2024 NREC Funded Research Projects
See the end of this document for objectives for newly funded projects

Project Title	Institution	Principal Investigator	2024 Project Budget
New for 2024			
Beyond cereal rye: evaluating synergies and tradeoffs of winter legumes and brassica cover cropping systems in Illinois	UI	Preza Fontes	$ 78,774
The implementation of innovative practices for dry dams/WASCoBs to address water quality concerns in southern Illinois row-crop agricultures	SIU	Schoonover	$ 136,378
Evaluating the impacts of fall-applied controlled-release N fertilizer on N use efficiency, soil water quality, GHG emissions, and grain yield in a strip-till corn cropping system	UI	Preza Fontes	$ 47,064
Impact of timing of cover crop termination on water quality and soil N and P: Phase two of a long-term cover crop and tillage study in southern Illinois	SIU	Williard	$ 169,074
Enhancing cover crop establishment and spring decomposition to benefit no-till corn/soybean production	UI	Below	$ 158,022
Ongoing projects			
Quantifying the effects of tillage, fertilizer placement, and winter cover crops on nutrient losses via soil macropore flow	UI	Yu	$ 129,934
On-farm and farmer-led: quantifying nutrient use efficiencies and contextualizing nutrient losses in corn-soybean production	UI	Margenot	$ 14,248
Assessing Diverse Crops for N and P Efficiency, C Sequestration, and Economic Impact on Illinois Crop Rotation	ISU	Ryhkerd	$ 152,421
A missing piece of the Illinois phosphorus puzzle: quantifying statewide streambank erosion in inform effective nutrient loss reduction strategy	UI	Margenot	$ 281,138
Updating Illinois phosphorus and potassium soil test recommendations for the 21st century	UI	Margenot	$ 149,707
Assessing Illinois WASCoB's - water quality, legacy P and sediment trapping	SIU	Schoonover	$ 116,624
Double-Dipping P Loss Reductions: Integrating and stacking struvite in P BMP's	UI	Margenot	$ 159,909

Improve the N rate calculator and MRTN for Illinois farmers by leveraging NREC historical N trials and new computing tools	UI	Guan	$ 113,078
Evaluating streambank and in-stream erosion as a source of P and sediment in two agricultural watersheds	SIU	Schoonover	$ 144,303
Integrating livestock grazing into the western Illinois corn-soybean cropping system to enhance farm profitability and reduce nutrient loss	WIU	Bernards	S 63,337
Reducing Nutrient Loads in WASCOBs in Southern Illinois	UI	Yu	$ 121,788
Managing the maize microbiome for sustainable nutrient retention in Illinois agricultural soils	UI	Kent	$ 263,927
Precision Nitrogen Management of Corn for Improving Farm Profitability and Water Quality in Southern Illinois	SIU	Sadeghpour	$ 44,974
Next Generation Cover Cropping in Corn-Soybean Rotation to Improve Farm Benefits and Decrease Environmental Losses in South and Central Illinois	SIU	Sadeghpour	$ 211,141
C-S rotation with wheat to improve water quality, etc.	SIU	Sadeghpour	$ 181,565
Capitalizing on 150 Years of Soil Samples to Determine Legacy P and Improve Water Quality in Illinois	UI	Margenot	$ 194,507
Nitrogen Rate Research & NREC Project Partnership	IFCA	Schaefer	$ 373,212
Integrating tillage, soil carbon dynamics, and tile nitrate loss (Eric Miller)	UI	Yu	$ 265,146
A Long-term Evaluation of Nitrogen Application Timing and Cover Crops Impacts on the Fate and Availability of Nitrogen Fertilizer and Crop Production on Tile Drained Fields	Purdue	Armstrong	$ 175,488
The effect of cover crops on surface water quality: A paired watershed experiment in the Lake Bloomington watershed	Purdue	Armstrong	$ 204,925
Evaluating nutrient loss reduction strategies: longer rotation with cover crops and bioreactor (Miller Project)	UI	Yu	$ 172,842

