



**February 10, 2021**

NREC Research Committee Meeting Minutes  
Held via Zoom

Committee Members Present: Ed Corrigan, Jeff Kirwan, Jenny Mennenga, Don Guinnip, Trevor Sample, Michael Ganschow, David Droste, Robert Mullen, Cindy Skrukruud, Chuck Cawley, German Bollero, Matt Duncan, Dirk Rice, David Wessel

Staff Present: Julie Hewitt, Shani Golovay

Others attending: Liz Hobart, Raelynn Parmley

Meeting was called to order by committee chairperson Ed Corrigan at 10:04 a.m. and the meeting agenda and purpose were reviewed.

Chairman Corrigan asked for a review and approval of minutes. Chuck Cawley requested an update to correct the spelling of Austin Omer's name. Minutes were approved as amended with a motion by Jeff Kirwan and a second by Robert Mullen.

Research Manager update was given by Dr. Shani Golovay. She provided an update on the 2021 Annual Report and indicated that it was almost complete and that we plan to publish online and print a small quantity for stakeholders. A video report will also be created. Dr. Golovay also reviewed the project status for our current project. That report is included as Attachment A.

Giovani Preza-Fontes and Dr. Laura Christianson provided a report on the NREC funded project - *"Assessing synergies and tradeoffs of recommended BMP's to reduce nutrient loss"*.

Following the presentation, Dr. Christianson reviewed the status of the Dudley Smith farm and the movement from a continuous corn to C/S rotation. She asked for input from the group and Don Guinnip included a request to include wheat into the rotation and/or as a cover crop. Dr. Christianson thanked the group for their willingness to fund long term studies and pointed out that there are limited opportunities to do these types of projects.

Julie Hewitt and Shani Golovay reviewed the stakeholder survey results. This report is included as "Attachment B". Beyond the comments provided by survey participants, the committee added input around the need for more outreach and education, the importance of Carbon, the utilization of other nutrients to increase efficiencies, and additional research just beyond the rate of nitrogen, and the role of legacy phosphorus in streambanks.

The committee reviewed the 2020/2021 RFP to determine what still applies and what items need to be added/changed. The updated RFP priorities are included as "Attachment C". Matt Duncan suggested

that staff create a standard statement regarding the funding of biologicals and other proprietary products. The committee also held significant discussion regarding the need for carbon data and an analysis of the existing data. The committee opted to not directly include a call for carbon research projects but to utilize the existing data. Shani will finish the RFP and send to researchers and stakeholders in the next week.

Jeff Kirwan moved and Dirk Rice seconded a motion to adjourn the meeting at 1:40 p.m.

# 2020 End of Year Research Update

## Cover Crops

### Armstrong “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.”

Goals: Utilize  $^{15}\text{N}$  methods to identify whether cover crops primarily take up soil or fertilizer N. Utilize  $^{15}\text{N}$  methods to determine the synchrony of the timing and quantity of cover crop residue N release and corn and soybean N demand.

#### Progress

- Significant increase in corn yield following cereal adoption due to additional nitrogen fertilizer added at the V10 growth stage using YDrop technology was reported.
- On average, approximately 60 lbs A<sup>1</sup> of N is scavenged in the cereal rye above ground biomass and only 10% of that biomass N is used by the subsequent cash crop, leaving the corn N deficient, according to the  $^{15}\text{N}$  research findings.
- A reduction in N uptake for corn planted in cereal rye residue was observed as the plant was transitioning into reproduction growth.
- This leads to recommendations of late applications of fertilizer N in addition to sidedress at the V6 growth stage. It was assumed that soil derived N would satisfy the N demanded of the plant at V6, but **shifting the sidedress N from V6 to V10, resulted in a reduction of N uptake and yield.**
- Significant increase in corn yield following cereal adoption was due to additional nitrogen fertilizer added at the V10 growth stage using YDrop technology.
- Another significant finding is that 30% more fertilizer N was applied to the Adaptive 2 treatment (Fall 120lbs/A + 5 lbs starter + 85lbs sidedress @ V6 + 5lbs Y drop at V8 = **285lbs total**) relative to the non-Cereal Rye Regional Control (Fall 120lbs/A + 100lbs @ sidedress V6), yet the Adaptive 2 treatment resulted in **38% less N lost via tile drainage**, which was similar to the other cereal rye treatments.
- This finding suggests that **growing cereal rye in the fallow period generates a larger capacity for fertilizer to be applied without the result of greater nitrate loss via tile drainage.**

## 2020 Issues

Delay in sample analysis due to significant malfunction of laboratory instrument, but the issues are being resolved and full execution will occur through the no cost extension.

## **Armstrong: “The Effect of Cover Crops on Surface Water Quality: A Paired Watershed.”**

### Progress:

- Cover cropping reduces overall nitrate loss
- Cover cropping provides resistance to variable weather conditions. The cover crops acted as a buffer that stabilized nutrient loss in a particularly wet spring of 2019

## 2020 Issues

More data will be forthcoming from Shalamar as he evaluates the data and begins to add Phosphorus to the analysis.

## **Gentry: “Cereal Rye Ahead of Corn”**

Goals: to learn how to best manage cereal rye as a winter cover crop before corn in either a corn/soybean rotation or in continuous corn.

### Progress:

- They found with cereal rye ahead of corn that it is very effective to front load all the fertilizer N in the early spring to overcome the reduction in plant available N early in crop development.
- They successfully no-till planted soybean into standing cereal rye (approximately 2 tons/A of above ground biomass) and have had excellent yields and better weed control.
- They reported a corn yield loss (6%) when cereal rye biomass was greater than 0.5 tons/A, and when corn planting is within 2 weeks of cover crop termination.
- Using data from two other Gentry on-farm NREC studies, they found a significant decrease in tile nitrate whenever at least 0.5 tons/A of cereal rye biomass is produced. (Featured in Gentry’s Agronomy Day Talk and ASA Poster)
- To get both a tile nitrate reduction and little interference to the subsequent crop, the safe zone or Goldilocks zone for cereal rye biomass is 0.25 tons/A ahead of soybean but ahead of corn the aim may be to only attain 0.5 tons/A of cereal rye biomass (allowing at least 2 weeks between termination and corn planting).

## 2020 Issues

Granted a no-cost extension to analyze and summarize all data generated. Soil inorganic N data collected at corn planting and at V7 corn growth stage each year has not been statistically analyzed at both research sites.

## **Gentry “Evaluating Nutrient Loss Reduction Strategies: Longer rotation with cover crops and bioreactor.”**

**Goals:** Test the effectiveness of a longer rotation with cover crops in combination with a bioreactor to decrease tile nitrate loss and directly examine this potential nutrient loss reduction scenario on a field-scale production system.

## 2020 progress

- It is clear that the longer rotation and the presence of cover crops limit nitrate losses as compared with the control treatment (corn-soybean).
- Wheat in the rotation has a dramatic effect on reducing tile nitrate loss as well as taking up mineralized N following soybean.
- This research documents the dramatic reduction in tile nitrate concentration and load that is possible under row crop agricultural production.

## 2020 Issues

The bioreactors are still not performing to expectations and less than what has been reported in popular press and journal articles.

This needs to be addressed going forward.

## **Kaiyu Guan, Wang Zhou, and Ziqi Qin “Assessing Suitability and Benefits of Cover Crops in Illinois.”**

**Goals:** to assess the impact of cover crops at the regional scale for the State of Illinois using a computer model that analyzes weather, agronomic and economic impacts on cover crop use.

## Progress:

- They have finished calibrating and validating the model. They can simulate yield and cover crop impact
- With the good performance of site-scale cover crop biomass simulation and regional-scale crop yield simulation, they will test the suitability of cover crops:
  - in the current and future climate conditions to answer where, when and

- how cover crops will be suitable,
- assess the potential benefits of cover crop and
  - quantify the model uncertainty in the next year.

No 2020 Issues to report

## Seiter “ Insect Management in Cover Crop Systems.”

Goal: to inform pest management recommendations in cover crop systems in Illinois by assessing pest and beneficial insect populations in rye as well as termination timing effects.

### 2020 Progress

- Similar to the first year of observations, we continue to see a low overall risk of damaging insect infestations in soybean following a rye cover crop.
- While certain insect pests were more likely to be found in fields that had a rye cover crop, no economic damage was observed.
- While there are certain insect pests (including armyworms) that are more abundant in fields that follow a rye cover crop, results after completing two of three planned years of research indicate that economic damage from insect pests in rye cover fields is infrequent

### 2020 Issues

They were fortunate to suffer limited pandemic related setbacks in the scheme of things; while there were a variety of inconveniences associated with distancing requirements, etc, overall they were able to maintain progress with only slight delays.

## Williard, “Minimizing Phosphorus and Nitrogen Loss from Agricultural Systems with Cover Crops and Tillage in Southern Illinois.”

Goals: to assess the long-term impact of cover crops under conventional tillage and no tillage on nutrient leaching

### 2020 Progress:

- Cover crop rotations cereal rye-soybean-hairy vetch-corn and cereal rye-soybean-oats/radish-corn exhibited 82% and 68% less nitrate leaching, respectively, compared to the no cover crop rotations.
- Phosphate leaching was significantly higher in rotations under conventional tillage compared to the no-till plots.
- The greatest phosphate leaching was observed in no cover crop plots under conventional tillage, which was 66% higher than the no cover crop plots under no-till.
- At the watershed scale, cover crops reduced total suspended sediment (TSS) loads in stream water by 46% and streamflow volume by 51% compared to the expected pre-treatment condition (no cover crop).
- These findings indicate that cover crops reduced erosion by providing dormant season ground cover and reduced runoff by increased evapotranspiration and soil infiltration rates.

## 2020 Issues

The 2020 soybean season received less than typical rainfall. Therefore, the number of soil water sampling events for the year was comparatively lower.

## 4-R

**Below, Fred “Nitrogen placement and application timing for best efficiency, growth, and yield of corn across Illinois.**

Goals: Maximize nitrogen use efficiency of corn in Illinois through optimum fertilizer placement, rates, and timing while maintaining or increasing grain yield and limiting N loss to the environment.

## 2020 progress

- Collectively these data show that **concentrating N near the crop row (i.e) banding can increase grain yield and N removal, while limiting N loss to the environment.**

Data collected thus far supports the hypothesis that

- concentrating N fertilizer belowground near the crop row (i.e. banding) can increase grain yield and N removal, while limiting N loss to the environment.
- While some interaction between optimal initial N rate and placement of N was observed in grain yield, this study will need to be repeated in more environments before determining the optimal rates for each placement method.

## 2020 Issues

Two field sites have experienced severe weather conditions including a drought resulting in poor pollination and yield loss at Champaign in 2019 and severe wind damage at Yorkville in 2020.

They plan to be done on time with this project.

## **Gentry “ Nitrogen Management Systems in tile-drained fields (Douglas County).”**

Goals: to improve our understanding of split N application systems on corn yields and nitrate losses from tile-drained fields in Illinois and to determine when and why tile nitrate losses occur in these management systems.

## 2020 progress

An important finding is that the leaching of nitrate from soil mineralization contributes nearly 50% to the tile nitrate load, which explains an important source of tile nitrate following soybean production.

Therefore, tile nitrate is not simply a matter of excessive N fertilization.

## 2020 Issues

Granted a no-cost extension to analyze and summarize all data generated. This study along with support from an FFAR grant has generated an enormous amount of data.

## **Kent & Yang: “Towards Management of Dissimilatory Nitrate Reduction to Ammonium for Nitrate Retention.”**

Goals: “to improve understanding about the importance of and controls on DNRA in Illinois agricultural soil by quantifying drivers of DNRA rates across agricultural management treatments, identifying controls on DNRA gene expression in soil microbial communities, and assess identified drivers to more accurately evaluate the combined effects of soil.”

## 2020 progress

- Meaningful DNRA activity was observed at soil moisture levels low enough so that oxygen prevents denitrification.
- This suggests that **DNRA may act as an alternative nitrate reduction pathway when reduction via denitrification has been inhibited by the presence of oxygen.**
- Meanwhile, at higher soil moistures where oxygen diffusion is inhibited and nitrate transport is promoted, we observed the cooccurrence of denitrification and DNRA.
- These findings thus far demonstrate that DNRA can occur **both** within the conventionally recognized reducing conditions characteristic of saturated soils—such as during the **early growing season**—and also within the substantially drier soils characteristic of the **late growing season**.
- DNRA activity can be attributed to gene expression, rather than gene abundance at the DNA level.
- Significantly different microbial communities were expressing *nrfA*, the gene responsible for DNRA, across the moisture gradient.
- These findings suggest that the distinct microbial community that is ‘activated’ under drier conditions is responsible for DNRA’s ability to persist at soil moistures low enough to inhibit denitrification. In addition, sequences representing a novel group of DNRA organisms were detected in samples ranging the full moisture gradient.

### 2020 Issues

In summer and fall, they experienced difficulties sourcing reagents for planned molecular work as a result of the temporary shortages caused by COVID19.

Supplies have now been replenished and the expression work has resumed

### **Sadeghpour & McGrath “Precision nitrogen management for improving farm profitability and water quality in southern Illinois.”**

**Goal:** To generate an algorithm for Illinois farmers, as well as provide them with improved conventional nitrogen recommendations. In addition, to evaluate the precision and accuracy of existing commercially and publicly available nitrogen recommendation systems to help farmers make informed decisions regarding nitrogen management.

### 2020 Progress

- This research has generated an extensive and robust dataset with fine resolution nitrogen response data.
- The current response database has in excess of 10,000 datapoints.
- Starting in January of 2021 they will use this yield response data, combined with other field data -- including soil characteristics, topography, and in-season canopy NDVI, to generate algorithms for use with active sensors to guide variable rate or flat rate N recommendations.
- In addition, they will compare existing standard recommendation systems from the land grant universities against this data set.
- They anticipate testing potential algorithms during the 2021 growing season.

### 2020 Issues

They could only fly one trial in KY but not in IL. Sadeghpour's lab has purchased a drone with camera (startup package) and a new postdoc joining that lab who is going to be trained to fly the trials to collect UAV data as proposed.

They have requested a no-cost extension for this project.

They still have to compensate growers for using their land and also run >1500 soil samples collected from the trials.

### **IFCA "Nitrogen Rate Research & NREC Project Partnership."**

Goals: This project provides support, coordination and implementation of protocol treatments for the Nitrogen Rate trial and also for Douglas and Piatt County projects reported by Lowell Gentry.

### 2020 Progress

- The research this year continues to reinforce the validity of the "range" of nitrogen rates that can achieve maximum return to nitrogen for a grower;
- This year more N was needed in some of the trials but when included in the dataset, the updated ranges continue to provide growers flexibility while reinforcing the message that adding more than the recommended rate of N is not advised for either agronomic or environmental reasons.

### 2020 Issues

The 2020 growing season was a difficult one in that we experienced heavy rains throughout the state around planting time.

This created a scenario where many cooperating growers had to decide whether or not to replant, or possibly even switch from corn to beans in specific fields depending on how long they needed to wait for the ground to be fit to plant into.

Rain affecting grower decisions was the major factor in the program losing particular trials in specific geographic regions

## Edge of Field

### Bhattarai: "Watershed scale response of agricultural systems to drainage water management in Central Illinois"

**Goal:** To observe and communicate new information about the watershed scale effects of drainage water management (DWM) on water and nitrogen (N) losses, and crop production in Central Illinois.

#### 2020 Progress

- They started the baseline data collection this summer as water samples were being collected from the subsurface drainage and the stream.

#### 2020 Issues:

They estimate that an additional nine (9) months to one (1) year of baseline data collection would be highly beneficial to the efficacy of this research.

In the first year of the project, they realized project delays due to a shortage of local farmers willing and able to participate in a research project of this scale.

They aim to complete the project on-budget. However, they will be requesting one (1) year extension on the project to meet the project objectives due to the delay in identifying the potential project site in the year 2019 and due to COVID-19 related delays in instrumentation and data collection.

### Bhattarai: "Assessing tile depth and spacing impact on nutrient losses and crop production."

**Goals:** Produce and communicate new information on best practices for balancing drainage depth and spacing, water quality, and crop production goals in Illinois.

#### 2020 Progress:

- Preliminary analysis of observed drainage flow at CF site showed **higher drainage flow in plots with closely spaced laterals.**
- The plots with **shallow drain depth of 2.5 ft found to have less drainage flow compared to plots with drain depth of 3.5 ft.**
- At the LF site, the drainage flow found higher in plots with wider drain spacing and **4-inch laterals.**

\*No 2020 Issues to report

## **Laura Christianson, Richard Cook and Paul Davidson University of Illinois. “ Drainage Water Management and Saturated Buffers for Achieving NLRs Goals.**

**Goals:** Monitor and perform an economic evaluation of Drainage Water Management (DWM) and Saturated Buffer practices (\$ per acre treated and \$ per pound of nitrogen removed). Evaluate if these practices should be added to the IL NLRs. And if so, DONE for saturated buffers: Develop an appropriate N loss reduction value to add to the NLRs tables.

DONE: Develop a procedure and seek approval for adding saturated buffers to the NLRs.

DONE: Perform an economic evaluation of saturated buffer practices (\$ per acre treated and \$ per pound of nitrogen removed).

- The most significant achievement this past year has been the data analysis and summarization of the performance of seven saturated buffer site-years (three sites) in Illinois. This data summary was submitted to Dr. Shani Golovay and included in the NREC proposal to add saturated buffers as a recommended practice in the Illinois Nutrient Loss Reduction Strategy.
- Preliminary data shows a significant difference in % N loss reduction across the seven site-years. Total mass diverted into the saturated buffers from all the site-years and total mass removed by the Saturated Buffers from all the site-years again resulted in a significant difference in %N load reduction practice efficiency.
- They are eagerly anticipating the roll-out of the new saturated buffer model at outreach events in 2021. They intend to create an extension program (including factsheet) around this model.

\*No Issues to Report

## **Laura Christianson and Richard Cooke University of Illinois “ Bioreactors for Illinois: Smaller, Better, Faster.”**

Goals: This work was to test novel full-size bioreactor designs intended to maximize nitrogen removal from drainage water while limiting land removed from production.

2020 Progress:

- Results from the Monmouth Research and Education Center high-flow booster bioreactor presented in November 2020 indicated the paired bioreactors treated 87% of the total drainage from the field over the first three years of monitoring. This was notable considering their large drainage treatment area of nearly 80 acres.
- The ultimate N loss reduction provided by the paired bioreactors was on par with more conventionally designed bioreactors at  $\approx 25\%$ , except in 2019 which was a very wet year (only 8% N loss reduction).

Issues for 2021

They have requested a No Cost Extension for 1-year which would extend the project end date to 30 Jan 2022. As long as funds remain, it seems prudent to continue monitoring to collect as many site-years of N-removal performance as possible, especially given some advances and new added-value studies at some of the sites.

**Richard Cooke, Olawale Oladeji, and Rabin Bhattarai University of Illinois “On-Farm Evaluation and Demonstration of Reduced Off-Farm Nutrient Transport through Drainage Water Recycling.”**

Goals: To evaluate and demonstrate drainage water recycling as an effective management practice that optimizes crop yield at reduced fertilizer application, enhances nutrient use efficiency by crops, and reduces nutrient (N and P) export to riverine water.

2020 Progress:

- The replicated systems at both sites provided an opportunity to examine the persistence of land disturbance. The variability between the 2-acre plots on the South Farm in Champaign County was more pronounced than that between the 5-acre plots at Fulton County. However, the instability due to the disturbance caused by the installation did not persist beyond the first year at either site.

- Based on the results from both sites, there is an apparent transient drainage system response for the first year after installation. Therefore, we would caution the use of data from the first year after the installation of a drainage system. Yield data from this year indicated a significant drop in yield from the plots on which fertilizer was applied at half the recommended rate. Irrigation increased crop yield on the plot on which fertilizer was applied at the agronomic rate.

#### Issues in 2020:

Covid delayed the arrival of irrigation pumps so they were only able to start irrigating in the first week of August, after the growing stage that would most benefit from it. However, they were able to learn valuable information about the effect of fertilizer amount, but not about the combination of fertilizer amount and Irrigation.

### **Schoonover “Modelling and Designing Saturated Buffers for Nitrogen and Phosphorus Mitigation in Illinois.”**

Goals: Design, install, and monitor a saturated buffer implementing a new pitchfork design equipped with backflow check valves to test the impact on water quality (nitrogen and phosphorus) and quantity reaching the tile outlet and compare results to a standard buffer in the same field.

#### 2020 Progress

- Preliminary data suggests that the **backflow valve is critical in saturated buffer function at high flows** . The pitchfork buffer and standard buffer are both contributing to the dispersion lines (i.e. water flowing away from control structure).
- The research by the SIU Watershed Science team has found that the **pitchfork buffer has outperformed the standard buffer during storm events** by removing incoming tile flow and thereby decreasing NO<sub>3</sub>N and DRP loads.
- The success of the pitchfork design is attributed to the **backflow check valve** that is not part of the NRCS Saturated Buffer (Code 604) practice standard. The check valve in the design has been a crucial part of a working system on our research site. **It prevents the dispersion line from serving as a tile line during wet conditions.**
- Most of the NO<sub>3</sub>-N and DRP load reductions are occurring during storm events. The most positive highlight is the reduction of NO<sub>3</sub>N input loads by ~65%.
- Data was sent to Dr. Shani Golovay with NREC for the inclusion in the NREC proposal for Saturated Buffers in Dec of 2020.

## 2020 Issues

In 2020 weather has still been the greatest challenge with this research project. This year saw fewer storm events, and therefore fewer sampling events.

Furthermore, the ISCO samplers occasionally produced errors, limiting the data obtained from storm events.

## Phosphorus

### Yuji Arai “Understanding Mechanisms and Processes of Dissolved Reactive Phosphate (DRP) Loss in Illinois Tile Drained Fields”

Goals: Evaluate factors influencing the seasonal distribution and movement of Dissolved Reactive Phosphorus (DRP) in tile drainage systems.

