

Phosphorus Management

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Endres Berryridge Farms

Waunakee, WI



Welcome to the Farm



Economic Impact

- Milk 350 dairy cows three times a day
- 30,000 lbs of milk annually per cow
 - 12 gallons per day per cow
- \$21,000 economic value per cow annually
- \$7.35 million for whole herd annually



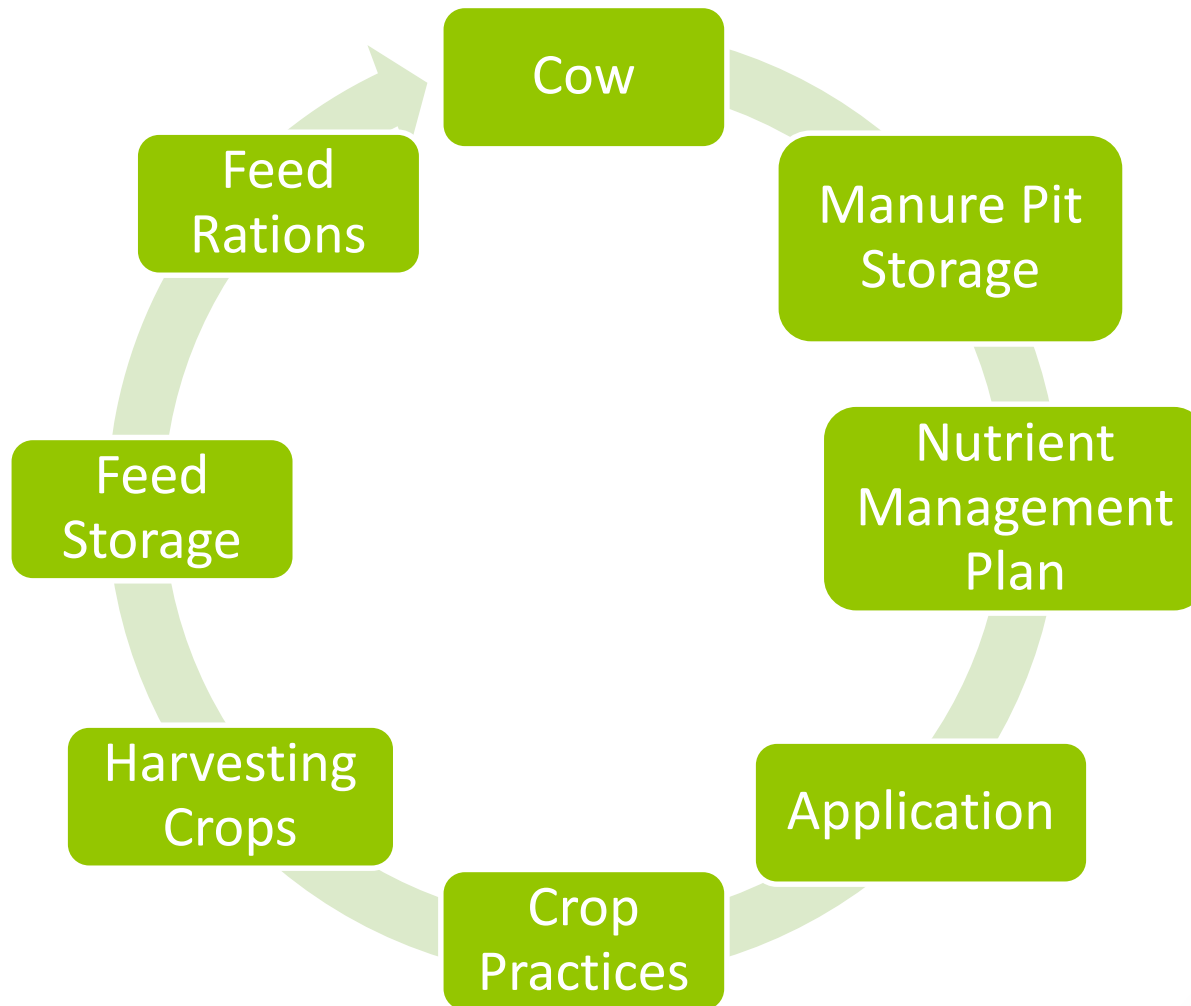
Cropland

- 1,100 acres
- 50% owned & cash rented



Managing the Phosphorus Impact

The Closed Loop Approach



Step 1: The Cow

- Need to know phosphorous output per cow
- Example for one cow:
 - $45 \text{ gal waste} \times 365 \text{ days} = 16,425 \text{ gal annual waste}$
 - $16,425 \text{ gal} / 1,000 \text{ gal} = 164.25 \text{ thousandths}$
 - $164.25 \text{ thousandths} \times 9.6 \text{ lbs p205 per thousand gal} = 156 \text{ lbs total phosphorus per cow annually}$
- Berryridge's herd output:
 - $156 \text{ lbs} \times 350 \text{ cows} = 54,600 \text{ lbs of p205 annually}$

