





**EFFECTIVE COVER CROPPING**  
maximizing benefits, minimizing risks



Joel Gruver – WIU Agriculture

PERSPECTIVE |  Open Access |  


## Applying a “fail-fast” approach to conservation in US agriculture

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 SECTIONS

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 TOOLS

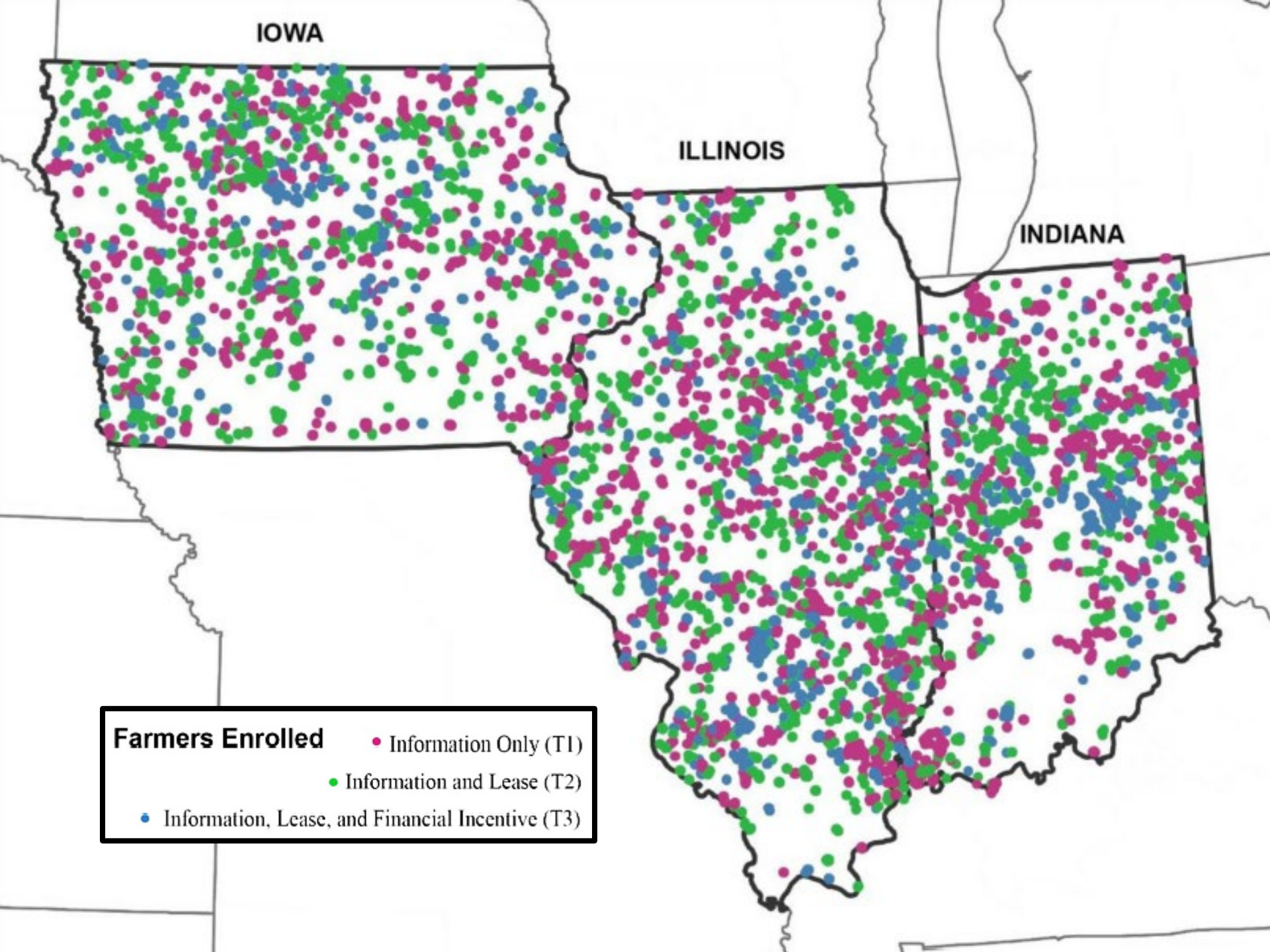
 SHARE

### Abstract

Conservation programs often operate for many years with little information on program performance or impacts. A better process would encourage programs to “fail fast”—in other words, to implement rapid testing to learn and adapt early, and thereby avoid

