FOTC 2014

Fertilizer Outlook & Technology Conference

MAKING THE RIGHT MOVES

OUR CHALLENGES. OUR IMAGE. OUR FUTURE

Tom Staples

Director, Echelon
Crop Production Services Canada

Precision Agriculture

The Fertilizer Institute
Nourish, Replenish, Grow

Fertilizer Industry Round Table

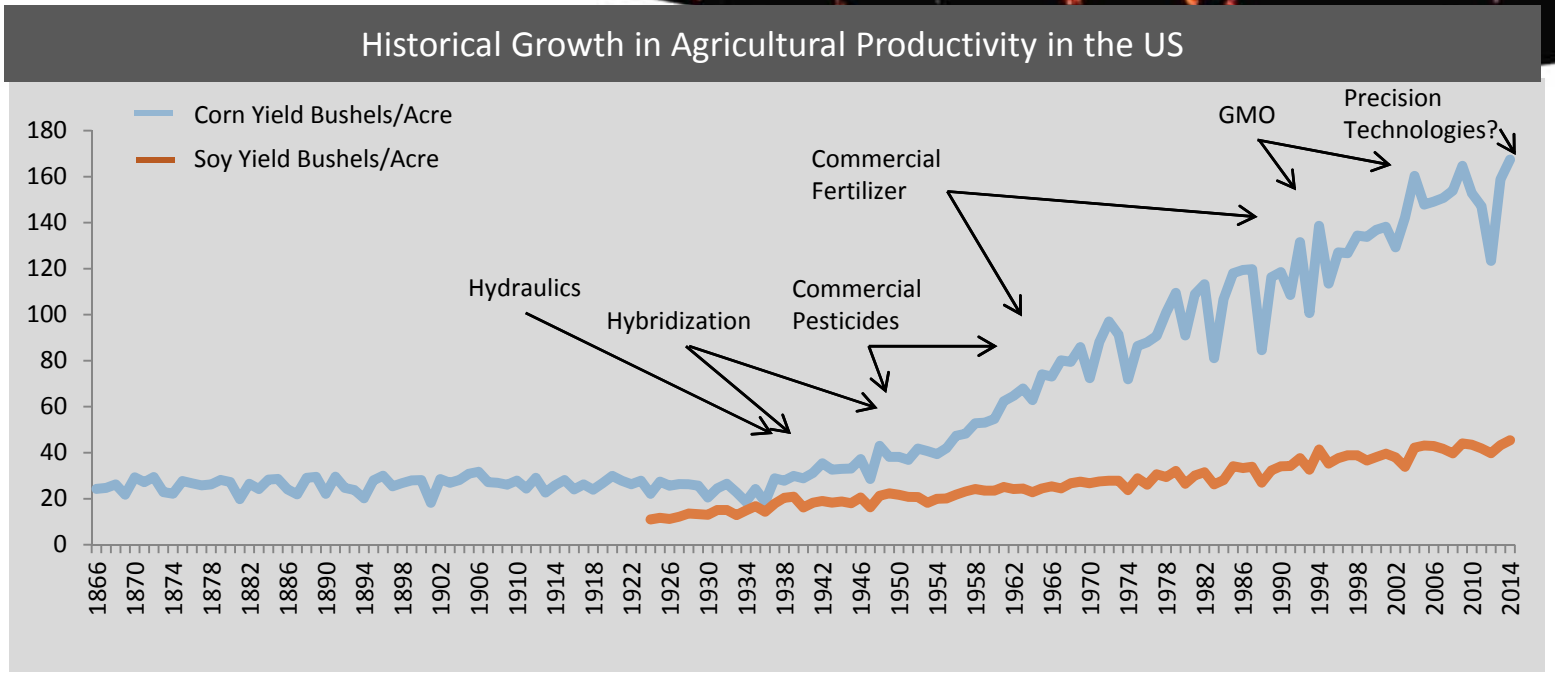
Influence of Precision Agricultural Technologies on North American Nitrogen Fertilizer Usage Outlook

Tom Staples

Director, Echelon

Crop Production Services (Canada) Inc.