#### Progress

- **High levels of P are contributing to the subsurface P loss** The release of phosphate was highest from surface soils and sharply decreased with increasing depth .
- The accumulation of mobile (Iron)Fe colloids increased with increasing depth. These colloids acted as a carrier for both phosphate and organic P from surface soils to tile line, especially during high flow events. Therefore, subsurface loss of P should not be neglected when developing the strategy to reduce the agricultural P loss in the Gulf of Mexico.

## 2020 Issues

They had some issues with analytical lab accessibility so there are some delays with final data analysis and they have requested a no cost extension.

### Christianson, Reid “Reducing P Loss in Southern Illinois: Producers, Practices, and Productivity.”

Goal: evaluate, refine, and promote both recommended and novel practices to reduce phosphorus (P) losses in unglaciated areas of Illinois. The practices under evaluation are no-till/conservation tillage, cover crops, and edge-of-field P filters.

#### 2020 Progress:

- Phosphorus losses in runoff from the cover crop freezing study showed an increasing trend with freezing severity. Light freezing and rainfall intensity had little impact on phosphorus losses through runoff.
- The first round of soil test phosphorus at the Ewing Demonstration Center showed **high spatial variability across the plots**, indicating there are likely **no pre-project biases among treatments**.

- Further, indications are that soil phosphorus concentrations show classic increases as we approach the toe slope due to soil movement down the hill.
- Initial design of the edge-of-field P filter has been done with an expected capacity of ~28,000 gallons per hour. Materials tested in the lab may be replaced with materials tested by the USDA ARS in Indiana to ensure performance. Discussions with ARS will ensue in the spring of 2021, if warranted.

## **2020 Issues**

The previous delay of installation of runoff monitoring at the Ewing Demonstration Center due to weather conditions was overcome in Fall 2019 with the completion of monitoring equipment. COVID related delays occurred throughout 2020. The full extent is still being assessed, though limited travel to the Ewing Demonstration Center resulted in backlogged maintenance of runoff monitoring maintenance. As before, all other facets of the project are on schedule.

Though they are on-budget financially, they are one full year behind on Objective 1 of 6 (surface runoff monitoring at the Ewing Demonstration Center).

## **Margenot “Evaluating Slow Release P fertilizers to increase crop production and environmental quality.”**

### **Goal:**

Determine optimum formulations of slow-release P for testing agronomic and environmental potential under field conditions while measuring P availability, loss and crop performance in the field.

### **2020 Progress:**

- Struvite alone was unable to maintain early season (i.e., vegetative) crop growth, but blends of struvite with highly water soluble MAP support similar biomass and P uptake as MAP only.
- MAP blends (25–50% struvite) appear to lower soluble P loss risk compared to MAP without restricting early season (vegetative) growth of maize and soybean, and this can differ by crop species.
- Adding struvite on the same P basis as highly water soluble P fertilizers can decrease soil test P levels and water soluble soil P, indicating it can be used to maintain yields but decrease residual soil test P values.

- 4 publications and 2 more submitted.

No 2020 issues to report beyond data analysis being a bit behind but will be caught up by planting 2021.

## Williard “Water Quality and agronomic impacts of gypsum applications in Southern Illinois.

**Goal:** to evaluate different application rates of flue gas desulfurization (FGD) gypsum for reducing P losses in surface runoff and to determine the impact of FGD gypsum applications on crop production

### 2020 Progress

- Gypsum, lime, and sulfur treatments did not significantly impact corn or soybean grain yields in 2019 or 2020, respectively.
- Gypsum applications resulted in lower dissolved reactive phosphate (DRP) and total phosphorus (TP) concentrations and loads in surface runoff compared to control in the initial post-gypsum application period (Dec. 2, 2018- May 2, 2019; n = 15 storm events).
- In the post-P fertilization period from May 2019 through December 2020, none of the gypsum treatments had lower DRP or TP concentrations or loads in surface runoff than the control flumes.
- This finding suggests that the applied P fertilizer overwhelmed any remaining P abatement effect of the gypsum in high P soils.
- Gypsum applications did not result in any significant increases in heavy metal concentrations in soil or runoff.
- Overall, FGD gypsum appeared to be an effective phosphorus abatement tool for southern Illinois soils to improve water quality. However, its effectiveness over the long term appears to be in question given the results in the post P fertilization period.

## 2020 Issues

In 2020, the surface runoff site received less precipitation than in 2019. Thus, fewer runoff events were collected.

Another challenge is that SIU Farms yield site is highly prone to water logging and yield damage from animals so yield data from the SIU Farms yield site was excluded from the analysis.

## **Zeng “ Designer Biochar to capture and recycle Phosphorus from Tile Drainage Systems.”**

Goals: To generate designer biochars to effectively capture phosphorus from subsurface tile drainage, recycle phosphorus captured biochars as a slow release fertilizer, and keep phosphorus in the closed agricultural loop.

### 2020 Progress

- They have manufactured designer biochar pellets and packed them into the P sorbing filters for a field experiment.
- They have built three biochar-sorption chambers and installed them in the MWRD field site in Fulton County to capture nutrient loss from drainage water.
- They have optimized the pyrolysis conditions to manufacture a designer biochar pellet for the field study.
- According to the field trial, the designer biochar pellet could capture dissolved phosphorus from subsurface drainage water.

### 2020 Issues

The dry weather resulted in no water flow in the subsurface drainage from July to December.

They will change the pellet strength to prevent their loss due to the drainage water flow and adjust the size of pellets to make sure that they won't block water flows and they will have a high removal efficiency to dissolved phosphorus.

They will use the remaining budget to cover the deficits.

## WASCOBS

Lowell Gentry, John Pike and Corey Mitchell University of Illinois “Reducing Nutrient Loads in WASCOBs in Southern Illinois.”

Goal: Quantify nutrient and sediment loads transported via water and sediment control basins (WASCOBs) and evaluate the effectiveness of conservation practices aimed at reducing soil erosion and nutrient loss. Water exiting pairs of WASCOBs are evaluated for one year under identical production practices and then a single treatment variable (such as tillage) is imparted across one of the two WASCOBs.

### 2020 Progress

- The first year of monitoring was used to develop a baseline comparison of water quality between the WASCOBs. In the second year, the effect of vertical tillage versus no-till was compared on nutrient and sediments exiting WASCOBs at two on-farm research sites.
- Preliminary data suggests that **no-till reduced total P concentrations and loads by approximately 50% compared to vertical tillage**. During high flow periods, total phosphorus concentrations predominantly consisted of organic P (particulate P). High particulate P concentrations were accompanied by high total suspended solids, indicating **soil erosion was the main source of P in drainage water** exiting the WASCOBs.
- There was also **evidence of fertilizer loss** (high nitrate, ammonium, chloride, and sulfate concentrations) via the WASCOBs **during the first heavy rain event following broadcast application of DAP**. This study will help quantify typical WASCOB nutrient and sediment loads under current production systems and determine techniques that reduce nutrient and sediment loss.

### 2020 Issues:

1 year behind on Bond County site, but it is up and running now.

Jon Schoonover Southern Illinois University “Water and Sediment Control Basins (WASCOBs) influence on Crop Yields and Water Quality near Atterberry, Illinois.”

Goals: Identify the benefits of Water and Sediment Control Basins on water quality, soil health, and crop yields. Two treatments were established at the site: 1.) WASCoB vs. No WASCoB (i.e., an ephemeral drain), and 2) Cover Crop vs. No Cover Crop.

2020 Progress:

- The research team has collected surface runoff water since the installation of the flumes and ISCO samplers. Water samples are analyzed NH<sub>4</sub>-N, Dissolved Reactive Phosphorus (DRP), Total Suspended Solids, and NO<sub>3</sub>-N.
- Preliminary data show higher mean values of nutrient and sediment concentrations in the ephemeral drain sub-watersheds compared to the WASCoB drained sub-watersheds. More storm events need to be collected to quantify impacts of the cover crop on water quality; however, preliminary data suggest that nutrients and sediment is lower in the cover crop watersheds.
- Data show average concentrations of NO<sub>3</sub>-N and NH<sub>4</sub>-N are lower in the WASCoBs than the ephemeral gully monitored in the East Flume. Total Phosphorus and DRP concentrations were also lower in the WASCoBs. The trend for TSS is consistent with the nutrients as well.

2020 Issues:

Delayed installation and then planting in 2019

2020 had less precipitation samples

Calibrating the ISCO due to distance from PI

Gully erosion occurred in 2020 and this reflected in the nutrient results

**Upcoming NREC projects:**

**Mark Bernards Graciela Andrango, Joel Gruver, John Nichols, Keela Trennepohl, and Roger Viadero Western Illinois University “Integrating livestock grazing into the western Illinois corn -soybean cropping system to enhance farm profitability and reduce nutrient loss.”**

Goal: To document the agronomic, economic and environmental impacts of increasing the duration of living vegetative cover and adding livestock grazing to a corn-soybean based cropping system.

The three cropping systems investigated will be:

- a corn-soybean control using standard practices for western Illinois,
- a continuous cover system including cash crops corn, soybean and a small grain and cover crop mixtures established between each cash crop to provide fall/winter/early spring grazing, and
- A perennial intermediate wheatgrass, Kernza®, that will be harvested for grain and grazed.

### 2020 Progress and Issues

They were only able to secure enough Kernza seed to establish two of the three plots.

Seed arrival was later than desired so planting was delayed to early October. They observed emergence but the stand is currently thin.

The third replication has been planted to triticale and will be frost-seeded with red clover in the late winter to establish a perennial cover.

They will harvest Kernza seed from the plots next summer and establish the third replication

### **Laura Christianson, Reid Christianson, and Richard Cooke University of Illinois “Knowledge is power: Powering up Bioreactors and Saturated Buffers.”**

SPRINGFIELD III. (Nov. 2, 2020) Dr. Laura Christianson with the University of Illinois was awarded a \$2.25 million grant from USDA, of which \$1.13 million was provided by partners to meet the 50% match requirement. (NREC) is providing a portion of the matching funds that helped make the grant possible.

### **Gentry & Margenot “Integrating Tillage, Soil Carbon Dynamics, and Tile Nitrate Loss.”**

## Goals:

To assess the benefits of C accounting and C trading to reward and offset conservation costs. Real world field data will be needed to calibrate and ultimately validate models used to assess C credits derived for C market. Outcomes from this work will inform producers with intensively tile drained fields of how to best manage their fields to enhance soil C, tighten the N cycle, and improve their bottom line.

## 2020 progress and Issues :

- Soybean plant and root biomass was collected for nutrient analyses prior to grain harvest. Treatments are in place and baseline soil sampling was conducted in November. AgriDrain structures are installed and fitted with a V-notch stoplog.
- There have been some delays with equipment shipping.

## Fratterigo “Characterizing subfield variability for efficient phosphorus management: targeting hotspots.”

### Goals

To advance the identification and understanding of the dynamics of P hotspots at a subfield scale.

### Progress and Issues

- They conducted preliminary surface soil sampling in 85 locations at the Douglas County Farm to determine Bray P content.
- Sampling of tile water and tile discharge measurement at the Douglas County Farm is ongoing and they have added lysimeters

- No issues to report

### **Kent: “Managing the Maize Microbiome”**

**Goals:** Can we achieve synergy between the plant and microbial functions such as N fixation, biological inhibition of nitrification and DNRA to potentially reduce the requirement for N fertilizer input.

#### 2020 Progress and Issues

- Currently growing plants in the greenhouse to generate two sets of testcross hybrids.
- No issues and progress is on track

### **Margenot “Capitalizing on 150 Years of Soil Samples to Determine Legacy P and Improve Water Quality in Illinois”**

**Goals:** To evaluate Illinois soil legacy P using archived soil samples collected as part of the epic national soil survey. These georeferenced soils date back to the late 1800s and therefore provide a unique opportunity to evaluate how agricultural management has altered P in soils across the state of Illinois over time.

#### Progress and Issues:

- Subsoil P supply power may be compromised by legacy P, which is why neighboring states of IA and WI have dropped this concept from their agronomic recommendations in the interpretation of soil test P. Based on insights from neighboring states, we strongly expect to find the subsoil P supply concept in Ch. 8 of the Illinois Agronomy Handbook in need of updating.
- Even though this project was funded to start on Oct 1, 2020, they are already ahead of schedule on the implementation of the project. Efforts began immediately on Oct 1 on the curation of archived soils for analyzing legacy P. This was enabled by leveraging \$75,000 in seed funding from the UIUC Student Sustainability Committee (award also to PI Margenot).
- No Issues to report

## Markus “Detection and attributes of recent changes in P loading in the Illinois River Watershed.”

**Goals:** to calculate P loads for the entire period of record at selected sites in the Illinois River watershed and to attribute riverine phosphorus loads to several explanatory variables, including pH, chloride, climate drivers, and point/nonpoint sources.

### 2020 Progress and Issues:

- Most phosphorus data sets needed for this study have been collected. The first step towards detecting changes in riverine phosphorus in the Illinois River was made by calculating annual loads at Valley City on the Illinois River.
- No issues and they have added an expert from USGS.

## Sadeghpour “Next Generation Cover Cropping in Corn-Soybean Rotation to Improve Farm Benefits and Decrease Environmental Losses in South and Central Illinois

**Goals:** evaluate the efficacy of precision cover crop management. Specifically, they will evaluate altering planting dates by interseeding and use precision planting of cover crops to skip the corn/soybean row – known as “skip row” planting and evaluate whether “skip row” allows for delayed termination of cover crop mixtures.

### 2020 Progress and Issues

- C:N ratios were higher in SippingThe-Corn-Row than normal planting in one out of three site-yrs (ARC2019) indicating greater chance of N immobilization when Cereal Rye was planted later than usual.
- Implementing Skipping - The- Corn- Row saved \$8.4 ha<sup>-1</sup> for growers and could incentivize growers to adopt this practice.
- Currently analyzing the corn response to SippingThe-Corn-Row compared with normal planting and assess if soil quality declines by STCR practice over time.
- They have published a paper based on their preliminary findings used to write the proposal.
- PostDoc and Master’s students were delayed but will arrive in May.

## Yu: “Sources and cycling of nitrate in tile-drained corn-soybean rotation systems: A stable isotope approach.”

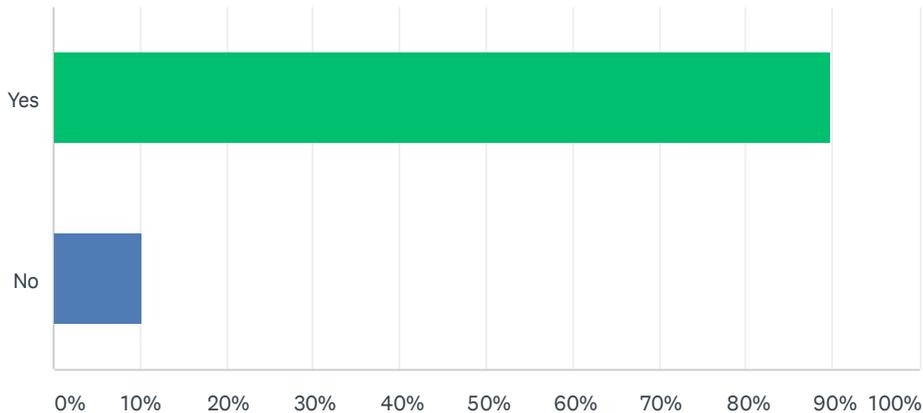
**Goals:** improved understanding of the efficiency of fertilizer management and winter cover crops in reducing tile NO<sub>3</sub> leaching, unprecedented insights into the relative contribution of soil mineralization and N fertilizers to NO<sub>3</sub> - loss in tile drainage, and new constraints on field denitrification and N mass balance.

### 2020 Progress and Issues:

- One Ph.D. student (Yiping Zuo) has been recruited using funds provided by this project. The student will start in the spring to work on this project.
- The final installation step of the isotope ratio mass spectrometer has been postponed to the spring, with a possibility that they may train Dr. Yu remotely, so that he can finish the installation. Given the possible delay in the instrument setup, they have sent collected tile drainage and soil samples out to the University of Pittsburgh Stable Isotope Laboratory for nitrate isotope analyses.

# Q1 Are you engaged in Illinois Agriculture as a farmer or other professional OR do you work in Water Quality in either a personal or professional capacity?

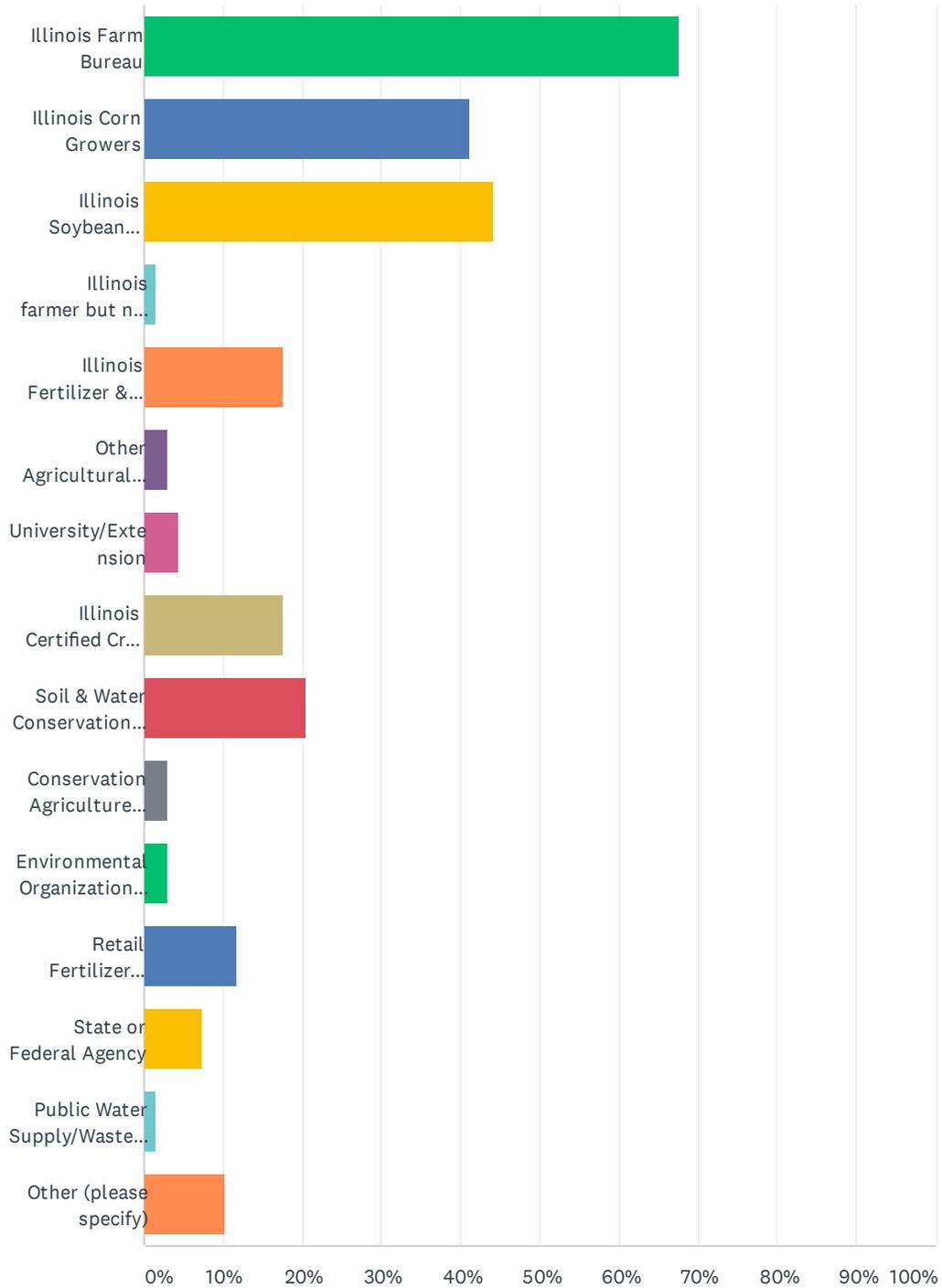
Answered: 88 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	89.77%	79
No	10.23%	9
TOTAL		88

### Q3 Please check the organization(s) you are affiliated with through either membership or employment:

Answered: 68 Skipped: 20



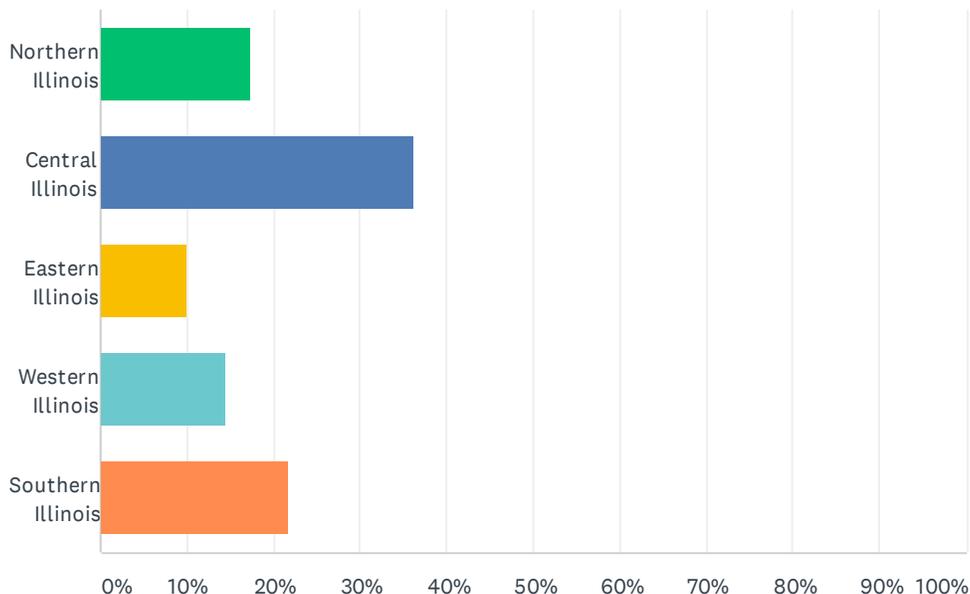
2022 NREC Research Priorities

ANSWER CHOICES	RESPONSES
Illinois Farm Bureau	67.65% 46
Illinois Corn Growers	41.18% 28
Illinois Soybean Association	44.12% 30
Illinois farmer but not a member of any commodity organizations	1.47% 1
Illinois Fertilizer & Chemical Association	17.65% 12
Other Agricultural Commodity Organization	2.94% 2
University/Extension	4.41% 3
Illinois Certified Crop Advisor	17.65% 12
Soil & Water Conservation District	20.59% 14
Conservation Agriculture Group (American Farmland Trust, The Nature Conservancy, Wetlands Initiative, Prairie Rivers Network, etc)	2.94% 2
Environmental Organization (Sierra Club, Environmental Law & Policy Center, etc)	2.94% 2
Retail Fertilizer Employee	11.76% 8
State or Federal Agency	7.35% 5
Public Water Supply/Wastewater Treatment Plan	1.47% 1
Other (please specify)	10.29% 7
Total Respondents: 68	

