# Creating Nitrous Oxide Emissions Offsets in Agricultural Crop Production in the U.S.

## EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #11

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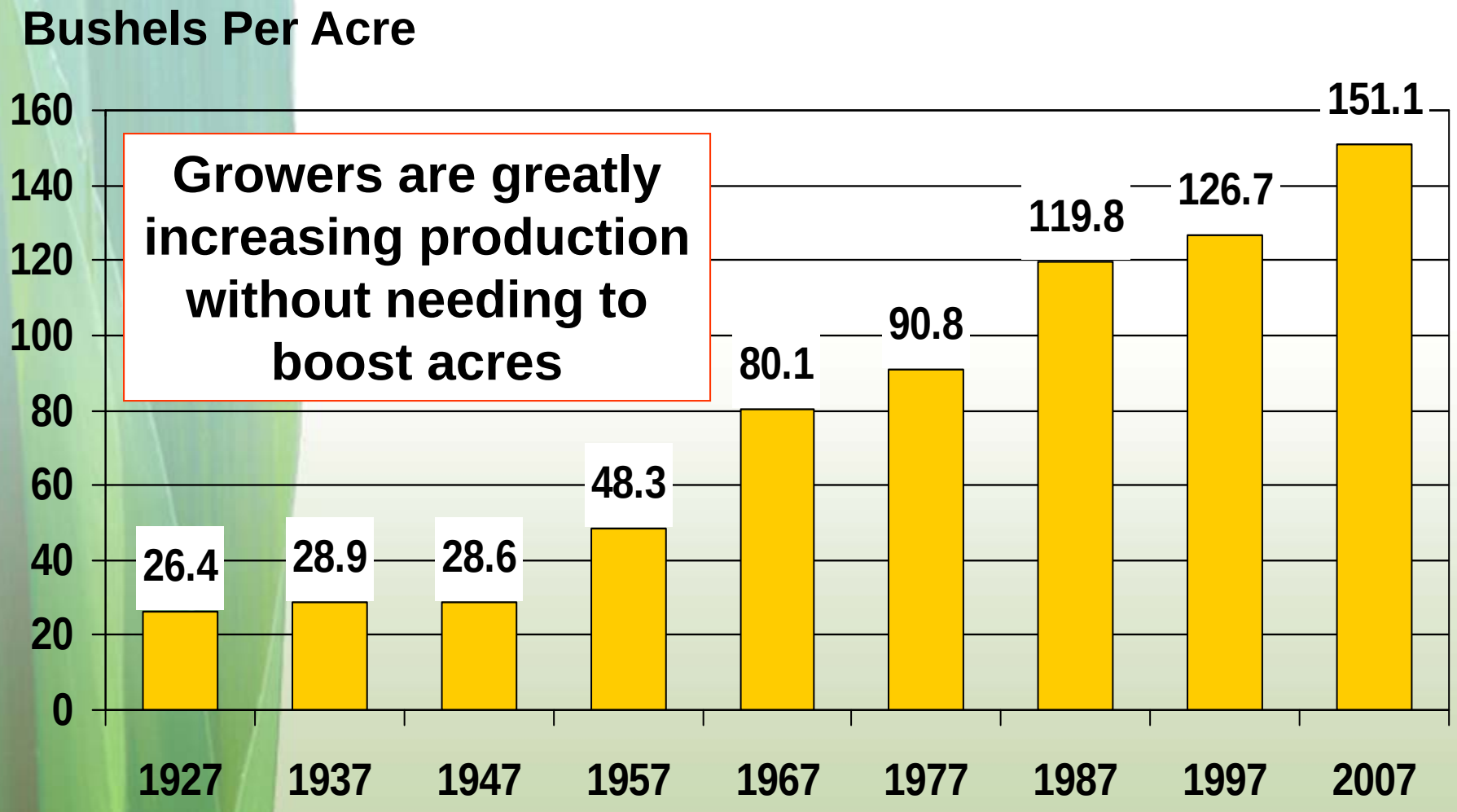
NCGA
www.ncga.com

# 2050 Challenge

- By 2050, the world's population will increase to more than 9 billion people
- Food production must be doubled with the same amount of arable land
- Any discussion of sustainability, GHG emissions or overall environmental metrics must consider efficiency gains – production per acre
- Intensification is one of the keys to meeting future food demand while minimizing environmental impact