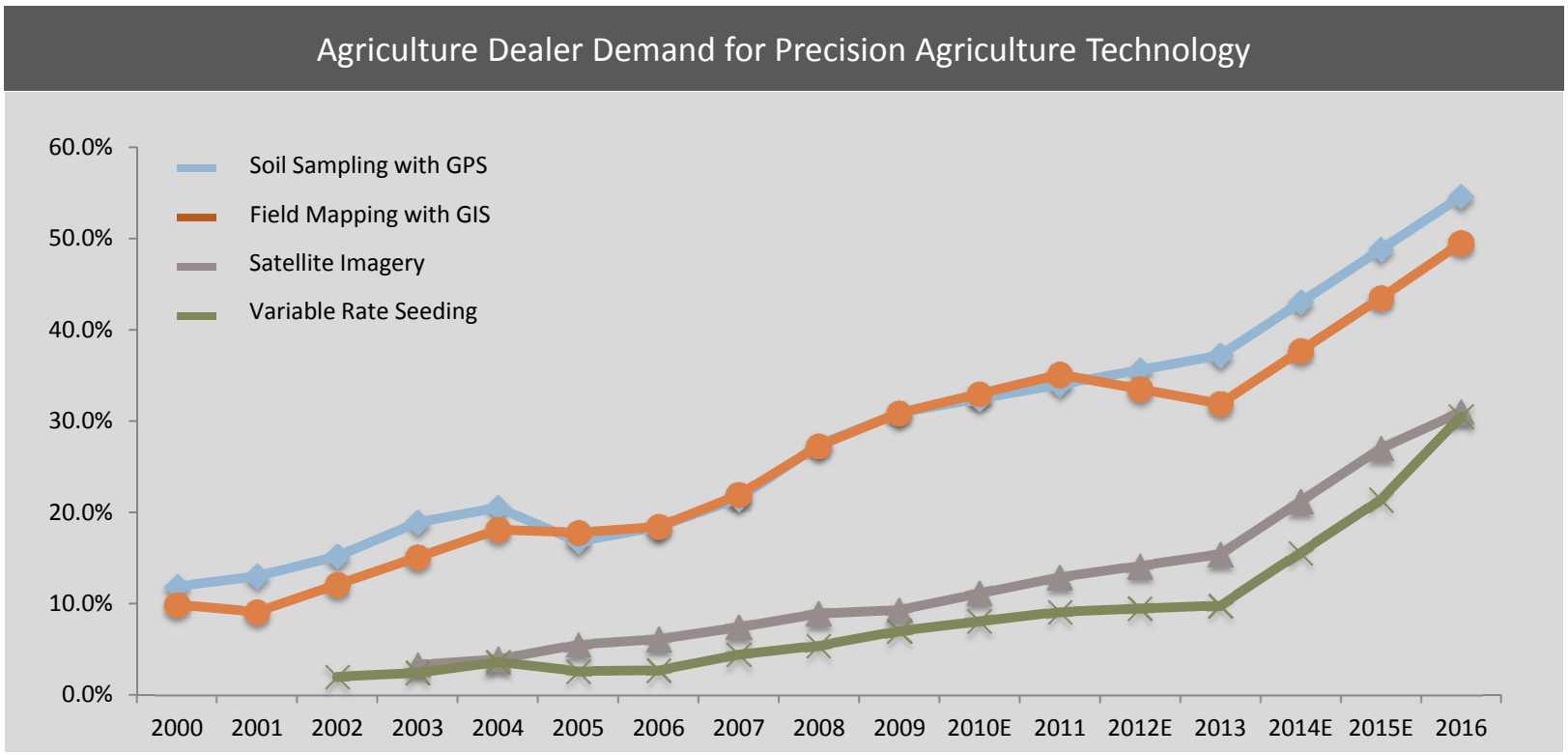
Innovation & Production Growth



*Source: US Department of Agriculture – National Agriculture Statistics Service

- Corn yields up nearly 7X, soybean yields up more than 4X since 1930s
- Numerous technologies have cumulatively contributed to yield increases
- Many believe precision technologies will provide the next stimulus to yield improvements