Project Objectives of Newly Funded Projects

Beyond cereal rye: evaluating synergies and tradeoffs of winter legumes and brassica cover cropping systems in Illinois	UI	Preza Fontes

Objectives:

1. Generate robust information for Illinois producers on cover crop management and simultaneously generate the data needed for the Illinois Nutrient Loss Reduction Strategy to add/update the effectiveness and potential reduction in nutrient losses by cover crop species beyond cereal rye.
2. Assess the effects of cover crop species on tile drainage nutrient losses (e.g., grass, legume, and legume/brassica blend).
3. Evaluate the effects of cover crop species on crop nutrient uptake and grain yield.
4. Evaluate whether cover crop species reduce nitrate leaching but increase N2O emissions.
5. Determine the impact of cover crop species on farm profitability and economic risks,

relative to no cover crop cropping systems.
6. Communicate results to agricultural community stakeholders through field days and extension outlets.

The implementation of innovative practices for dry dams/WASCoBs to address water quality concerns in southern Illinois row-crop agriculture	SIU	Schoonover

Objectives:

1. Evaluate four WASCoB treatments compared to the control based on their performance in reducing nitrogen, phosphorus, and sediment loads.
2. Determine the impacts of the various WASCoB treatments on corn and soybean yields.
3. Evaluate the economic benefit of each innovative WASCoB design, including environmental benefit and yield impacts.

Evaluating the impacts of fall-applied controlled-release N fertilizer on N use efficiency, soil water quality, GHG emissions, and grain yield in a strip-till corn cropping system	UI	Preza Fontes

Objectives:

1. Evaluate the agronomic traits and grain yield and quality responses of corn to fall-applied controlled-release N fertilizer (CRNF) versus anhydrous NH_3 strip-till banded.
2. Investigate the effects of fall-applied CRNF on soil GHG emissions relative to anhydrous NH_3.
3. Assess the impacts of fall-applied CRNF on soil water quality associated with nutrient loss compared to anhydrous NH_3.
4. Determine whether fall-applied CRNF in a subsurface band can economically replace and lower the economic optimum N rate and improve N use efficiency compared to anhydrous NH_3.
5. Communicate results to agricultural community stakeholders through field days and extension events.

Impact of timing of cover crop termination on water quality and soil N and P: Phase two of a long-term cover crop and tillage study in southern Illinois	SIU	Williard

Objectives:

1. Determine the nitrate-N and phosphate-P leaching and N_20 emission in no-till hairy vetch rotation with different termination times.
2. Evaluate the hairy vetch biomass and nutrient composition with respect to the termination date and its impact on corn grain yield, soil N and P content, and the potential N credit.
3. Determine the effect of hairy vetch termination timing on weed suppression.
4. Evaluate the effect of cover crops and tillage on nitrate-N and phosphate-P leaching and N_20 emission in a corn-soybean rotation.
5. Determine the cash crop yield and soil N and P removal with different cover crop and tillage rotations.
6. Evaluate the impact of cover crops and tillage practices on weed suppression during the cover crop seasons.
7. Evaluate the impact of cover crops and tillage on improving soil properties.

Enhancing cover crop establishment and spring decomposition to benefit no-till corn/soybean production	UI	Below

Objectives:

1. Improve fall cover crop establishment with mechanical management of corn stover at harvest prior to cover crop seeding.
2. Utilize spring management practices to enhance cover crop decomposition during the season to optimize mineralization of captured nutrients for use by the currently-established corn or soybean crop.
3. Mitigate the residue yield penalty associated with high-biomass generating production systems, improving economic and environmental benefits when cover crops are incorporated into grower rotations.
4. Identify secondary benefits of cover crops for carbon sequestration potential and improved soil quality by tracking long-term changes in soil nutrient and carbon levels at varying depths of the topsoil.
5. Communicate results in mid-year reports, presentations and the University of Illinois Crop Physiology Field Day and ASA meetings, and online at the Crop Physiology Laboratory website.