#	OTHER (PLEASE SPECIFY)	DATE
1	Illinois Beef Association	2/8/2021 2:50 PM
2	Seed sales	2/2/2021 12:32 PM
3	Lake Springfield Watershed committee	1/28/2021 9:12 AM
4	business association	1/27/2021 9:52 AM
5	Illinois Association of Drainage Districts, IL Stewardship Alliance	1/27/2021 7:01 AM
6	Applied Ecological Services	1/26/2021 7:20 PM
7	Mississippi River Collaborative	1/26/2021 4:28 PM

### Q4 Please identify the geographic area of Illinois that you most closely identify with:

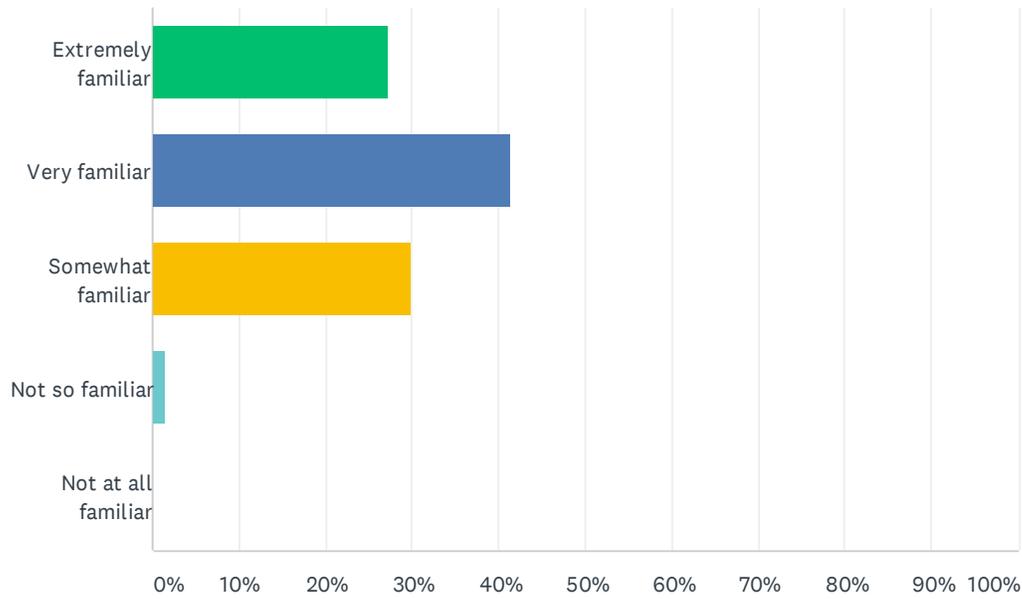
Answered: 69 Skipped: 19



ANSWER CHOICES	RESPONSES	
Northern Illinois	17.39%	12
Central Illinois	36.23%	25
Eastern Illinois	10.14%	7
Western Illinois	14.49%	10
Southern Illinois	21.74%	15
TOTAL		69

## Q5 How familiar are you with Illinois NREC and the role that they play in Illinois agriculture?

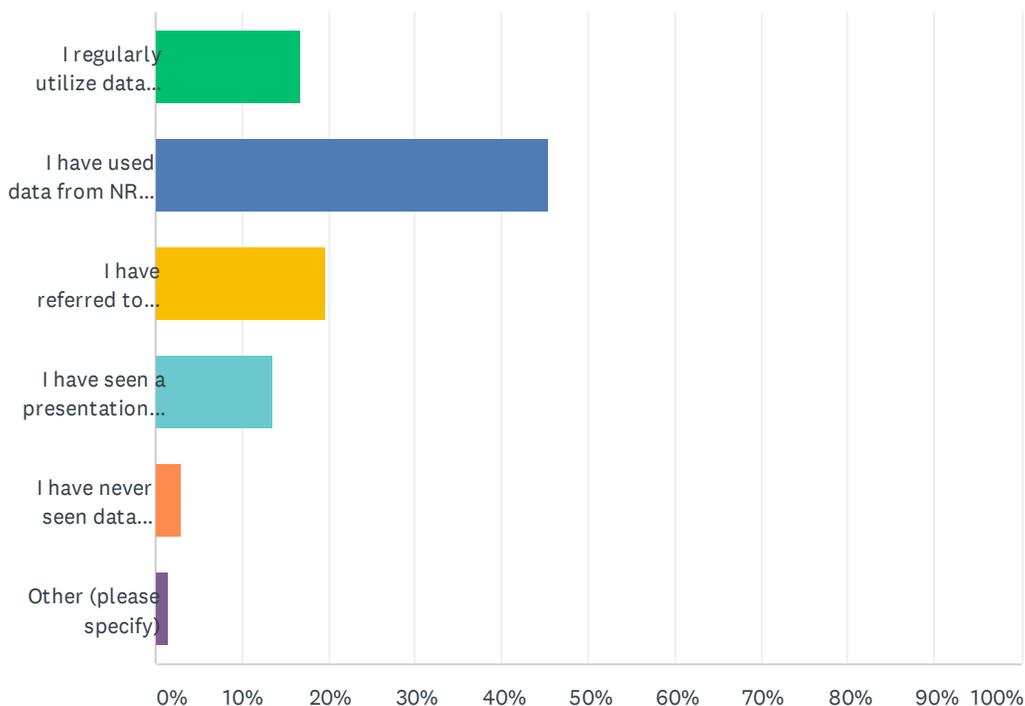
Answered: 70 Skipped: 18



ANSWER CHOICES	RESPONSES	
Extremely familiar	27.14%	19
Very familiar	41.43%	29
Somewhat familiar	30.00%	21
Not so familiar	1.43%	1
Not at all familiar	0.00%	0
TOTAL		70

### Q6 Please choose the option that best describes how you have used NREC research in the past to make decisions on your farm or for those whom you advise on production practices.

Answered: 66 Skipped: 22

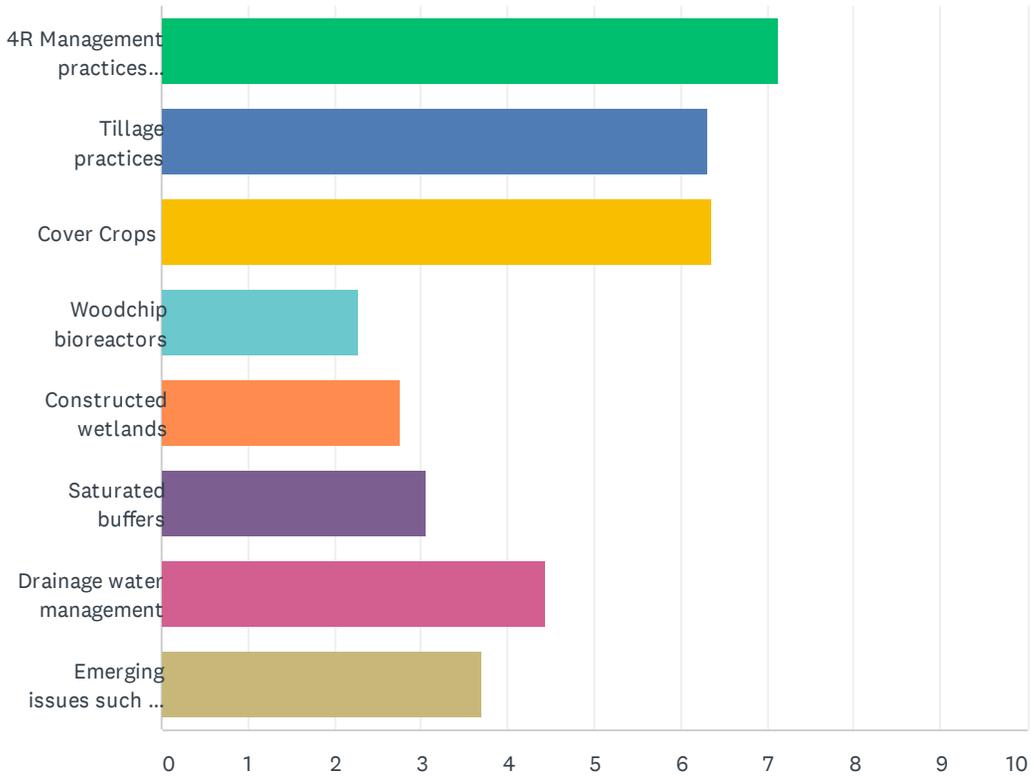


ANSWER CHOICES	RESPONSES
I regularly utilize data from NREC research to make decisions regarding nutrient efficiency	16.67% 11
I have used data from NREC research from time to time to make decisions regarding nutrient efficiency	45.45% 30
I have referred to NREC-funded research but have not used the data to make decisions	19.70% 13
I have seen a presentation regarding NREC-funded research but have not not used the data to make decisions	13.64% 9
I have never seen data coming from NREC-funded research	3.03% 2
Other (please specify)	1.52% 1
<b>TOTAL</b>	<b>66</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	There is a little data worthwhile but a majority is not.	1/26/2021 1:44 PM

Q7 Most of the work being done on nutrient issues can be put into several broad categories. As you think about these categories please rank them based on your belief of their relevance and their ability to impact nutrient concerns in the state.

Answered: 63 Skipped: 25



2022 NREC Research Priorities

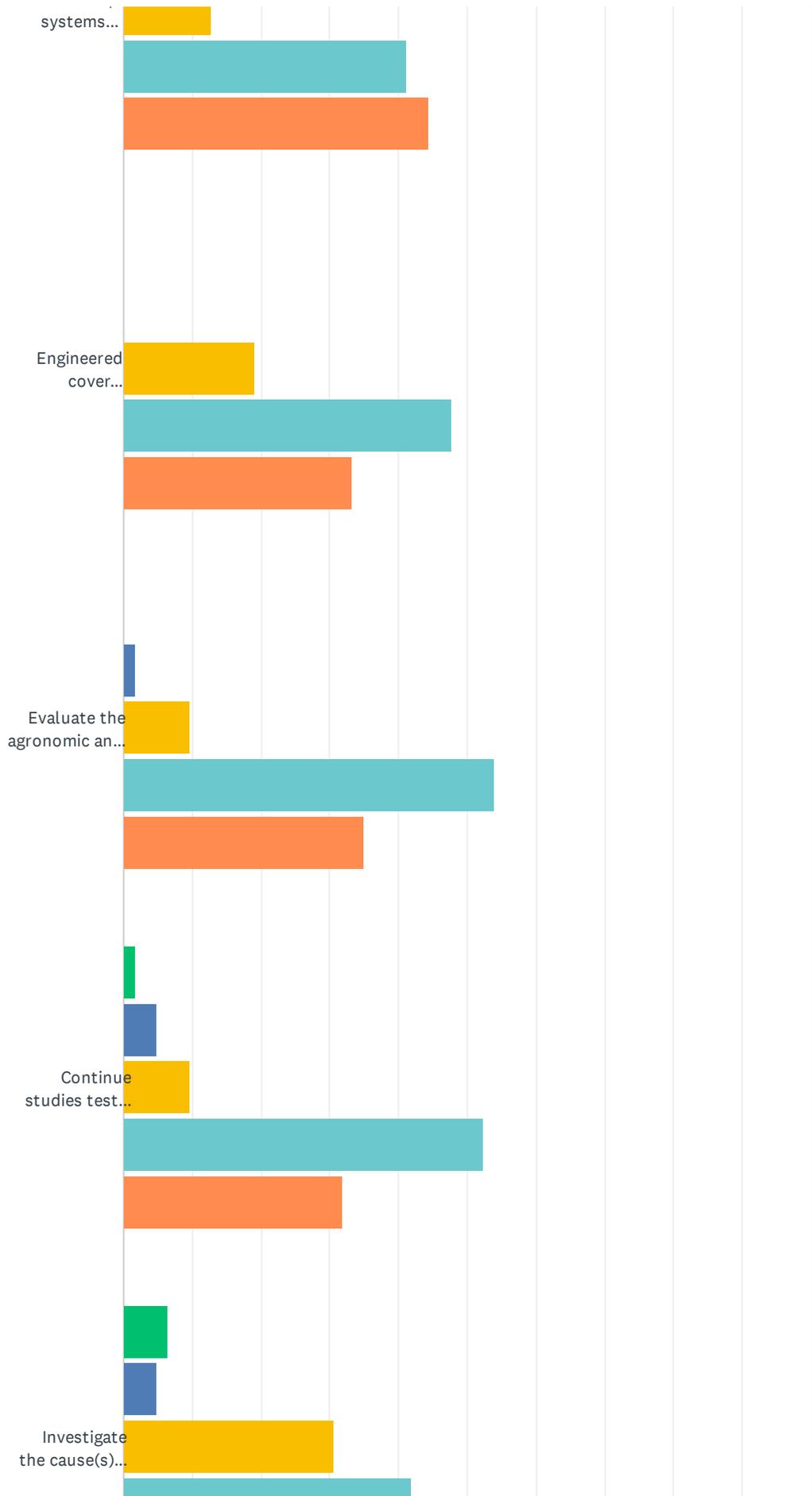
	1	2	3	4	5	6	7	8	TOTAL	SCORE
4R Management practices (timing, rate, form, placement)	58.73% 37	15.87% 10	17.46% 11	1.59% 1	3.17% 2	1.59% 1	1.59% 1	0.00% 0	63	7.14
Tillage practices	17.74% 11	37.10% 23	17.74% 11	20.97% 13	1.61% 1	3.23% 2	0.00% 0	1.61% 1	62	6.31
Cover Crops	17.46% 11	34.92% 22	31.75% 20	9.52% 6	1.59% 1	1.59% 1	0.00% 0	3.17% 2	63	6.37
Woodchip bioreactors	0.00% 0	1.61% 1	3.23% 2	4.84% 3	8.06% 5	19.35% 12	20.97% 13	41.94% 26	62	2.29
Constructed wetlands	0.00% 0	1.61% 1	1.61% 1	8.06% 5	16.13% 10	24.19% 15	30.65% 19	17.74% 11	62	2.77
Saturated buffers	0.00% 0	0.00% 0	3.23% 2	12.90% 8	16.13% 10	30.65% 19	27.42% 17	9.68% 6	62	3.05
Drainage water management	0.00% 0	4.84% 3	22.58% 14	22.58% 14	29.03% 18	6.45% 4	11.29% 7	3.23% 2	62	4.44
Emerging issues such as gypsum, slow release fertilizers, etc	4.84% 3	4.84% 3	3.23% 2	20.97% 13	25.81% 16	11.29% 7	8.06% 5	20.97% 13	62	3.71

Q8 The following is a list of the current research priorities identified by Illinois NREC. Please review each point and rate each as you think about priorities going forward.

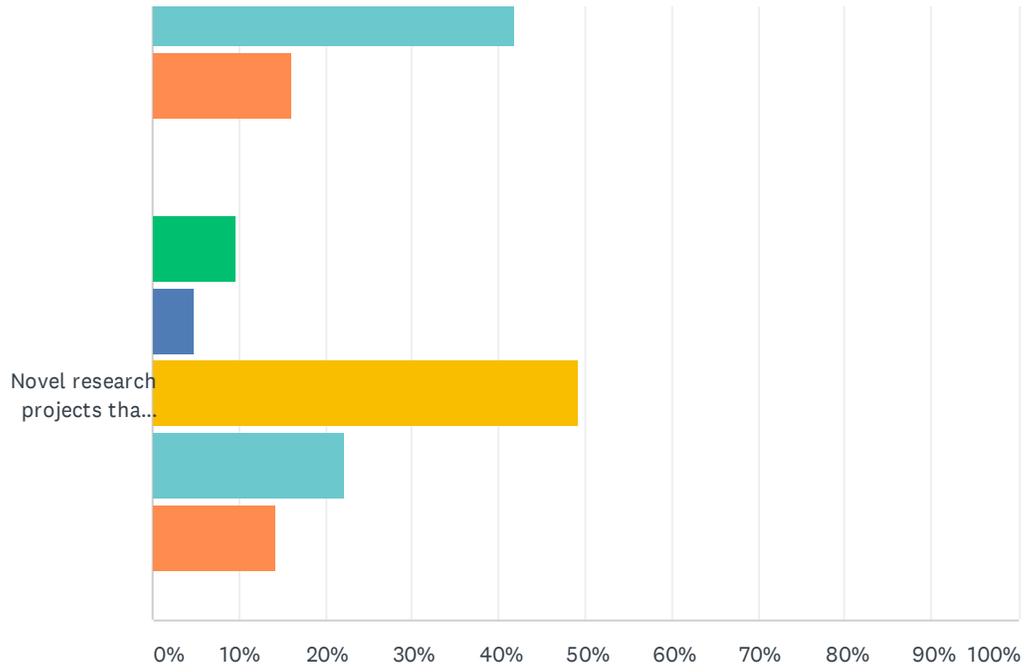
Answered: 63 Skipped: 25



# 2022 NREC Research Priorities



## 2022 NREC Research Priorities



- Strongly disagree that this should be a priority in 2022
- Disagree that this should be a priority in 2022
- Undecided
- Agree that this should be a priority in 2022
- Strongly agree that this should be a priority in 2022

2022 NREC Research Priorities

	STRONGLY DISAGREE THAT THIS SHOULD BE A PRIORITY IN 2022	DISAGREE THAT THIS SHOULD BE A PRIORITY IN 2022	UNDECIDED	AGREE THAT THIS SHOULD BE A PRIORITY IN 2022	STRONGLY AGREE THAT THIS SHOULD BE A PRIORITY IN 2022	TOTAL
Maintain statewide distribution of work on optimum N rate to meet the needs of the MRTN.	4.76% 3	4.76% 3	12.70% 8	36.51% 23	41.27% 26	63
Evaluate the efficacy of combinations of (4R's) form, method, rate and time of application on N efficiency.	3.17% 2	3.17% 2	9.52% 6	42.86% 27	41.27% 26	63
Evaluate the feasibility, economics, water quality impacts and best management practices of growing cover crops to address nitrogen and phosphorus loss as well as crop productivity.	1.59% 1	0.00% 0	11.11% 7	39.68% 25	47.62% 30	63
Cover Crop systems following soybeans and ahead of corn to maximize corn production and minimize nutrient losses.	0.00% 0	1.59% 1	12.70% 8	41.27% 26	44.44% 28	63
Engineered cover crops/Cover crop options beyond cereal rye	0.00% 0	0.00% 0	19.05% 12	47.62% 30	33.33% 21	63
Evaluate the agronomic and environmental benefits of tillage/erosion control and the placement and timing of phosphorus applications.	0.00% 0	1.59% 1	9.52% 6	53.97% 34	34.92% 22	63
Continue studies testing the impact of Phosphorus management systems on efficient Phosphorus usage, the role of legacy Phosphorus, as well as placement and timing of Phosphorous applications in corn and wheat	1.59% 1	4.76% 3	9.52% 6	52.38% 33	31.75% 20	63
Investigate the cause(s) of increased nutrient loads in the Illinois and/or Rock River watersheds identified in the latest NLRS Biennial Report.	6.45% 4	4.84% 3	30.65% 19	41.94% 26	16.13% 10	62
Novel research projects that don't fit into one of the above categories	9.52% 6	4.76% 3	49.21% 31	22.22% 14	14.29% 9	63

**Q9 What is missing from these priorities? What other things do you think NREC should be studying?**

Answered: 38 Skipped: 50

## 2022 NREC Research Priorities

#	RESPONSES	DATE
1	The interaction of conservation tillage and nutrient management with different nutrient products. The interaction of cover crops and nutrient management with different nutrient products. Producer based treatments to help make the system work not just see what happens for academic purposes.	2/9/2021 7:11 AM
2	On cover crops, I believe more emphasis and data needs to be provided on nutrient uptake and release within cover crops. This could develop further to show such differences between species. On nitrogen management, the MRTN works great but are there other systems that work better? Are there systems that utilize ISMT data in conjunction with plant determinant type that better sheds light on nitrogen needs? How do these processes work in higher/lower plant densities across varying soil and tillage practices throughout the State? On edge of field practices, has research been conducted to show when these areas (especially waterways) need cleaned out due to over-saturation of nutrients? Waterways and filter strips may not be straining nutrients if they're saturated.	2/8/2021 8:55 PM
3	The easiest way to reduce P loss is to reduce soil erosion. More focus needs to be on no-till for soybeans and strip till for corn. Also when strip tilling, placing of N, P, and K in the strip (root zone banding) for better nutrient uptake efficiency. No-till/strip till also greatly increases water holding capacity and infiltration rate. Studies show no-till reduces runoff by 40-60%. That is dramatic and would basically wipe out our P load to the river systems. With greater water holding capacity, this would reduce NO3 movement in ground water. I'm also curious to see if pattern tile systems wouldn't be as effective in a no-till systems. If that's the case, less pattern tile systems would be needed because infiltration rates would increase and the soil would be able to store more water. Banding P and K for corn and soybeans needs greater attention. This will definitely be something that farmers will move to in the future, if not by choice but by requirement.	2/8/2021 4:54 PM
4	I like the idea of low cost easy to deploy practices. Keep it simple	2/8/2021 1:03 PM
5	We are seeing sulfur deficiencies appear with our soil tests. Is this an issue? Is it affecting the economics on our farms? What is the best way to deal with this? Sulfate like nitrate should be very susceptible to leeching through the soil profile, so how do we manage this while maintaining water quality and decreasing downstream environmental impacts?	2/8/2021 10:23 AM
6	More info on cover crops and effect on cash crop e.g. how cereal rye impacts yields. Cover crops in a production setting. Further evaluation of N in different settings, e.g. when the corn needs the N, whether density of plants impacts N needs, etc. Evaluating new species of cover crops. More information on strip till in different topographies. Research on whether waterways are stockpiling nutrients.	2/8/2021 9:06 AM
7	interaction of cc, nitrogen placement and timing, strip till/banding - popular question, regional differentiation.	2/5/2021 3:57 PM
8	None	2/4/2021 10:25 AM
9	.	2/4/2021 8:27 AM
10	this is a very comprehensive list, fills the bill.	2/4/2021 8:22 AM
11	seems like spend lot of effort on N, and need to look at P as well.	2/3/2021 8:48 PM
12	Why didnt you list end of pipe research here?	2/3/2021 9:33 AM
13	How carbon sequestration does or does not impact soil characteristics.	2/3/2021 8:54 AM
14	cover crops are not for everyone, you need alternatives to reach your objectives	1/28/2021 7:48 PM
15	This horse has been beaten way past death. The science keeps proving what needs to be done. NREC monies needs to be coming back to the farms to implement some of these practices. Keep in mind that farmers fund this. If people have not soaked up the information by now they won't until the government regulates us to do so. Then there will be lobbying and he said/she said and more money will be spent and the problems will still exist. 2 things I think need to be set in stone. 1. The value of the top 1" of topsoil for a farm, because we can have all these conversations and scientific seminars we want but until a \$ figure is assigned to the soil that lost, which can be easily 5 ton/acre without seeing the first gully, then all other conversations are worthless. 2. Beat it into the heads of the ag community that when it comes to the voting booth we are a minority. The Norman Rockwell days of farming are long past and	1/28/2021 5:44 PM

## 2022 NREC Research Priorities

the consumer wants clean water, period. The largest effect a lawmaker can make without affecting many of their constituents is to come after ag. We have had it made for a long time, if we want it to be treated as a business, it is time to step up to the plate and act like it.

