

# *Reducing Crop Production Costs: Focus on Fertility*

**Jim Camberato, Professor of Agronomy & Soil Fertility Specialist**

**Michael Langemeier, Professor & Associate Director**

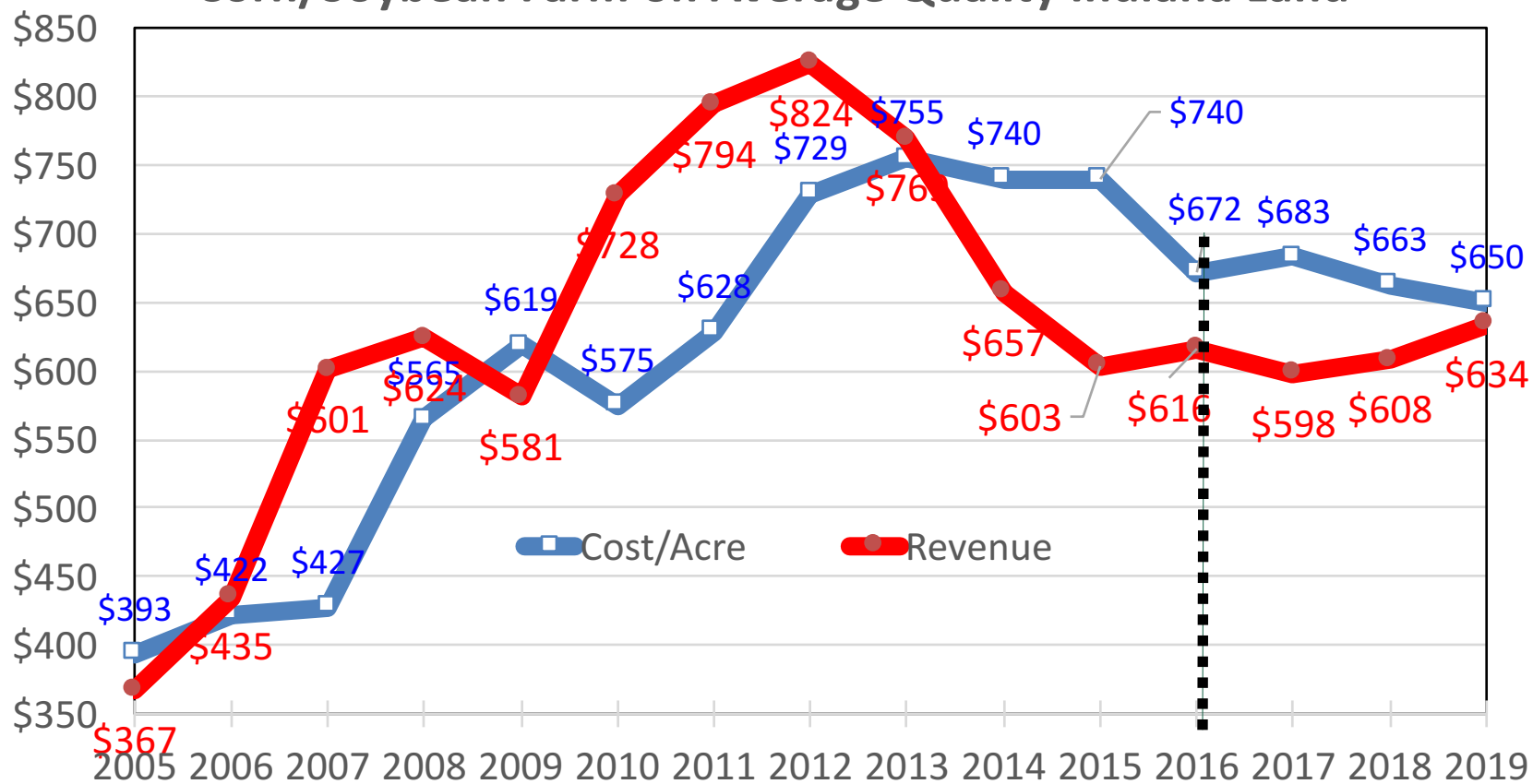
**James Mintert, Professor & Director**

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Commercial Agriculture



## Estimated Revenue and Costs/Acre on a 50/50 Corn/Soybean Farm on Average Quality Indiana Land



**(Variable Cost + Fixed Cost) ÷ Yield = Total Cost per Bu.**

**Reduce cost by:**

- 1. Reducing variable cost without impacting yield**
- 2. Reducing fixed cost (lowers fixed cost per bushel)**
- 3. Improving yield without increasing variable or fixed cost**

# Top 6 Cost Categories for Corn and Soybeans

## \$ Per Bushel, Average Productivity Indiana Farmland

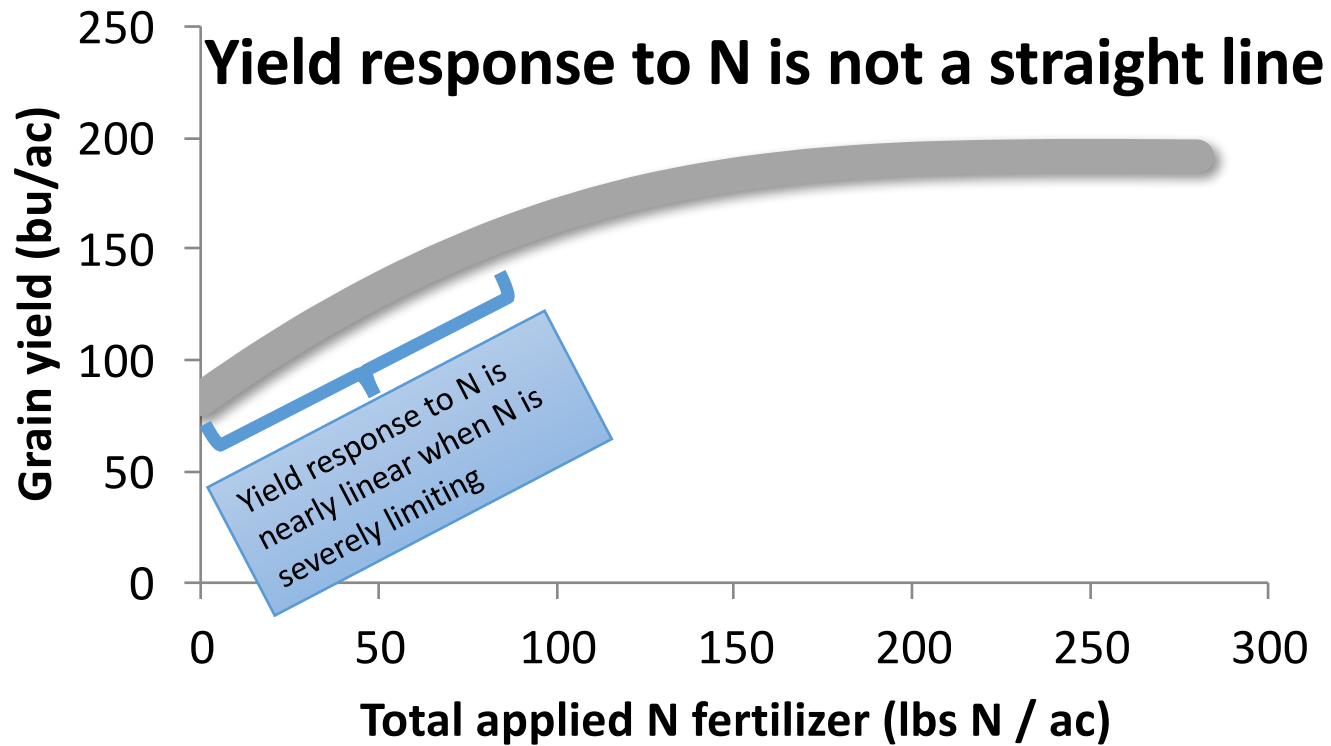
Cost Category	Rotation Corn	Rotation Soybeans
Land (Fixed)	\$1.14	\$3.73
Machinery (Variable & Fixed)	\$0.80	\$2.42
Seed (Variable)	\$0.71	\$1.38
Fertilizer (Variable)	\$0.64	\$0.77
Pesticides (Variable)	\$0.32	\$0.90
Labor (Fixed)	\$0.24	\$0.79
<b>Sub-Total</b>	<b>\$3.85</b>	<b>\$10.00</b>
<b>Total Cost per Bushel</b>	<b>\$4.40</b>	<b>\$10.88</b>

