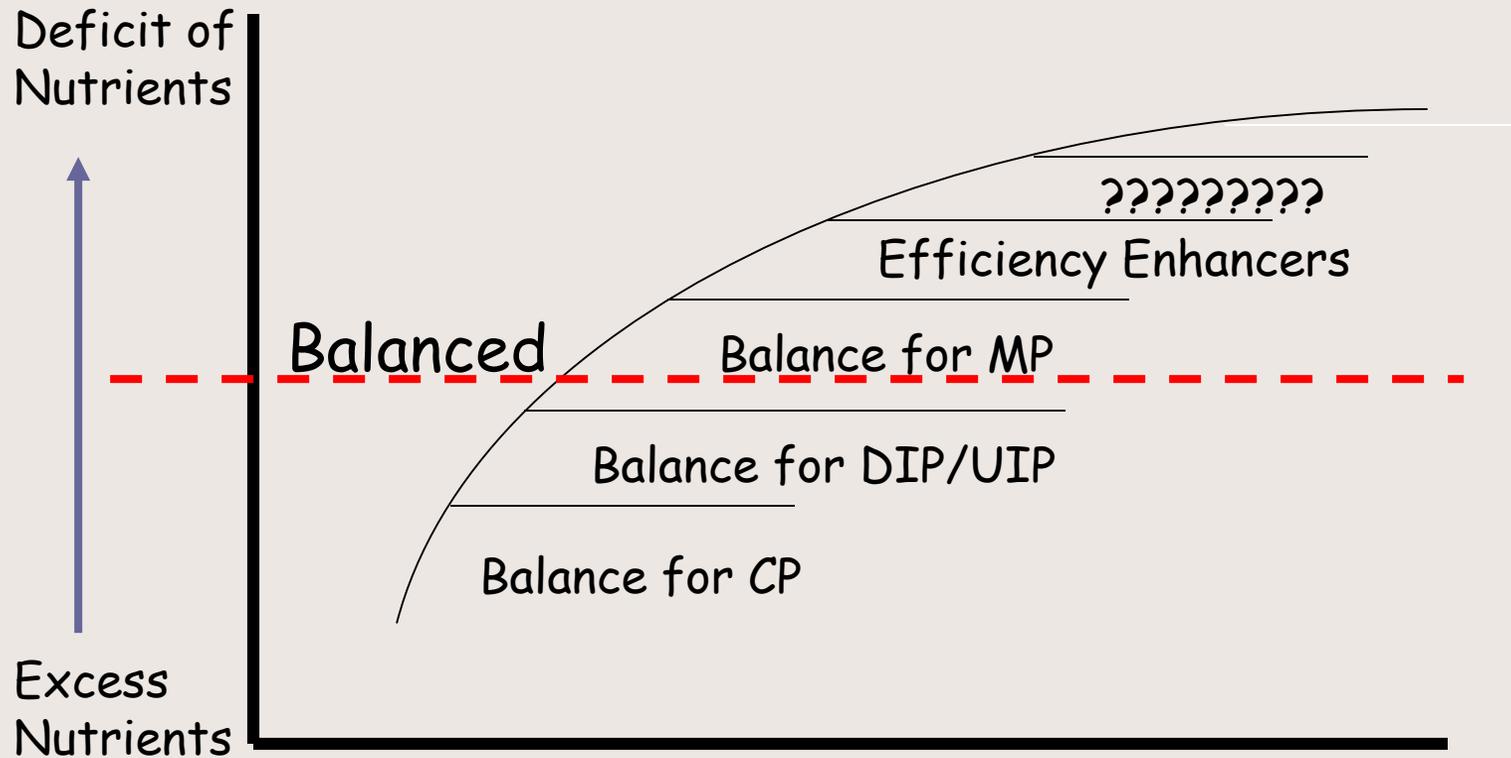


Increased Adoption of Feed Management Practices

Focus on Nitrogen



Improvement in Whole Farm Nutrient Balance



Increased Adoption of Feed Management Practices

Focus on Nitrogen





Protein and Amino Acid Balance

Crude Protein → Ruminally Degraded Protein
and Ruminally Undegraded Protein

Prediction of Amino Acid Needs of the Cow

Diets

- **Two diets consisted of the general herd Diet and a reduced CP diet utilizing Alimet, lysine HCL, and SoyPass**



Supplemental Amino Acids **and Protein**

SoyPass
(vegetable based source)

Methionine in the form of Alimet
(D, L-2 hydroxy-4-methylthio-butanoic acid)
(Novus Internatonal)

Lysine in the form of lysine-HCL



Rations

Rations were formulated with the CPM model.