wasteful investments. This approach, which is a form of adaptive management, can be used to guide program design and implementation. The fail-fast approach is a management strategy that emphasizes learning from failure and quickly adjusting to new information. It is a process of iterative learning and adaptation that allows managers to test assumptions and adjust their strategies as they learn more about the system. The fail-fast approach is a form of adaptive management that emphasizes learning from failure and quickly adjusting to new information. It is a process of iterative learning and adaptation that allows managers to test assumptions and adjust their strategies as they learn more about the system. The fail-fast approach is a form of adaptive management that emphasizes learning from failure and quickly adjusting to new information. It is a process of iterative learning and adaptation that allows managers to test assumptions and adjust their strategies as they learn more about the system.

**FAIL-FAST approach = adaptive management with an emphasis on reducing the cost of failure and quickly learning from failure**



IOWA

ILLINOIS

INDIANA

**Farmers Enrolled**

- Information Only (T1)
- Information and Lease (T2)
- Information, Lease, and Financial Incentive (T3)

**Based on 3 sources of evidence,  
initial interventions failed**  
- neither the lease template  
nor the financial incentive  
increased cover crop adoption,  
compared to only providing information.

**The project quickly pivoted  
to alternative interventions**  
based in part on insights  
gained through initial work  
and continued to include experiments  
as part of program designs.

**Why is it so difficult to move the needle on cover crop adoption?**



**I have tried cover  
crops and they cost  
me \$\$\$... No need  
to do that again...**

**Farmers have  
valid concerns  
about cover  
crops that have  
not been  
adequately  
addressed**



# Cover crops use in Midwestern US agriculture: perceived benefits and net returns

2020

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## Abstract

Despite being generally accepted as a promising conservation practice to reduce nitrate pollution and promote soil sustainability, cover crop adoption in Midwestern US agriculture is low. Based on focus groups, surveys and partial budgets, we calculated the annual net returns

This study uniquely compared cropping systems w/ and w/o cover crops on the same farm.

The resulting comparisons are more robust than the typical comparisons of cover crop users vs unrelated non-adopters.

Despite farmers' positive perceptions about cover crops & the availability of cost-share, net returns to cover crop use were negative for most participants.

Cover crops affect whole farm profitability through several channels besides establishment and termination costs. Despite farmers' positive perceptions about cover crops and the availability of cost-share programs, calculated annual net returns to cover crops use were negative for most participants.

# In 2014, the NCGA launched an ambitious project to advance understanding of the economic and environmental impacts of conservation practices

With a peak annual budget > \$5 million, ~20 employees and ~200 farmer collaborators in 16 states, the SHP outlived its original 5 year plan and generated large amounts of on-farm data but was terminated in 2021



FARMER-LED, FARMER FOCUSED.

Dave Beard – Frankfort, Indiana

**Mission: The Soil Health Partnership promotes the adoption of soil health practices for economic and environmental benefit.**

By building a peer-to-peer network, the Soil Health Partnership partnered with farmers to explore the economic and environmental benefits and risks of soil health practices. SHP collected on-farm data to evaluate the impacts of soil health practices on the soil, the environment, and the farmer's bottom line.

**Some of the data is unreleased  
but valuable reports have been  
compiled and are available on  
the SHP website**

# Conservation's Impact on the Farm Bottom Line



K·COE  
ISOM



## Findings at a glance

Based on the information collected, we identified three practices among our participating farmers. key financial impacts of implementing conservation

### 1 Key finding:

#### Conservation tillage reduces operating costs

In the face of a challenging farm economy, reducing costs of production can be one way for farmers to improve profitability.

**By reducing or eliminating tillage, growers were able to reduce operating costs.**

In our study, growers practicing conservation tillage had higher net returns and lower per-acre costs than fields under conventional tillage for both corn and soybeans. Cost savings largely resulted from fuel and oil, machinery, equipment and repair expenses.