# Maximize efficiency of N application

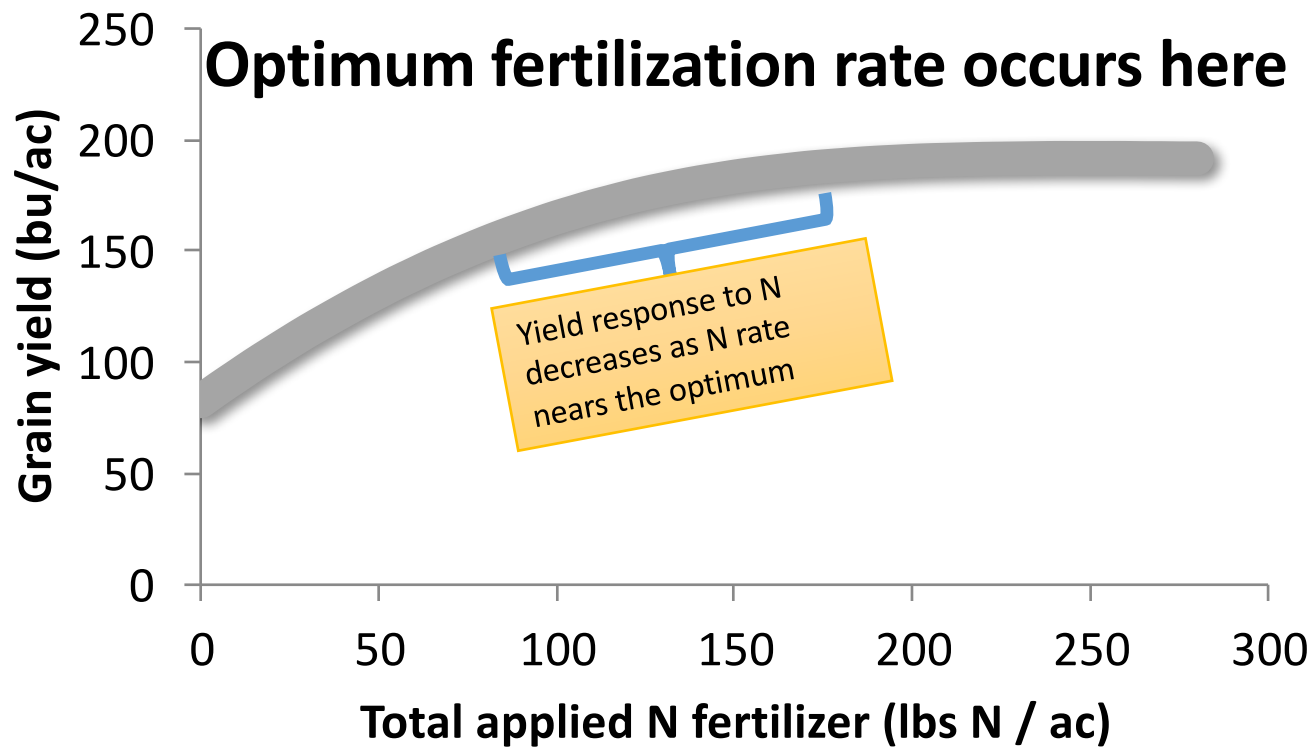
- 1. Apply as much of the total N in-season as possible, preferably between growth stages V3 and V7**
- 2. If using pre-plant anhydrous ammonia aim for 10-14 days before planting and ensure the depth of application is 7-8 inches or precision place between where the rows will be**

## Maximize efficiency of N application

- 3. Injected bands of UAN (28-32%) are less prone to N loss than broadcast UAN**
- 4. Do not leave urea or urea-containing N fertilizers on the soil surface**
- 5. Adjust the rate of application based on cost of N and anticipated value of grain**