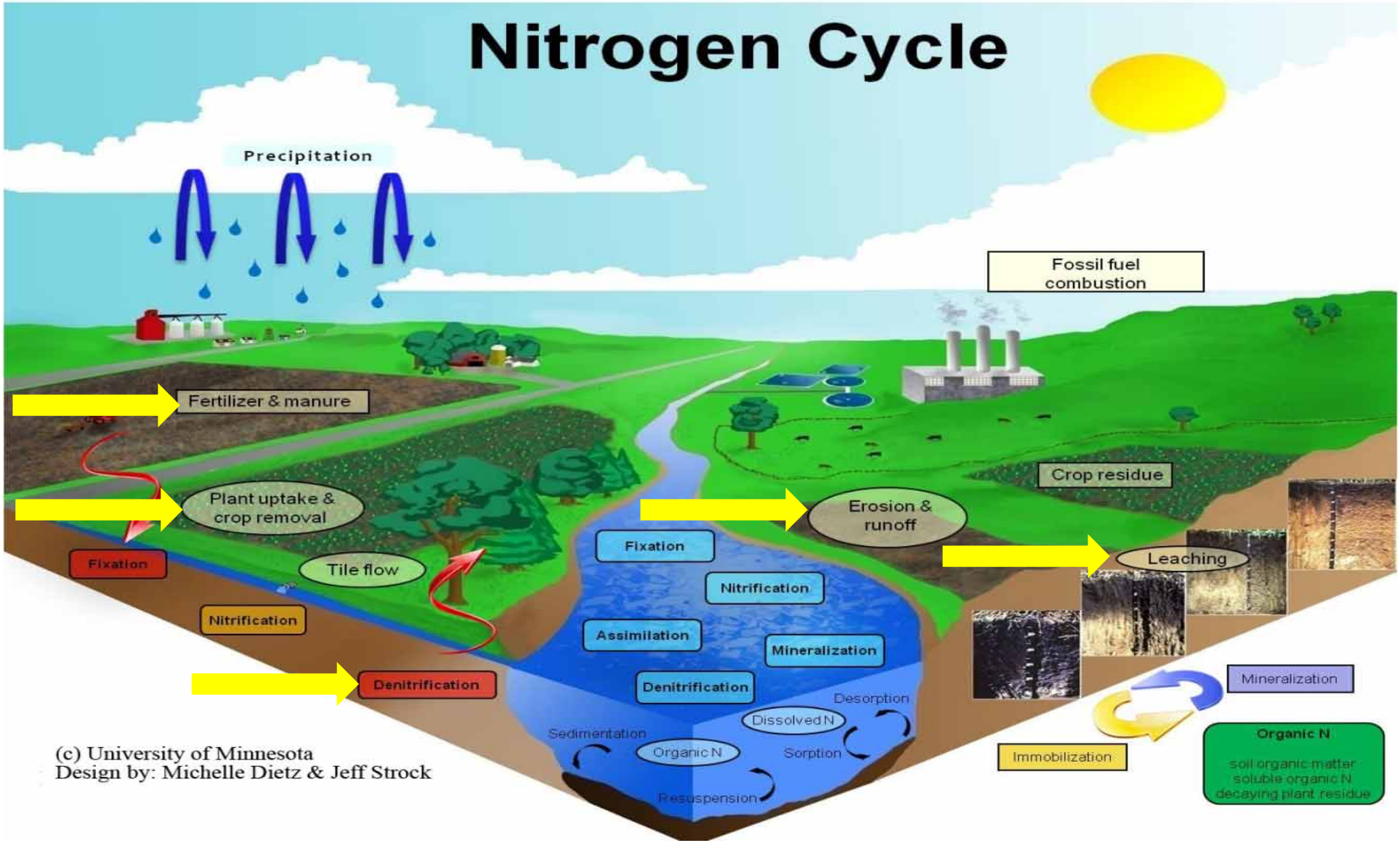
Precision Ag Technology Adoption



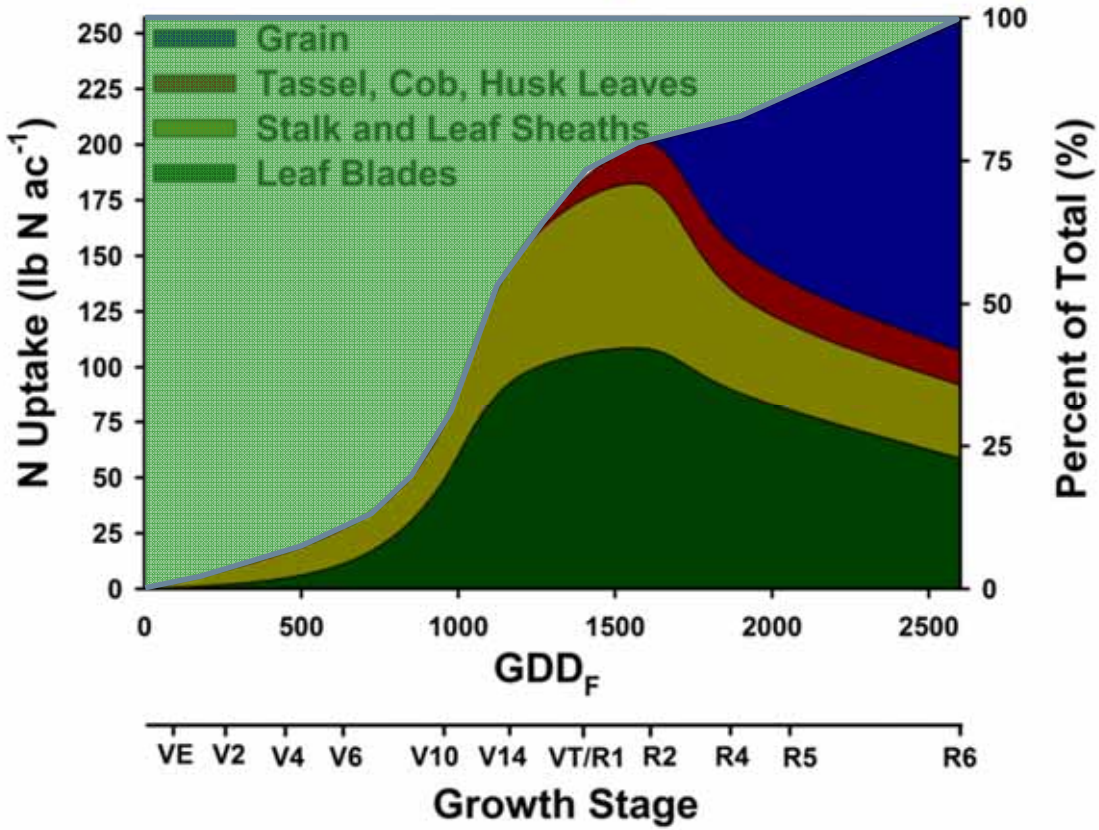
*Source: 2013 Purdue University Precision Agricultural Services Dealership Survey