16	Surveying what it will take to overcome reluctance to use best practices regarding nutrients sooner.	1/28/2021 3:31 PM
17	Ways to determine if the "nutrient efficiency" products being marketed to farmers are truly legitimate.	1/28/2021 12:42 PM
18	strip freshner bars and biological products.	1/28/2021 9:27 AM
19	I think these priorities can cover most good research that is needed. While novel research can be important, I think NREC funds are probably better spent on addressing the bigger issues and fine tuning overall nutrient management systems common among a large amount of today's farmers in IL.	1/28/2021 7:09 AM
20	I think NREC is looking at the key issues	1/28/2021 5:53 AM
21	Optimum conservation tillage plan to minimize nutrient loss over 3 crop seasons.	1/27/2021 8:15 PM
22	more studies on Phosphorus uptake and efficiency.	1/27/2021 7:48 PM
23	The ideas covered in questions above are plenty to hit the key issues facing IL crop production. Things like saturated buffers, constructed wetlands and bio reactors are not a good investment since the costs of using these practices to a meaningful extent would not be feasible.	1/27/2021 7:27 PM
24	If standing corn stalks over winter provide any erosion protection.	1/27/2021 1:55 PM
25	Study cover crop germination to evaluate cover crop species and/or variety relative to location and planting date.	1/27/2021 11:06 AM
26	Efforts to quantify benefits of different practices.	1/27/2021 9:56 AM
27	Maybe consider a farmer behavioral study to understand why change/adoption is "slow" then fine tune focus to improve farmer evolution	1/27/2021 9:36 AM
28	value of filter strips	1/27/2021 7:35 AM
29	The effect of soil health practices on the recycling of nutrients. The effect soil health practices on preferential flow to tile. The impact of annual ryegrass use on reducing nitrogen and phosphorus loss in southern IL fields. The impact of soil health practices on carbon sequestration and the relationship with C-N ratio to sequestration.	1/27/2021 7:10 AM
30	Nutrient cycling with cover crops, reduce applied P	1/27/2021 5:56 AM
31	N&P discharge from tile on hard pan soils. Rt. 16 to Rt. 13. Nutrient loss from wheat-double crop SB.	1/26/2021 9:33 PM
32	I think the areas listed above cover the top priorities	1/26/2021 7:02 PM
33	What amount of phosphate is already in the silt in streams?	1/26/2021 5:58 PM
34	edge of field practices	1/26/2021 4:43 PM
35	Consideration of growing crops other than corn and beans	1/26/2021 4:32 PM
36	Biological products that claim to be nitrogen replacement or claim nitrogen fixation for corn. products or claim soil health benefits. Pivot Bio N and Entiva. Stealing dollars from farmers. Most are start up company's looking to sell business to make a quick dollar.	1/26/2021 2:40 PM
37	Soybean cropping systems and the nutrient movement associated when they are included in the rotation.	1/26/2021 2:09 PM
38	This projects funded need to benefit farmers not researchers wanting 10 year.	1/26/2021 1:48 PM

**Q10 What new research are you reading about/seeing that you think is important for the NREC Council to be aware of?**

Answered: 40 Skipped: 48

## 2022 NREC Research Priorities

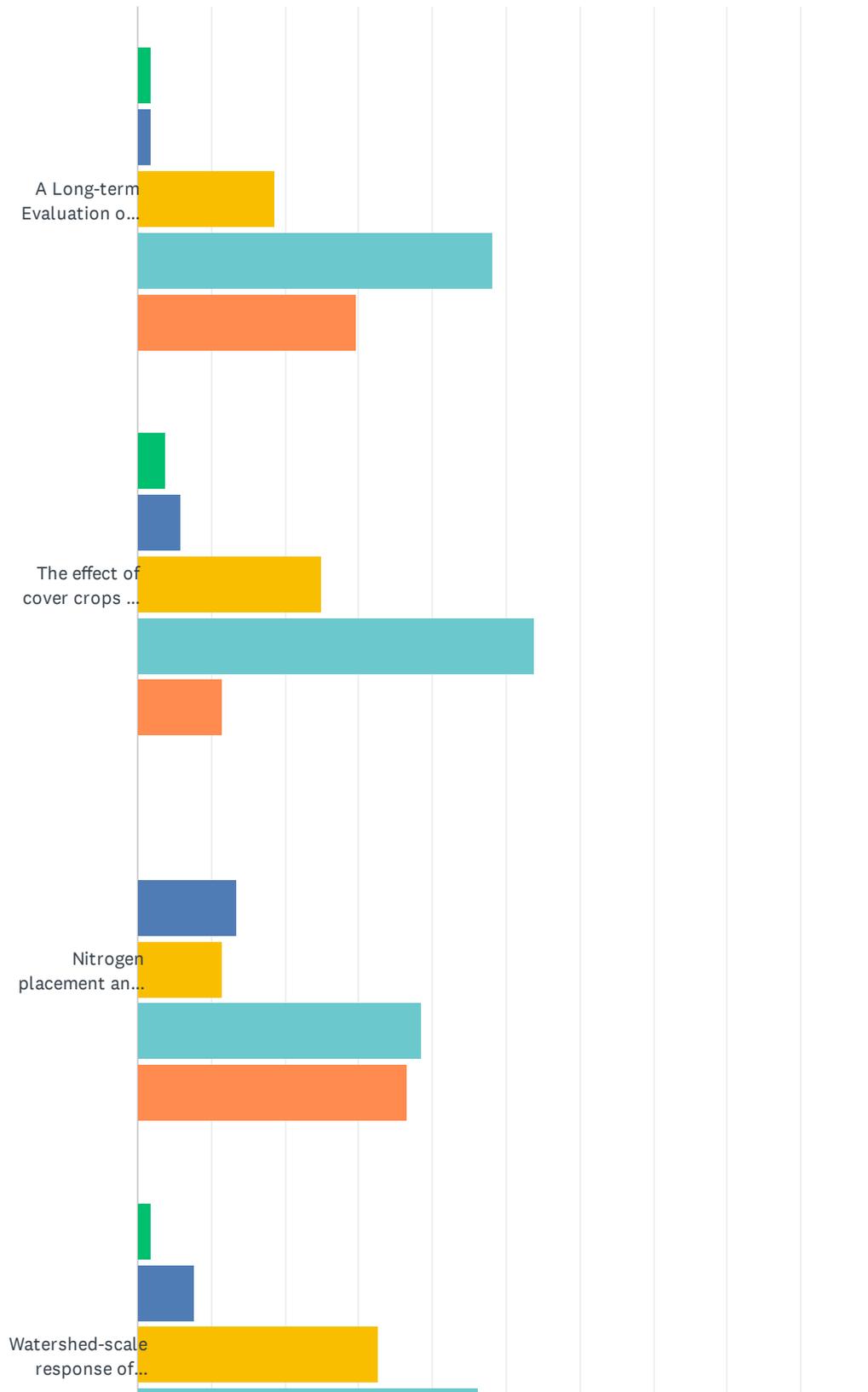
#	RESPONSES	DATE
1	Variable rate application including variable population, products, etc. How does that fit into a conservation tillage or cover crop system? The potential to apply several different N or P products at the same time at pre-plant into cover crops. Seen a lot on rye grass hardly any research on different species of cover crops or improved/engineered cover crops. Have seen alot on bioreactors and saturated buffers but have not seen research into the mechanism by which they work. In other words is it holding the water back or the microbes working that reduce N loss from these practices? More drainage water management research needs to take place in Illinois.	2/9/2021 7:11 AM
2	I recently listened to a podcast by Ken Ferrie that talked about nitrogen needs in correlation to plant ear determination and ISMT score. This was from his Boots In The Field podcast from January 12, 2021. I'd be interested to see more on this from NREC's perspective. In addition, I also listened to a recent podcast from the University of Minnesota where they discussed the MRTN tool and they questioned if obsolete data was in their database; in essence if their sample set of data was too wide and encompassing information from tillage and nitrogen practices that are archaic.	2/8/2021 8:55 PM
3	Electroconductivity (EC) mapping to create zone maps. EC maps are basically CEC/Organic Matter maps. This is picking up the different soil types. If you lay a yield map over the EC map, they basically mimic each other. Using the EC map, a grower can more accurately variable rate fertilizer based on crop uptake. 2.5 acre grid sampling works but can be somewhat inconsistent in regards to "how accurate our the soil tests" at times. The EC map with a yield map to help guide fertilizer recommendations would be much more accurate.	2/8/2021 4:54 PM
4	Release of nutrients from cover crops as they break down and how vulnerable they are to entering the water supply	2/8/2021 12:18 PM
5	We are seeing more information our way about other products like plant hormones, bacteria and fungi species and a whole suite of micronutrients and are wondering about the efficacy of those products?	2/8/2021 10:23 AM
6	Hearing mixed messages on N application amounts	2/8/2021 9:06 AM
7	n/a	2/5/2021 3:57 PM
8	None	2/4/2021 10:25 AM
9	.	2/4/2021 8:27 AM
10	slow release combinations of different fertilizers custom made per geography.	2/4/2021 8:22 AM
11	including other brand of N stabilizers other than just using Nserve and Centuro. Also check out the Pivot Bio and other newer products that claim to be able to reduce N rate as they help the corn affix its own N	2/3/2021 8:48 PM
12	None	2/3/2021 9:33 AM
13	Products that allow corn to fix nitrogen. Studies that analyze net impact of a combination of practices.	2/3/2021 8:54 AM
14	establishing a "retail value" of all of the practices	2/1/2021 9:56 AM
15	Iowa has been receiving compensation for cover crops why haven't you gotten Illinois to do the same	1/28/2021 7:48 PM
16	The recent presidential election.	1/28/2021 5:44 PM
17	The role of tillage in reducing nutrient losses does not get enough focus	1/28/2021 12:42 PM
18	Impact of Foliar Nutrients to improve plant N efficiency as well as solar maximization to increase yields without increasing N rates.	1/28/2021 9:27 AM
19	Cover crop management in relation to value of carbon sequestration. All cover crop fields don't yield the same carbon value so better management should be rewarded rather than placing \$X value on all acres enrolled as if they are all alike. This could reward good managers and encourage others to adopt more cover crop acres.	1/28/2021 7:09 AM
20	I keep going back to cover crop ready. I really want to see them work but there are definitely	1/28/2021 5:53 AM

## 2022 NREC Research Priorities

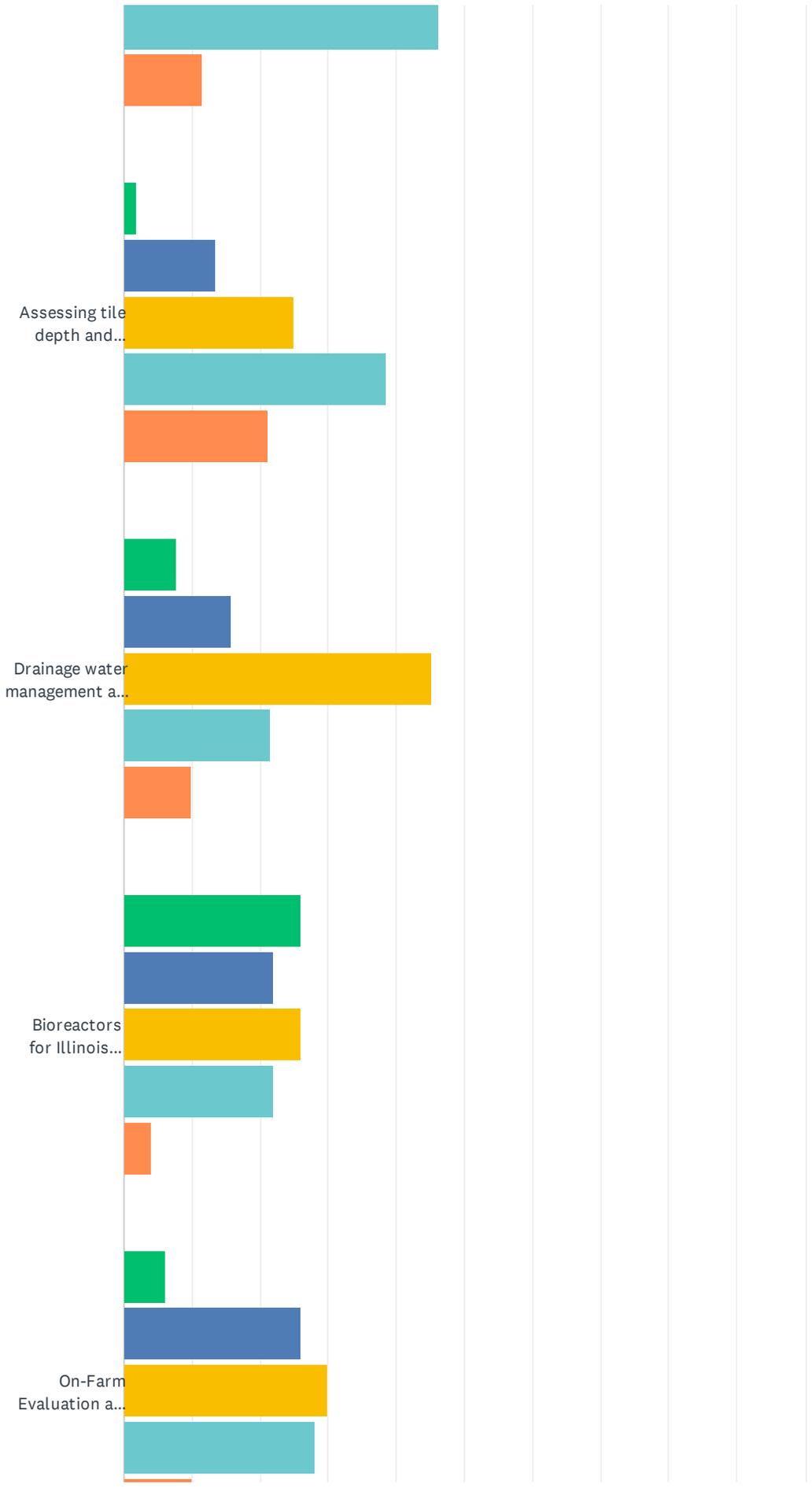
	hurdles to get past	
21	New nitrogen enhancing biological and the role they could play in reducing nitrate issues in the future.	1/27/2021 8:15 PM
22	Microbial activity on fertilizer reductions.	1/27/2021 7:48 PM
23	Cover crop systems and links to maximize value of carbon credits with good management. Good cover crop systems should receive higher payments to encourage improved management, not just planting a cover crop for a \$10 payment to Achieve reductions in erosion only. Improved cover crop management should be worth higher payments.	1/27/2021 7:27 PM
24	Can side dressed N rates be reduced further?	1/27/2021 1:55 PM
25	Nitrogen fixing bacteria in corn	1/27/2021 11:06 AM
26	N/A	1/27/2021 9:56 AM
27	Many of the bio stimulant companies are focused on NUE as that's where their investors are focused. Lots of hype but two year personal testing has shown no statistical difference in naturally fertile high OM soils	1/27/2021 9:36 AM
28	?	1/27/2021 7:35 AM
29	See the above. This not anything being done of any consequence by NREC research relating to the impact of soil health on nutrient loss other than cover crops.	1/27/2021 7:10 AM
30	making nutrients available to crop, through nutrient cycling and being able to reduce applied P & K. deep placement of P, does it allow less P to be applied while reducing nutrient loading in surface water.	1/27/2021 5:56 AM
31	Biological that claim to cause bacteria to produce N, thus reducing need for N fertilizer	1/26/2021 9:33 PM
32	Banded nutrient placement versus broadcast and increase efficacy of nutrients. Modeling for Nitrogen on a zone basis rather than soil type	1/26/2021 7:58 PM
33	Effect of tillage on increasing nutrient availability following a cover crop	1/26/2021 7:02 PM
34	Phosphorus levels that are already in the drainage system.	1/26/2021 5:58 PM
35	tradeoffs between recommended practices; stacked conservation practices; regenerative ag practices	1/26/2021 4:43 PM
36	Effect of HABs on climate through creation of methane	1/26/2021 4:32 PM
37	Let's test nutrient cycling with covers against no covers with and without commercial fertilizer.	1/26/2021 2:40 PM
38	I'm reading about drilling down nutrient application to the granular level, blocks of 24'x24'. Would love to see more research on that, equipment requirements, etc.	1/26/2021 2:31 PM
39	At what phosphorus level does leaching become a problem.	1/26/2021 2:09 PM
40	biologics	1/26/2021 1:48 PM

Q11 Please review each of these projects (link above) and rate them as you consider them in the portfolio of research currently being funded.