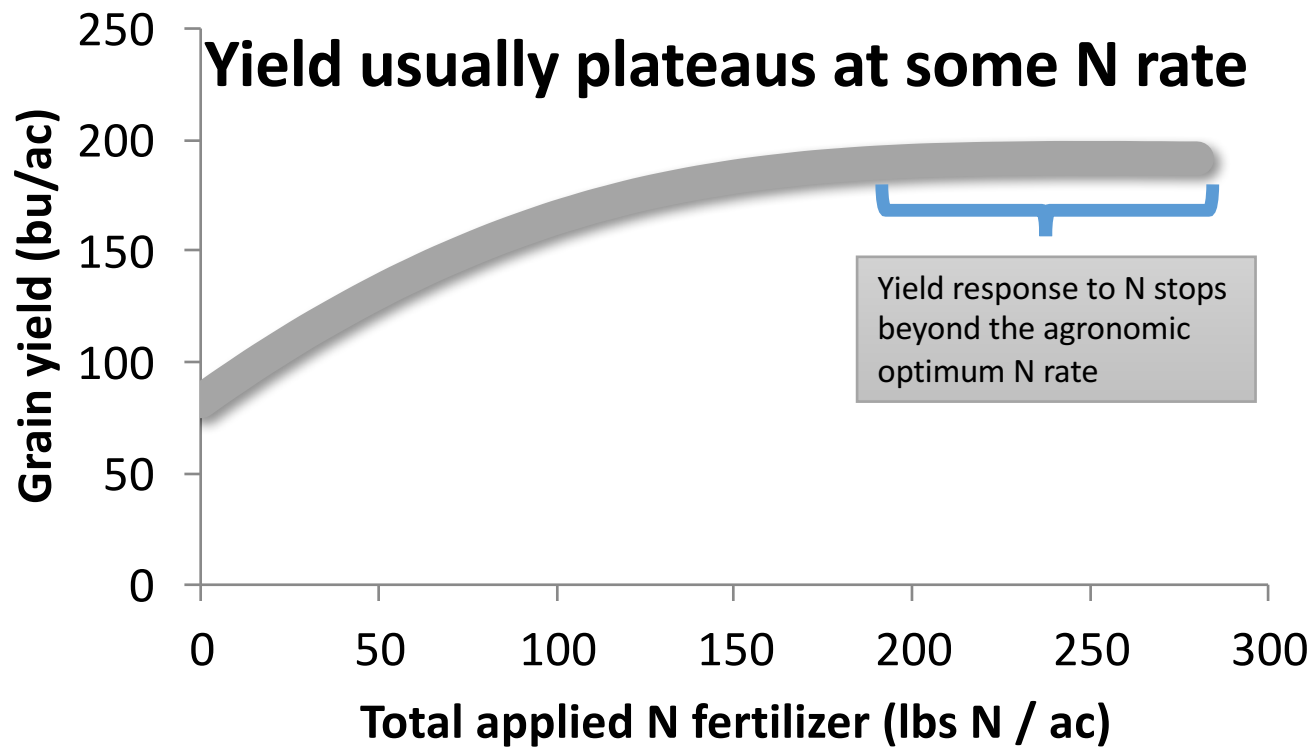


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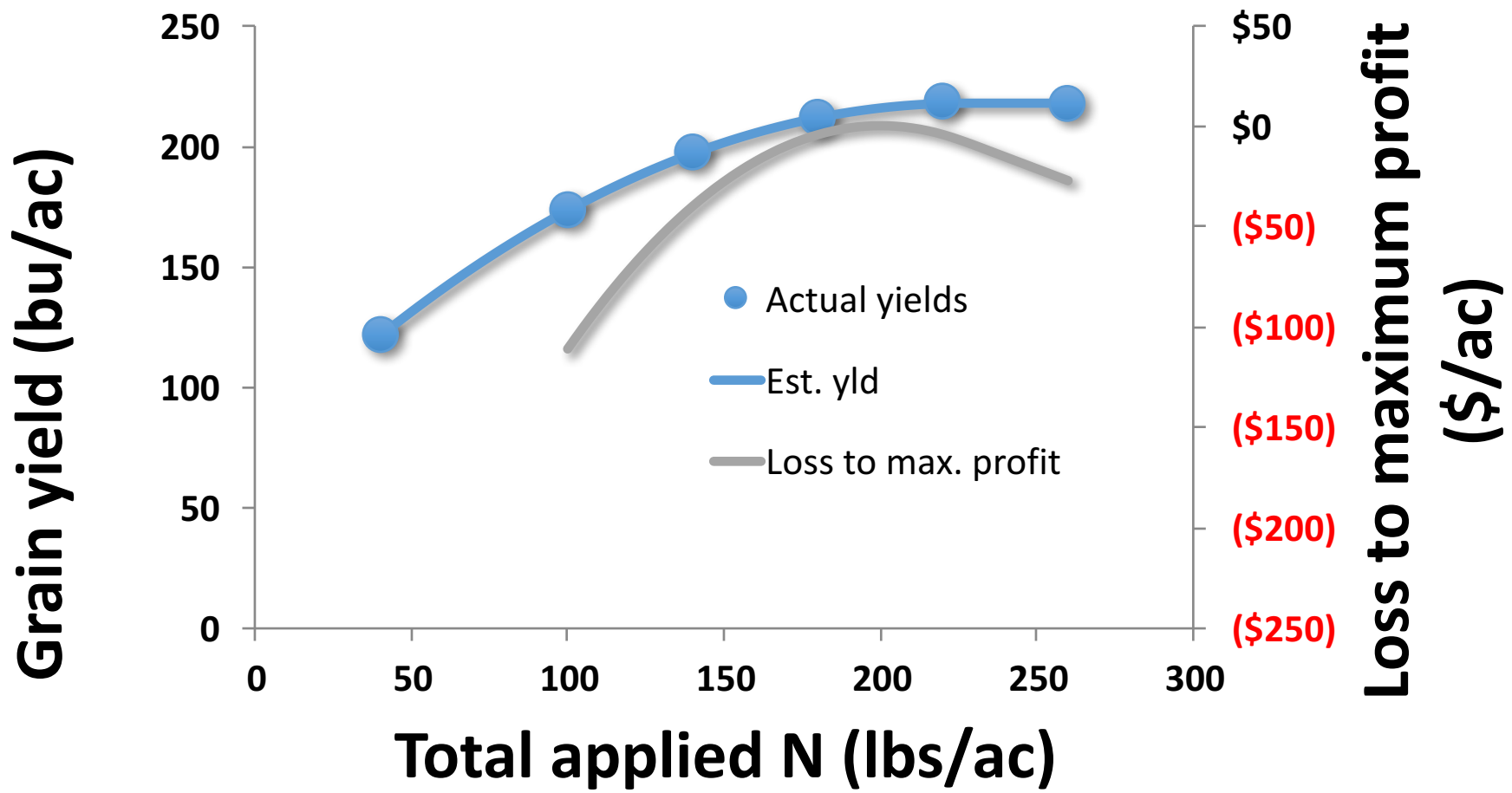


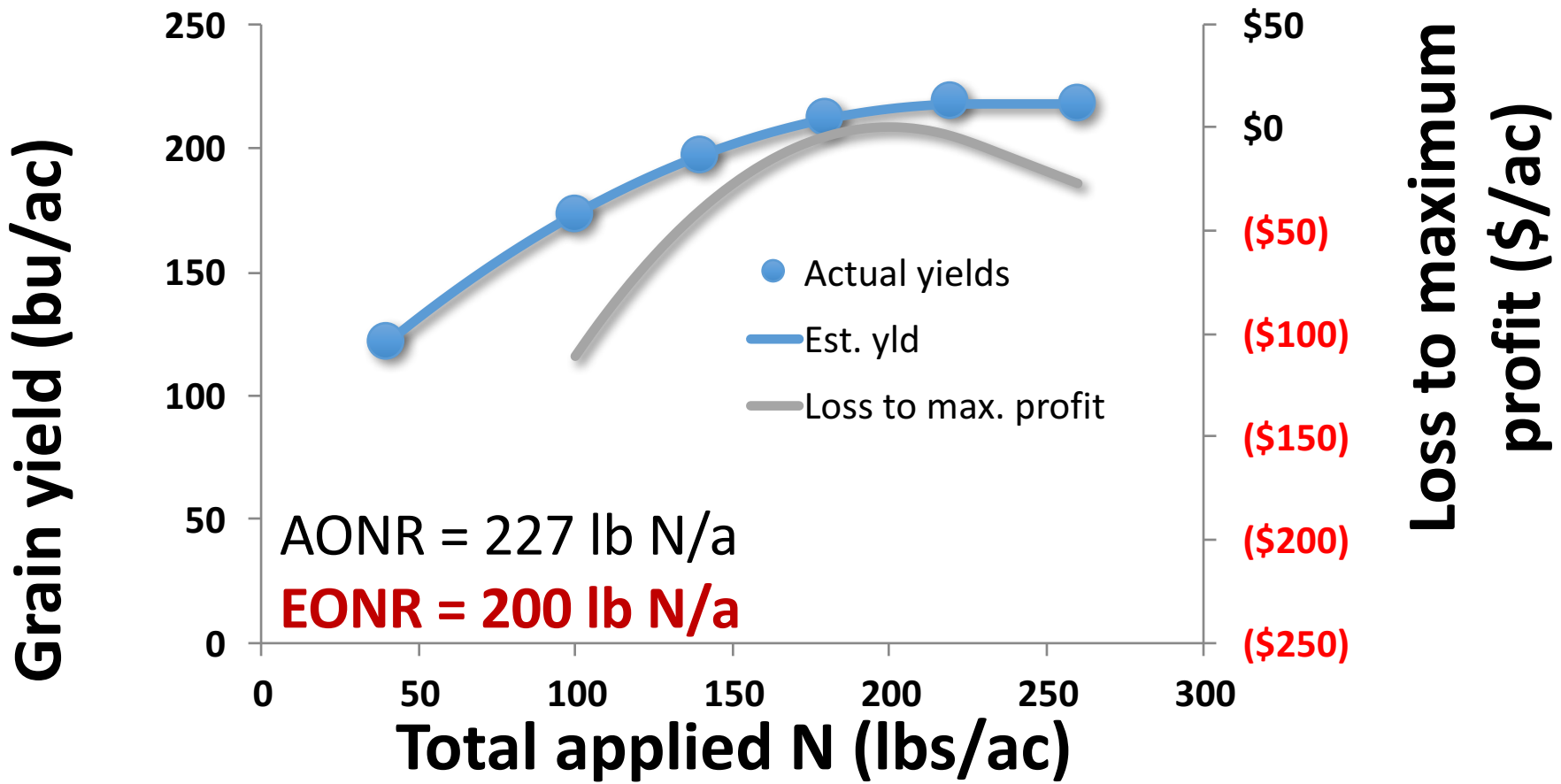
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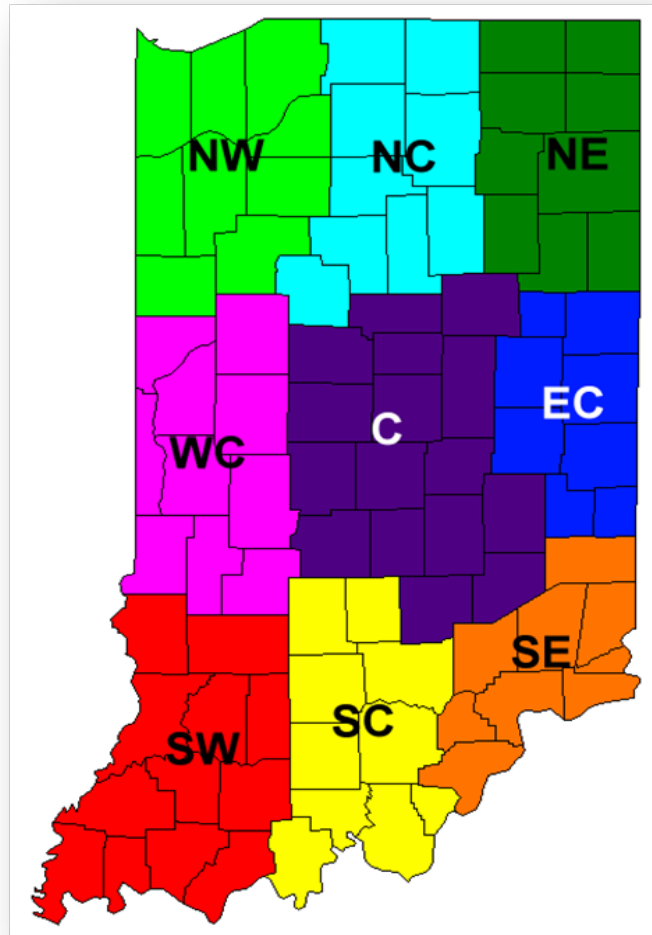