- Adoption of precision agriculture services has increased rapidly, and the pace of adoption is expected to accelerate

Grower's Goal is to Minimize Loss and Maximize Uptake



Nitrogen Vulnerability Gap

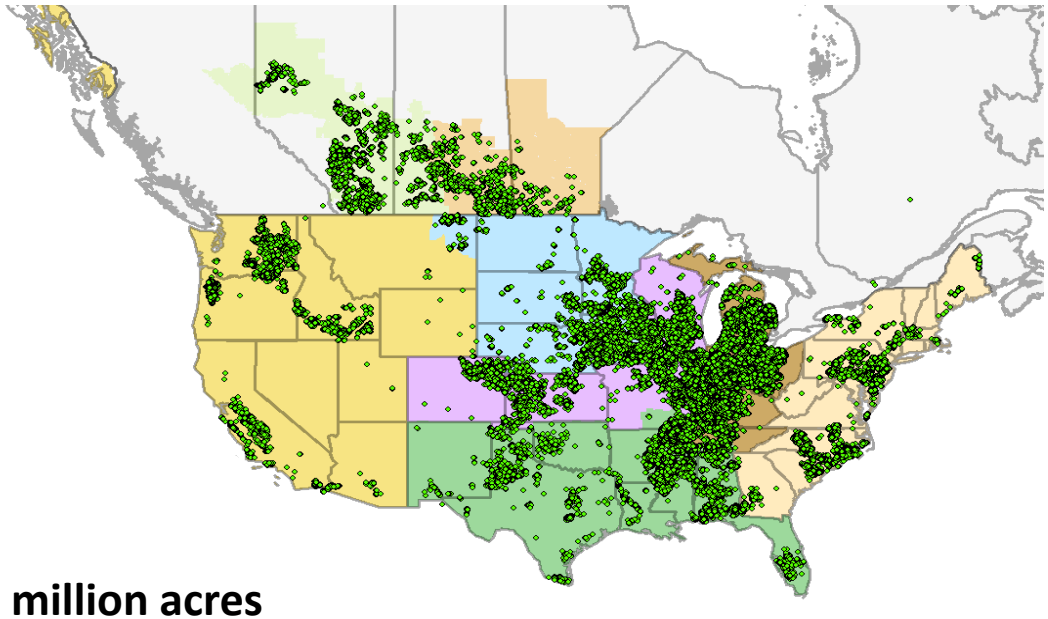


- Until the crop takes up all required N, soil and fertilizer N is vulnerable to loss

Source: Bender et al., 2013

CPS FIELD TECHNOLOGY SOLUTION

- Echelon is the CPS Precision Ag Technology platform
- Currently:
  - > 1,500 CPS Crop Advisors
  - > 31,000 Growers