# U.S. Corn Yield

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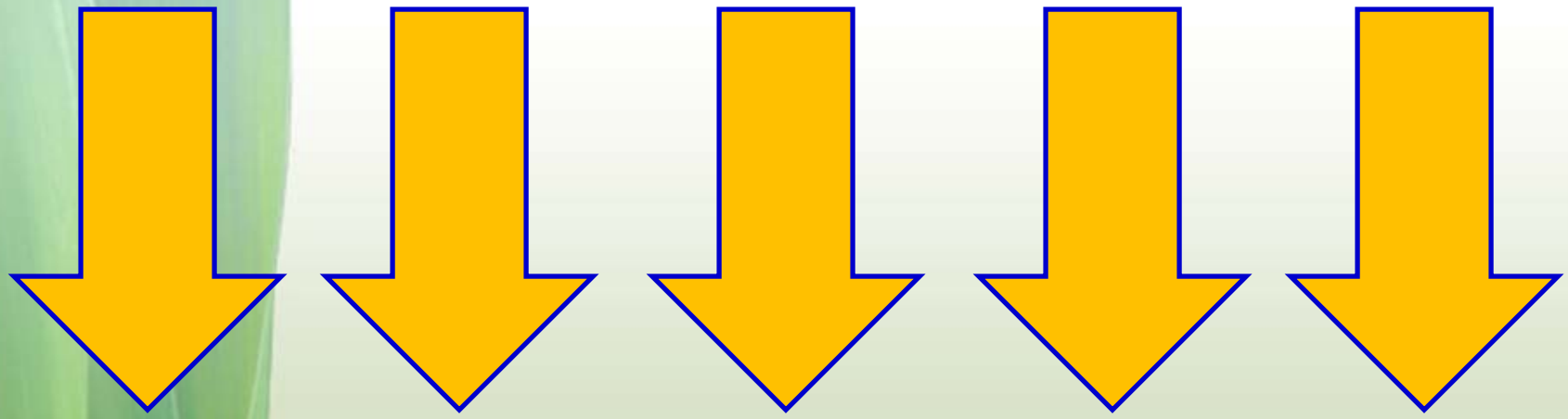
Source: USDA

# Corn's Impacts, 1987-2007

| Land Use | Soil Loss | Irrigation | Energy | Climate |
|---|---|---|---|---|
| Amount of land to produce one bushel of corn | Soil loss per bushel, above a tolerable level | Irrigation water use per bushel | Energy used to produce one bushel | Emissions per bushel |
| 37% | 69% | 27% | 37% | 30% |