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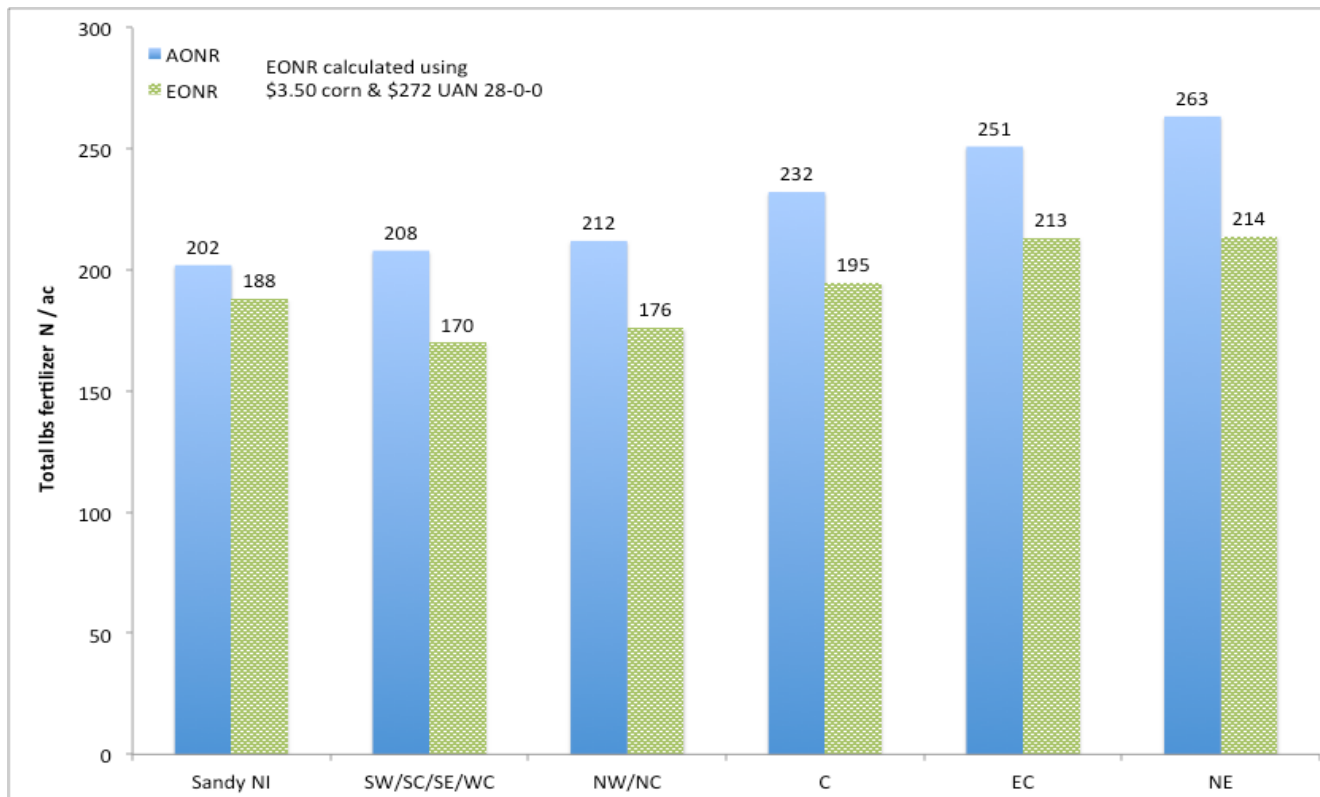




Optimal Nitrogen rates vary by region and predominant soil types in those regions



# N rate recommendations



<https://www.agry.purdue.edu/ext/corn/news/timeless/NitrogenMgmt.pdf>

Purdue University Department of Agronomy

*Applied Crop Research Update*

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Updated May 2016

URL: <http://www.kingcorn.org/news/timeless/NitrogenMgmt.pdf>

## **Nitrogen Management Guidelines for Corn in Indiana**

*Jim Camberato<sup>1</sup> and RL (Bob) Nielsen*

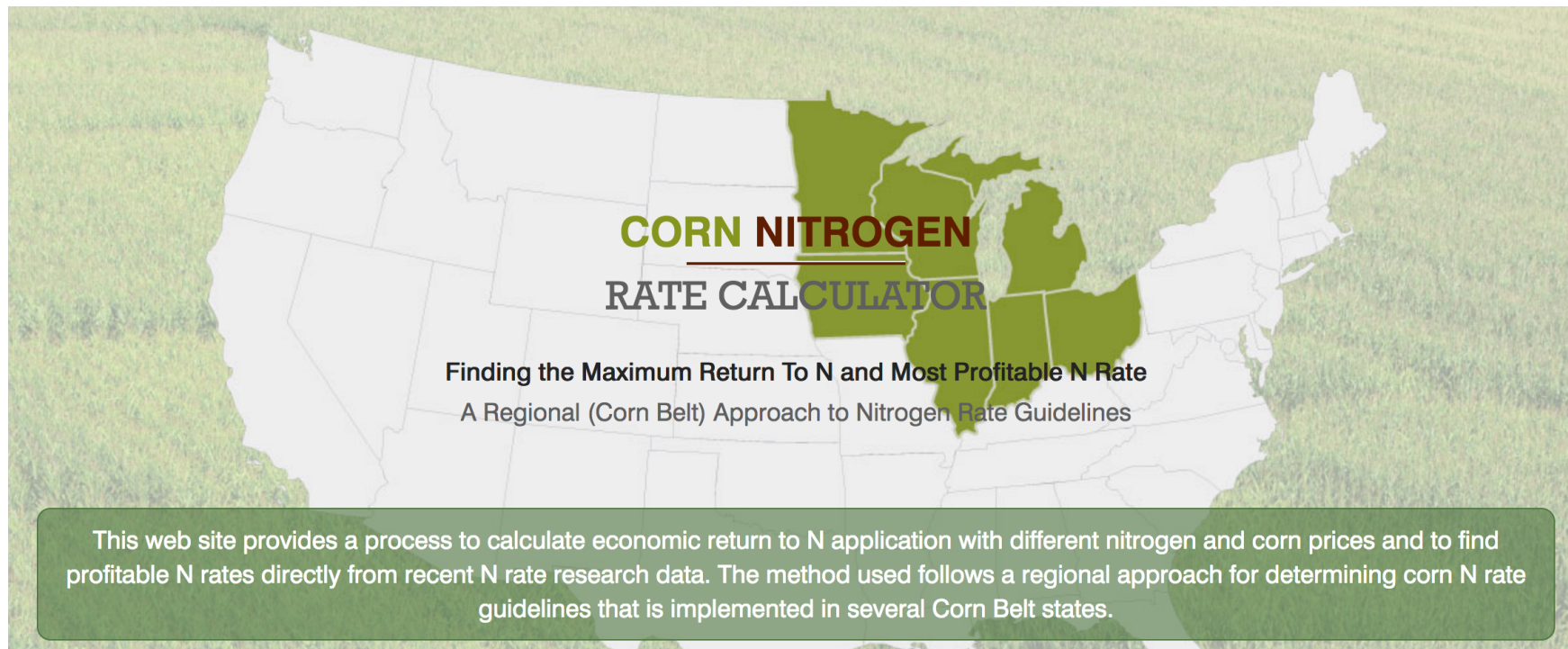
*Agronomy Department, Purdue Univ., West Lafayette, IN*