### 2 Key finding:


#### Cover crops can be part of a profitable system, especially as experience grows

All of the farmers we worked with used cover crops on at least a portion of their acres, but their scope of use, management practices, and experience level varied. We found that, while this conservation practice requires up-front investment (e.g., seed), **profitability with cover crops improves as growers get more experience with this approach.**

### 3 Key finding:

#### Success with conservation practices is optimized with a targeted, stepwise, tailored approach

Profitable conservation systems do not look the same on every farm since growers implement different strategies to address their specific needs. **Farmers in our study achieved profitable conservation systems by aiming to address specific management challenges with in-field conservation practices.**



# Cover Crops Can be Part of a Profitable System, Especially as Experience Grows

## COVER CROPS

The role of experience in the profitability of cover crop systems was one of the key findings that arose from our 2021 report, [Conservation's Impact on the Farm Bottom Line](#). We found that:

- Unlike the immediate cost savings of conservation tillage, cover crops have annual costs, and efficiencies and soil health benefits can take time to achieve
- Farmers with many years of cover crop experience are more profitable than farmers who have recently adopted cover crops
- Reducing cover crop and input costs is critical to cover crop profitability



Terry Taylor gathers soil and tissue samples from a field of continuous corn on his farm in Wayne Cty, IL. He is one of many farmers in IL who depend on their OWN cover crop research

The right covers can transform tough soils, but farmers must fight past early challenges to find what works on their farm

# Bending the CC learning curve ( **Reducing cost of failure and quickly learning from failure** )

## How to Get a Faster Return from Cover Crops

**W**hen evaluating average fields in average weather conditions, it can take three or more years for cover crops to pay off if no incentive payments are obtained and no special circumstances exist. However, every farmer has their own challenges and opportunities that can affect this picture. Therefore, when evaluating the economics of cover crops, it can be helpful to consider common situations or scenarios under which they will pay for themselves more quickly, often within a year or two. Seven situations in which cover crop profits are accelerated are listed here and then described in more detail in a later section of this bulletin.

### Cover crops can pay their way more quickly when:

1. Herbicide-resistant weeds are a problem
2. Cover crops are grazed
3. Soil compaction is an issue
4. Cover crops are used to speed up and ease the transition to no-till
5. Soil moisture is at a deficit or irrigation is needed
6. Fertilizer costs are high or manure nutrients need to be sequestered
7. Incentive payments are received for using cover crops

A detailed discussion of each factor is contained in this bulletin



Cover crops decrease maize yield variability in sloping landscapes through increased water during reproductive stages, Leuthold et al (2021)