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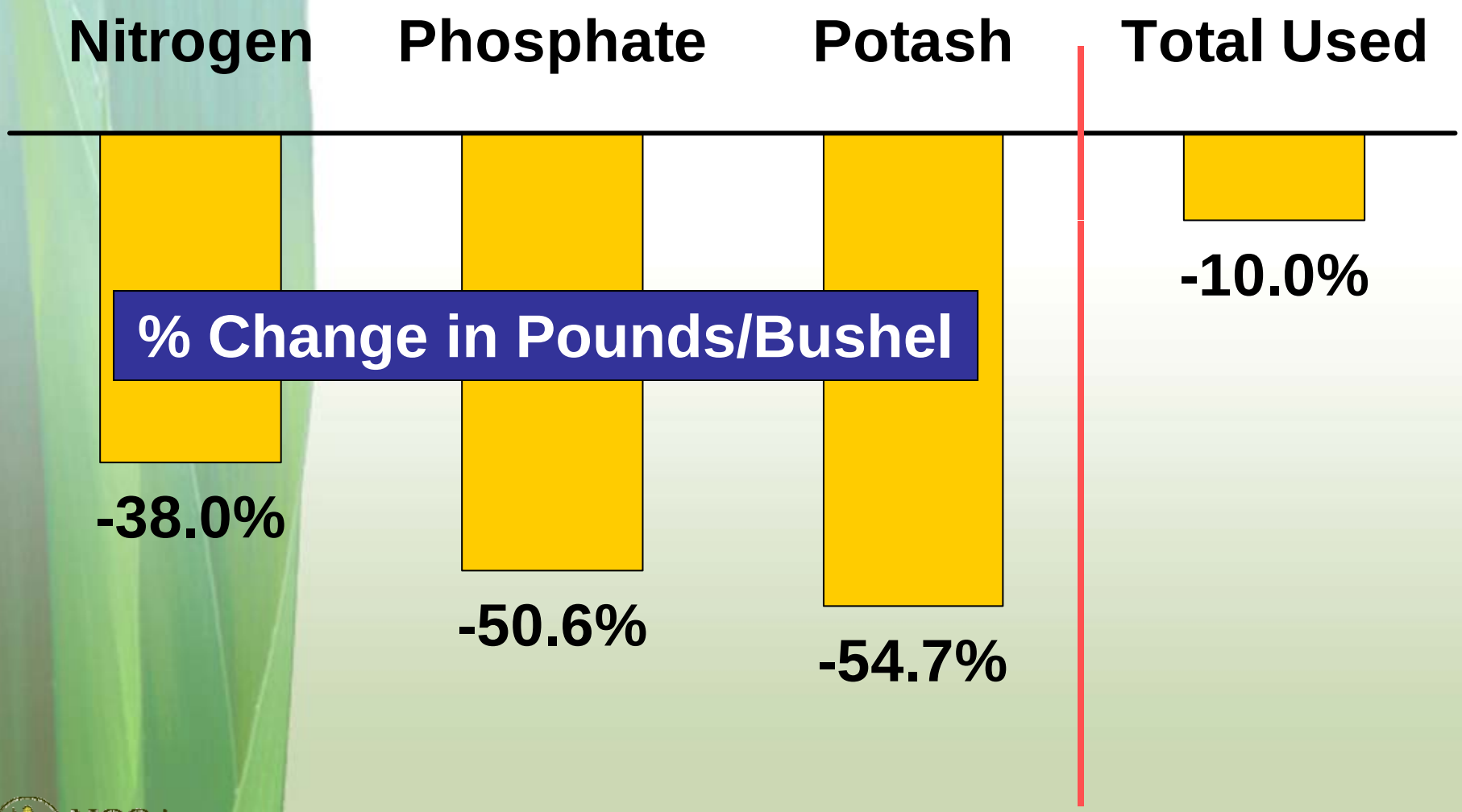
Source: Field to Market

# Nutrient Use, 1980-2005




Source: The Fertilizer Institute

# GHG emissions in corn (’87-’07)

- **Emissions per acre increased by 8%**
- **Emissions per bushel decreased by 30%**

*“Changes in the application methods for nitrogen fertilizer as well as the true change in energy use over time are difficult to approximate and consequently efficiency gains over time may not be captured in our analysis.”*

*- Field to Market Environmental Indicator Report (2009)*

# NCGA's earlier policy position on emissions trading regimes

*NCGA and more than a dozen other agricultural groups endorsed "nine key principles" for climate legislation early in 2009*

#2. Any cap and trade legislation must fully recognize the wide range of carbon mitigation or sequestration benefits that agriculture can provide