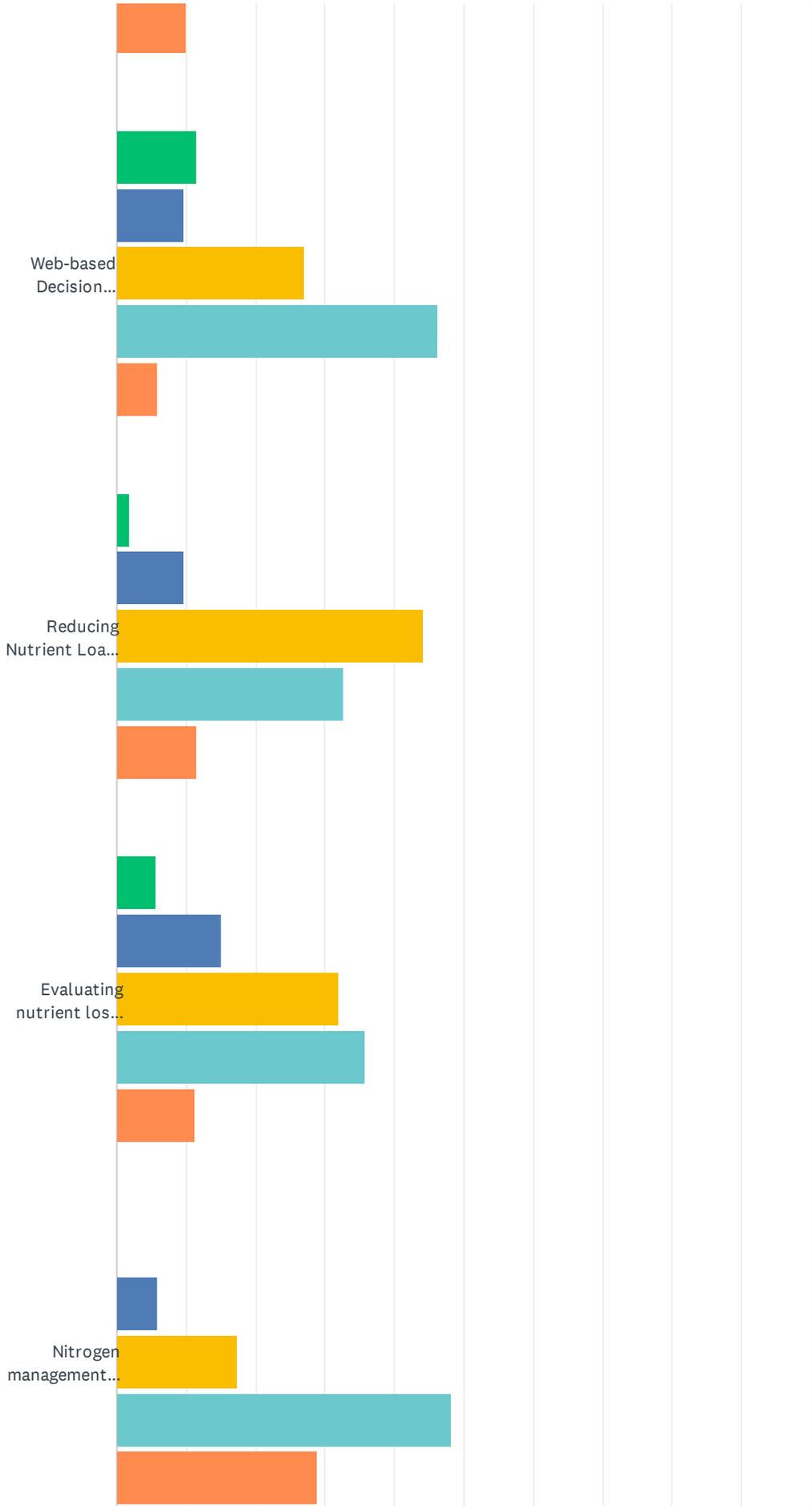
Answered: 54 Skipped: 34



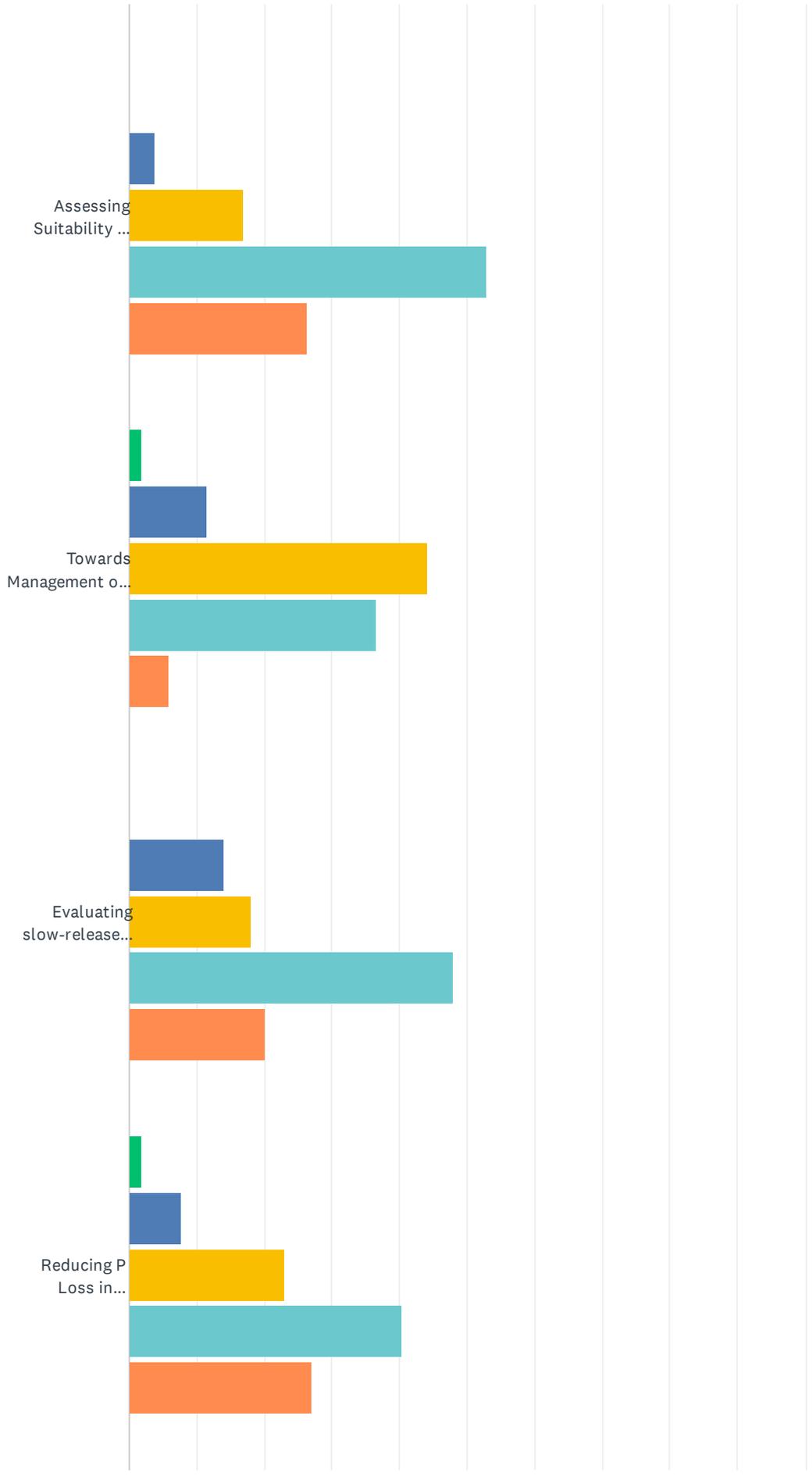
# 2022 NREC Research Priorities



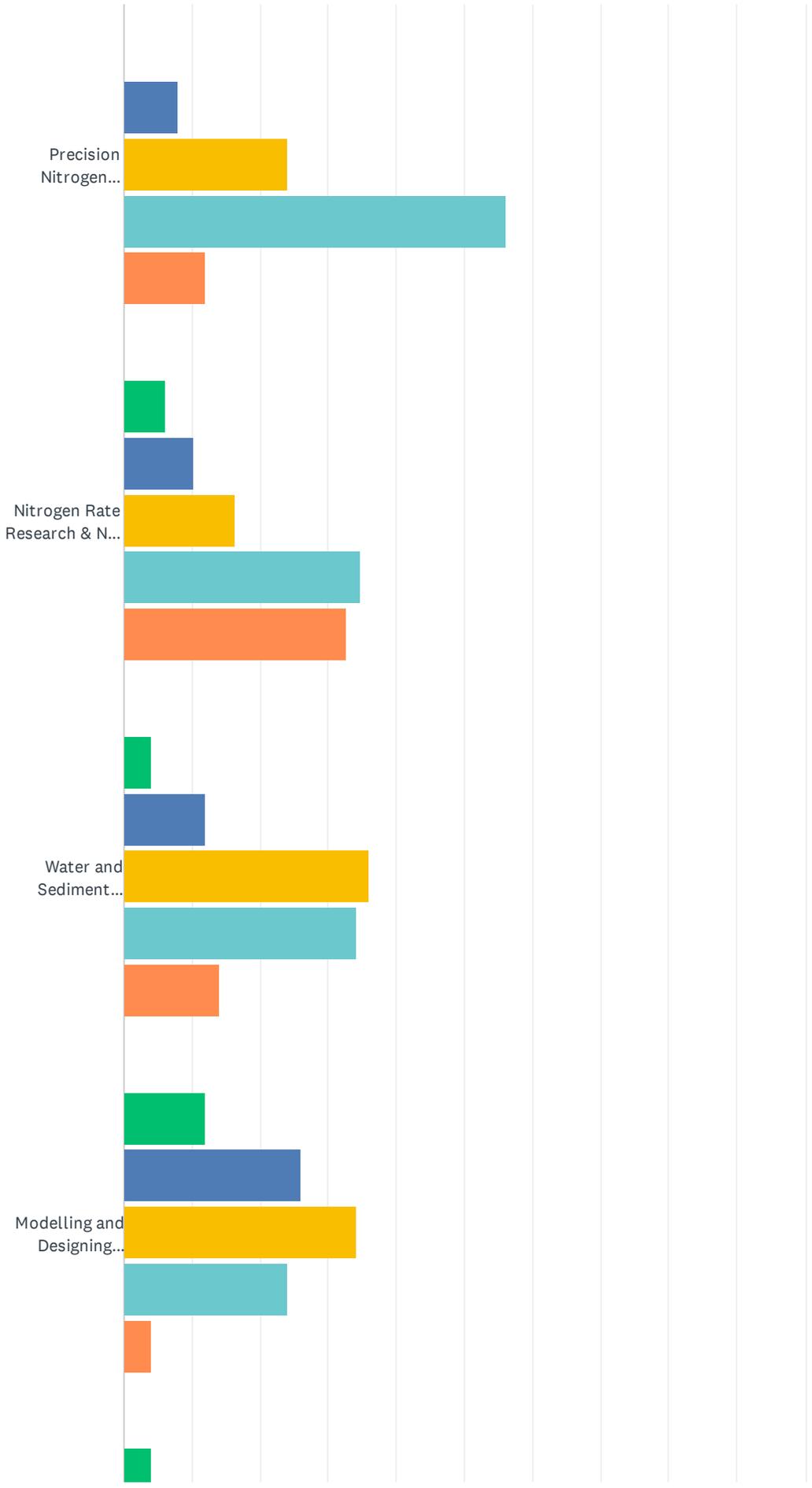
# 2022 NREC Research Priorities



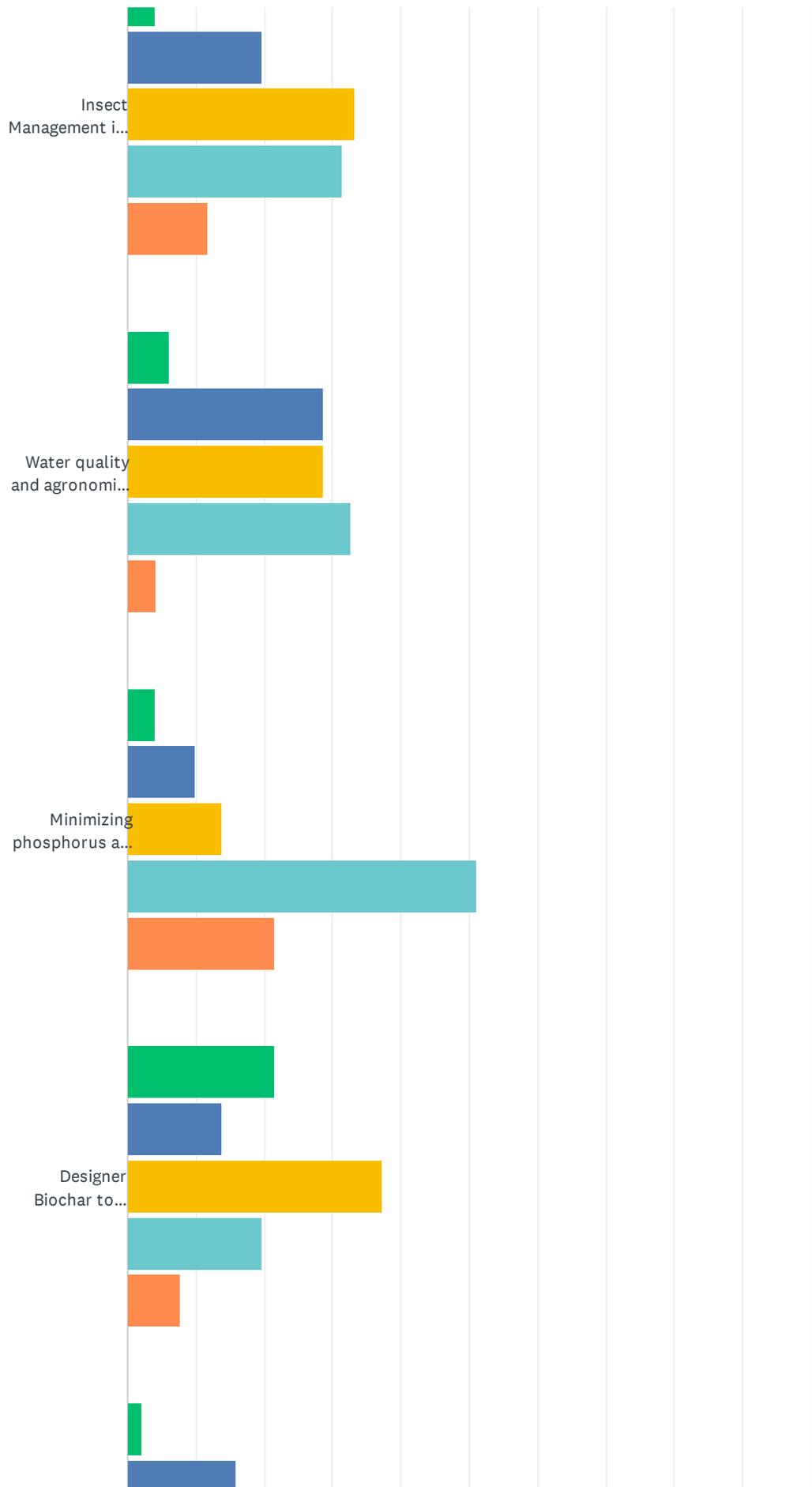
# 2022 NREC Research Priorities



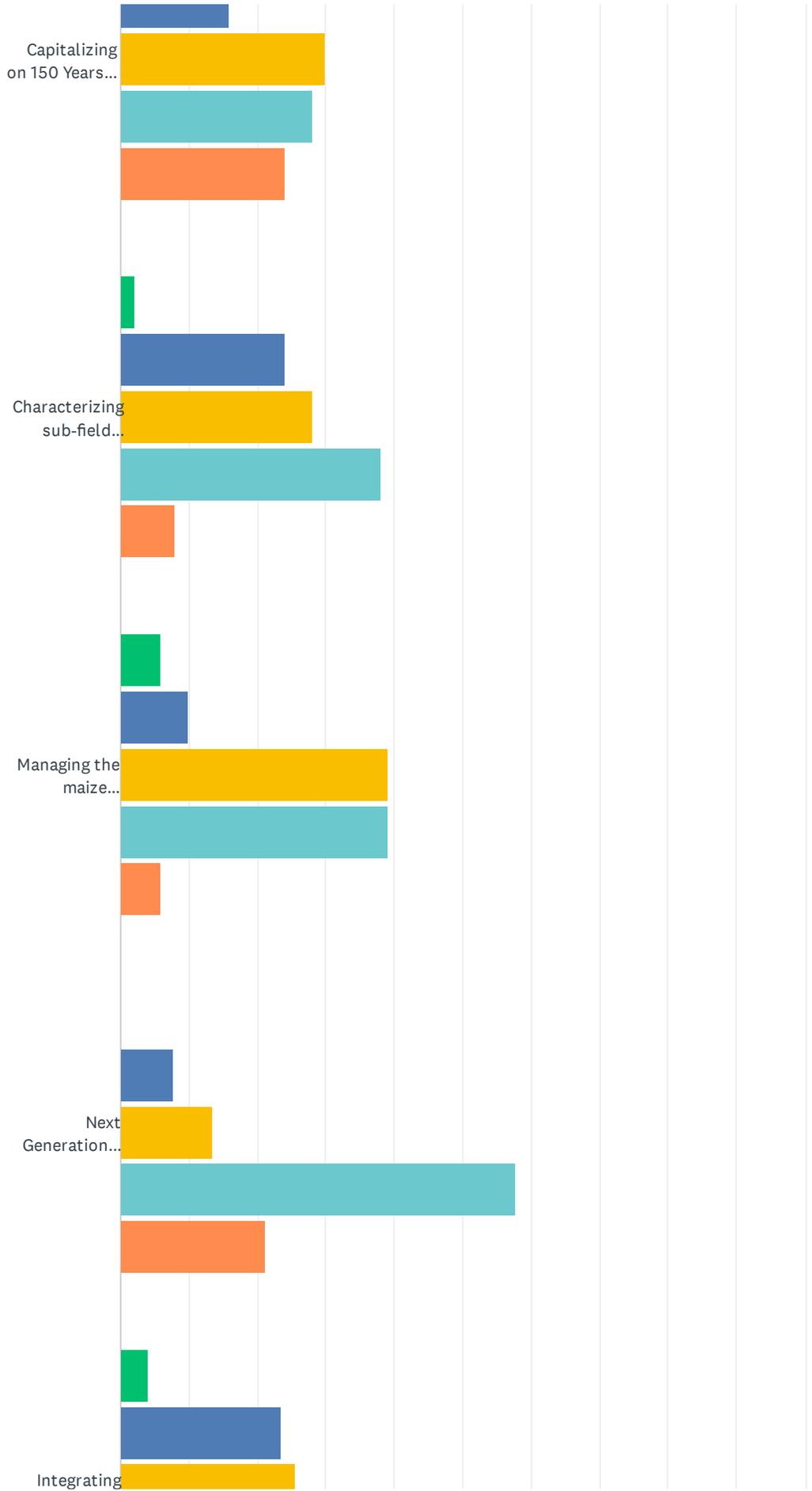
# 2022 NREC Research Priorities



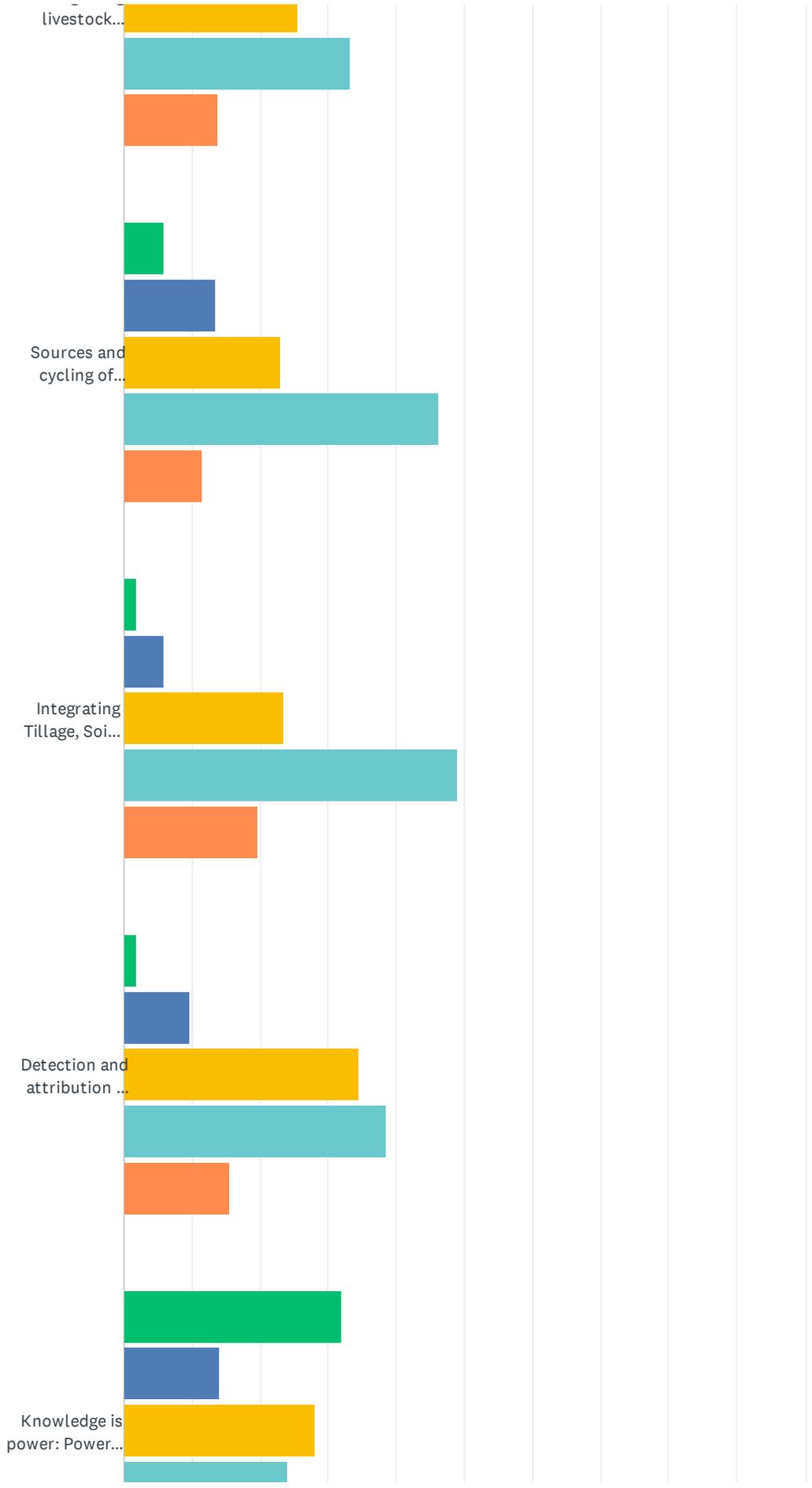
# 2022 NREC Research Priorities



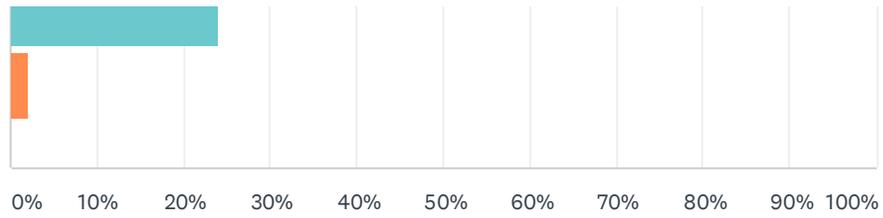
# 2022 NREC Research Priorities



# 2022 NREC Research Priorities



## 2022 NREC Research Priorities



- No additional funding should be allocated to this project
- Limited funding should be allocated to this project
- I need more information to make an informed decision
- Important research that SHOULD continue to be funded
- Extremely critical research that MUST continue to be funded