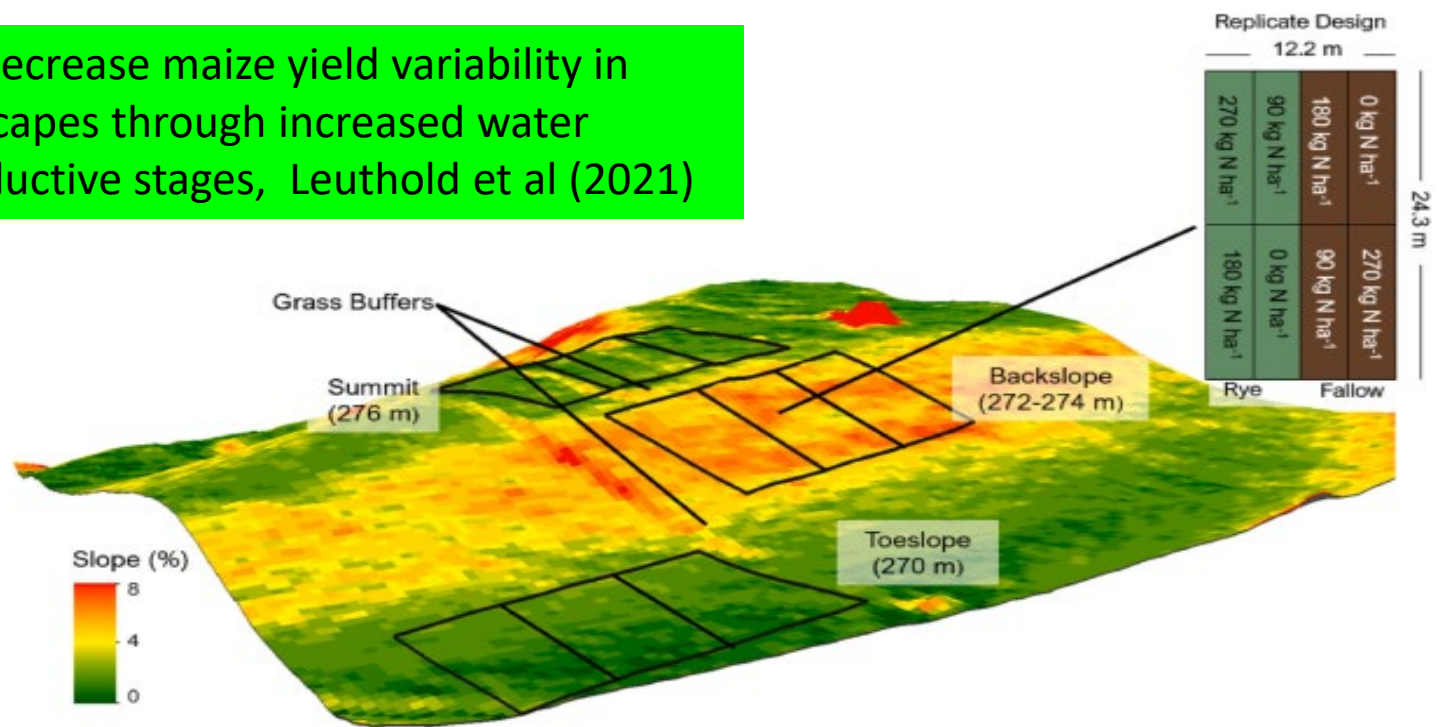


Fig. 1. Topographic map with % slope and experimental layout for field experiments in 2019.

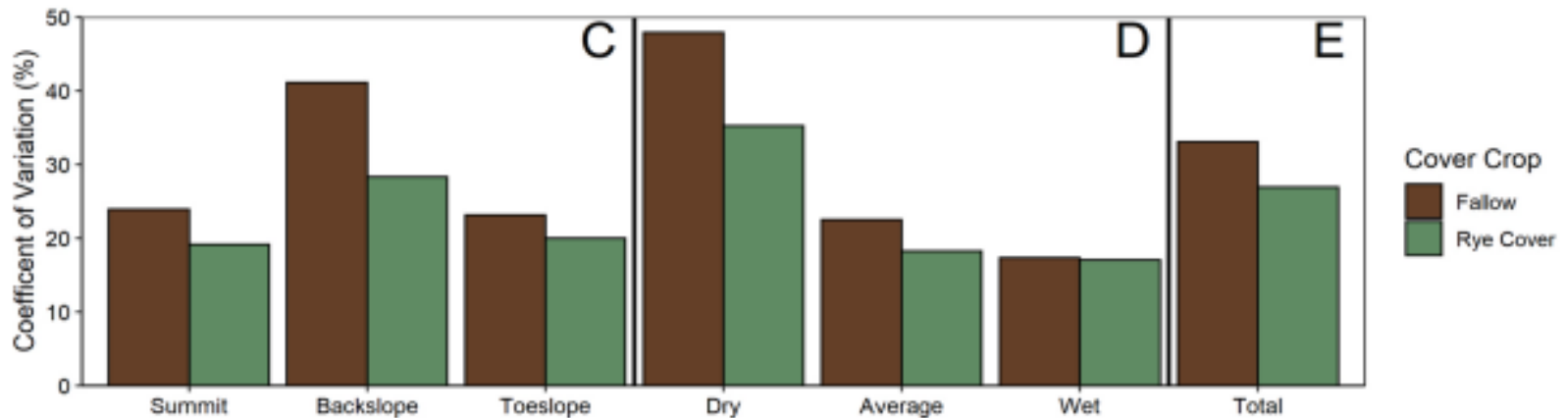


Fig. 7. Top: Maize grain yield vs. variance plot for the different landscape positions (A) and different precipitation categories (B). Dashed lines connect the fallow and cover cropped treatment within the same landscape position.  $\sigma^2(\text{Yield})$  is equal to one standard deviation in kg ha<sup>-1</sup>. Bottom: Yield coefficient of variation from 30-year simulations by landscape position (C), precipitation category (D), and total (E), of maize grown after fallow or after a cereal rye cover crop.

# Building a cover crop learning community



Practical Farmers of Iowa

## **Don't Farm Naked**

Plant Cover Crops



**PFI has a comprehensive program supporting effective use of CCs in conventional and organic systems including dedicated staff, coordination of on-farm research, field days and other learning community events, cost-share, web tools and farmer friendly research reports.**



Find Cover Crops

Find nearby cover crop service providers for your seed and application needs.