Step 2: Manure Storage

- Adequate storage
- Allows farmers to store instead of haul during times of high risk
- Allows for more efficient hauling

Step 3: Nutrient Management Plan

- Determines Nitrogen, Phosphorus & Potassium amounts
 - Test soil every four years
 - Record harvest yields annually



Step 4: Application

- Different applications used on different types of land
- Application types
 - Top spread
 - Top spread followed by incorporation of tillage
 - Direct injection from manure tanker
 - Direct pump from storage to field and incorporated

Types of Application

Top Spread



**Top Spread followed by
incorporation of tillage**



Types of Application Cont.

**Direct Injection from
Manure Tanker**



**Direct Pump from Storage
to Field & Incorporated**



Step 5: Cropping Practices

- Proper tillages to minimize run-off
- Types of tillage
 - Conventional tillage
 - Minimal tillage
 - No tillage

Types of Tillage

Conventional Tillage



Minimal Tillage



Types of Tillage Cont.

No Tillage



Step 6: Harvesting Crops

- Yield Tracking
- Residue Management
- Cover Crop



Step 7: Feed Storage

- Concrete Bunkers
- Plastic Bags
- Moister
- Run-off

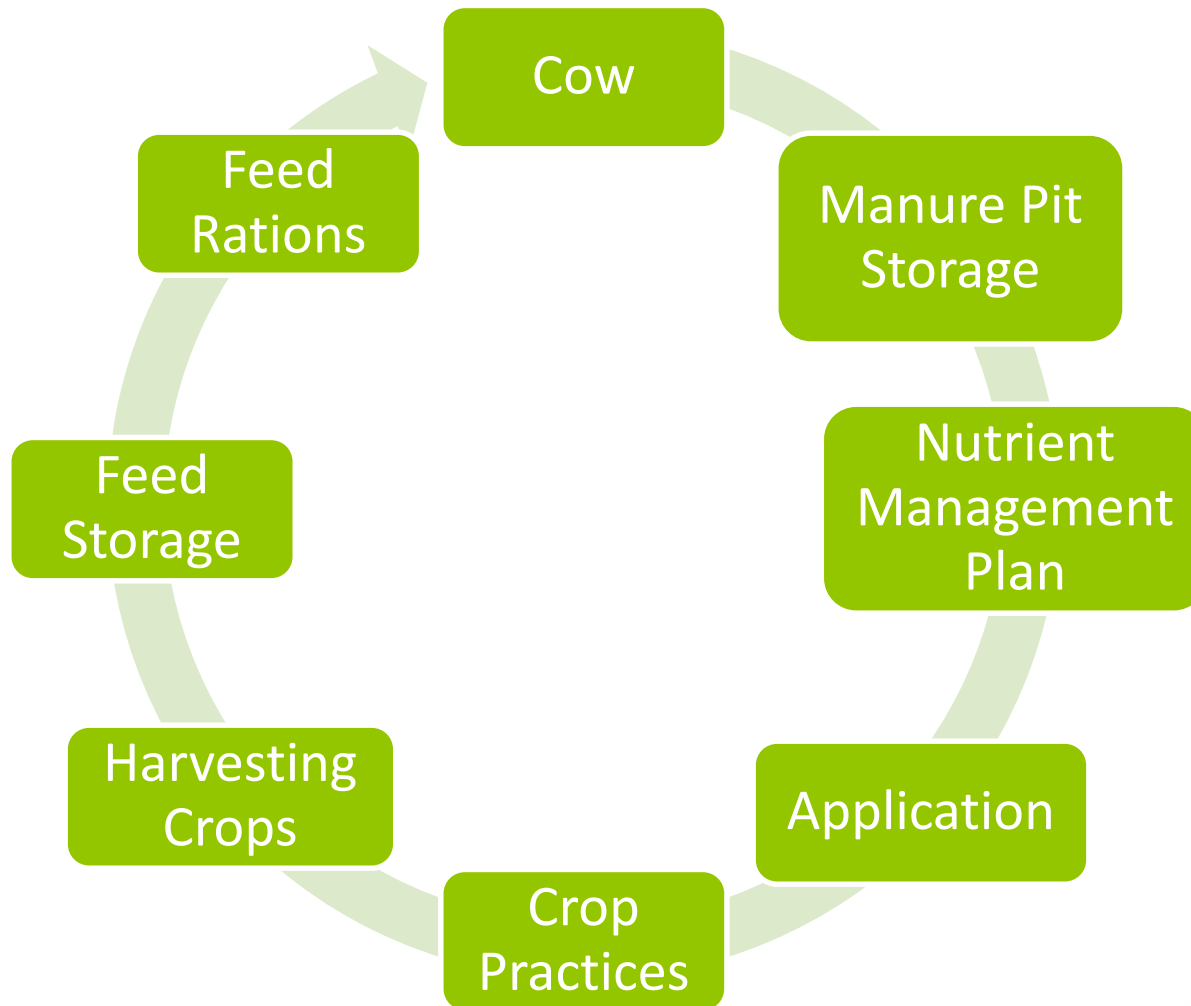


Step 8: Feed Rations

- Test forages, grains & bi-products
- Balance phosphorus levels in rations



The Closed Loop Approach



How do we know how much phosphorus is leaving the loop?

Estimated Phosphorus Leaving the Loop

- UW-Discovery farm's research of field edge monitoring
