Inorganic Fertilizer in CAST

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Outline

- Defining Inorganic Fertilizer
- How Inorganic Fertilizer is used
- Inorganic Fertilizer nutrient applications

Agriculture nutrient categories

- Manure collected (with losses) within the barnyard
- Manure deposited on pasture
- Manure deposited within riparian areas of pasture
- Organic sources (manure, biosolids, and spray irrigation) available for application to crops
- Inorganic Fertilizer available for application to crops

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How do Ag Nutrients cycle through CAST?

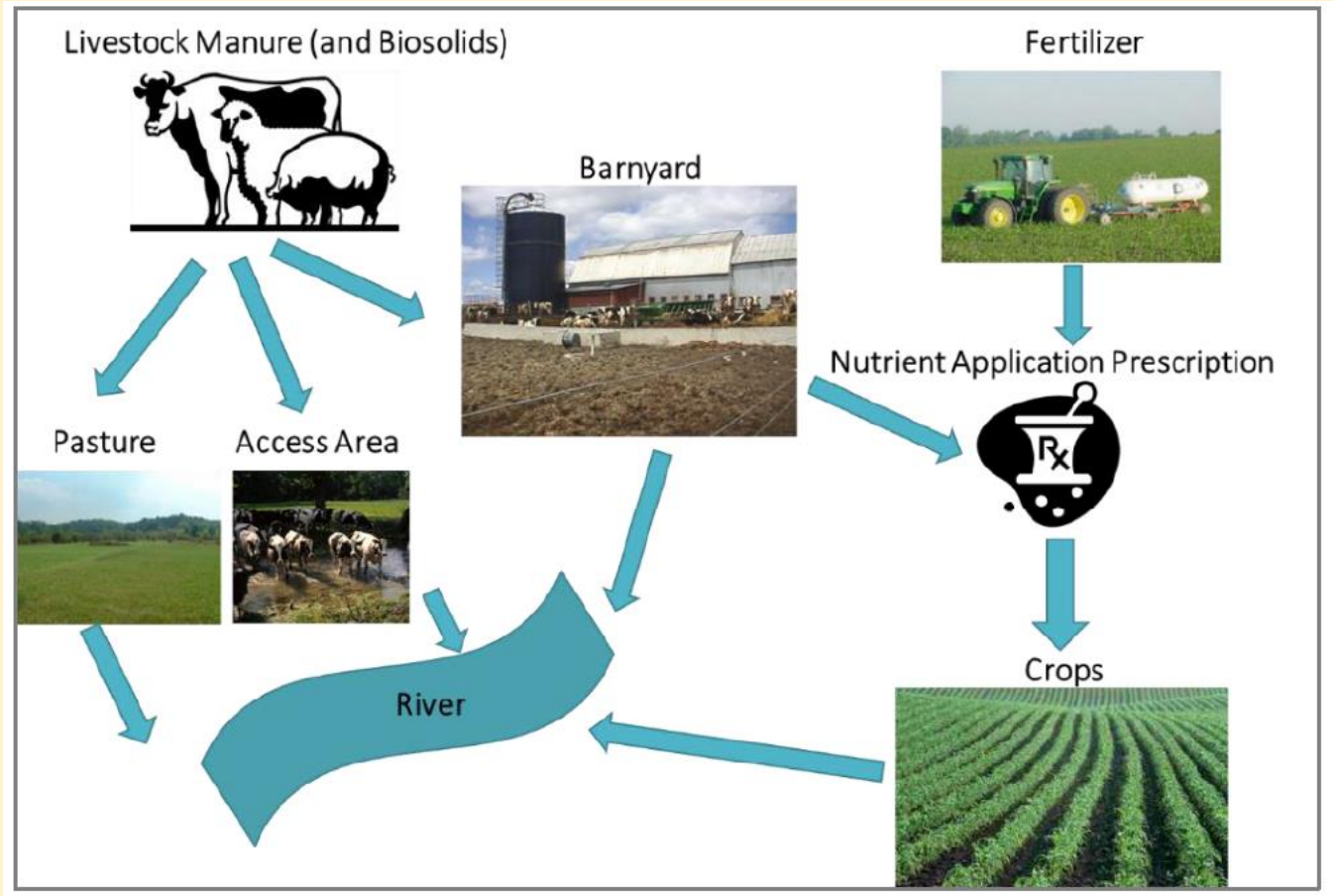

Figure 3-4 Conceptual diagram of nutrient fate through agricultural lands

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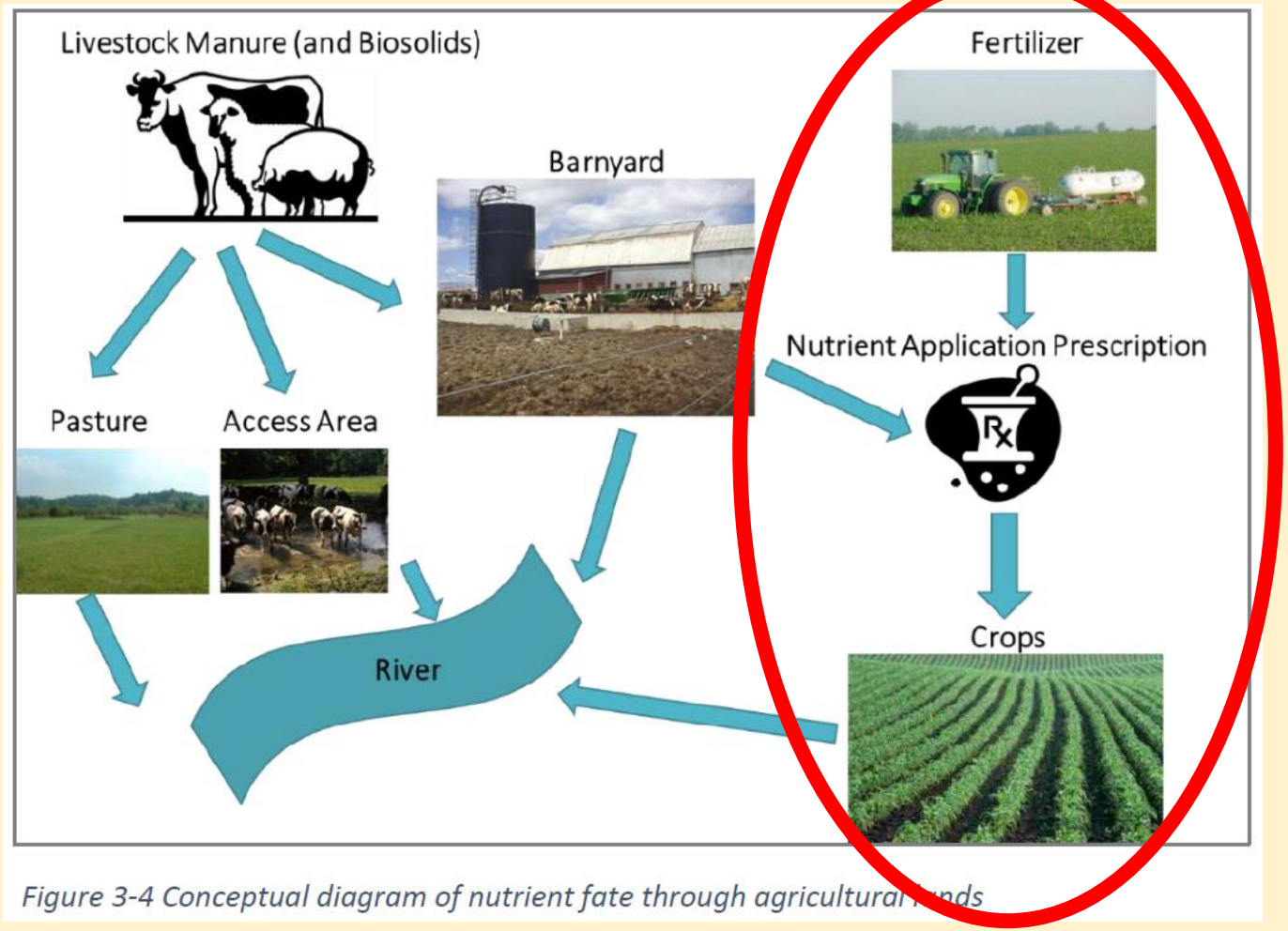

