Project SENSE 2015 Results

Sensors for Efficient Nitrogen Use and Stewardship of the Environment

Laura Thompson, John Parrish, Nathan Mueller, Joe Luck, Brian Krienke, Troy Ingram, Dean Krull, Keith Glewen, Tim Shaver, Richard Ferguson

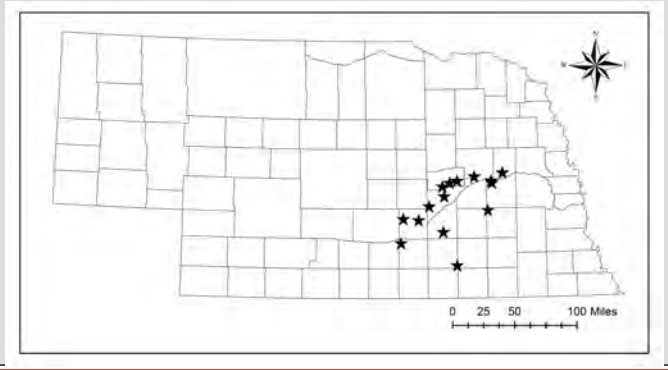
Project SENSE is a collaborative effort of University of Nebraska-Extension, the Nebraska Corn Board, Natural Resources Districts, and USDA to encourage adoption of in-season nitrogen (N) application for corn. Through this practice we expect nitrogen use efficiency (NUE) will increase, reducing nitrate loss to groundwater.

Why Sensors?

A *reactive* approach, using crop canopy sensors, has been proven through research to be an effective way to approach EONR, adjusting for spatial and temporal variation. The sensors used in this project are OptRx active crop canopy sensors. These sensors are mounted on a high clearance applicator and record plant reflectance. The applicator then applies N fertilizer in real-time. For more information about how crop canopy sensors work visit: http://go.unl.edu/sensevideo.

Where?

Research experiments were set up at 17 field sites in 2015, located in 5 Natural Resource Districts: Central Platte, Little Blue, Lower Loup, Lower Platte North, and Upper Big Blue.



Plot Design

Experimental plots were randomized and replicated field-length strips. The grower's standard N management practice was compared to crop canopy sensor-based management. Plot layout is shown below.

Producer N rate
Sensor N rate
Sensor N rate
Producer N rate
High N Check
Sensor N rate
Producer N rate
Sensor N rate
Producer N rate
High N Check
Sensor N rate
Producer N rate
Producer N rate
Sensor N rate

For each plot strip, the producer target rates were noted, the OptRx sensor system target rates were logged and averaged, and the yield monitor data was recorded, logged, and averaged. Additional layers of spatially dense data such as aerial imagery and electrical conductivity are being collected for many of the sites. For each field plot, the grower N rates and yields were compared to that of the sensor system.

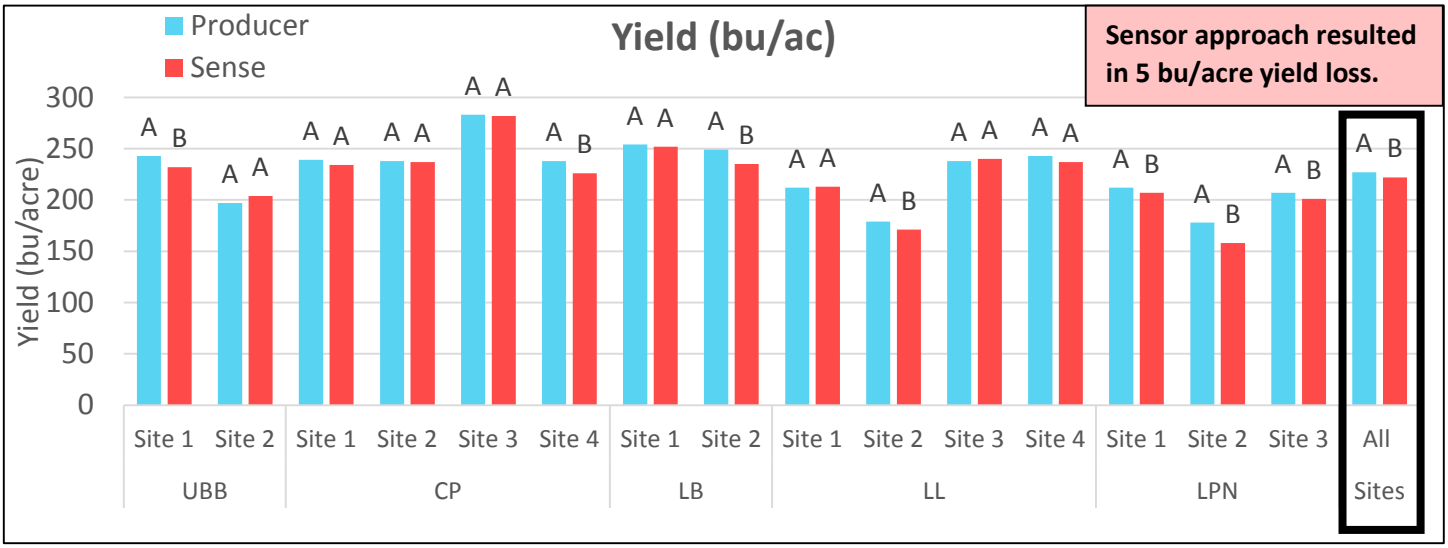
Field Days

Field Days were held in July and August in each NRD. Total attendance for the 5 demonstration days was 107 growers and advisors representing 319,000 acres. Participants rated the value of knowledge gained at $5.82/acre