### **10-YEAR SUMMARY OF CORN RESPONSE TO NITROGEN FERTILIZER**

<https://www.agry.purdue.edu/ext/corn/news/timeless/NitrogenMgmt.pdf>

# Use the Corn Nitrogen Rate Calculator...

<http://cnrc.agron.iastate.edu>

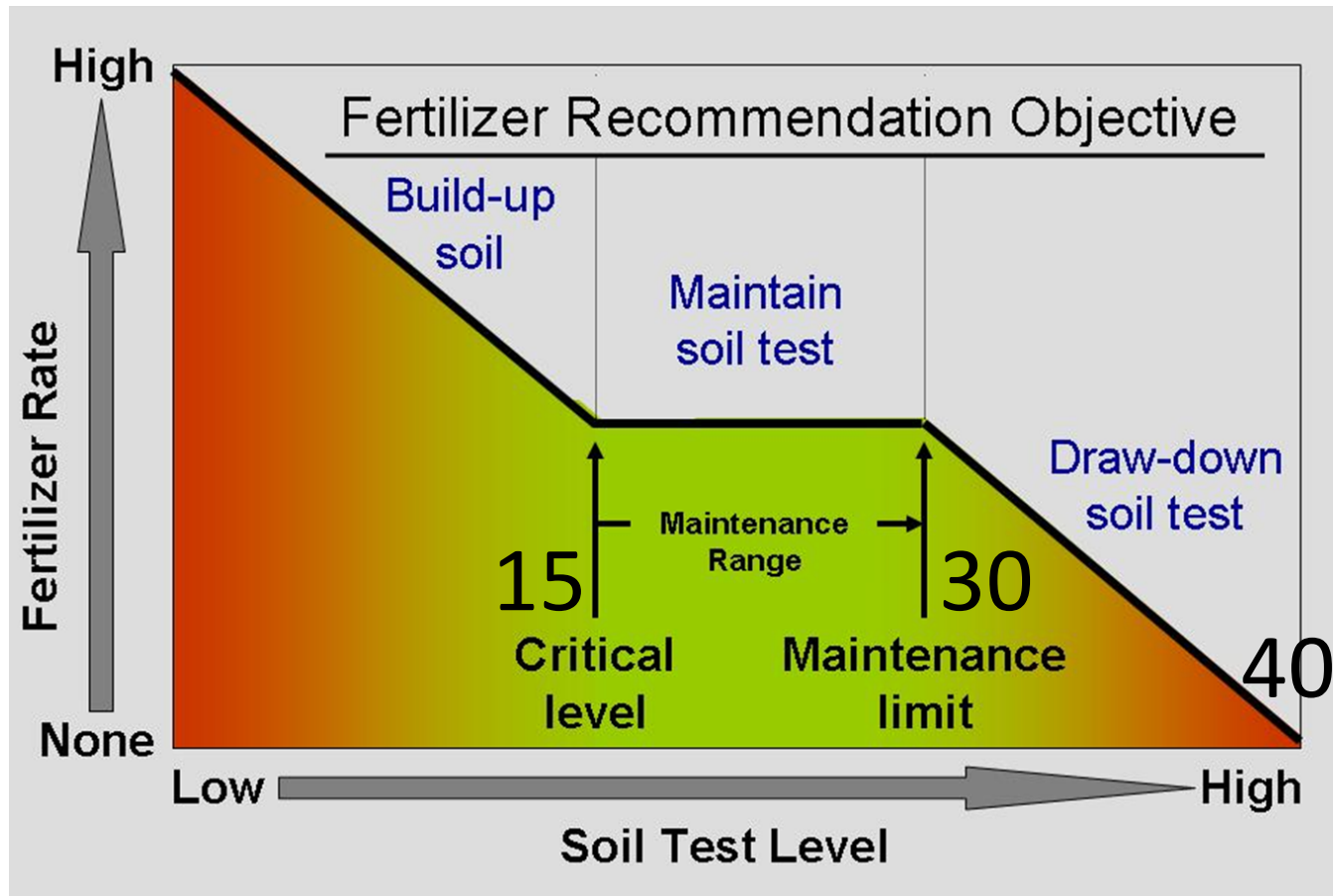


# Phosphorus and potassium fertilization

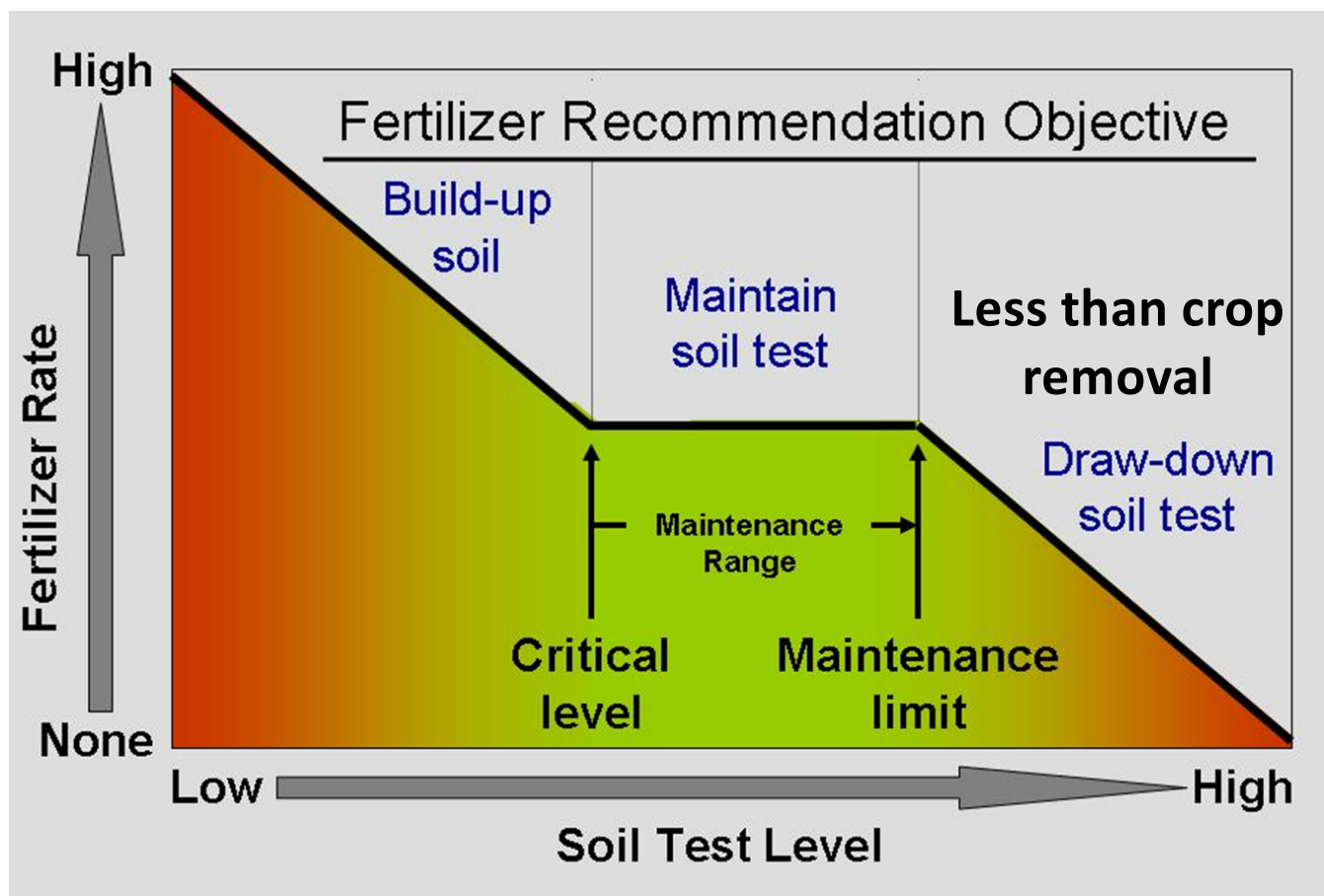
- **Build-up, maintain, drawdown philosophy of P and K fertilization based on soil testing was built around soil fertility stewardship, land ownership or long-term renting, minimizing risk of yield loss**



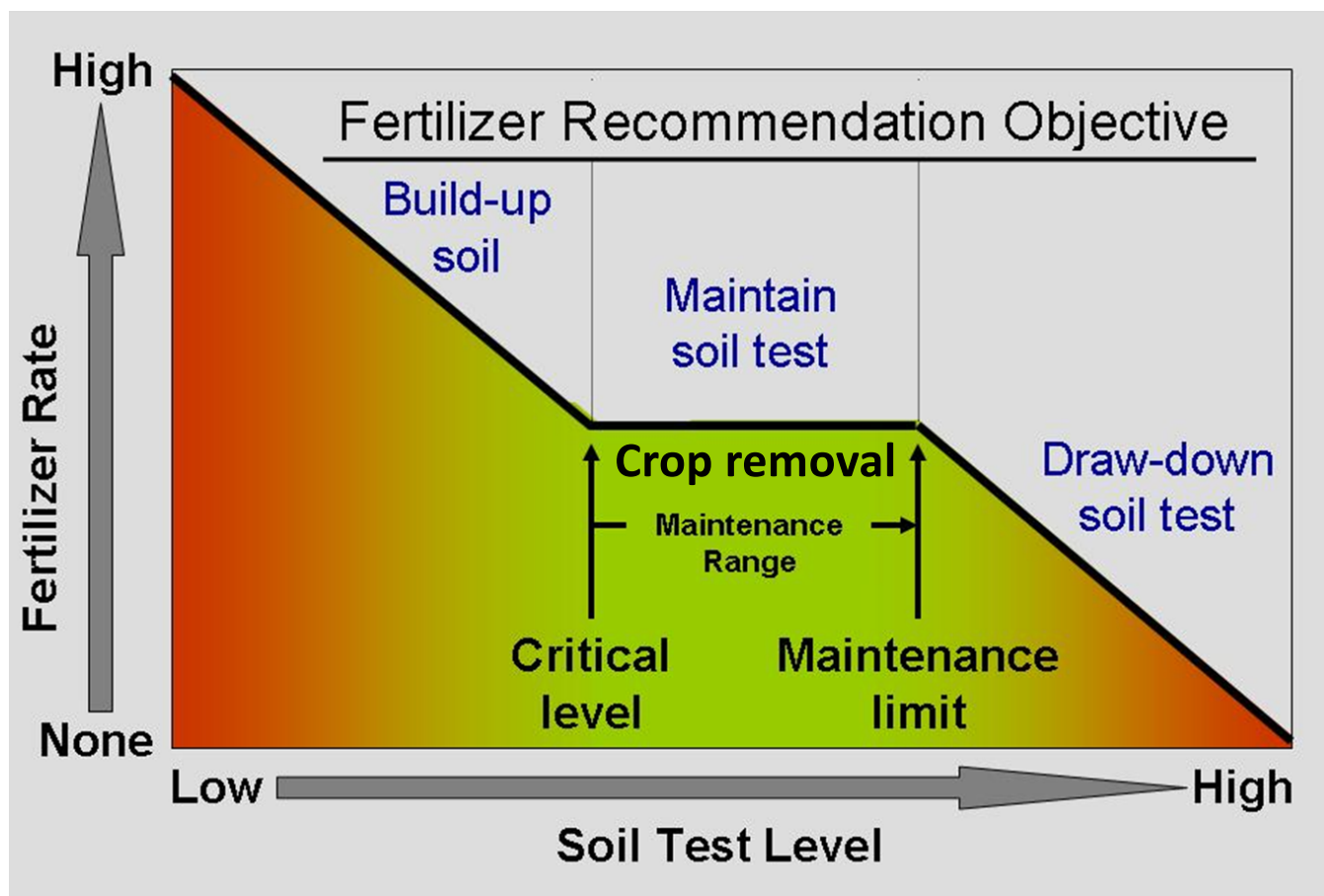
## Soil test P (ppm) associated with limits for corn and soybeans