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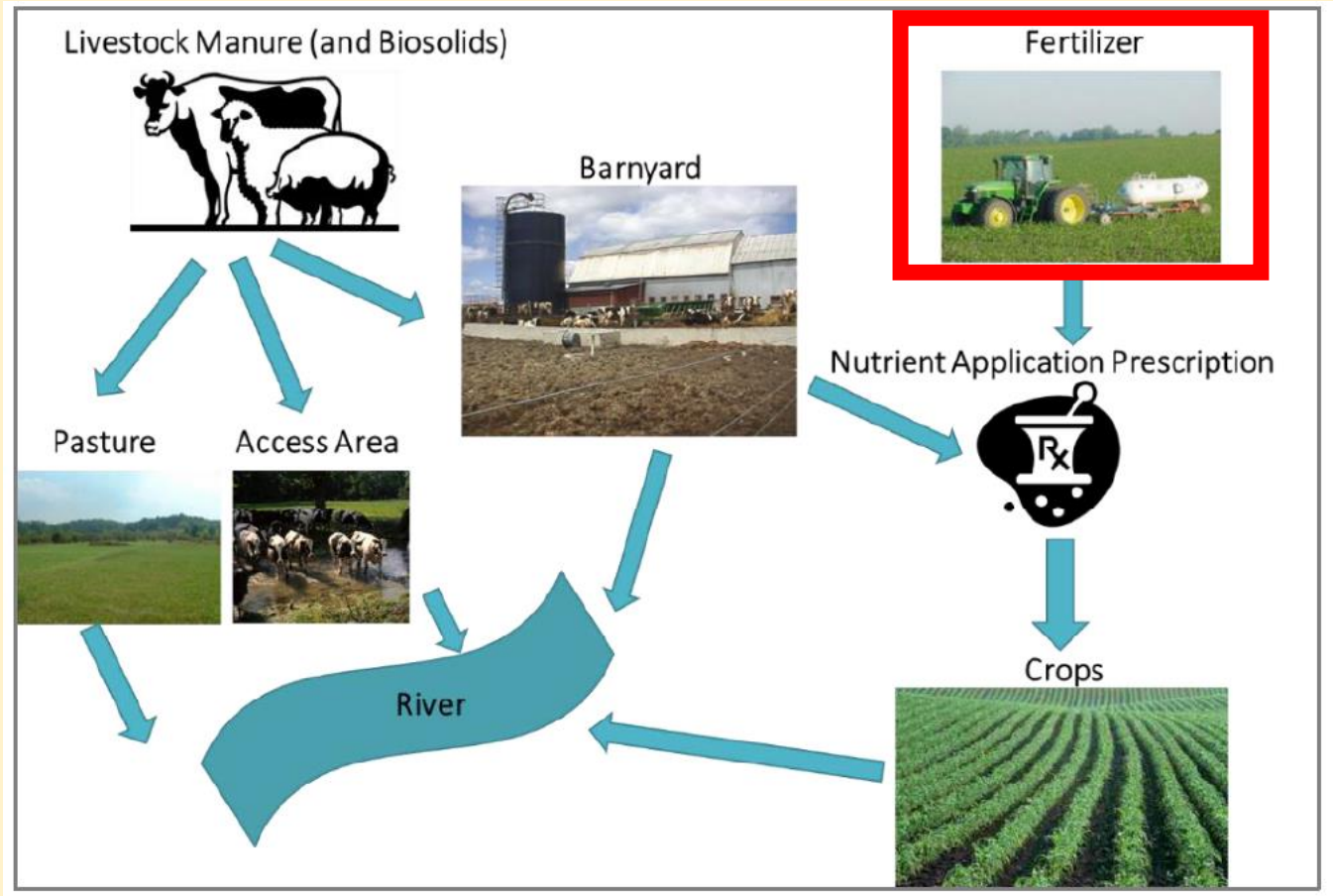

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Inorganic Nutrients

AAPFCO: Association of American Plant Food Control Officials

STATE REPORTED

Consistent: Uniform Fertilizer Tonnage Reporting System (UFTRS).