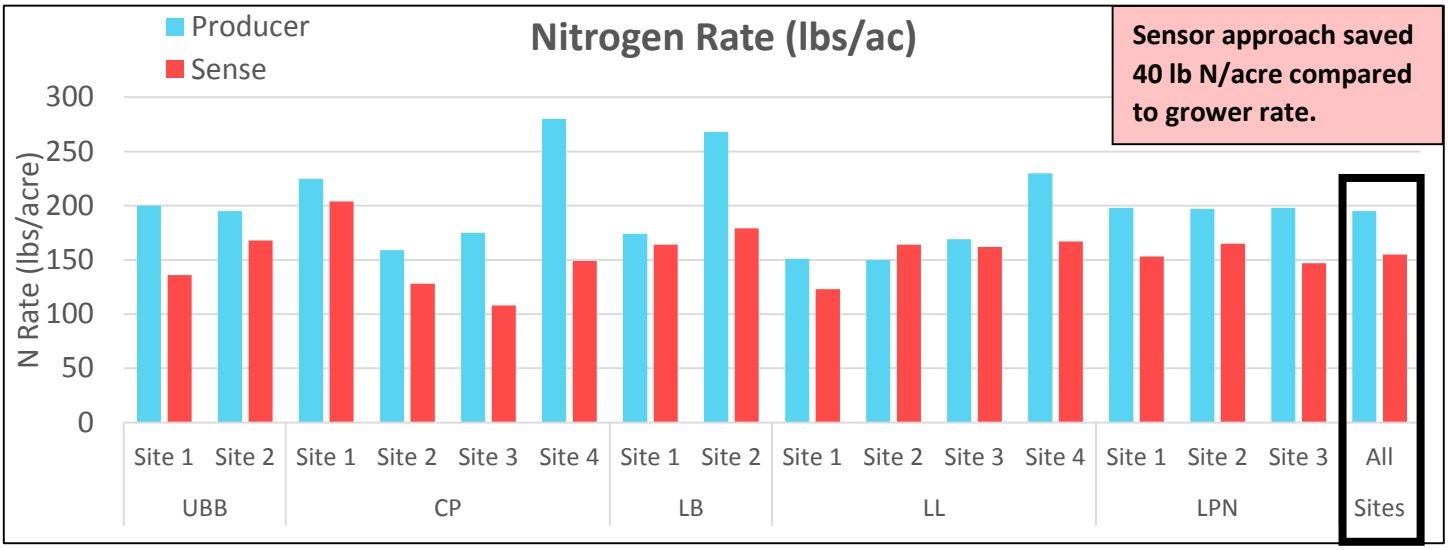
This project is made possible through support from:

Nebraska Corn Board, USDA, Central Platte NRD, Lower Loup NRD, Little Blue NRD, Lower Platte North NRD, Upper Big Blue NRD

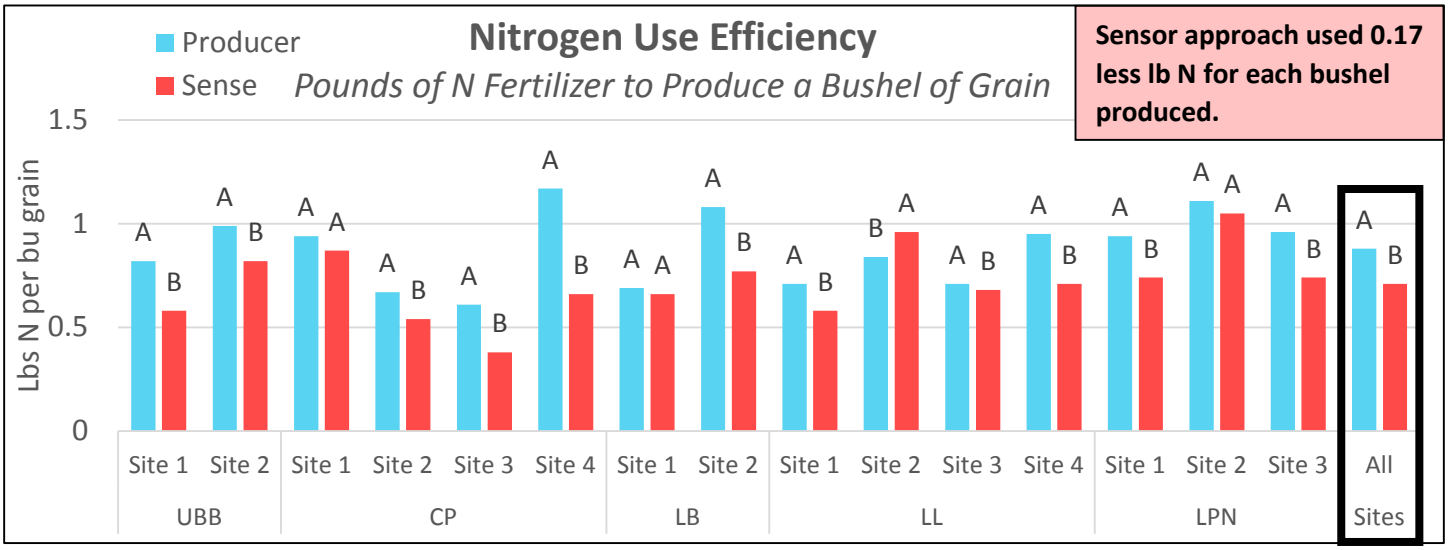
2015 Research Results



Sensor approach resulted in 5 bu/acre yield loss.



Sensor approach saved 40 lb N/acre compared to grower rate.



Sensor approach used 0.17 less lb N for each bushel produced.

*Values with same letters are not significantly different at alpha=0.05. Letters apply within site.

Net Return

Using a price of $0.65/lb N and $3.65/bu corn, the sensor management resulted in a marginal net return that was $10.35/acre greater than the grower management.