 - Average loss per acre=1/2 lb of p205
- Other UW models
 - Average 0.3 lbs per inch of runoff water

What is the percentage of total phosphorus per acre leaving the loop?

Soil Testing

- Top 6 inches of the soil column tests 100 parts per million phosphorus
- Soil test of 100 parts per million=2,600 lbs p205
- For every inch of rain that runs-off the field,
0.3 lbs of p205 leaves the field
- 2,600 lbs p205- 1 lb p205= 2,599 lbs p205
 - This is the total amount of p205 staying on the field
- 2,599 lbs p205 **OR** 99.96% p205 is left on the fields per acre

Keeping the P on the Field

- Field Practices
- Crop Rotation
- Buffers
- Cleaning Drainage Ditches

Field Practices

- Contour Stripping
- Contour Farming
- Water Ways
- Terraces
- Sediment Containment Structures



Crop Rotation

- Legumes
- Crop Residue
- Cover Cropping



Buffers

- Areas of concentrated flow
- Along drainage ditches



Cleaning Drainage Ditches

- Phosphorus in sediment
- Last chance to close the loop
- Clean and secure

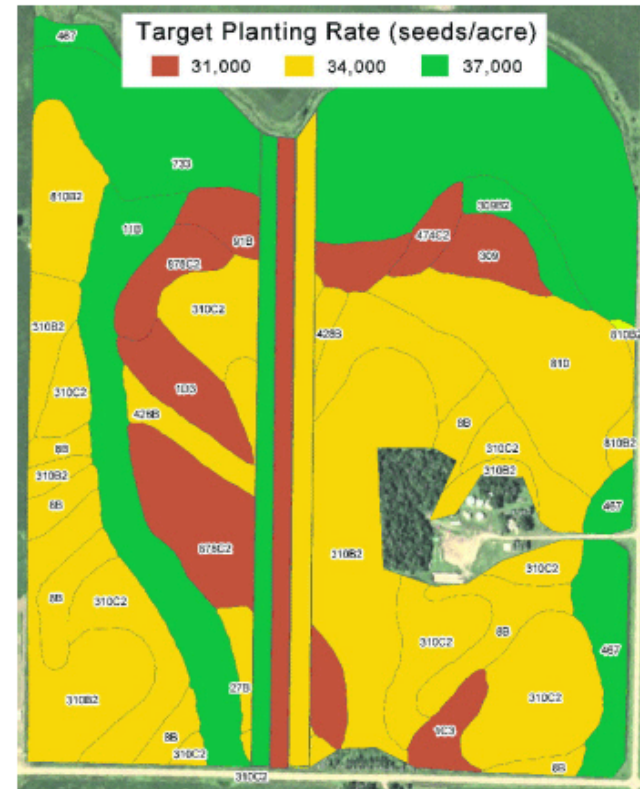




MOVING FORWARD

Farming with the Latest Technology

- Grid Mapping
- Yield Tracking
- Precise Tillage
- Variable Rates
- Precise Planting



Education & Outreach

- Don't play the “blame game” or pass the buck
- Create alliances between rural & urban entities
- Understand challenges for both rural & urban
- Create a feasible plan that minimizes regulations for all



Sources

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