**The levels of methionine and lysine were targeted
to be at ~ 88 % or 111% of Met and
97 % or 108% of Lys**

**Met Protein was estimated at -449 gm
and -259 gm**



Estimated Intake of Alimet and Lysine HCL

Lysine HCL

33 gms

Alimet

21 gms



Diet Composition

<u>Item</u>	<u>Control</u>	<u>Treated</u>
	-----%DM-----	
Alf hay	29.3	26.2
CS	19.5	20.0
Corn grain, flaked	16.1	18.0
Corn distillers	8.3	8.5
Beet Pulp pellets	2.1	6.2
Molasses	1.7	1.9
Ener GII	1.5	.63
SBM	----	3.5
Bakery mix	14.3	-----
Bakery waste	----	8.0
SoyPass	----	3.95
Mineral/vitamin mix	2.8	----
Mineral/vitamin mix + Alimet and lysine HCL	----	3.1

Effect of Reduced CP Diets with Amino Acid Formulation In a High Producing Herd

<u>Item</u>	<u>Control</u>	<u>Reduced CP Diet</u>
Diet CP, %	17.8	16.9
DMI, lbs	56.7	55.2
Milk, lbs/day	99.9	101.9
Milk Protein, %	2.90	2.93
Milk Protein, lbs	2.88	2.95
Ratio of Milk True Protein: Feed Protein	.285	.316

2001 - L-HCL



Effect of Reduced CP Diets with Amino Acid Formulation In a High Producing Herd

<u>Item</u> <u>CP Diet</u>	<u>Control</u>	<u>Reduced% Change</u>	
Nitrogen Intake, gms	734	680	- 7.4
Milk Total Nitrogen, gms	240	246	+ 2.5
Predicted Urinary Nitrogen, gms	289	239	- 17.3
Calculated Fecal Nitrogen, gms	205	195	- 5.0

2001 - L-HCL



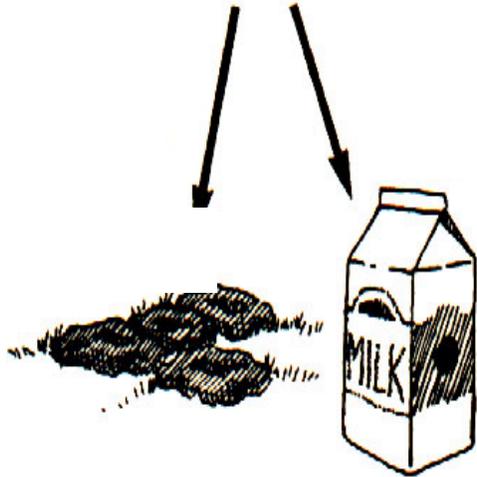
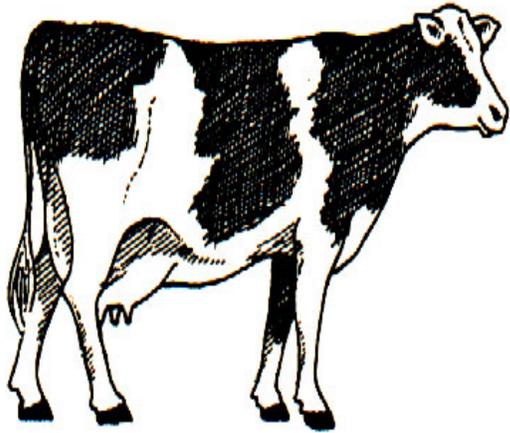
Economic Evaluation

<u>Item</u>	<u>Control</u>	<u>Experimental</u>
Feed Cost, \$/day	4.82	4.88
Milk Income, \$/day	11.92	12.10
IOFC, \$/day/cow	7.10	7.22

