Nitrogen use efficiency

Josh Lofton- LSU AgCenter Soils training session LACA meeting February 12th, 2014

N fertilizer in agricultural systems

- Essential for all production systems
- The application of N will continue to be a major agronomic input
 - "Work-horse" varieties/hybrids
 - Increasing price of fertilizer N
- Focus shouldn't be
 - Continual unjustified N rate increases
- Instead
 - Enhancement of crop N uptake efficiency
 - Decrease cost but maintaining productivity
 - Increase productivity at similar input



What is NUE?

- Amount of applied N that is utilized by the crop to create the final product
 - Grain
 - Biomass
 - Extractable sugars
 - Essentially what you are utilizing to make a crops
- Methods of determining NUE
 - Difference method
 - Partial factor productivity
 - Nutrient balance

NUE- Difference method

 Determined by uptake or yields from fertilized and unfertilized areas compared to application

Accuracy varies

• %

 Can be very accurate due to comparison of high and low rates

 $NUE = \frac{(Nuptake_F-Nuptake_0)}{N application}$

- Management can alter accuracy
- Heavily utilized in research situations
 - On-farm feasibility less due to need of unfertilized

NUE- Partial factor productivity

- Compares the yield with the N application
 - bu yield/lbs N
 - No use of unfertilized area

- Accuracy still varies, but based on management
- Can be used on a more field, farm, or region basis
 - Precision ag potential?

Why improving NUE is important?

• Can often mean \$\$\$ in the pocket



% N use

Why improving NUE is important?



Managing for increased NUE

- Following 4 "R's" of nutrient management
- Right Rate
 - Constantly being upgraded
 - Application of rate within a system, not independent
- Right Time
 - Understand the peak uptake curves for crops managing
 - Split applications when possible
 - Attempts to minimize excessive losses



Managing for increased NUE

- Right placement
 - More essential for soil immobile nutrients
- Right source
 - Many N products available
 - Understand the a.i. and their intention
 - More about these in the next presentation
- No silver bullet for increasing NUE
 - Improvement will vary as much as the system does





Questions?