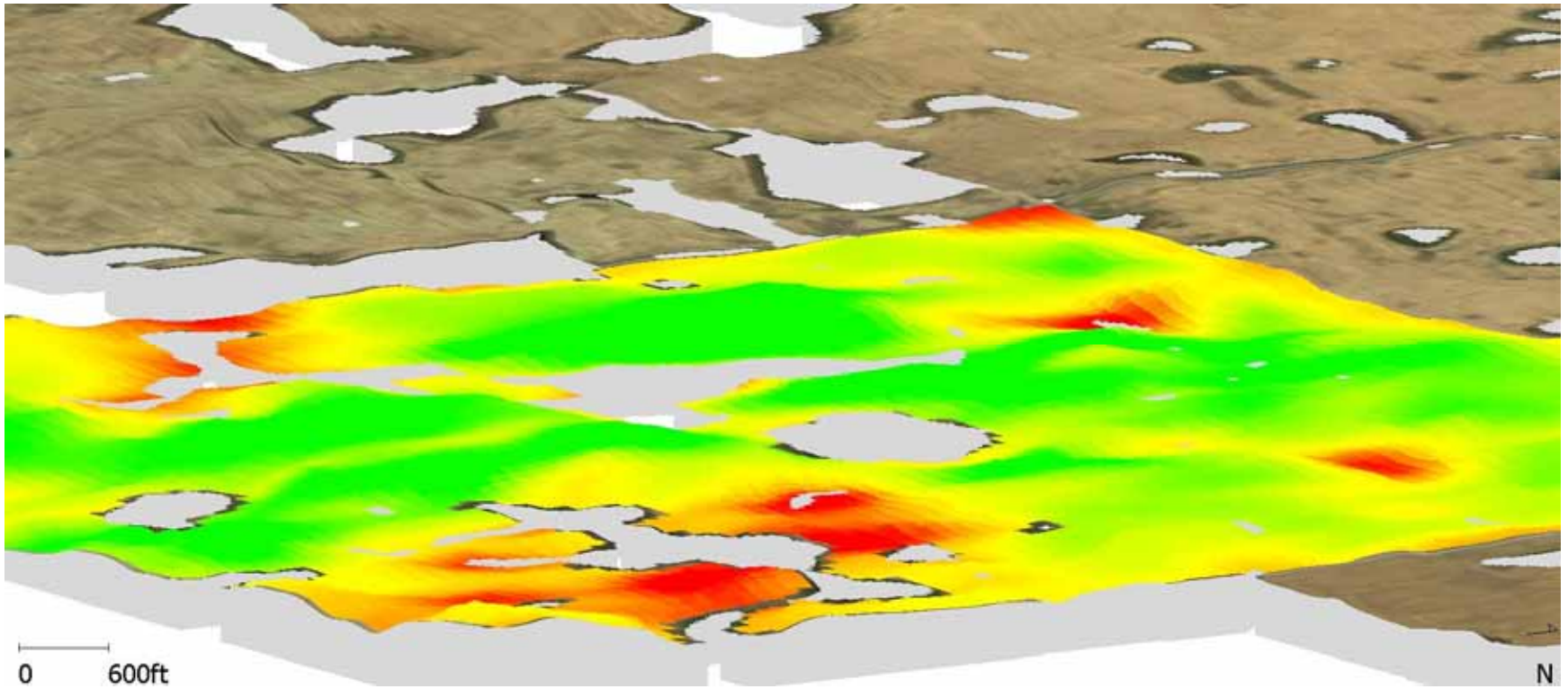


> 19 million acres

KEY BENEFITS FOR GROWERS

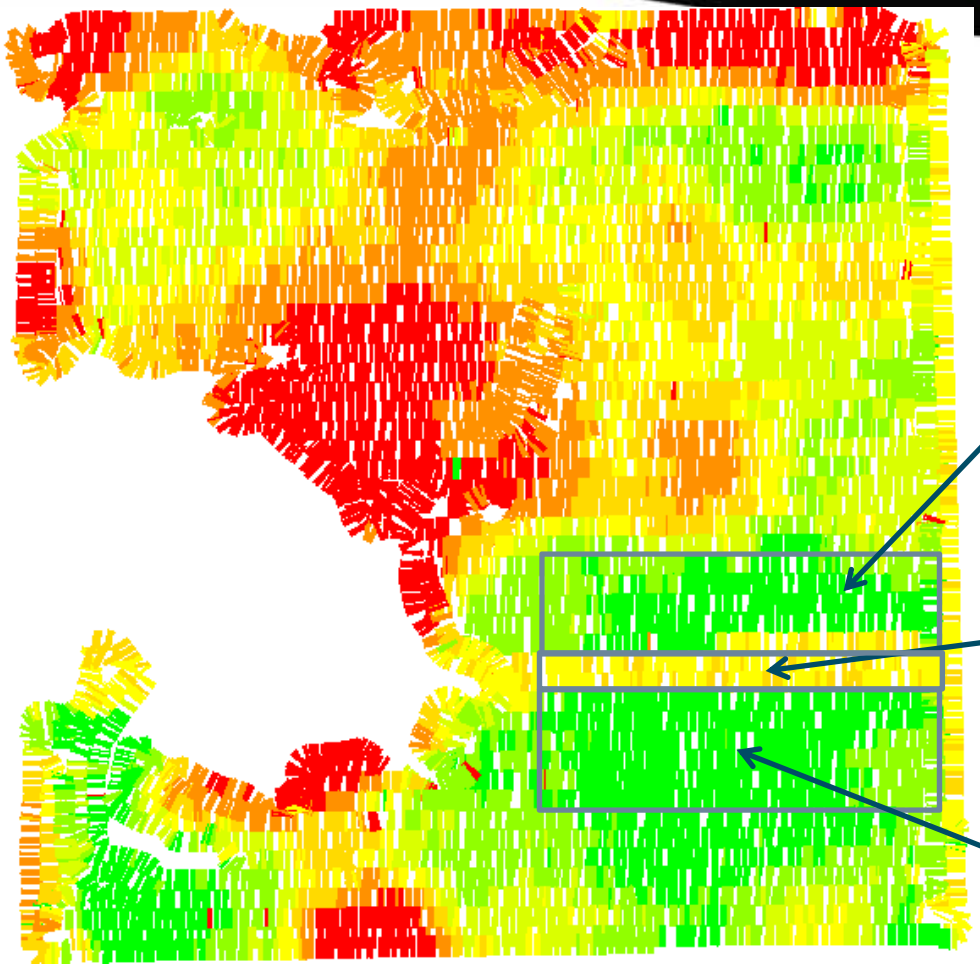
- Technology helps maximize field productivity and grower returns
- Optimizes use of Crop Inputs (crop yields may improve as much as 20% using similar levels of inputs)
- Potential for environmental benefits, as well as compliance and record keeping management
- CPS/Echelon is “all inclusive” – providing access to a wide array of brands/solutions, i.e. not tied to one product offering or equipment brand (color blind)
- Unique variable rate N technology