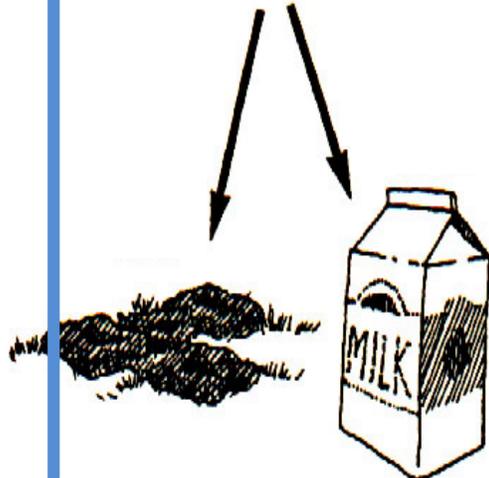
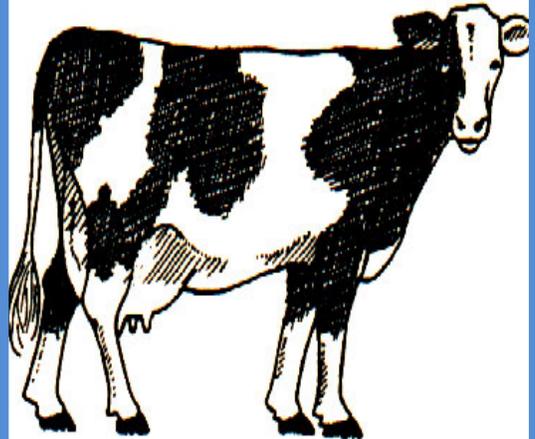
2001 - L-HCL



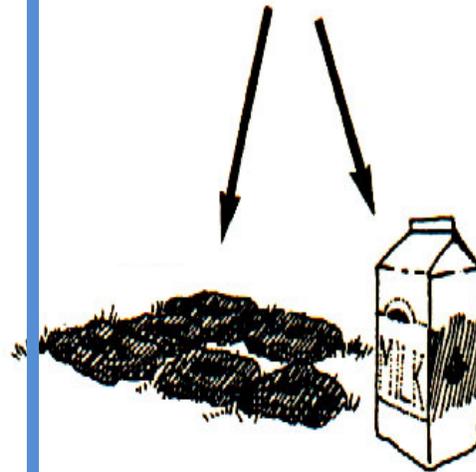
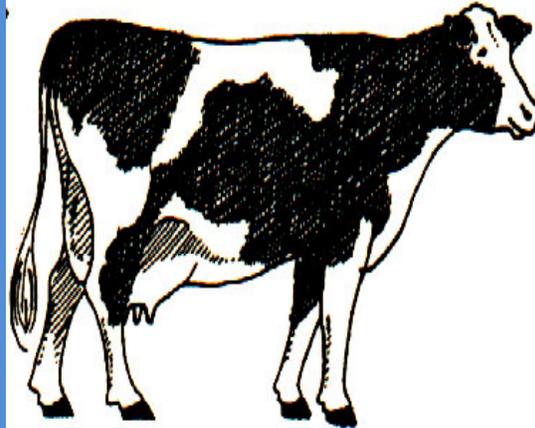
Nitrogen
20% maintenance



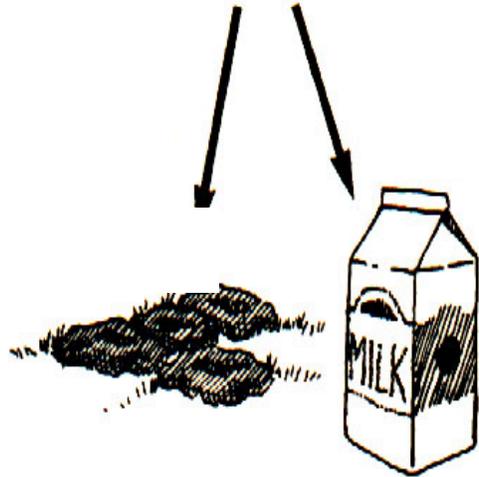
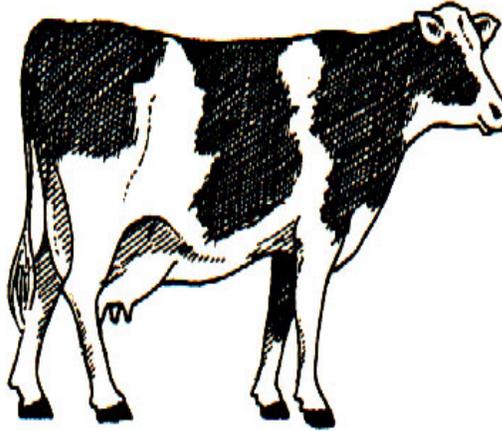
Phosphorus
13% maintenance