#3. Cap and trade legislation that makes economic sense for agriculture

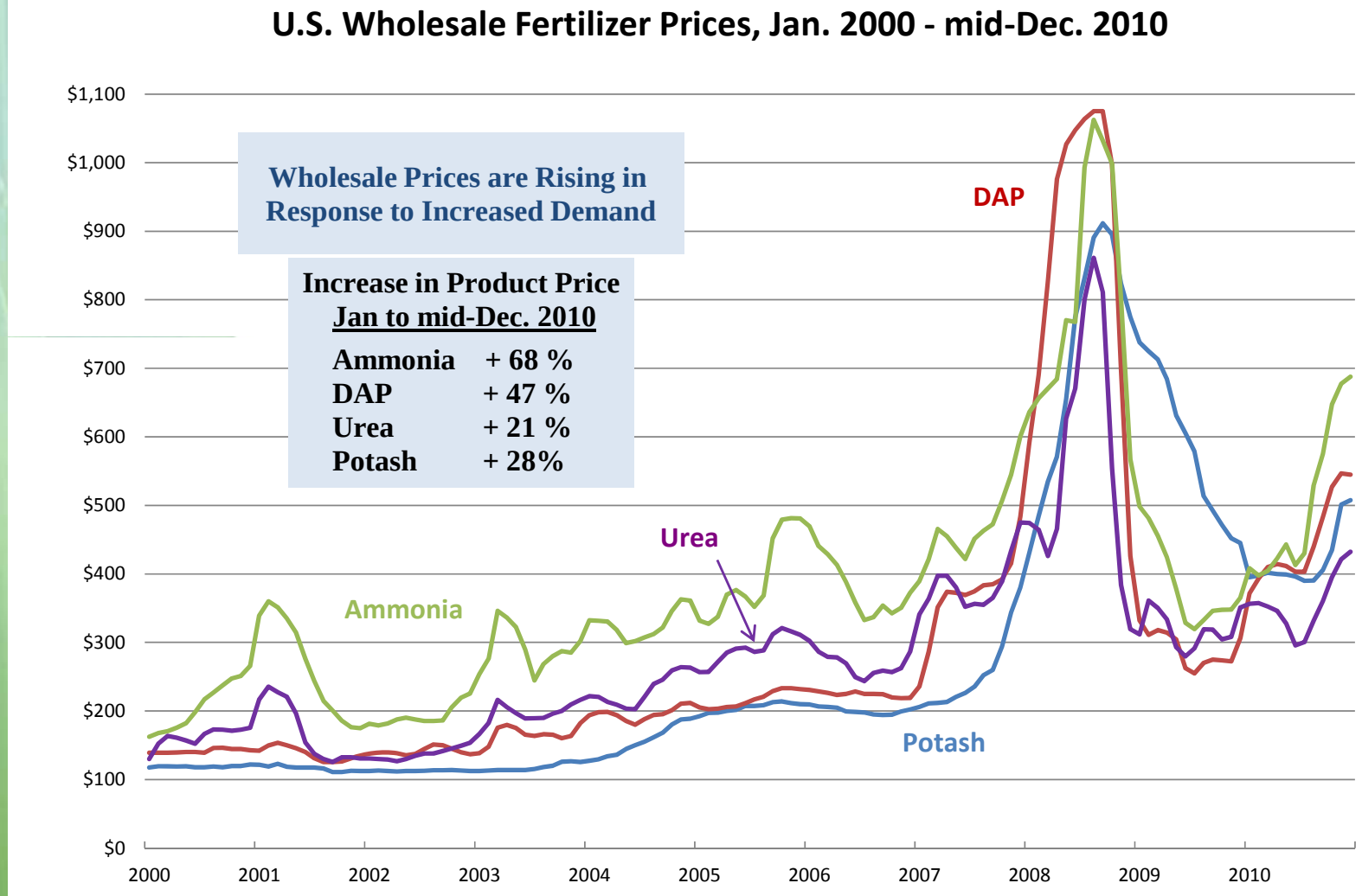
#6. Establish carbon sequestration and greenhouse gas mitigation rates based on science