2022 NREC Research Priorities

	NO ADDITIONAL FUNDING SHOULD BE ALLOCATED TO THIS PROJECT	LIMITED FUNDING SHOULD BE ALLOCATED TO THIS PROJECT	I NEED MORE INFORMATION TO MAKE AN INFORMED DECISION	IMPORTANT RESEARCH THAT SHOULD CONTINUE TO BE FUNDED	EXTREMELY CRITICAL RESEARCH THAT MUST CONTINUE TO BE FUNDED	TOTAL	WEIGHTED AVERAGE
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	1.85% 1	1.85% 1	18.52% 10	48.15% 26	29.63% 16	54	4.02
The effect of cover crops on surface water quality: A paired watershed experiment in the Lake Bloomington watershed	3.85% 2	5.77% 3	25.00% 13	53.85% 28	11.54% 6	52	3.63
Nitrogen placement and application timing for best efficiency, growth, and yield of corn across Illinois.	0.00% 0	13.46% 7	11.54% 6	38.46% 20	36.54% 19	52	3.98
Watershed-scale response of agricultural systems to drainage water management in Central Illinois	1.92% 1	7.69% 4	32.69% 17	46.15% 24	11.54% 6	52	3.58
Assessing tile depth and spacing impact on nutrient losses and crop production	1.92% 1	13.46% 7	25.00% 13	38.46% 20	21.15% 11	52	3.63
Drainage water management and saturated buffers for achieving NLRs goals	7.84% 4	15.69% 8	45.10% 23	21.57% 11	9.80% 5	51	3.10
Bioreactors for Illinois: Smaller, Better, Faster	26.00% 13	22.00% 11	26.00% 13	22.00% 11	4.00% 2	50	2.56
On-Farm Evaluation and Demonstration of Reduced Off-Farm Nutrient Transport through Drainage Water Recycling	6.00% 3	26.00% 13	30.00% 15	28.00% 14	10.00% 5	50	3.10
Web-based Decision Support Tool for Cover Crop Management	11.54% 6	9.62% 5	26.92% 14	46.15% 24	5.77% 3	52	3.25
Reducing Nutrient Loads in WASCObS	1.92% 1	9.62% 5	44.23% 23	32.69% 17	11.54% 6	52	3.42

2022 NREC Research Priorities

in Southern Illinois							
Evaluating nutrient loss reduction strategies: longer rotation with cover crops and bioreactor	5.66% 3	15.09% 8	32.08% 17	35.85% 19	11.32% 6	53	3.32
Nitrogen management systems in tile-drained fields: Optimizing yields while minimizing losses	0.00% 0	5.77% 3	17.31% 9	48.08% 25	28.85% 15	52	4.00
Assessing Suitability and Benefits of Cover Crops in Illinois	0.00% 0	3.77% 2	16.98% 9	52.83% 28	26.42% 14	53	4.02
Towards Management of Dissimilatory Nitrate Reduction to Ammonium for Nitrate Retention in Agricultural Soils	1.92% 1	11.54% 6	44.23% 23	36.54% 19	5.77% 3	52	3.33
Evaluating slow-release P fertilizers to increase crop production and environmental quality	0.00% 0	14.00% 7	18.00% 9	48.00% 24	20.00% 10	50	3.74
Reducing P Loss in Southern Illinois: Producers, Practices, and Productivity	1.92% 1	7.69% 4	23.08% 12	40.38% 21	26.92% 14	52	3.83
Precision Nitrogen Management of Corn for Improving Farm Profitability and Water Quality in Southern Illinois	0.00% 0	8.00% 4	24.00% 12	56.00% 28	12.00% 6	50	3.72
Nitrogen Rate Research & NREC Project Partnership	6.12% 3	10.20% 5	16.33% 8	34.69% 17	32.65% 16	49	3.78
Water and Sediment Control Basins (WASCoBs) influence on Crop Yields and Water Quality	4.00% 2	12.00% 6	36.00% 18	34.00% 17	14.00% 7	50	3.42
Modelling and Designing Saturated Buffers for Nitrogen and Phosphorus Mitigation in Illinois	12.00% 6	26.00% 13	34.00% 17	24.00% 12	4.00% 2	50	2.82
Insect Management in Cover Crop Systems	3.92% 2	19.61% 10	33.33% 17	31.37% 16	11.76% 6	51	3.27
Water quality and agronomic impacts of	6.12% 3	28.57% 14	28.57% 14	32.65% 16	4.08% 2	49	3.00

## 2022 NREC Research Priorities

gypsum applications in Southern Illinois								
Minimizing phosphorus and nitrogen loss from agricultural systems with cover crops and tillage in Southern Illinois	3.92% 2	9.80% 5	13.73% 7	50.98% 26	21.57% 11	51	3.76	
Designer Biochar to Capture and Recycle Phosphorous from Tile Drainage Systems	21.57% 11	13.73% 7	37.25% 19	19.61% 10	7.84% 4	51	2.78	
Capitalizing on 150 Years of Soil Samples to Determine Legacy P and Improve Water Quality in Illinois	2.00% 1	16.00% 8	30.00% 15	28.00% 14	24.00% 12	50	3.56	
Characterizing sub-field variability for efficient phosphorus management: targeting hotspots	2.00% 1	24.00% 12	28.00% 14	38.00% 19	8.00% 4	50	3.26	
Managing the maize microbiome for sustainable nutrient retention in Illinois agricultural soils	5.88% 3	9.80% 5	39.22% 20	39.22% 20	5.88% 3	51	3.29	
Next Generation Cover Cropping in Corn-Soybean Rotation to Improve Farm Benefits and Decrease Environmental Losses in South and Central Illinois	0.00% 0	7.69% 4	13.46% 7	57.69% 30	21.15% 11	52	3.92	
Integrating livestock grazing into the western Illinois corn-soybean cropping system to enhance farm profitability and reduce nutrient loss	3.92% 2	23.53% 12	25.49% 13	33.33% 17	13.73% 7	51	3.29	
Sources and cycling of nitrate in tile-drained corn-soybean rotation systems: A stable isotope approach	5.77% 3	13.46% 7	23.08% 12	46.15% 24	11.54% 6	52	3.44	
Integrating Tillage, Soil Carbon Dynamics, and Tile Nitrate Loss	1.96% 1	5.88% 3	23.53% 12	49.02% 25	19.61% 10	51	3.78	
Detection and	1.92%	9.62%	34.62%	38.46%	15.38%			

2022 NREC Research Priorities

attribution of recent changes in phosphorus loadings in the Illinois River watershed	1	5	18	20	8	52	3.56
Knowledge is power: Powering up bioreactors and saturated buffers in Illinois	32.00% 16	14.00% 7	28.00% 14	24.00% 12	2.00% 1	50	2.50

#	COMMENTS FOR "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"	DATE
1	meeting the 2025 goals of the INLRS depends upon solving the problem of nutrient loss in tile drained systems	1/28/2021 12:57 PM
2	Agriculture needs improved practices to minimize yield reductions from the use of cover crops.	1/28/2021 9:47 AM
3	I think any research of this type should be replicated on fields that have a history of good cover crop management along with what goes at the university research farms that have mostly been managed in non-cover crop systems. Since soil biology plays such a factor in nutrient cycling, results of research like this in "transitional" years could be a lot different than what might be in play in fields that have more biological activity due to already being under cover crop management and present a different picture of true nutrient cycling possibilities over time.	1/28/2021 8:29 AM
4	My belief is very little if no nitrate is lost through drainage water and I hope that can be shown in data	1/28/2021 6:07 AM
5	This is good research as long as the researchers have a good understanding of total cover crop management and the variables that impact cover crop growth and development from season to season. We seem to have several cover crop researchers that can gather data on cover crops, but few actually understand how to manage cover crops to get the best data. This funding should not be used so the researchers can learn what experienced farmers already know. Most cover crop projects need to hire a consultant or experienced farmer to advise setup and observations.	1/27/2021 8:38 PM
6	The recycling of nitrogen from decomposing cover crops needs to be understood especially in tile drained fields.	1/27/2021 7:34 AM

#	COMMENTS FOR "THE EFFECT OF COVER CROPS ON SURFACE WATER QUALITY: A PAIRED WATERSHED EXPERIMENT IN THE LAKE BLOOMINGTON WATERSHED"	DATE
1	This study should be complete by now, and we haven't seen any new information from it in a while. We know cover crops work.	1/28/2021 12:57 PM
2	When possible, some of these larger watershed projects are important. I doubt if there are many other funding sources around that would be interested in these things, so if it's feasible it makes sense that NREC would support some of this research. This type of research would seem to be more important to understanding bigger issues facing IL agriculture than investments in some of the novel research that probably could be funded through other sources.	1/28/2021 8:29 AM
3	Surface water is a problem especially with large rain events we've experienced. Keeping soil in place is very important to keep from losing nutrients.	1/28/2021 6:07 AM
4	Insect pressure in cover crops is so dependent on the season it seems unlikely that much good information would come of this.	1/27/2021 8:38 PM
5	Do same project on low organic matter soils in southern Illinois	1/26/2021 9:56 PM
6	It should have ran its course.	1/26/2021 2:49 PM

## 2022 NREC Research Priorities

#	COMMENTS FOR "NITROGEN PLACEMENT AND APPLICATION TIMING FOR BEST EFFICIENCY, GROWTH, AND YIELD OF CORN ACROSS ILLINOIS."	DATE
1	In order to continue to assure growers more N is not always needed, need to keep current on how timing and placement impacts crop yield and N efficiency	1/28/2021 12:57 PM
2	with changing technology in fertilizers, application equipment and corn hybrids, some research of this type can always be valuable.	1/28/2021 8:29 AM
3	Nitrogen is the most important nutrient on the farm. Farmers and the environment have a lot to gain if it is used the most efficient manner.	1/28/2021 6:07 AM
4	This type of continued research will always be important as practices and technology evolves.	1/27/2021 8:38 PM
5	Haven't we studied this for many years?	1/27/2021 7:34 AM
6	we already know the closer to when the crop will use it the better to reduce N loss	1/27/2021 6:16 AM
7	Important to dial in the optimum economic rate for a given region	1/26/2021 7:20 PM
#	COMMENTS FOR "WATERSHED-SCALE RESPONSE OF AGRICULTURAL SYSTEMS TO DRAINAGE WATER MANAGEMENT IN CENTRAL ILLINOIS"	DATE
1	I'm not sold that DWM reduces N on a watershed scale. Just because it isn't detected through the tile outlet, doesn't mean it doesn't make it to the stream through natural ground water movement.	2/8/2021 5:32 PM
2	There are only so many fields with less than 2% slope	1/28/2021 12:57 PM
3	Lots of field work done but some Observations at a high watershed level is a good thing.	1/27/2021 8:38 PM
4	I have these structures and I would like to see more info because on a watershed scale or a drainage district scale could impact downstream drinking water supplies	1/27/2021 7:34 AM
#	COMMENTS FOR "ASSESSING TILE DEPTH AND SPACING IMPACT ON NUTRIENT LOSSES AND CROP PRODUCTION"	DATE
1	Unfortunately so much tile is already in place it is hard to imagine that finding out how to change spacing will make a difference now	1/28/2021 12:57 PM
2	also include the best management practice to regulate water level in field tiles with new tile using end of tile structures to maximize yields.	1/28/2021 9:47 AM
3	This seems to be an engineering project.	1/28/2021 8:29 AM
4	This would be a difficult study especially with all the different soils and drainage characteristics in soils in Illinois.	1/28/2021 6:07 AM
5	Drainage systems need to be designed to work. Field cropping management need to fit the design, not the Other way around.	1/27/2021 8:38 PM
6	Even though tile drainage is necessary for optimum yields it is a leaky system.	1/27/2021 7:34 AM

## 2022 NREC Research Priorities

#	COMMENTS FOR "DRAINAGE WATER MANAGEMENT AND SATURATED BUFFERS FOR ACHIEVING NLRs GOALS"	DATE
1	For the saturated buffer, I recommend doing 12" tile for the laterals off the stop log structure. The laterals are just essentially acting as storage. The soil can only absorb so much water until it's too saturated and then at that point, the lateral is just storing water.	2/8/2021 5:32 PM
2	Getting farmers to put in any kind of new buffers is a challenge	1/28/2021 12:57 PM
3	See above!	1/28/2021 9:47 AM
4	I would rather see research dollars spent on in-field management since saturated buffers and bioreactors are usually designed for smaller areas and the cost of many of them across the state would not be cost effective to really make a big impact in water quality. Especially since they are designed to bypass in high flow rain events.	1/28/2021 8:29 AM
5	Unless saturated buffers can effectively treat whole fields, this seems low impact work. Concentrate on infield management for more impactful outcomes. I think some farmers wish that a silver bullet edge of field practice would eliminate the need for them to improve practices in the field so they don't have to change. That's not good long term thinking.	1/27/2021 8:38 PM
6	The jury is still out on saturated buffers. Until the NRCS allows harvesting of buffer vegetation, it will only continue to accumulate nitrogen from season to season.	1/27/2021 7:34 AM
7	nice practices, will not scale to make a real difference in nutrient reduction goals	1/27/2021 6:16 AM
#	COMMENTS FOR "BIOREACTORS FOR ILLINOIS: SMALLER, BETTER, FASTER"	DATE
1	I would be interested to see the results from the heat-enhanced bioreactor. This doesn't seem like it would be cost effective.	2/8/2021 5:32 PM
2	the usefulness of bioreactors is so limiting given they do not work in heavy rainfall events nor when water is cold, and these two scenarios is when most nutrient losses occur	1/28/2021 12:57 PM
3	I would rather see research dollars spent on in-field management since saturated buffers and bioreactors are usually designed for smaller areas and the cost of many of them across the state would not be cost effective to really make a big impact in water quality. Especially since they are designed to bypass in high flow rain events.	1/28/2021 8:29 AM
4	I'm not sure if bioreactors are economically feasible on all tile outlets. Very expensive from the looks of them	1/28/2021 6:07 AM
5	Another edge of field idea that tries to put a bandage on to cure a cancer. For the investment to treat very little land, there's few places where they are a good investment. Cover crops on the field can do a more dependable job at less cost.	1/27/2021 8:38 PM
6	Impractical on a large scale	1/27/2021 7:34 AM
7	unlikely to ever get to scale to make significant difference. Don't last long enough without new wood chips. Too much water not treated, because of bypass. \$ spent on Bioreactors do not help soil health, erosion, soil structure, P run off. Need to use infield practices that give multiple benefits, best use of limited resources.	1/27/2021 6:16 AM
8	High cost-limited acres	1/26/2021 9:56 PM
9	I don't see how these are ever going to be a viable solution on a scale large enough to make much of a difference	1/26/2021 7:20 PM
10	If the public will pay for these then it will work but it is not a viable option and farmers should not be paying for the work.	1/26/2021 1:57 PM
#	COMMENTS FOR "ON-FARM EVALUATION AND DEMONSTRATION OF REDUCED OFF-FARM NUTRIENT TRANSPORT THROUGH DRAINAGE WATER RECYCLING"	DATE
1	It's a novel concept but how it will be economical is the question	1/28/2021 12:57 PM
2	Drainage water retention is impractical on \$10,000/acre farmland.	1/27/2021 7:34 AM
3	This will be difficult to work economically. Work needs to focus in-field with NREC. Edge of field research needs to be covered with other funds.	1/26/2021 1:57 PM

2022 NREC Research Priorities

#	COMMENTS FOR "WEB-BASED DECISION SUPPORT TOOL FOR COVER CROP MANAGEMENT"	DATE
1	This project has been funded for a while plus you have PCM....haven't seen much from this project.	1/28/2021 12:57 PM
2	This sounds good but there are so many variables in play a reliable tool would unlikely be able to track more than a few basic aspects of cover crop growth and how to best manage in specific fields. With so little, quality cover crop management work being done at the universities in IL, I wonder where valid information would come from to support such a web tool.	1/28/2021 8:29 AM
3	Many are interested in cover crops and the more info the better	1/28/2021 6:07 AM
4	Better outreach and demonstration would be more impactful to help farmers better understand season factors that they need to observe to be a good cover crop manager. A good cover crop manager is not going to use a web tool and a new user of cover crops is not going to learn from a web tool with all the seasonal and field to field variables involved. Maybe Extension needs to upgrade their understanding to disseminate appropriate information per design of the Extension system. They are already paid to do this! Even though they don't. Please share this with the Dean.	1/27/2021 8:38 PM
5	The tool has to be aimed at farmers not reseachers to be truly useful. That means SIGNIFICANT user/farmer interaction as the tool is developed.	1/27/2021 11:25 AM
6	very helpful tool for beginning cover crop users	1/26/2021 7:20 PM
#	COMMENTS FOR "REDUCING NUTRIENT LOADS IN WASCOBS IN SOUTHERN ILLINOIS"	DATE
1	Again, putting in structures is going to be limited in scope and adoption by growers	1/28/2021 12:57 PM
2	This seems to be a close equivalent to the long standing drainage tile research in central IL and could help to catch up the knowledge base on issues more specific to So. IL.	1/28/2021 8:29 AM
3	This makes sense. Especially with U of I doing the project. SIU lacks expertise and experience to do much of this work. Need more of this.	1/27/2021 8:38 PM
#	COMMENTS FOR "EVALUATING NUTRIENT LOSS REDUCTION STRATEGIES: LONGER ROTATION WITH COVER CROPS AND BIOREACTOR"	DATE
1	Cash crop yield needs to be looked at in this study. Does doing a longer rotation with the cover crops hurt the cash crop yields? Or is there in field practices that can be done to limit yield drag such as strip till through the cover crop prior to planting?	2/8/2021 5:32 PM
2	We already know what cover crops can do from the research and bioreactors are an activity more than a real answer given the scope of tile drainage in Illinois	1/28/2021 12:57 PM
3	I think best to keep investment in bioreactors limited. Cover crop aspect and in-field management is a better target.	1/28/2021 8:29 AM
4	Impractical	1/27/2021 7:34 AM
5	Bioreactors inefficient ,expensive require maintenance	1/26/2021 9:56 PM
6	Bioreactors are un realistic at a scale that will matter.	1/26/2021 1:57 PM

2022 NREC Research Priorities

#	COMMENTS FOR "NITROGEN MANAGEMENT SYSTEMS IN TILE-DRAINED FIELDS: OPTIMIZING YIELDS WHILE MINIMIZING LOSSES"	DATE
1	In my opinion, the time period of nitrates through the tile line needs adjusted. You can't look at physical time but more like growing degree days in corn. For example, when comparing fall applied nitrogen vs spring applied nitrogen. If you look at the nitrates through the tile and go fall to fall for a time period, of course you will see more nitrates for the fall. It would have went through the winter months and we get tile line flow during that time and thus some nitrate movement. Then the spring applied nitrogen would just be from spring to fall. If you kept monitoring the spring applied through the winter, you would most likely end up with a similar amount of nitrates in the tile as fall applied. Mass cannot be created nor destroyed. The nitrogen has to go somewhere.	2/8/2021 5:32 PM
2	Unless we want N or tile to be regulated after 2025, we better have answers on this issue	1/28/2021 12:57 PM
3	This type of work should be continued as a priority.	1/27/2021 8:38 PM
4	Part of study has to be how to deal with lower than normal yield in dry weather situations. How to manage the excess N that the crop won't use.	1/27/2021 11:25 AM
5	Necessary, but will IL farmers change their practices.	1/27/2021 7:34 AM
#	COMMENTS FOR "ASSESSING SUITABILITY AND BENEFITS OF COVER CROPS IN ILLINOIS"	DATE
1	how many more studies do we need to please the epa?	1/28/2021 7:55 PM
2	The cover crop research needs to focus now on getting more growers to actually plan them	1/28/2021 12:57 PM
3	Good cover crop research is needed. I am suspect of any cover crop project that only thinks of Cover Crops and not the Cover Crop System. The "systems approach" is critical to success and should be approached in all good research that will foster increased adoption.	1/28/2021 8:29 AM
4	This is important as long as competent researchers are involved that really understand cover crops. Do we have any without Mike Plumer and Dixon Springs? NREC should not invest in projects for university researchers to get up to speed.	1/27/2021 8:38 PM
5	See comments in previous section	1/27/2021 11:25 AM
#	COMMENTS FOR "TOWARDS MANAGEMENT OF DISSIMILATORY NITRATE REDUCTION TO AMMONIUM FOR NITRATE RETENTION IN AGRICULTURAL SOILS"	DATE
1	Will this truly result in applied changes in practices? Nice to fund but only if it helps meet the INLRS goals by 2025	1/28/2021 12:57 PM
2	Very technical and will IL change their management	1/27/2021 7:34 AM
#	COMMENTS FOR "EVALUATING SLOW-RELEASE P FERTILIZERS TO INCREASE CROP PRODUCTION AND ENVIRONMENTAL QUALITY"	DATE
1	Has potential except placement also needs to be part of this project	1/28/2021 12:57 PM
2	limited supply	1/28/2021 9:47 AM
3	This sounds good, however, the companies developing these products should have a stake in this research, not NREC funding alone.	1/28/2021 8:29 AM
4	It works for nitrogen in the horticultural fields. Why not for P.	1/27/2021 7:34 AM
#	COMMENTS FOR "REDUCING P LOSS IN SOUTHERN ILLINOIS: PRODUCERS, PRACTICES, AND PRODUCTIVITY"	DATE
1	Very important, but seems heavily influenced by tillage, that we do too much of. I think we know that but how to influence farmers to reduce or eliminate tillage is important.	1/28/2021 8:29 AM
2	Biggest issue is soil run off. Less tillage would help	1/28/2021 6:07 AM
3	This seems like a good topic but skeptical of the ability of SIU to do much of this.	1/27/2021 8:38 PM
4	It is again necessary to change attitude before a change of ingrained practices.	1/27/2021 7:34 AM
5	Does adding wheat to the rotation reduce p loss?	1/26/2021 9:56 PM