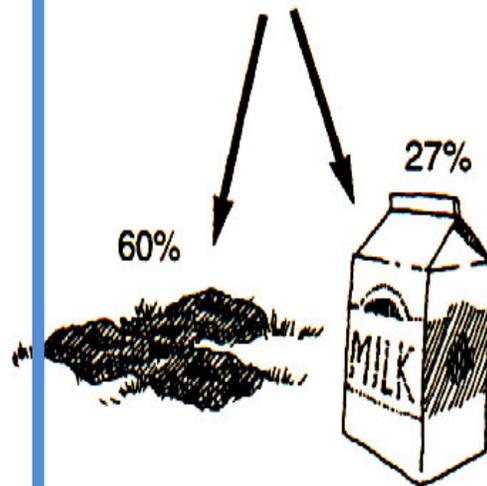
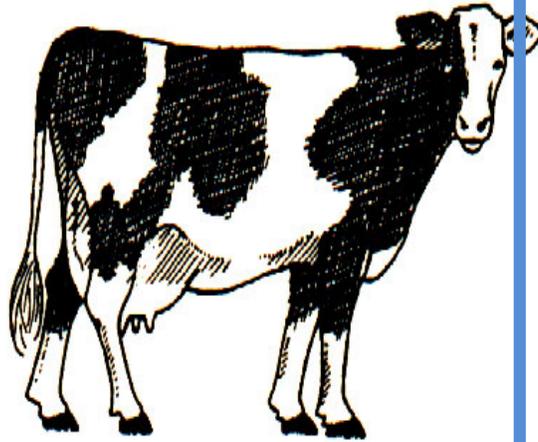
Potassium
12% maintenance



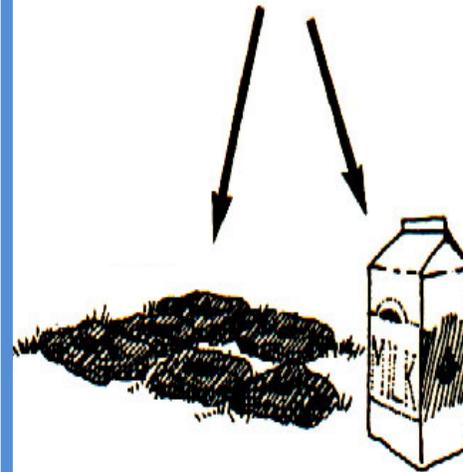
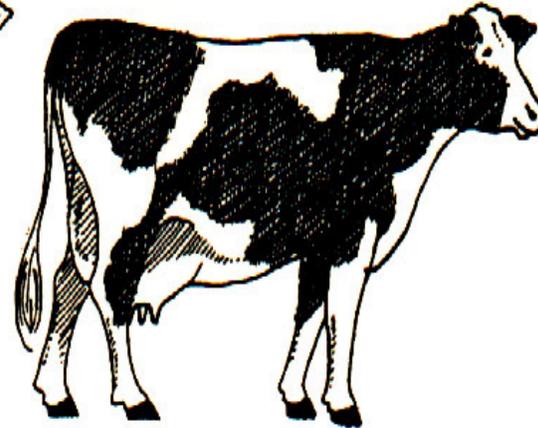
Nitrogen
20% maintenance



Phosphorus
13% maintenance



Potassium
12% maintenance



Impact of Manure Management on N & P Ratio

Raw Manure

5.8

Lagoon Stored Manure
(2% vs 8% solids)