- Shipper
- County
- Tons sold
- Grade (analysis)
- Use

Two main purposes for the reports:

1. Generate income to support the regulatory program

2. Reveal the kinds and amounts of fertilizers being distributed in the state

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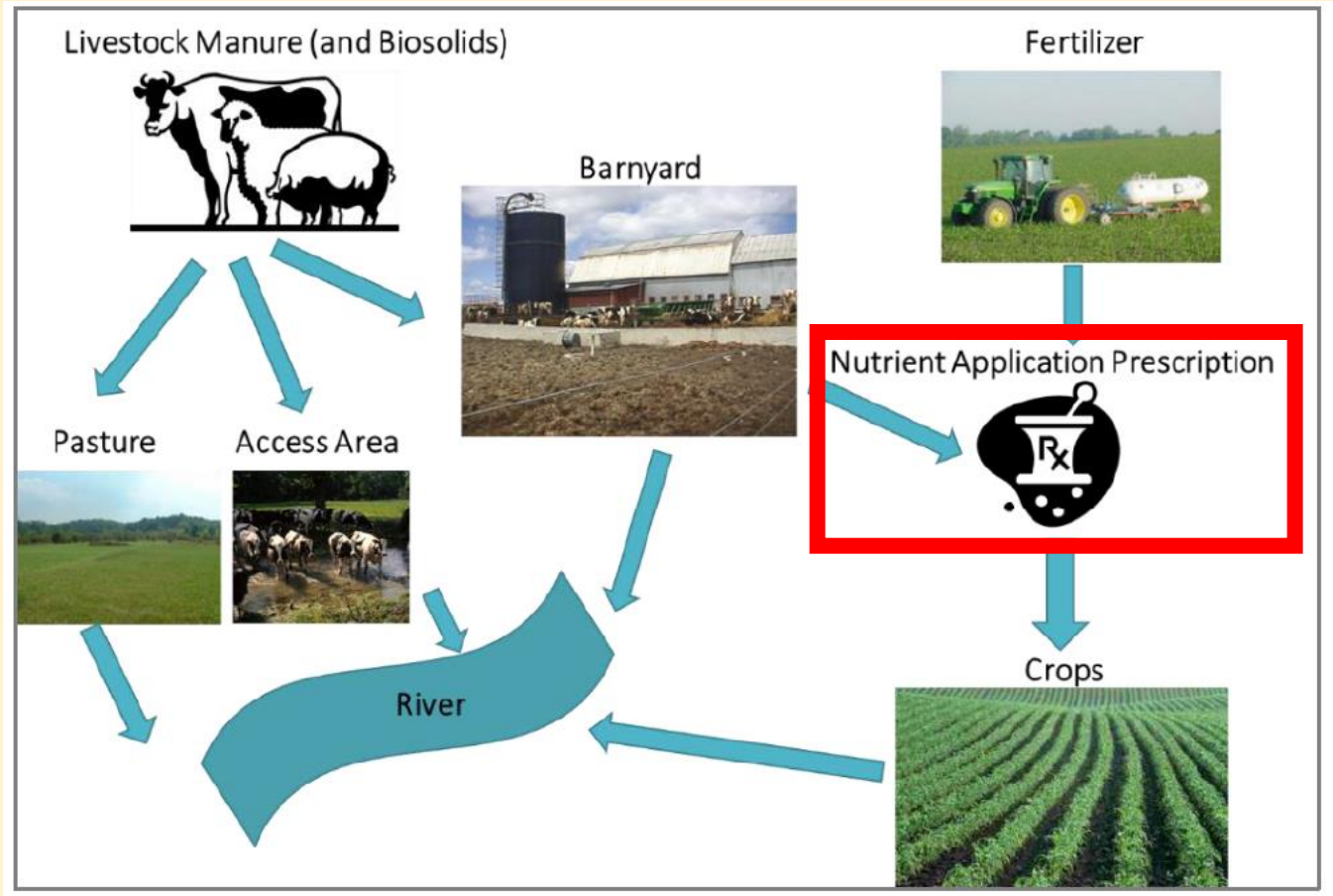