The Promise of Variable Rate N for Sustainability



- Echelon variable rate N technology reduces rates in areas of low yield potential
- Controlling N rates to yield potential maximizes yield while reducing N vulnerability to loss

Benefit of Variable Rate Nitrogen



Yield 60.1 bu
Rate 106 lbs N

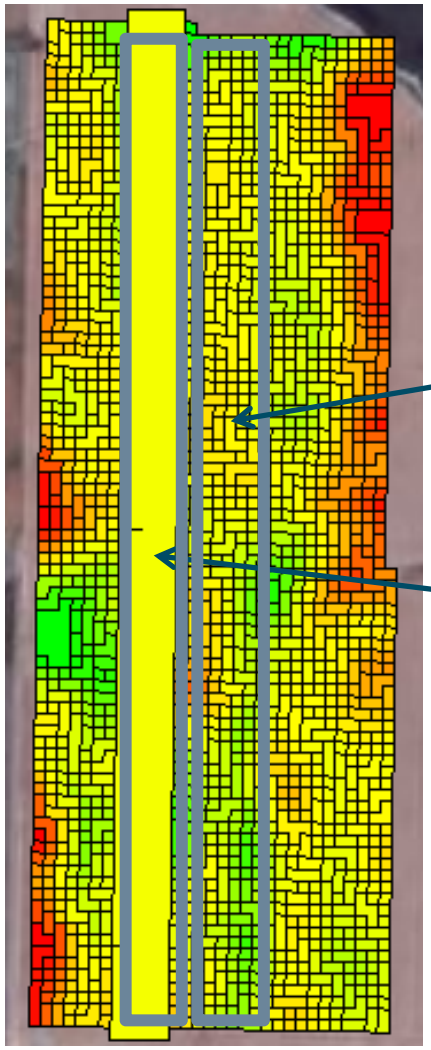
Yield 55.4 bu
Flat Rate 83 lbs N

Yield 58.6 bu