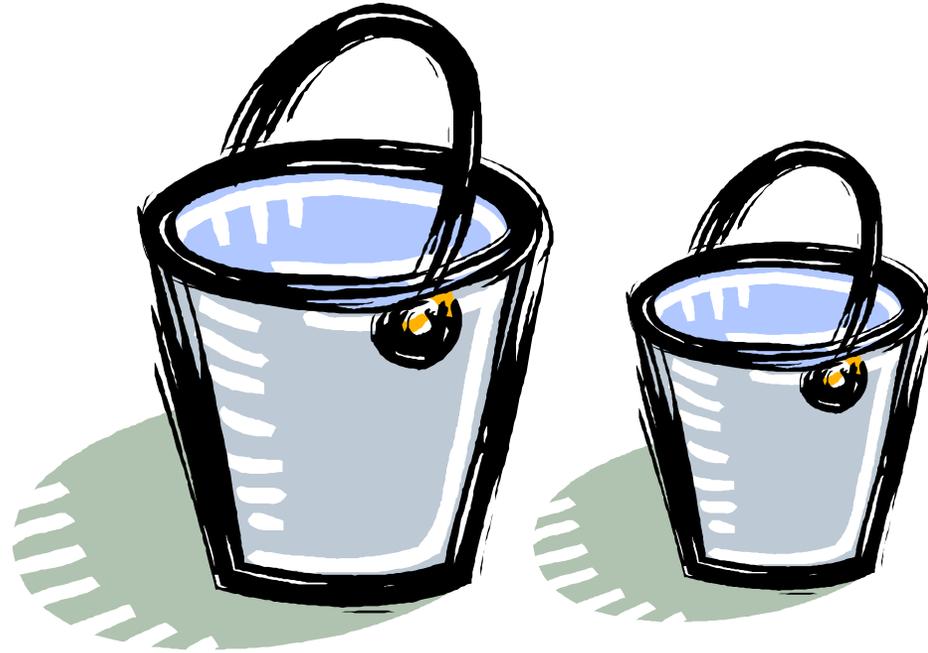
2.3 - 4.5

Raw Manure



100 # of N and 17 # P

Lagoon Stored Manure



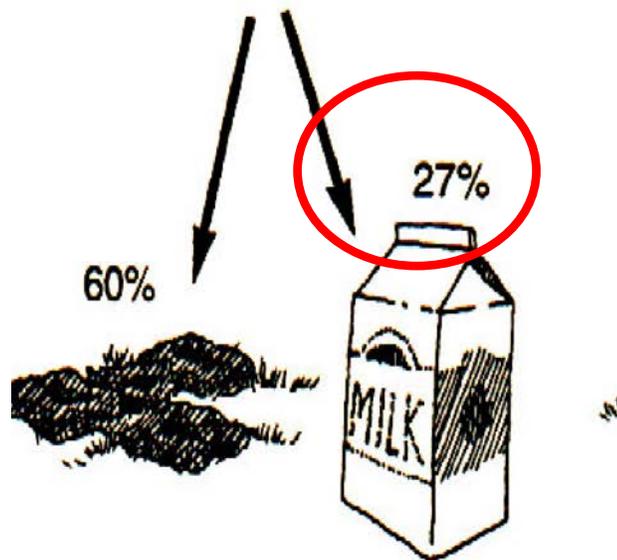
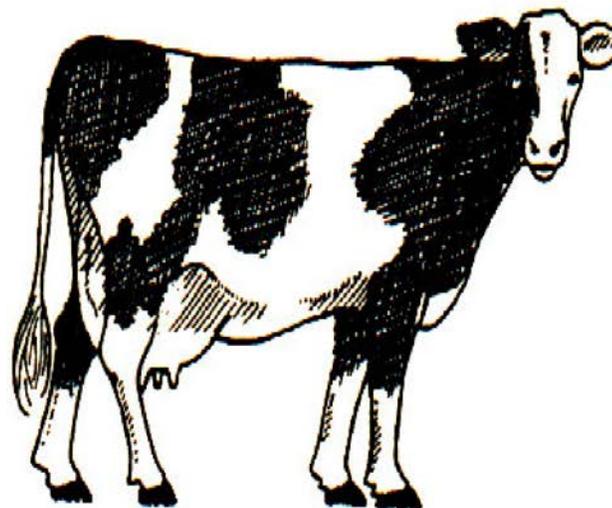
54 # N + 17 # P 46 # N + 14 # P