#9. Stackable credits

# 4Rs of Nutrient Management

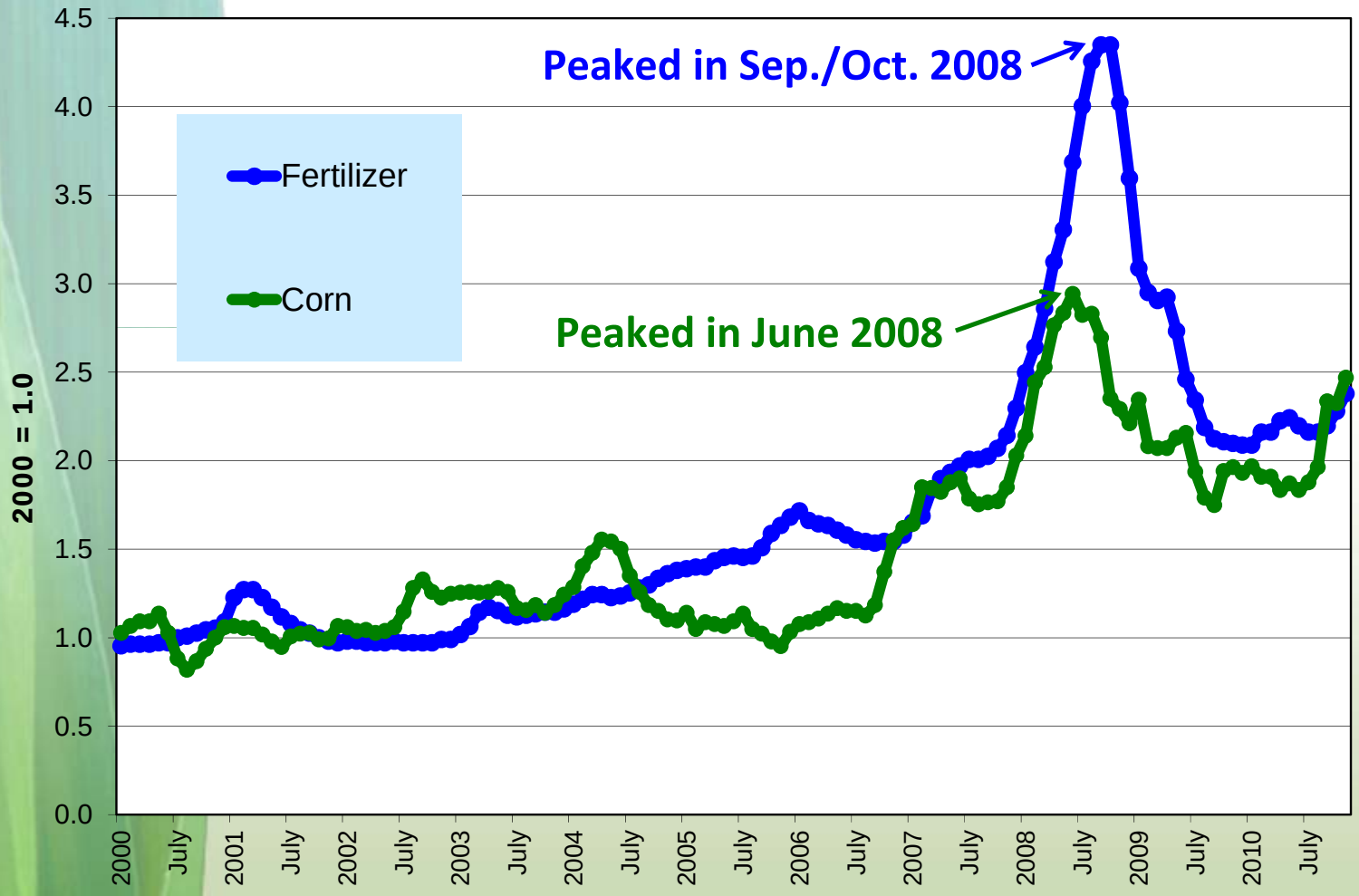
- Any N2O emissions offset program in agriculture must consider all 4Rs to be broadly accepted by growers with emphasis on **nutrient use efficiency**.
- Confining a protocol to simple N rate reduction will likely limit participation.
- Offsets program must make agronomic and economic sense to producers.

# Fertilizer price volatility




Source: Green Markets

# Index of Corn vs. Fertilizer Prices (2000 – 2010)




Source: Computed from data reported by the National Agricultural Statistics Service, USDA.

# 4Rs of Nutrient Management

- **Right Source**
  - **Choose N source that fits economic and logistical requirements and minimizes risk of N loss. The N source selection can affect the proper rate, timing and placement.**

*Source: "Fertilizer Nitrogen BMPs to Limit Losses that Contribute to Global Warming"*

# 4Rs of Nutrient Management

- **Right Rate**
  - **Accounting for soil N supply and other input sources (e.g. manure, irrigation water, etc.)**
  - **Site specific management**

# 4Rs of Nutrient Management

- **Right Timing**
  - Spring application for spring planted crops such as corn
  - Spring split or sidedress applied for spring planted crops such as corn
  - Anhydrous ammonia applied in fall after soil temp below 50 degrees
  - Nitrification inhibitor used
  - Controlled release technology used
  - Avoid applications to waterlogged soils during warm periods

# 4Rs of Nutrient Management

- **Right Placement**
  - **Subsurface incorporation**
  - **Surface banded**
  - **Shallow sidedress band**
  - **Surface applied with urease inhibitor**

# Smart Nitrogen Application Program (SNAP) Demonstration Project / USDA Conservation Innovation Grant

- **Objectives:**
  - **Develop a Smart Nitrogen Application Program (SNAP) and the necessary supporting outreach to implement the program on IA and IL corn and soybean farms**
  - **Evaluate, road test and compare the Alberta NERP, ACR and VCS protocols for quantifying reductions.**
  - **Implement the SNAP; aggregate and market the achieved credits.**
  - **Evaluate the SNAP to determine its effectives (accuracy, scalability, value to farmers, program requirements, efficiency, etc.)**

# Thank you!