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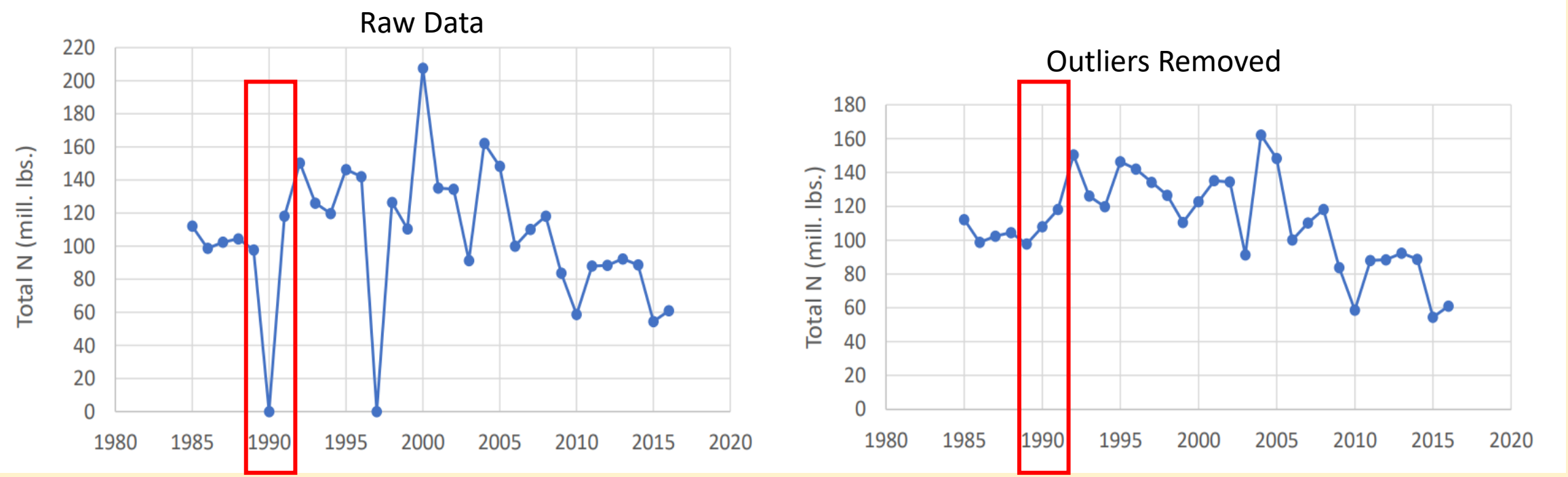
Data Processing

Ag Fertilizer Data is summed to the watershed-level then redistributed at county-level

- Reduce variability of fertilizer sales spatially and temporally
- Calculate a regionwide fertilizer amount by summing all states
- Determine watershed wide fertilizer use with cost from Ag Census data
- Distribute fertilizer sales to counties by inorganic crop application goal

Remove outliers

- Sum annual data for each nutrient type BY STATE
- Calculate median and standard deviation for each nutrient
  - Remove outliers (>2 sd) and replace with average of the next closest values



Smooth variability

Sum state totals to a regional total

Calculate the fraction of farm fertilizer to total fertilizer

- FarmFractionNsales = (FarmNsales Lbs.) / TotalNsales

Apply a three-year rolling average to the fraction

Calculate farm fertilizer amount for the entire six state region

- Multiply three year rolling avg to the regional total.

Estimate total watershed-wide fertilize use

USDA 5 year agricultural census

- Provides dollars spent on fertilizer and soil conditioners

Calculate the fraction of $ spent within the watershed vs the entire region fertilizer sales data for the

- CBWFraction$sales = (CBW$sales Lbs.) / RegionalTotal$sales

Calculate the final watershed fertilizer sales bucket

- Multiply fraction of watershed fertilizer by regional bucket

Distribute watershed-wide fertilizer sales to individual counties

Distribute county load based on crop yield and application goals (NASS data)