100 # N + 31 # P

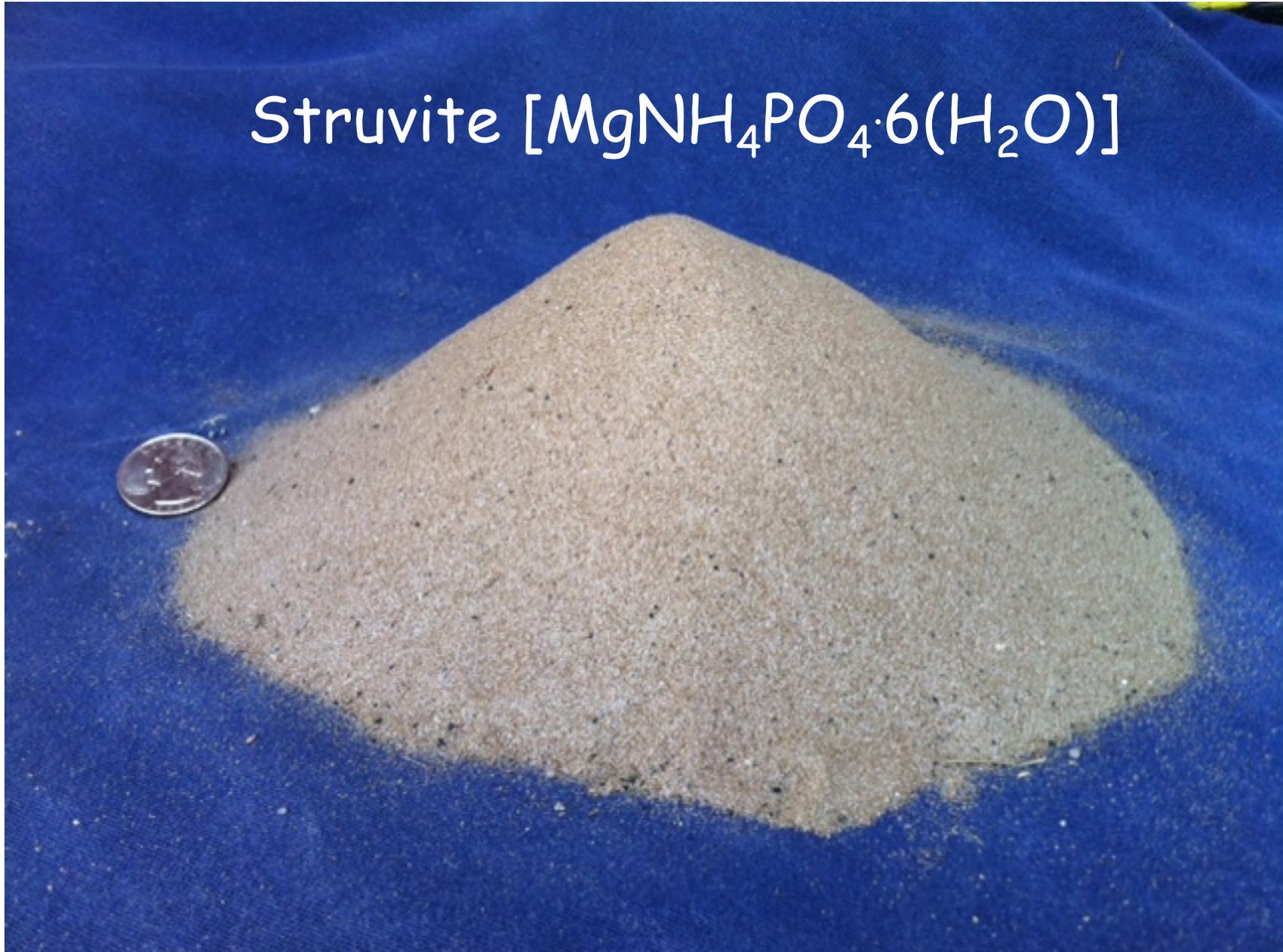
Got Phosphorus?

Want to Get Rid of Some?

Phosphorus
13% maintenance



Struvite [$\text{MgNH}_4\text{PO}_4 \cdot 6(\text{H}_2\text{O})$]



Pure Struvite N P K + Mg

6 - 29 - 0 + 16



Technology

- Struvite [$\text{MgNH}_4\text{PO}_4 \cdot 6(\text{H}_2\text{O})$] crystallization removes excess phosphorus (P) from livestock wastewater
- Fluidized bed with cone shape
- Lower pH to 6.4 with sulfuric acid
- pH boost with ammonia or caustic soda
- Mg Boost with magnesium chloride or MgO plus carbon dioxide

Mobile Nutrient Recovery System



Crops

- Triticale
- Oats
- Corn Silage
- Alfalfa



Questions?