Rate 104 lbs N

Crop Production Services

SE Sask - Wheat

Benefit of Variable Rate Nitrogen

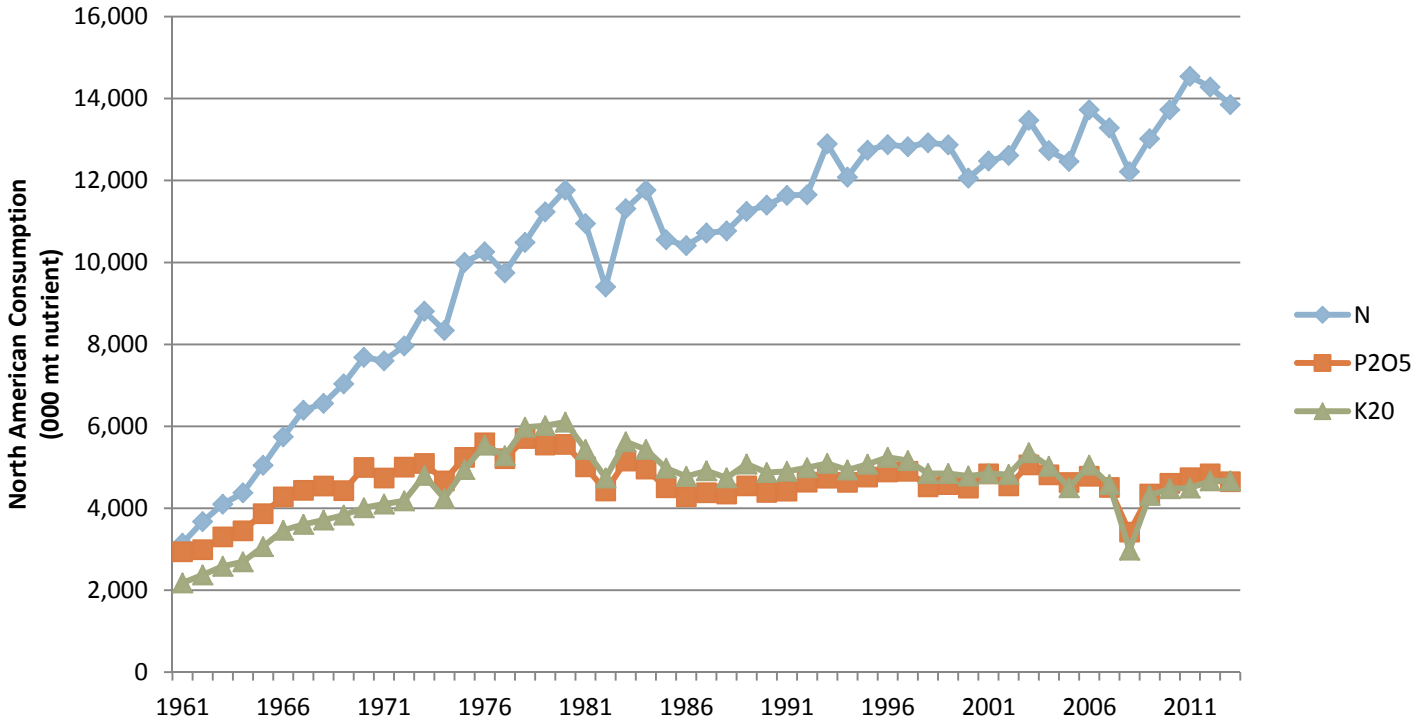


Yield 51.1 bu/ac
V Rate 163 lbs urea

Yield 45.4 bu/ac
Flat Rate 163 lbs urea

5.7 bu increase of wheat,
13% Yield Increase
$7.50/bu = $42.75/ac increase

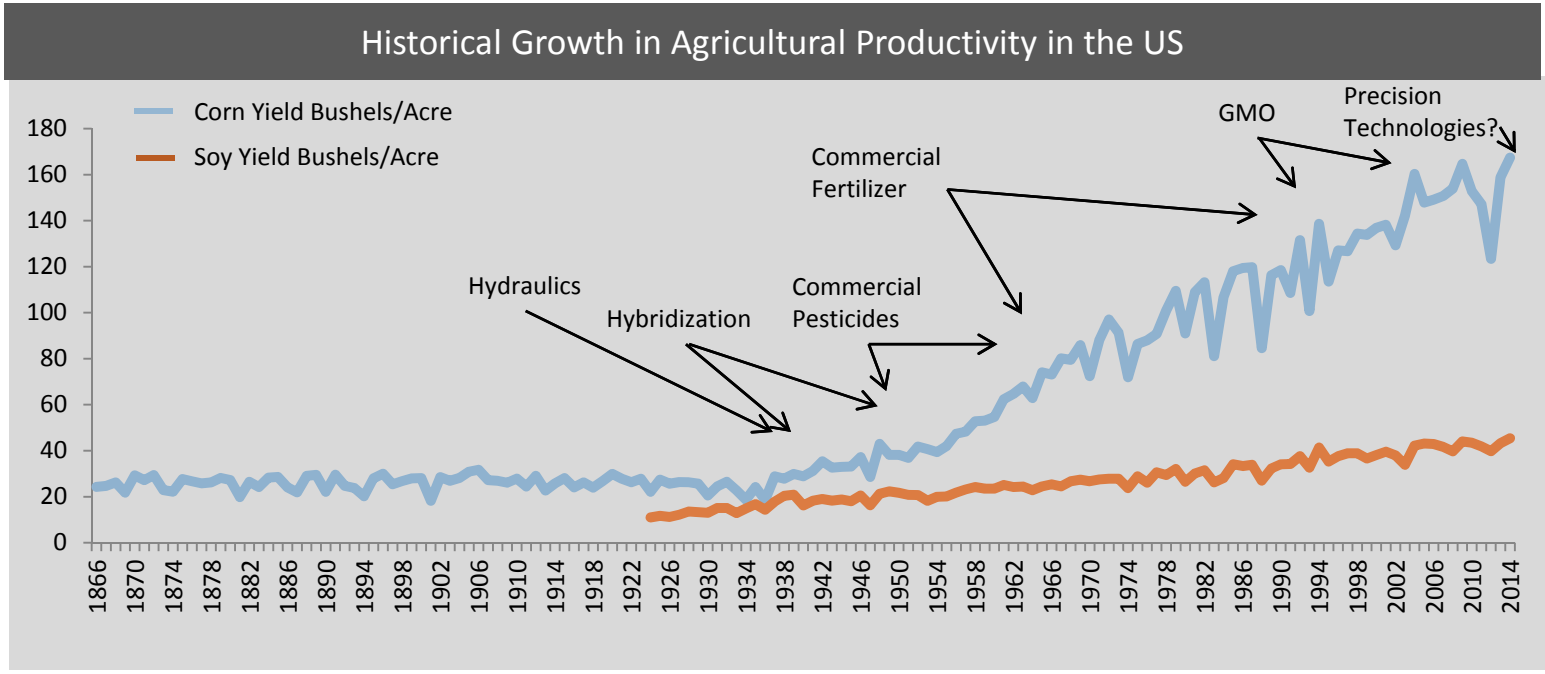
North American Fertilizer Consumption Trend