- AFTER biosolids and manure

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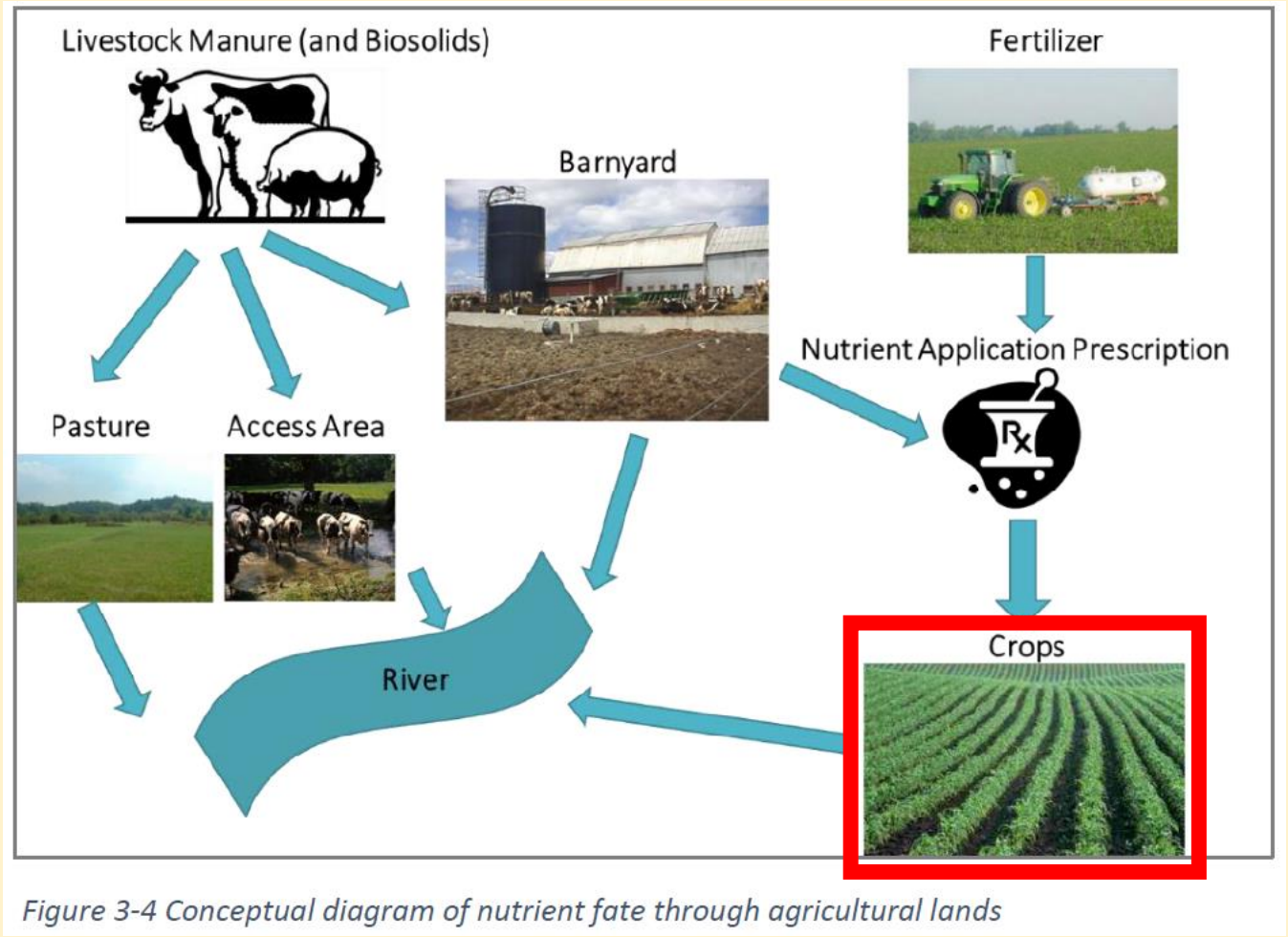

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Applications

Preferentially applied to higher value crops

Nitrogen

- Grains/specialty
- Row/Hay Legumes
- Non-legume Hay/Pasture

Phosphorus

- Grains/Specialty/Row Legumes
- Legume/Non-Legume Hay/Pasture

Summary

We need fertilizer data

We use a consistent state reported data set

Data are processed to remove high variation and location issues

Data are applied to the county level based on crop needs

Questions?