## 2022 NREC Research Priorities

#	COMMENTS FOR "PRECISION NITROGEN MANAGEMENT OF CORN FOR IMPROVING FARM PROFITABILITY AND WATER QUALITY IN SOUTHERN ILLINOIS"	DATE
1	Nitrogen is not really the issue in S IL	1/28/2021 12:57 PM
2	I would think equipment companies developing this technology would be involved in this research. If they do not have a stake in project, I'm not sure it's NREC's place to prove or develop the technology.	1/28/2021 8:29 AM
3	Things like this are interesting but funding through the fertilizer fund should be limited.	1/27/2021 8:38 PM
4	If they are using anhydrous ammonia now why do we think that precision will work?	1/27/2021 7:34 AM
#	COMMENTS FOR "NITROGEN RATE RESEARCH & NREC PROJECT PARTNERSHIP"	DATE
1	The IL nitrogen response database and MRTN data is admired by many in our surrounding states. This yearly information is a good foundation for discussion at producer meetings from both a practical and technical standpoint. Very important.	1/28/2021 8:29 AM
2	Having these plots in So IL has been a great thing. We can pull up a map and see results from the region and state for several years. Hearing about this at meetings is always one of the best parts of the meeting. When we could have meetings. John Pike is a good resource to have working on this in So IL. Always active in meetings and available for questions wherever he is.	1/27/2021 8:38 PM
3	MRTN is not an agronomical formula! It is an economical formula for nitrogen. We need an agronomical formula for corn production relating to nitrogen at different stages of development tied to hybrid differentials	1/27/2021 7:34 AM
4	There has been enough published in this area and funding should be discontinued or substantially reduced.	1/26/2021 1:57 PM
#	COMMENTS FOR "WATER AND SEDIMENT CONTROL BASINS (WASCOBS) INFLUENCE ON CROP YIELDS AND WATER QUALITY"	DATE
1	Are we researching the WASCOB or using the drainage structure to monitor other production activities used in these fields? The WASCOB alone would have no impact on crop yield beyond the value of better erosion control. Hasn't NRCS proved the efficiency of a structure/practice approved for their cost share programs?	1/28/2021 8:29 AM
2	We know the structures help to slow erosion but it's the other management practices used on these fields that really make the difference where nutrient loss is concerned. Research to reprove the effectiveness of an NRCS approved practice seems not to be a good idea unless it's more involved.	1/27/2021 8:38 PM
3	Important tool in southern Illinois	1/26/2021 7:20 PM
#	COMMENTS FOR "MODELLING AND DESIGNING SATURATED BUFFERS FOR NITROGEN AND PHOSPHORUS MITIGATION IN ILLINOIS"	DATE
1	Need to concentrate on In field management. Buffer strips are an acceptance of nutrient loss, not a solution. Especially when water is diverted with big rains.	1/27/2021 8:38 PM
2	Modeling must be ground truthed. Most difficult part of any modeling project and needs emphasis BEFORE the study begins	1/27/2021 11:25 AM
#	COMMENTS FOR "INSECT MANAGEMENT IN COVER CROP SYSTEMS"	DATE
1	This can help get farmers over some assumptions about voles and such	1/28/2021 12:57 PM
2	Insect problems are so weather dependent in cover crops it seems like it would be difficult to discover much unless this was a long term project.	1/27/2021 8:38 PM
3	Important for growers to have confidence their cover crops are not going to create insect problems	1/26/2021 7:20 PM
#	COMMENTS FOR "WATER QUALITY AND AGRONOMIC IMPACTS OF GYPSUM APPLICATIONS IN SOUTHERN ILLINOIS"	DATE
1	This seems like a pet project	1/28/2021 12:57 PM
2	Probably a good project but not as high of a priority as other things.	1/27/2021 8:38 PM

2022 NREC Research Priorities

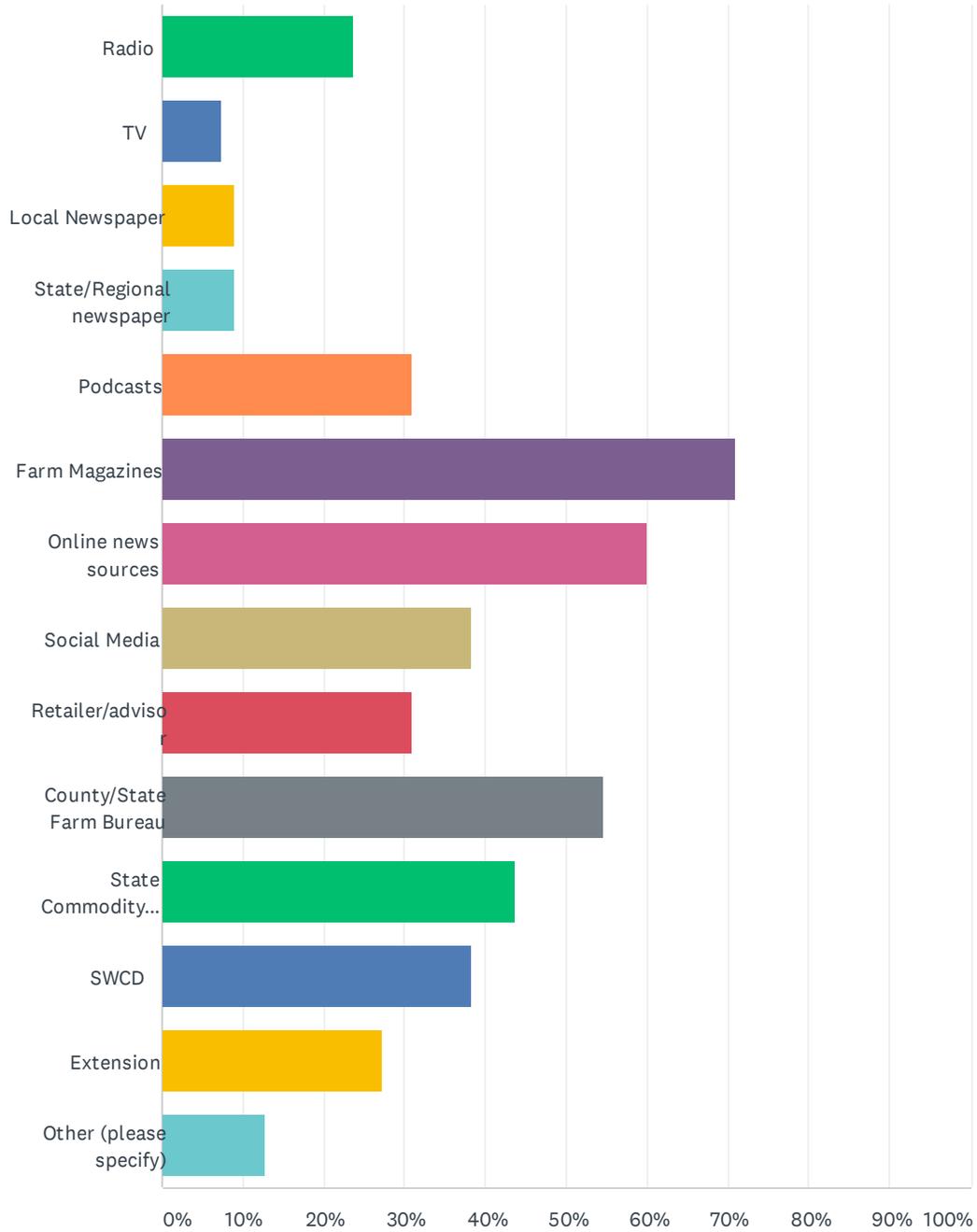
#	COMMENTS FOR "MINIMIZING PHOSPHORUS AND NITROGEN LOSS FROM AGRICULTURAL SYSTEMS WITH COVER CROPS AND TILLAGE IN SOUTHERN ILLINOIS"	DATE
1	Seems like a lot of these topics are redundant	1/28/2021 6:07 AM
2	Maybe work to perfect the cover crop systems to reduce tillage in So IL. Notill and cover crops could make a lot of problems better.	1/27/2021 8:38 PM
3	Find ways to increase infiltration may be more important	1/27/2021 7:34 AM
#	COMMENTS FOR "DESIGNER BIOCHAR TO CAPTURE AND RECYCLE PHOSPHOROUS FROM TILE DRAINAGE SYSTEMS"	DATE
1	Are we going to "treat" losses or find ways to reduce them occurring in the beginning?	1/28/2021 12:57 PM
2	looks like it can work, however the mgt. and number of acres that it can be used on is tiny.	1/28/2021 9:47 AM
3	New technology with little info at this time thus yes!	1/27/2021 7:34 AM
#	COMMENTS FOR "CAPITALIZING ON 150 YEARS OF SOIL SAMPLES TO DETERMINE LEGACY P AND IMPROVE WATER QUALITY IN ILLINOIS"	DATE
1	Somebody has to figure out how to solve the sins of the past	1/28/2021 12:57 PM
2	legacy P is a real problem. Not sure if it can be solved.....managed.	1/28/2021 9:47 AM
3	Not high priority.	1/27/2021 8:38 PM
4	We know we have it, so?	1/27/2021 7:34 AM
5	Could show trends	1/26/2021 9:56 PM
#	COMMENTS FOR "CHARACTERIZING SUB-FIELD VARIABILITY FOR EFFICIENT PHOSPHORUS MANAGEMENT: TARGETING HOTSPOTS"	DATE
1	Only on one field in Illinois.	2/9/2021 7:18 AM
2	Need some efficient management techniques.	1/28/2021 9:47 AM
3	Don't we have access to variable rate technology for this?	1/27/2021 8:38 PM
4	It is possible, but not practical to get a change in management when we have had VRT for 20 plus years.	1/27/2021 7:34 AM
#	COMMENTS FOR "MANAGING THE MAIZE MICROBIOME FOR SUSTAINABLE NUTRIENT RETENTION IN ILLINOIS AGRICULTURAL SOILS"	DATE
1	Not sure what this means and applicability is a big question mark	1/28/2021 12:57 PM
2	I need more info.	1/27/2021 7:34 AM
#	COMMENTS FOR "NEXT GENERATION COVER CROPPING IN CORN-SOYBEAN ROTATION TO IMPROVE FARM BENEFITS AND DECREASE ENVIRONMENTAL LOSSES IN SOUTH AND CENTRAL ILLINOIS"	DATE
1	I think we know what cover crops can do already, how to we get more farmers to plant them?	1/28/2021 12:57 PM
2	It is interesting that IL researchers would think about "next generation" cover crop work when so few have been involved in meaningful "first generation" work. But the right things in this area could be interesting and important.	1/28/2021 8:29 AM
3	As long as the researchers are working with experienced cover crop experts this makes sense. I'm now aware of the high end university cover crop experts that might be involved with this type of thing so I'll be cautiously optimistic.	1/27/2021 8:38 PM
4	Include ALL of Illinois. Need work in each section. North, West, Central & South	1/27/2021 11:25 AM
5	Next generation?	1/27/2021 7:34 AM
6	Time to move beyond cereal rye	1/26/2021 7:20 PM

2022 NREC Research Priorities

#	COMMENTS FOR "INTEGRATING LIVESTOCK GRAZING INTO THE WESTERN ILLINOIS CORN-SOYBEAN CROPPING SYSTEM TO ENHANCE FARM PROFITABILITY AND REDUCE NUTRIENT LOSS"	DATE
1	I	1/28/2021 12:57 PM
2	We need Illinois policy that does not try to chase all livestock to other states before this one makes much sense.	1/27/2021 11:25 AM
3	Must convince W. IL to go back to livestock (cattle)	1/27/2021 7:34 AM
4	We put cows & calves on corn stalks during winter. Cuts hay consumption. Don't know environmental effect	1/26/2021 9:56 PM
5	Livestock and cover crops are very compatible	1/26/2021 7:20 PM
#	COMMENTS FOR "SOURCES AND CYCLING OF NITRATE IN TILE-DRAINED CORN-SOYBEAN ROTATION SYSTEMS: A STABLE ISOTOPE APPROACH"	DATE
1	We need to know where N is coming from.	1/27/2021 7:34 AM
2	How much of our N loss is from applied N and how much is organic	1/26/2021 7:20 PM
#	COMMENTS FOR "INTEGRATING TILLAGE, SOIL CARBON DYNAMICS, AND TILE NITRATE LOSS "	DATE
1	We need more tillage research - and adoption of better tillage methods in IL. We are backsliding on conservation tillage	1/28/2021 12:57 PM
2	C-N ratios see former statements.	1/27/2021 7:34 AM
3	Carbon seems to be hot topic	1/26/2021 9:56 PM
4	Need to understand how much this is effected by soil type	1/26/2021 7:20 PM
#	COMMENTS FOR "DETECTION AND ATTRIBUTION OF RECENT CHANGES IN PHOSPHORUS LOADINGS IN THE ILLINOIS RIVER WATERSHED"	DATE
1	Some of this large scale watershed monitoring/understanding us important for all of IL ag. NREC should consider these things as possible.	1/28/2021 8:29 AM
2	Need to change attitudes	1/27/2021 7:34 AM
#	COMMENTS FOR "KNOWLEDGE IS POWER: POWERING UP BIOREACTORS AND SATURATED BUFFERS IN ILLINOIS"	DATE
1	When I asked the lead researcher how many bioreactors it would take in IL to make a difference, all they said was "lots and lots" What landowners are really going to install tens of thousands of these and maintain them when they also don't always work?	1/28/2021 12:57 PM
2	So much of the interest in edge of field practices seems to be driven by the hopes of minimizing the need or requirement for employing better in-field practices. If we fall back on these practices, we ignore the importance of keeping essential nutrients and soil in play for the long-term.	1/28/2021 8:29 AM
3	Seems like there needs to be more focus in these studies. So much over lap in different studies.	1/28/2021 6:07 AM
4	Limited value on limited acreage. Should not be a high priority	1/27/2021 8:38 PM
5	Oxymoron statement. Is the power in building bioreactors?	1/27/2021 7:34 AM

# Q12 Where do you get your news as it relates to nutrient issues?

Answered: 55 Skipped: 33



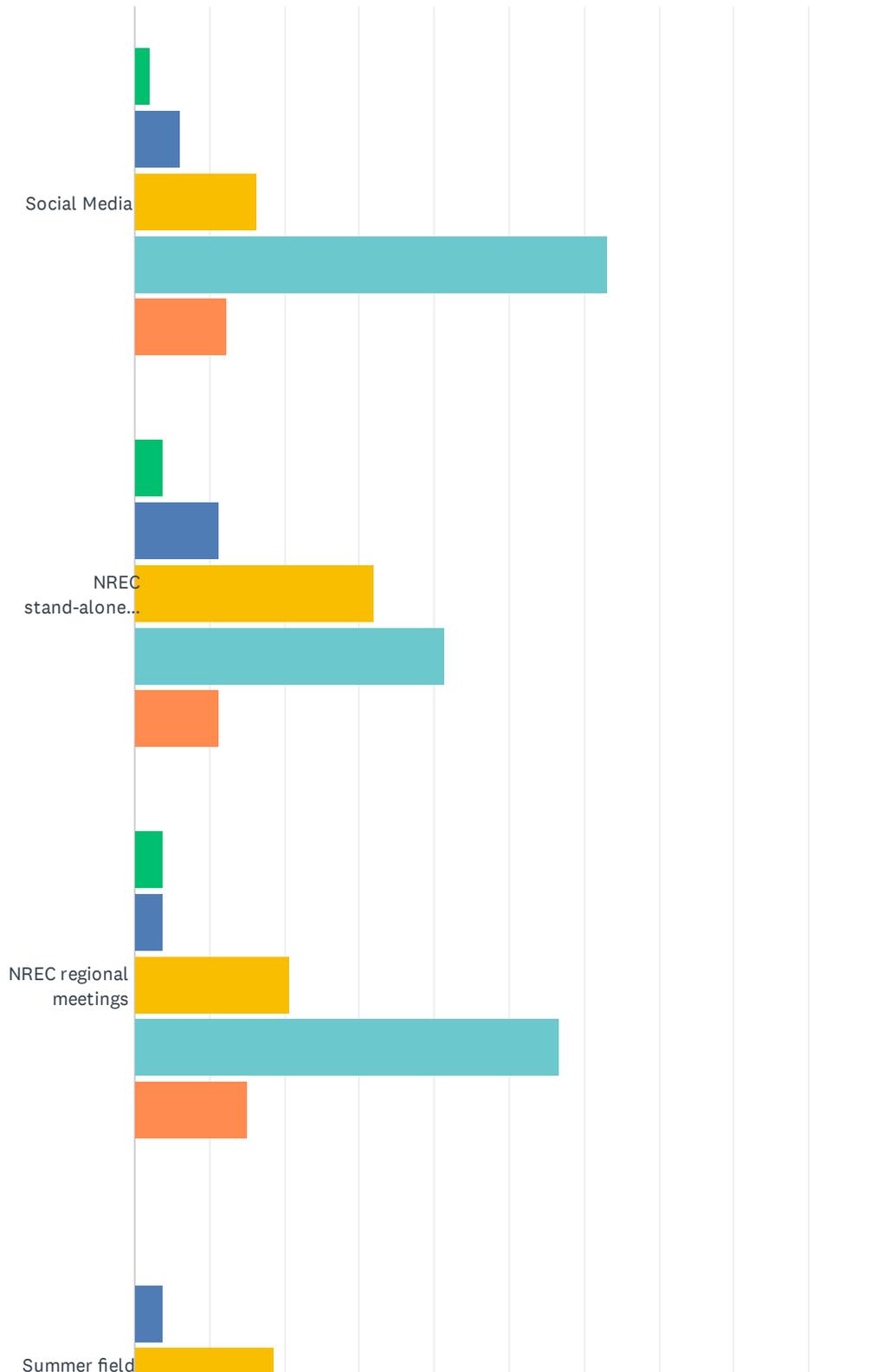
2022 NREC Research Priorities

ANSWER CHOICES	RESPONSES	
Radio	23.64%	13
TV	7.27%	4
Local Newspaper	9.09%	5
State/Regional newspaper	9.09%	5
Podcasts	30.91%	17
Farm Magazines	70.91%	39
Online news sources	60.00%	33
Social Media	38.18%	21
Retailer/advisor	30.91%	17
County/State Farm Bureau	54.55%	30
State Commodity organization	43.64%	24
SWCD	38.18%	21
Extension	27.27%	15
Other (please specify)	12.73%	7
Total Respondents: 55		

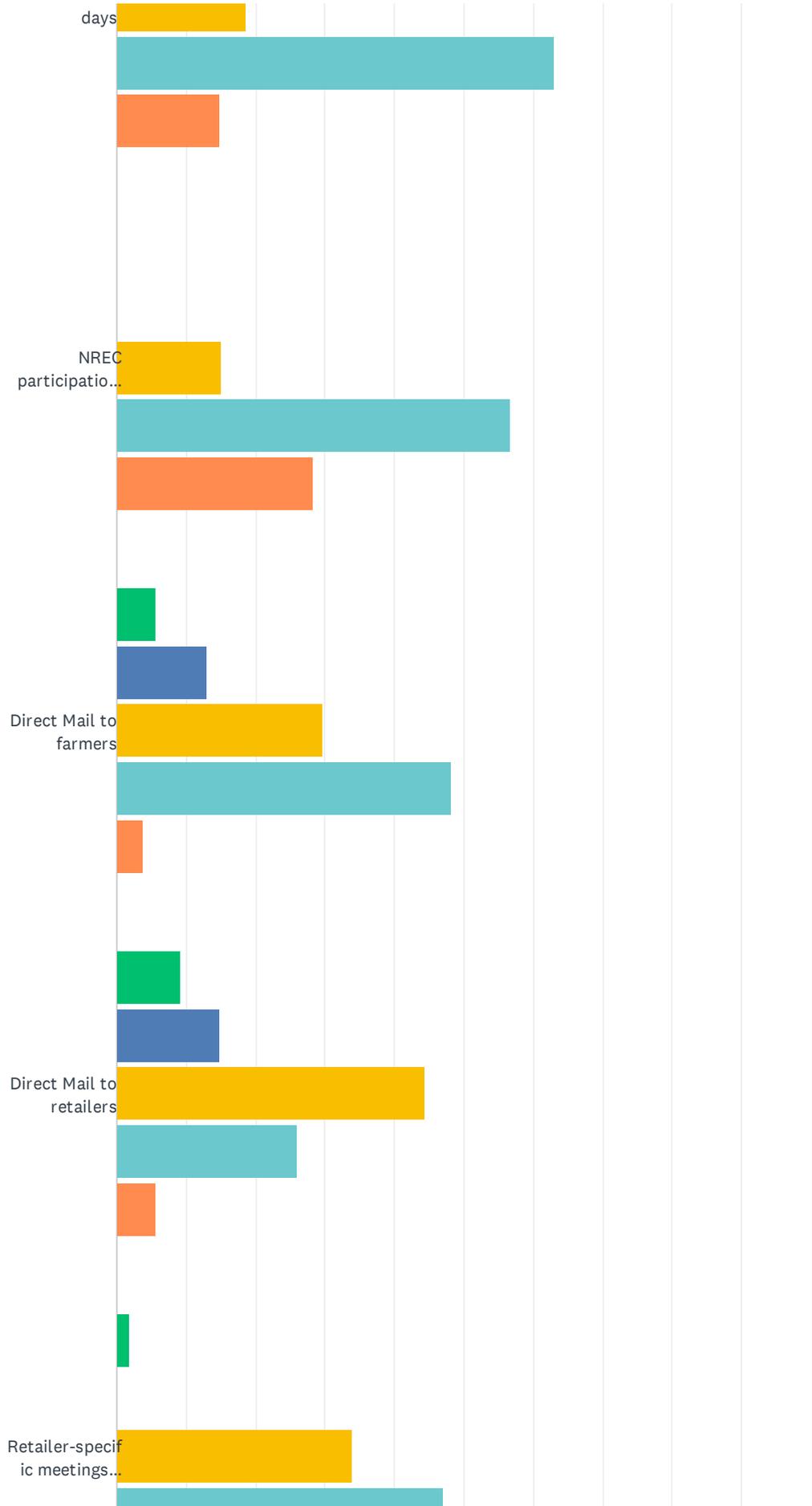
#	OTHER (PLEASE SPECIFY)	DATE
1	None	2/8/2021 9:02 PM
2	all	2/5/2021 4:17 PM
3	scientific journals	2/4/2021 8:36 AM
4	IFCA	2/3/2021 9:31 PM
5	Youtube	2/3/2021 9:28 AM
6	PCM	1/26/2021 7:24 PM
7	Scinece magazines, newsletters, conferences	1/26/2021 4:51 PM

### Q13 Please rank the following outreach methods as you think about the best ways to get current research into the hands of farmers, retailers and other influencers:

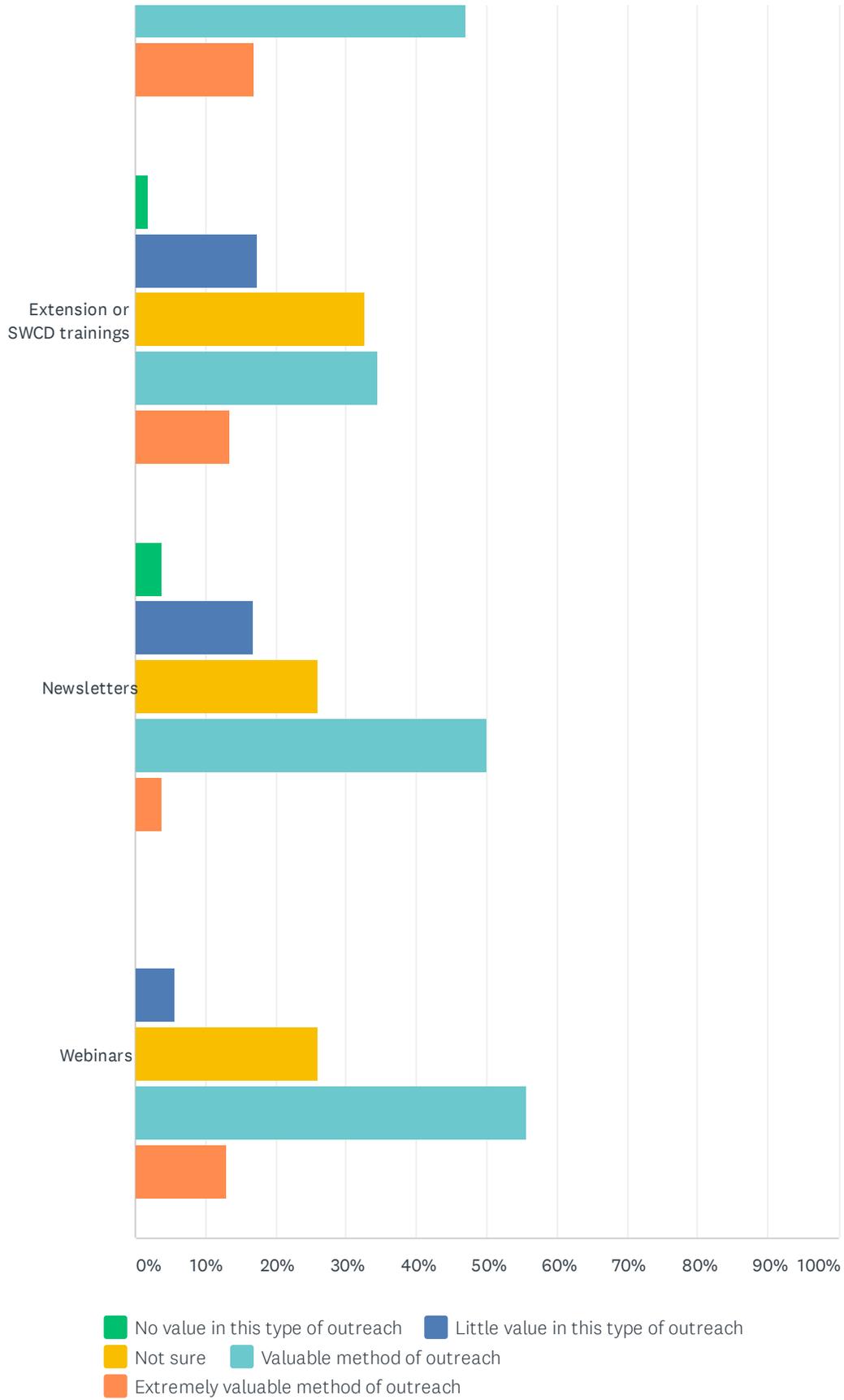
Answered: 54 Skipped: 34



# 2022 NREC Research Priorities



## 2022 NREC Research Priorities



2022 NREC Research Priorities

	NO VALUE IN THIS TYPE OF OUTREACH	LITTLE VALUE IN THIS TYPE OF OUTREACH	NOT SURE	VALUABLE METHOD OF OUTREACH	EXTREMELY VALUABLE METHOD OF OUTREACH	TOTAL
Social Media	2.04% 1	6.12% 3	16.33% 8	63.27% 31	12.24% 6	49
NREC stand-alone state-wide winter conference	3.77% 2	11.32% 6	32.08% 17	41.51% 22	11.32% 6	53
NREC regional meetings	3.77% 2	3.77% 2	20.75% 11	56.60% 30	15.09% 8	53
Summer field days	0.00% 0	3.70% 2	18.52% 10	62.96% 34	14.81% 8	54
NREC participation in existing conferences/meetings	0.00% 0	0.00% 0	15.09% 8	56.60% 30	28.30% 15	53
Direct Mail to farmers	5.56% 3	12.96% 7	29.63% 16	48.15% 26	3.70% 2	54
Direct Mail to retailers	9.26% 5	14.81% 8	44.44% 24	25.93% 14	5.56% 3	54
Retailer-specific meetings (train the trainer)	1.89% 1	0.00% 0	33.96% 18	47.17% 25	16.98% 9	53
Extension or SWCD trainings	1.92% 1	17.31% 9	32.69% 17	34.62% 18	13.46% 7	52
Newsletters	3.70% 2	16.67% 9	25.93% 14	50.00% 27	3.70% 2	54
Webinars	0.00% 0	5.56% 3	25.93% 14	55.56% 30	12.96% 7	54

#	ARE THERE OTHER OPPORTUNITIES FOR OUTREACH NOT LISTED ABOVE THAT YOU THINK ARE WORTH EXPLORING?	DATE
1	None	2/8/2021 9:02 PM
2	Mass Texting Service? or sponsoring grain markets mass texting service that would have information included in the grain bids	2/4/2021 8:51 AM
3	Videos	2/3/2021 9:28 AM
4	consultant, CCA conferences.	1/28/2021 9:56 AM
5	Start and Maintain a Podcast	1/27/2021 11:32 AM
6	Have we tracked attendance? Is the audience CCA's looking for credits?	1/27/2021 7:36 AM
7	Community college staff & students	1/26/2021 10:03 PM
8	Why not work with commodity organizations?	1/26/2021 1:59 PM

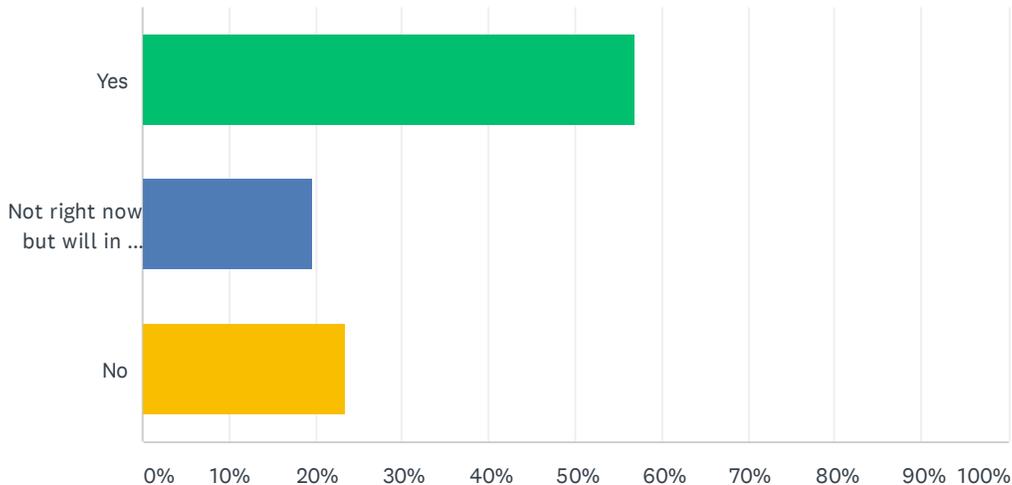
## Q14 Are there any specific topics that you would be interested in learning more about via an online webinar or recorded video content?

Answered: 24 Skipped: 64

#	RESPONSES	DATE
1	None.	2/8/2021 9:02 PM
2	Carbon credit or water quality credit markets	2/8/2021 5:36 PM
3	Using cover crops to manage nutrient needs for the following cash crop	2/8/2021 12:30 PM
4	n/a	2/5/2021 4:17 PM
5	.	2/5/2021 9:54 AM
6	None	2/4/2021 10:36 AM
7	you need more information surrounding cover crops and strip tillage practices.	2/4/2021 8:51 AM
8	no	2/3/2021 9:31 PM
9	Whatever the topic, I hope that it is real-world applicable. Much of what is being researched lately is only feasible on a small-scale operation.	2/3/2021 3:37 PM
10	no	2/3/2021 9:39 AM
11	The set up and implementation of projects. Management changes needed when trying research recommended practices.	2/3/2021 9:28 AM
12	What is the ultimate goal of each project---little podcasts or articles on these would be good and how are these projects working together?	1/28/2021 1:00 PM
13	economics of Cover crops....	1/28/2021 9:56 AM
14	Nitrogen timing of application, percentage of total applied	1/28/2021 9:14 AM
15	Cover Crop management. What works? Why some things don't? And BMPs to make cover crops work better. We seem to hear a lot of negatives, yet at the same time there are examples of success out in the country.	1/28/2021 8:35 AM
16	Cover crops, nitrate loss reduction	1/28/2021 6:10 AM
17	Nutrient loss based on cover crop species	1/27/2021 11:32 AM
18	Teach farmers by example, showcase successful cover croppers and their methods	1/27/2021 10:32 AM
19	big challenge in adding more fall cover crops to the rotation is the lack of herbicide carryover studies.	1/27/2021 7:43 AM
20	Biochar	1/27/2021 7:36 AM
21	Methods of nutrient application to wheat-double crop SB	1/26/2021 10:03 PM
22	Profitable alternative crops that use less fertilizer and pesticides	1/26/2021 4:51 PM
23	No	1/26/2021 2:52 PM
24	cover crops and tillage	1/26/2021 1:59 PM

### Q15 Are you/your organization involved in research or education/outreach activities that you think would be opportunities for collaboration with NREC?

Answered: 51 Skipped: 37



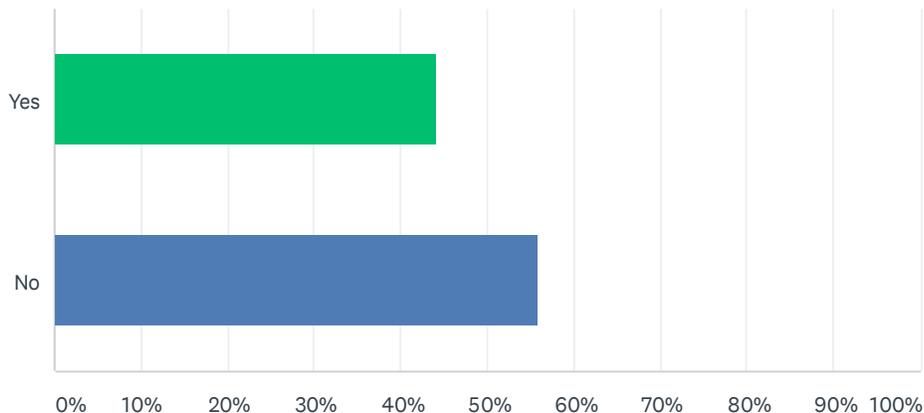
ANSWER CHOICES	RESPONSES	
Yes	56.86%	29
Not right now but will in the future	19.61%	10
No	23.53%	12
<b>TOTAL</b>		<b>51</b>

2022 NREC Research Priorities

#	IF YOU ANSWERED YES, PLEASE PROVIDE MORE DETAILS:	DATE
1	I am a field cooperater with Soil Health Partnership. Currently doing a multi-year strip-trial with cover crops	2/8/2021 12:30 PM
2	Mosaic helps fund 4R research	2/5/2021 3:45 PM
3	.	2/5/2021 9:54 AM
4	Currently doing MiField trials on growers farms.	2/4/2021 10:36 AM
5	I work for NRCS and we provide technical and financial assistance to farmers for nutrient managment	2/4/2021 8:36 AM
6	Wabash Valley Stewardship alliance member	2/4/2021 8:28 AM
7	installing new wascob this year that could be used for research if needed	1/28/2021 8:03 PM
8	N rate study	1/28/2021 5:47 PM
9	Research farms utilizing emerging farming practices that improve yields through Nutrient balancing, biological products, with cultural practices.	1/28/2021 9:56 AM
10	IL soybean association and IL corn growers are funding PCM that looks at nitrogen efficiency, cover crops and soil health, could be good data for NREC	1/27/2021 8:33 PM
11	PCM project collaboration between ISA and IL corn. Soy Summit and Voice for Soy magazine for outreach.	1/27/2021 8:01 PM
12	Yes as a director of local soil & water district, conservation education is a key responsibility	1/27/2021 10:32 AM
13	We are involved with many conservation partners statewide on different water quality demos/initiatives and have co-partnered on some with NREC already.	1/27/2021 9:34 AM
14	AISWCD puts out a weekly E news letter to leaders and staff across the state. Weekly NREC research content or announcements I think would be useful and welcome	1/27/2021 6:22 AM
15	Corn-PCM	1/26/2021 10:03 PM
16	PCM	1/26/2021 7:24 PM
17	Illinois Farm Bureau	1/26/2021 6:04 PM
18	Sierra Club and ELPC are working with NREC	1/26/2021 4:51 PM
19	Illinois corn marketing board	1/26/2021 2:13 PM
20	NREC though has never expressed interest.	1/26/2021 1:59 PM

## Q16 Are you currently receiving the NREC Quarterly newsletter?

Answered: 52 Skipped: 36



ANSWER CHOICES	RESPONSES
Yes	44.23% 23
No	55.77% 29
TOTAL	52

#	IF YOU ARE NOT CURRENTLY RECEIVING OUR ELECTRONIC NEWSLETTER AND WOULD LIKE TO BE ADDED TO THE DISTRIBUTION LIST, PLEASE LEAVE YOUR EMAIL ADDRESS HERE:	DATE
1	mindy.scott@usda.gov	2/9/2021 7:45 AM
2	jared.greggfarms@gmail.com	2/8/2021 9:02 PM
3	colbyhunt82@hotmail.com	2/8/2021 1:11 PM
4	pollard8@comcast.net	2/8/2021 10:27 AM
5	.	2/5/2021 9:54 AM
6	npierce@goldstarfs.com	2/4/2021 10:36 AM
7	bfairfull@mmservice.com	2/4/2021 8:51 AM
8	brett.roberts@usda.gov	2/4/2021 8:36 AM
9	stervekoeller82@yahoo.com	1/28/2021 1:49 PM
10	euphoff90@gmail.com	1/28/2021 6:10 AM
11	Rkjkfarms@gmail.com	1/27/2021 8:33 PM
12	rylandr@mymctc.net	1/27/2021 11:32 AM
13	seideljl@hamiltoncom.net	1/27/2021 10:32 AM
14	?	1/27/2021 7:36 AM
15	ricefarm2@gmail.com	1/26/2021 7:24 PM
16	Bradd77@frontier.com	1/26/2021 6:04 PM
17	Ettinger.Albert@gmail.com	1/26/2021 4:51 PM

## Q17 Do you have any other comments/questions that you would like to share with the Council/Research Committee?

Answered: 15 Skipped: 73

#	RESPONSES	DATE
1	None.	2/8/2021 9:02 PM
2	No.	2/8/2021 5:36 PM
3	none	2/8/2021 10:27 AM
4	.	2/5/2021 9:54 AM
5	None	2/4/2021 10:36 AM
6	Focus on the projects that farmers are most willing to change in their operations. Farmers are creatures of habits and more inclined to make small changes to their current practices that large changes. In order to continue the success of reducing N & P loads we need more money and more outreach for the projects that will make the most significant impact to the final goal with the farmers. Put my farmer hat on, cover crops and reduction of tillage or different tillage practices are my focus in the future.	2/4/2021 8:51 AM
7	no	2/3/2021 9:31 PM
8	I like the diversity and depth of research, but we've got to start endorsing and showing concepts that get us toward nutrient and soil improvement goals.	2/3/2021 9:28 AM
9	you to get different tools to use to reach the goal. I have neighbors that love tillage so cover crops will never be used. If only part of us are working for the goal, we never will make it. All have to contribute if we are to achieve our goal.	1/28/2021 8:03 PM
10	The Research and outreach must stay focused on meeting the 2025 INLRS goals, nothing is more important to avoid litigation/regulation/legislation which is why NREC was created	1/28/2021 1:00 PM
11	NREC does a lot of good for IL Ag. Farmers need to be more aware of what is going on, that's made possible by NREC funding that comes from their fertilizer purchases.	1/28/2021 8:35 AM
12	Should do more PR	1/26/2021 10:03 PM
13	no	1/26/2021 4:51 PM
14	No	1/26/2021 2:52 PM
15	It would be nice to see collaboration with the commodity groups as they also represent farmers.	1/26/2021 1:59 PM



801 E. Sangamon Ave PO Box 19281  
Springfield, IL  
62794

MEMO TO: NREC Potential Project Investigators  
FROM: Ed Corrigan, NREC Research Committee Chair  
RE: **REQUEST FOR 2021/2022 NREC PROJECT PROPOSALS**

We are pleased to announce the solicitation of projects for the crop year 2022 for the Illinois Nutrient Research & Education Council (NREC).

NREC's priority is funding projects that advance the science of products and practices that increase the efficiency of nitrogen and phosphorus use while maintaining productivity goals. It is expected that the results of such projects will be shared with other scientists by publishing in peer-reviewed scientific journals. We also expect the results to be widely distributed to farmers and crop advisors via meetings, news releases, and electronic media in a manner that effectively promotes and assures implementation of the derived conclusions or best management practices.

As NREC approaches our 10<sup>th</sup> year of funding, we are looking for research projects that achieve "Phase 2" of our understanding of agronomic practices around nutrient management. Much of this research will need to be multidisciplinary, with multiple sites and using a systems approach. Therefore, priority will be given to those projects that demonstrate a multidisciplinary approach and collaborate with researchers from other universities or entities.

Under our new funding cycle, it is expected that any project proposed with cover crops, fall nutrient applications or other fall treatment be initiated the year funding is awarded. With this in mind, site identification, cooperators, equipment, and other needs must be complete when submitted.

**Economic Cost/Benefit Analysis:** Feedback from farmers in Illinois consistently shows that a major hurdle in the adoption of conservation practices is the lack of economic information. To that point, we are looking for research proposals that include an annual economic analysis OR a stand-alone project that utilizes data from other NREC-funded projects in order to conduct the economic analysis.

For 2022, NREC is focusing on the following key areas of investigation that farmers and other key stakeholders have identified as needed based upon the goals outlined in the Illinois Nutrient Loss Reduction Strategy. While much of our current research has been focused on nitrogen and phosphorous, we recognize that other nutrients play a role in crop nutrition and we are open to research projects that look beyond these two primary nutrients.

1. Continue studies testing the impact of N management systems on efficiency of N use.
  - a. Maintain statewide distribution of work on optimum N rate to meet the needs of the MRTN.
  - b. Evaluate the efficacy of combinations of (4R's) source, place, rate and time of application on N efficiency.
  - c. Synergistic approaches to 4R's including utilization of macro/micronutrients to improve N efficiency
2. Cover Crop Systems: Evaluate the economics, feasibility, water quality impacts and best management practices of growing cover crops to address nitrogen and phosphorus loss as well as crop productivity. Proposals should address all aspects of cover crops from crop selection, seeding and grazing through crop termination and subsequent mineralization and nutrient release.
  - a. Cover Crop systems following soybeans and ahead of corn to maximize corn production and minimize nutrient losses.
  - b. Engineered cover crops/Cover crop options beyond cereal rye.
  - c. Addition of wheat to corn/soybean rotation to increase nutrient utilization
3. Evaluate the agronomic and environmental benefits of reduced tillage/strip till/erosion control and the placement, timing and rate of nutrient applications throughout the entire state.
4. Phosphorus – Continue studies testing the impact of Phosphorus management systems on efficient Phosphorus usage, the role of legacy Phosphorus, as well as placement and timing of Phosphorous applications in corn and wheat.
  - a. Conduct a literature review on the body of research related to phosphorus transport in streams associated with streambank and streambed erosion at the watershed scale.
5. NREC is also very interested in research projects that go beyond the “known” into more innovative (novel, inventive, original) and forward-looking research. This could include edge-of-field practices.

We encourage you to submit well-defined proposals that will endure peer review yet will also be useful to crop producers and the agribusiness industry in their quest for higher yields, while minimizing potential negative environmental impacts of crop production practices in Illinois. In addition to detailed mid-year and year-end project reports, we also require that each project

identify at year-end any critical observations learned from the study that can be shared with the industry and the general public.

NREC is currently funding 33 projects and many of these will be considered for continued funding in 2022. Please go to [www.illinoisnrec.org](http://www.illinoisnrec.org) to view a summary of these projects as well as the 2019 Annual Report. The 2020 Annual Report will be available later this Spring.

Attached is an outline for submitting a project to NREC, a standard cover sheet and the project budget template. Please limit your proposal to ten pages total and the synopsis to one page. You can modify the budget template accordingly to best reflect your project's unique or specific budget items. Please be succinct but descriptive with your project titles and include an email and telephone number where the lead investigator can be reached.

**Please submit your proposals in PDF format via email to the NREC Research Manager at [sgolovay@illinoisnrec.org](mailto:sgolovay@illinoisnrec.org) by May 7th.** Shani will acknowledge receipt of your proposal. The NREC Council will consider the proposals and will announce in August 2021 the projects NREC will fund in the 2021/2022 crop year. If you have questions, please direct them to Shani, who can also be reached at 618-593-9229.

Thank you for your interest in NREC and helping us pursue research and educational projects to advance Illinois agriculture and protect our natural resources.