- N consumption growing by 1.0% annually
- P and K consumption relatively flat

Source: IFA, TFI, AAPFCO, Agrium

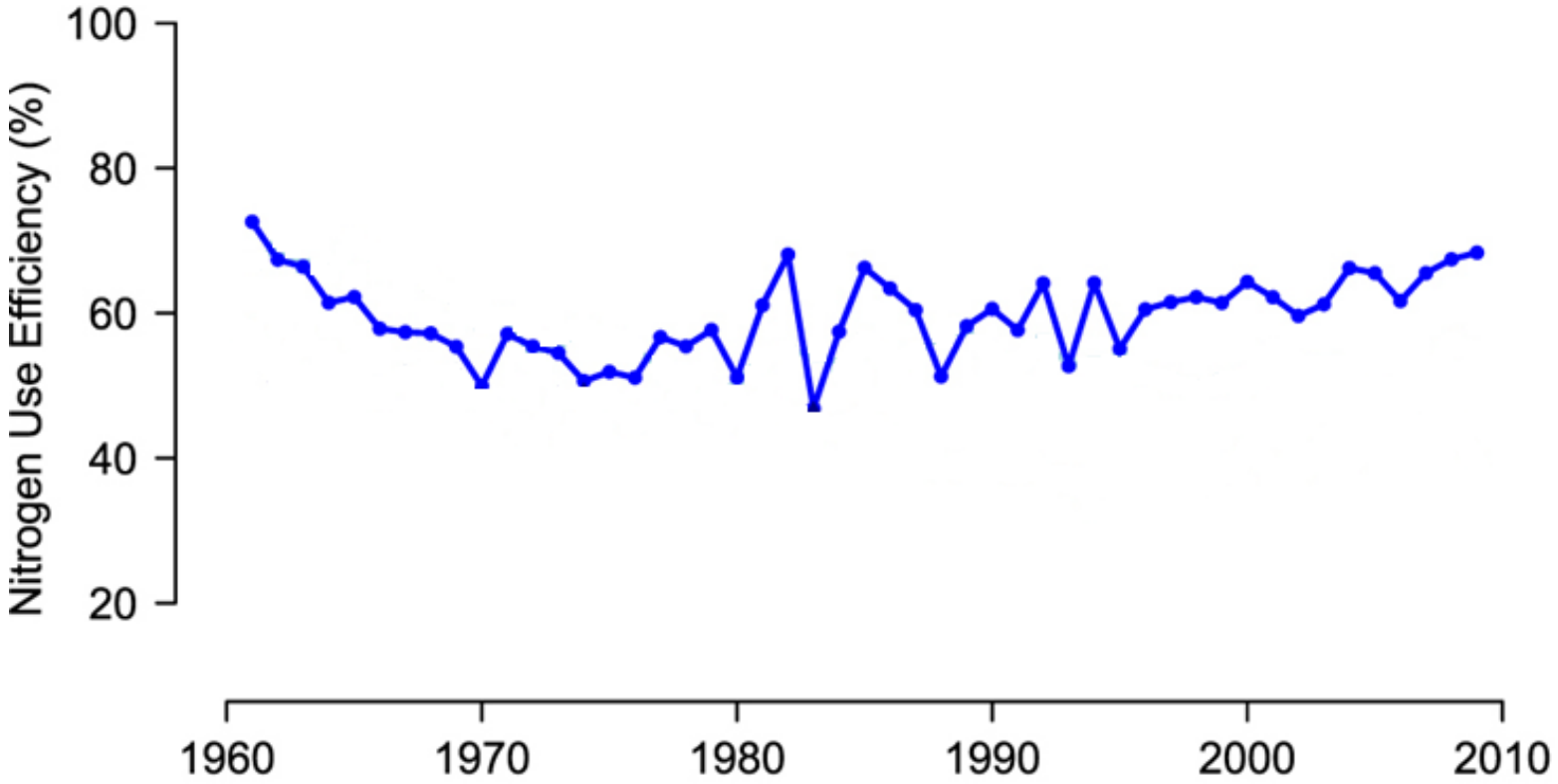
Innovation & Production Growth



*Source: US Department of Agriculture – National Agriculture Statistics Service

- Corn yields increasing by 1.4% annually, faster than N consumption increases

Nitrogen Use Efficiency Trend – USA 1960 - 2010



Nitrogen Use Efficiency increasing by approximately 0.35% annually in US since 1980

Source: Lassaletta et al., 2014

How has increased NUE been achieved?

- Mainly by increasing yields, associated with:
  - Greater N uptake, extending later into the season;
  - Increased internal efficiency in the plant, yielding more grain per unit of N taken up;
  - Small reductions in the crude protein (N) content of the grain.
- Improved understanding of 4R fundamentals also contributing

Source: IPNI, 2010

The Promise of Technology

- Improved agronomics to minimize N loss while maintaining and growing yield potential
- Improved weather modelling, and modelling of the impacts of weather on N cycling
- Genetic improvements in NUE

Take Home

- Precision agricultural technologies will be a critical tool to maintain current yield trend line
- Adoption of precision nitrogen technologies still in its infancy, expected to grow
- Current improvements in NUE by variable rate application and other technologies will improve sustainable use of N but not have impact on overall N consumption in short to medium term