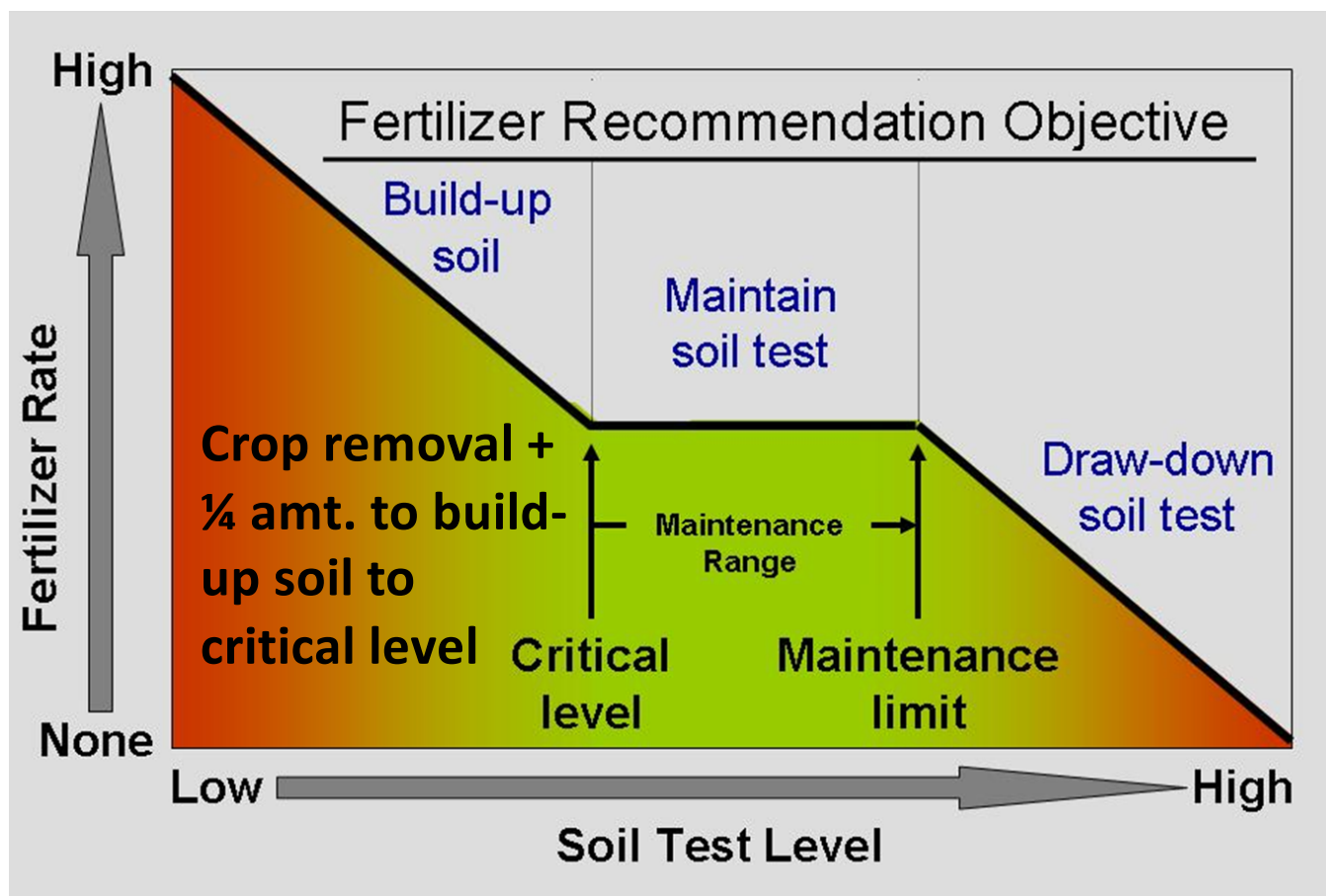
# Traditional recommendation



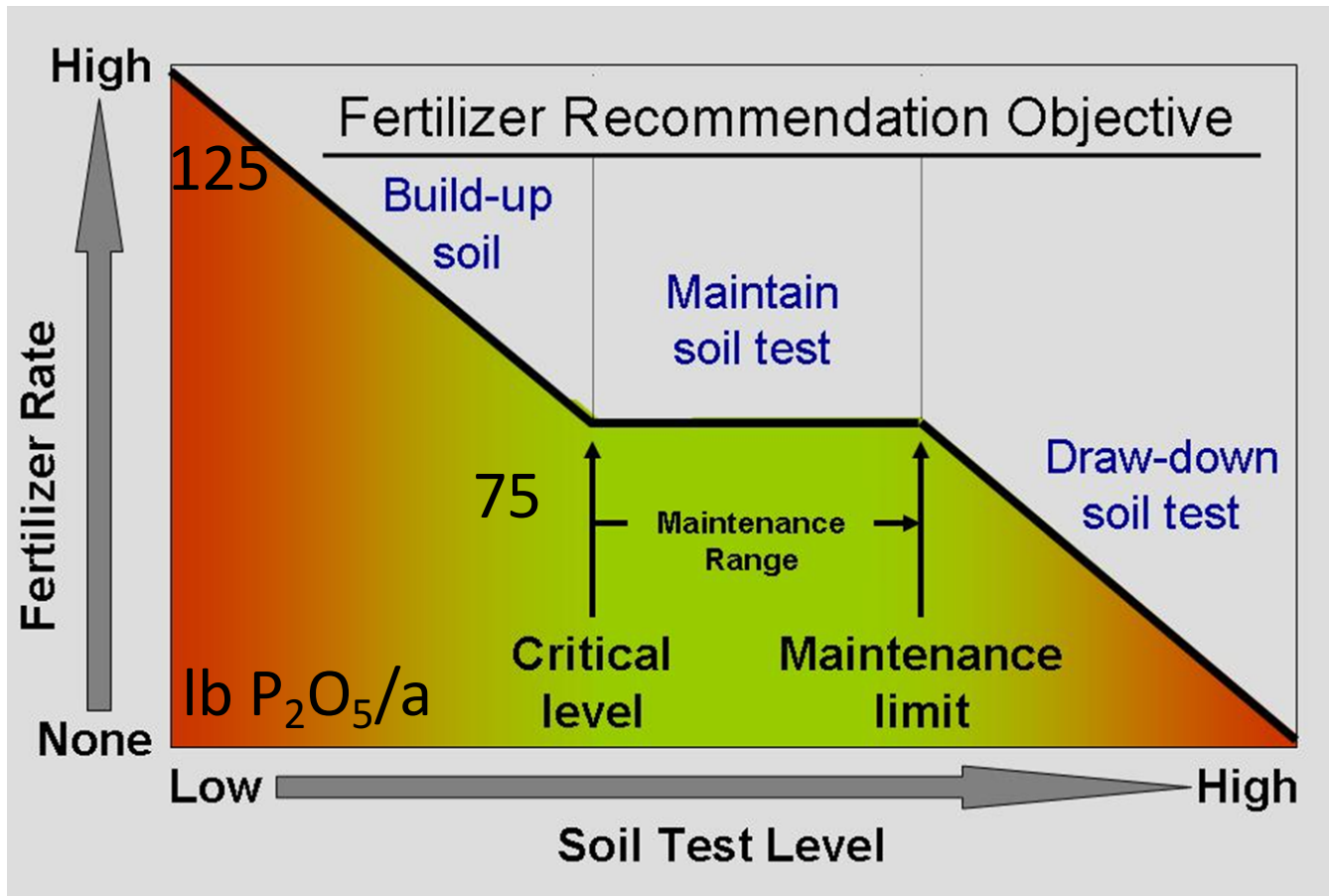
# Traditional recommendation



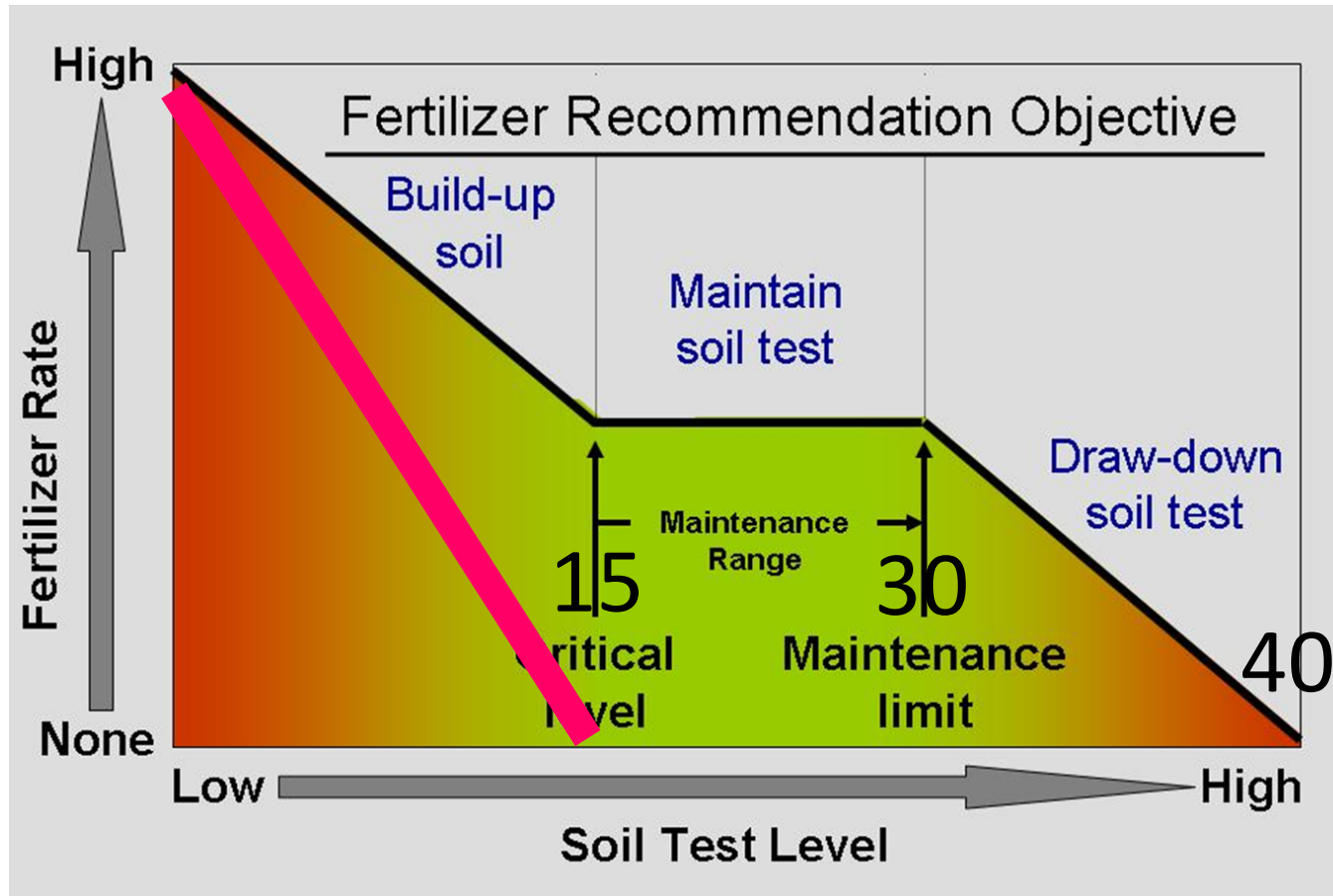
# Traditional recommendation



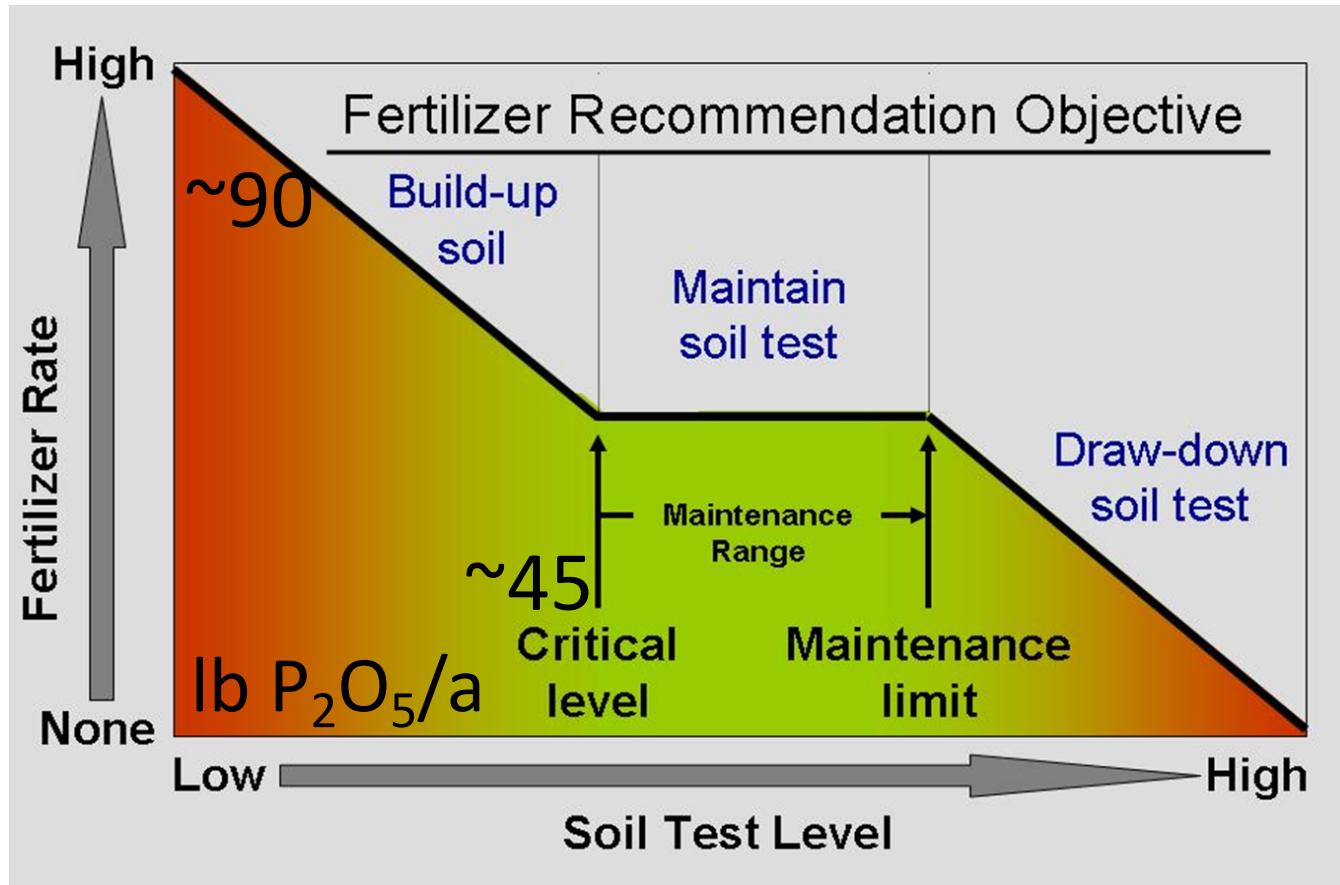
# Traditional recommendation – 200 bu/a



# Likelihood and magnitude of profit to fertilizer applied in a season



# Alternative fertilizer recommendation

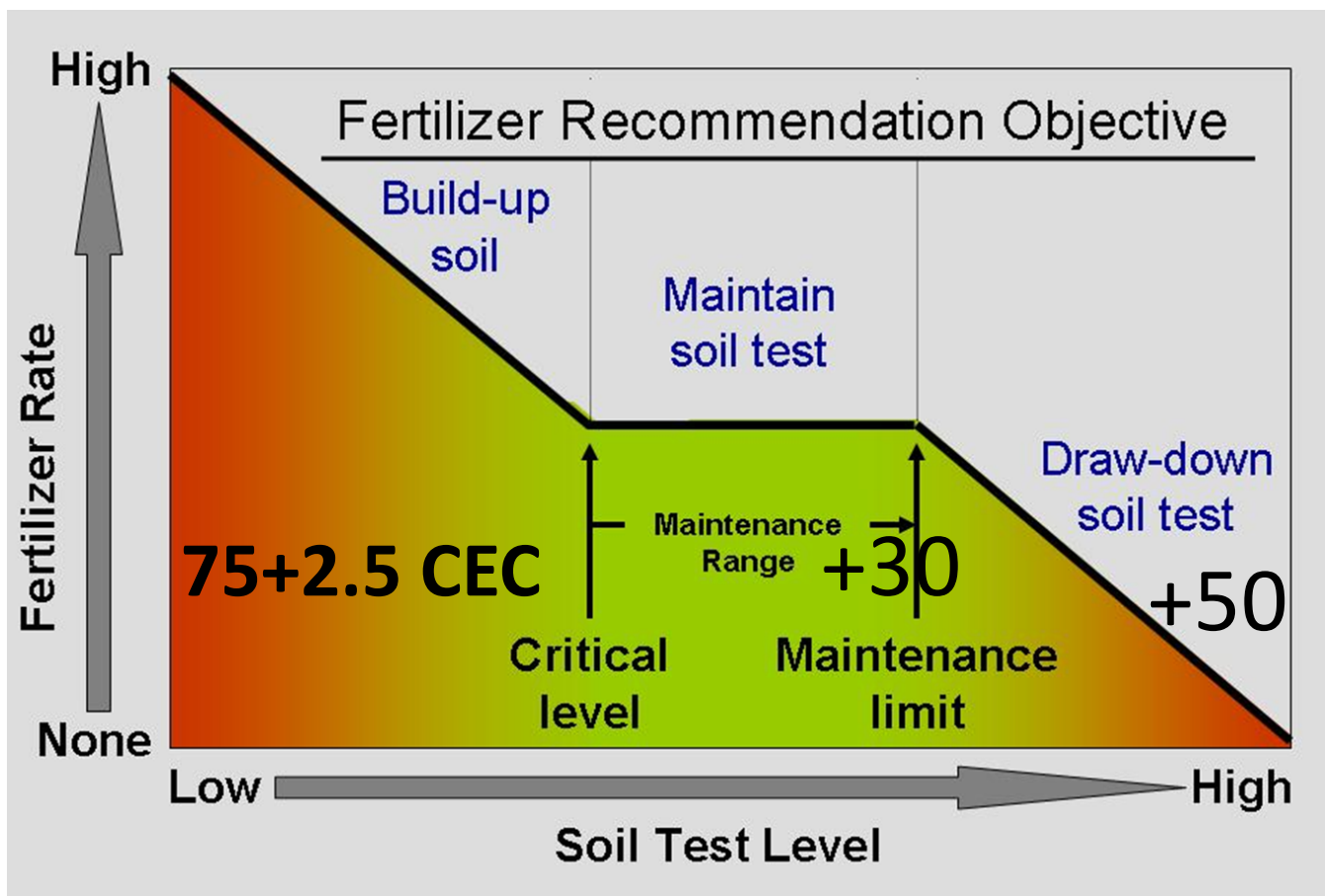


