Ohio Nutrient Balance

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Overview

• Nutrient removal
  • Crop yield trends
  • Nutrient removal
• Fertilizer/manures
  • Nutrient application
• Nutrient balance
  • How has Ohio been doing?
Crop Yields/Nutrient Removal
Crop Yield/Nutrient Removal Model Data

- What goes in as far as crop yields and nutrient removal
  - Crop used:
    - Corn, soybean, wheat, hay, corn silage, barley, oats, potato, sweet corn, tobacco, and tomato
  - Nutrient removal estimates provided by Tri-State Fertilizer Guide and IPNI
Crop Yields

Corn yield, bu/acre

Year

Source: USDA-NASS
Nutrient Removal

P2O5 removal – increased from 27 to 45 lb/acre

Source: USDA-NASS, Tri-State Fertilizer Guide, IPNI
Fertilizer Sales/Manure Sources
Fertilizer Sales/Manure Generation Model Data

- Fertilizer sales data comes from the Association of American Plant Food Control Officials
- Manure generation data comes from the Midwest Planners publication
- Estimates of manure generated and nutrient concentration based upon animal type
Fertilizer Sales

Fertilizer sales, tons x 1000

Year


P2O5 sales

K2O sales

Source: AAPFCO
Manure Fertilizer Generation

Manure nutrients, tons x 1000

P2O5

K2O

Year


Source: USDA-NASS, MWPS
Nutrient Balance Model Data

- Straight balance has a fundamentally flawed assumption (that manure nutrients can be separated and distributed well across all agricultural fields)
- ERS adjusted balance uses an estimate of crop acres receiving manure application based upon a USDA-ERS report
  - In the Corn Belt:
    - 10% of corn acres receive manure
    - 2.5% of soybean acres receive manure
    - 5% of wheat acres receive manure
    - 7% of hay acres receive manure
Nutrient Balance

P2O5 balance

Source: USDA-NASS, MWPS, IPNI, USDA-ERS, Tri-State Fertilizer Guide
Nutrient Balance

K2O balance

P2O5 balance, lb/acre

Source: USDA-NASS, MWPS, IPNI, USDA-ERS, Tri-State Fertilizer Guide
Implications
Declining Soil Test Levels

What happens to yield as soil test levels fall?

- Phosphorus

![Graph showing the relationship between Bray-1 Soil-Test P (ppm) and Relative Grain Yield (%)](image)

6-inch sampling depth  
Dodd & Mallarino, 2005
Declining Soil Test Levels
What happens to yield as soil test levels fall?

- Potassium

![Graph showing the relationship between soil-test K levels and relative yield for corn and soybean.](image)
Changing Soil Test Levels

\[ Y = 30 - 37.1X \]

\[ Y = -0.05 - 0.78X \]

\[ Y = -1 - 3.0X \]

\[ Y = -3 - 42X \]

Mallarino, 2011

6-inch sampling depth
Thank you

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