Nitrogen Loss Pathways –
A 4R Focus on Supplemental Fertilizer

Starting the Conversation...

How to start a conversation with a farmer about increasing retention of fertilizer nutrients.

Do you use UAN to apply your pre-emerge herbicides? What "above ground" nitrogen stabilizers are you using? Did you know that you could lose 3% of your Urea ***every day*** if conditions are dry and you're not using a stabilizer?

Thanks for sharing your soil test information. Do you add micronutrients to your fertilizer applications? We want to be sure we are capitalizing on the synergistic relationships between nutrients that can help you to maximize yield potential.

I see your Nutrient Management Plan calls for 100 lbs of nitrogen fertilizer. Are you looking to split apply the fertilizer to reduce early season losses and ensure nitrogen availability in later growth stages?

During my site visit I noticed the lower leaves of your corn have an inverted "V." That's a sign of nitrogen deficiency and could impact kernel fill and yield. What Rate and Timing decisions are you taking in order to manage late season nitrogen needs?

Love seeing your cover crop! How are you quantifying the nitrogen fertility contributions from this cover? Have you thought about Nitrogen Modeling to help fine-tune nitrogen rates?

4R BMPs to reduce potential losses from supplemental fertilizer nitrogen

	Rate	Source	Time	Place
At Planting Nitrogen			✓	✓
Split Applications	✓		✓	
Precision Ag Technologies	✓			
Nitrogen Stabilizers		✓		
Soil Structure & Drainage			✓	✓
Adaptive Management – PSNT, N Modeling		✓		
Agronomic Principles	✓	✓	✓	

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Nitrogen Loss Pathways

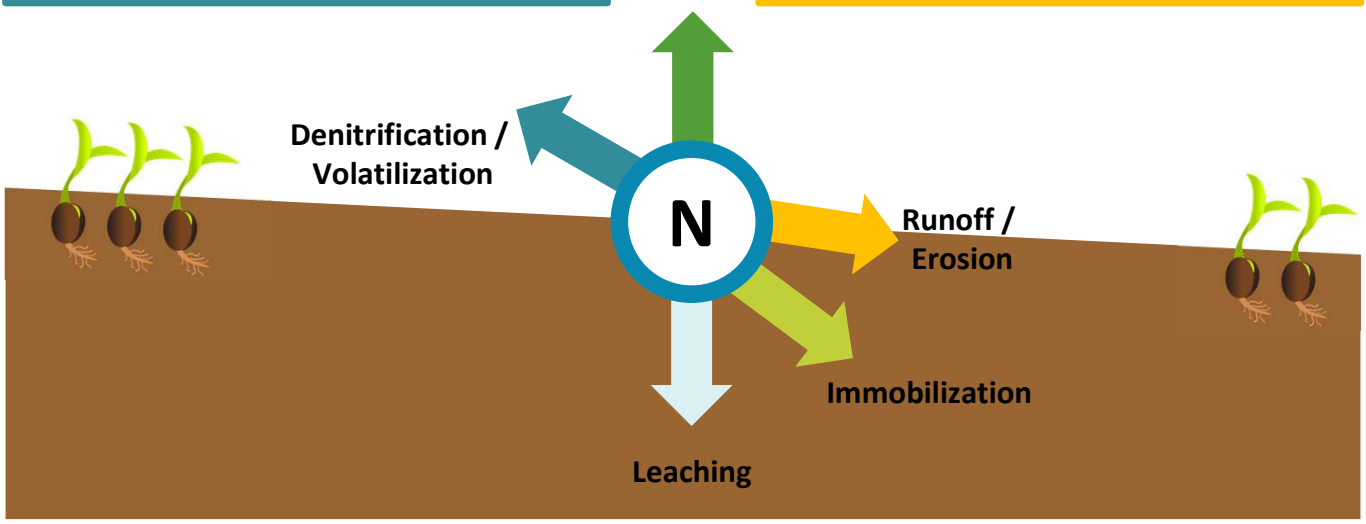
N Loss is Site Specific and impacted by:

- Rainfall timing, amount and intensity
- Soil Nitrate Levels
- Soil Water Holding Capacity
- Soil Conditions – compaction, % clay/silt/sand, current soil moisture, etc.
- Manure Characteristics
- Manure Application Management
- Residue Management
- Presence of Cover Crop & Living Roots

We worry about ***Volatilization*** *losses* when…
- Manure and Urea nitrogen fertilizers are surface applied
- Nitrogen sources are surface applied

We worry about ***Denitrification*** losses when…
- Water-filled pore space exceeds 60%

We worry about ***Erosion & Runoff*** *losses* when…
- Soils have low infiltration rates
- Surface applications of manure and fertilizer are made on unprotected soils
- Conservation plans are not implemented for appropriate rainfall intensity



We worry about ***Leaching*** *losses* when…
- Mineralization and nitrification occur outside of peak uptake periods
- Manures are applied to "bare" soils in fall or early spring
- There is not active root uptake of nutrients

We worry about ***Immobilization*** *losses* when…
- Manure with significant bedding is applied
- High Carbon:Nitrogen ratio crop residues or cover crops are present
- Nitrogen fertilizers are applied in any of the above situations

- On average, 50% of total applied nitrogen is lost through one of these pathways
- Pathway of concern will change from year to year, and within a year