## Phosphorus drawdown is slow

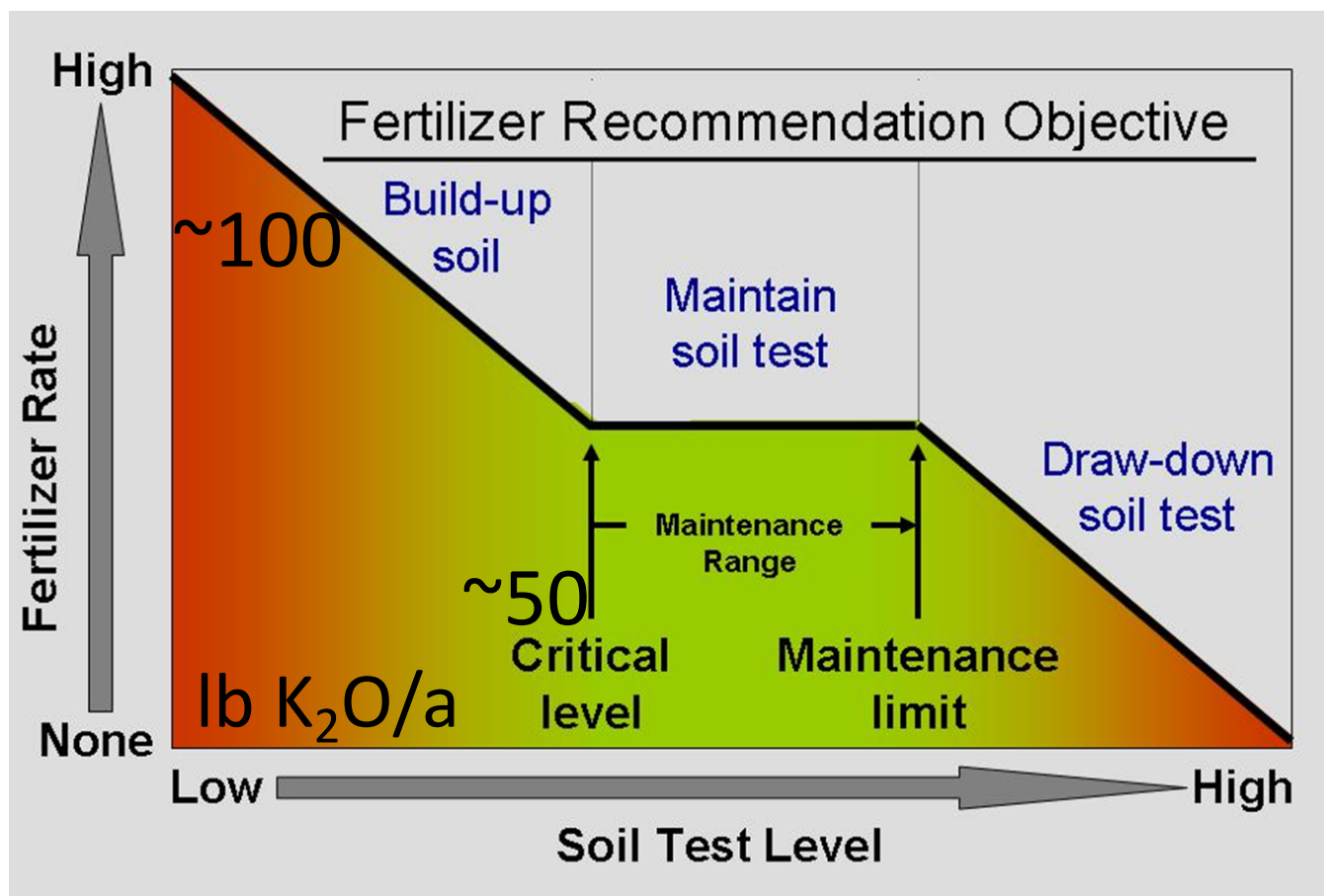
- **Expect 1 ppm decrease in soil test per 20 lb P<sub>2</sub>O<sub>5</sub> removed in excess of application**
- **For example:**
  - **200 bu/acre corn grown removing 75 lb P<sub>2</sub>O<sub>5</sub> per acre**
- **Expected decrease in soil test P is about 4 ppm**



## Soil test K levels (ppm) associated with limits



# Alternative fertilizer recommendation



## Potassium drawdown is not as slow as P

- 1. Expect 1 ppm decrease in soil test per 6 lb K<sub>2</sub>O removed in excess of application**
- 2. For example:**  
**200 bu/acre corn grown removing 55 lb K<sub>2</sub>O per acre**
- 3. Expected decrease in soil test K is about 9 ppm**

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January 20, 2017