Find Cover Crops

Get Started

## What kind of cover crop services are you looking for?

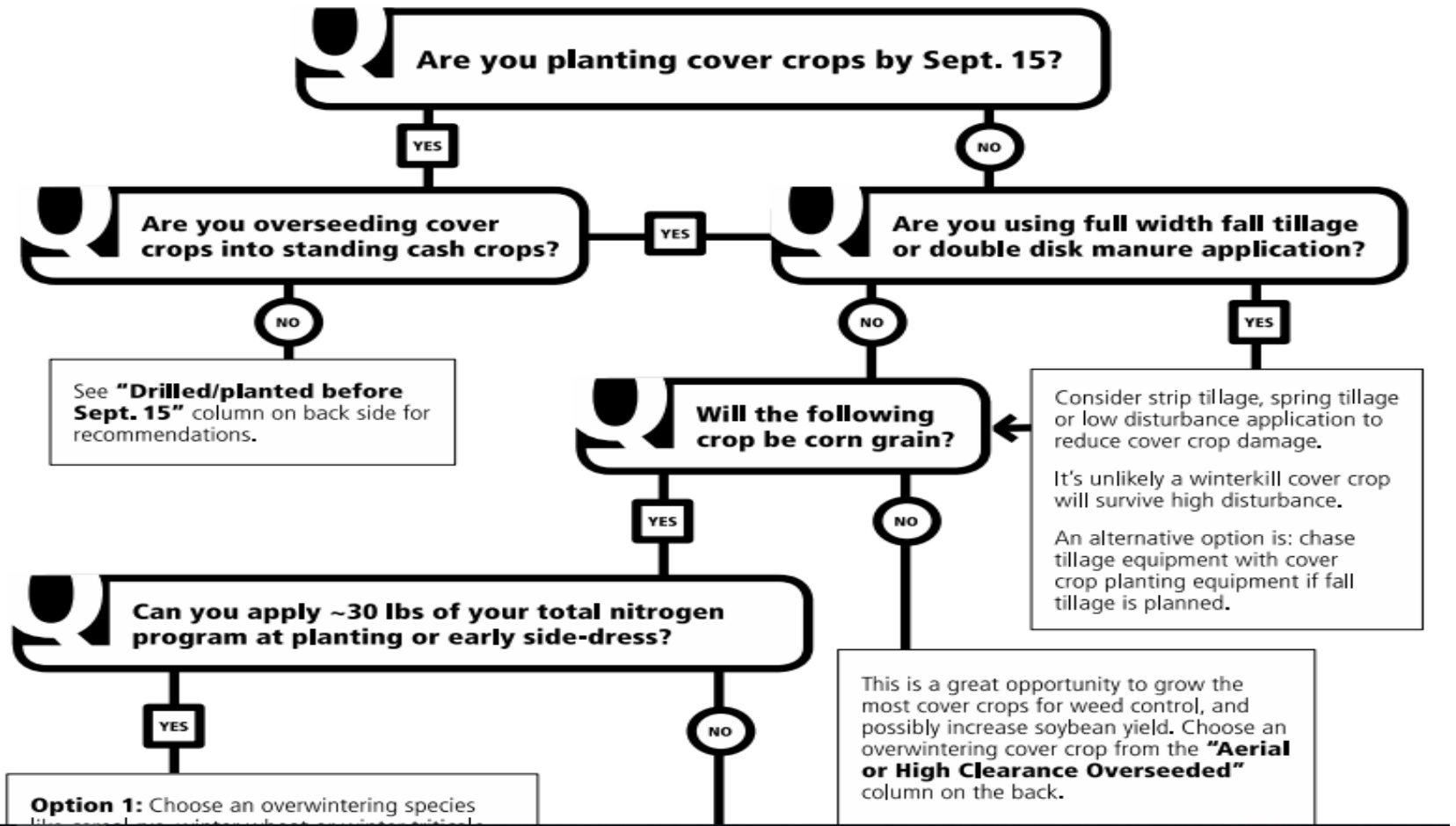
- Aerial Application
- Custom Drilling
- Custom Spraying
- Drone Application
- Dry Fertilizer Spreading
- High-Clearance Seeding
- Roller Crimping
- Seed Cleaning
- Seed Supplier
- \*\*Show Me Everything\*\***



# PFI Cover Crop Decision Tree



## Cover Crop Decision Tree



# Make Cover Crops Pay on your Farm

*Farmer-led Research Results from PFI's Cooperators Program*

1. Control Cover Crop Costs
2. Control Herbicide Costs
3. Avoid Cover Crop Establishment Failures
4. Avoid Redundant Expenses
5. Avoid Corn Yield Drag
6. Realize Soybean Yield Gains

**\$7. Feed Cover Crops \$**



PRACTICAL FARMERS OF IOWA  
**COOPERATORS'  
PROGRAM**

FARMER-LED RESEARCH

**Grazing is cheaper than stored feed!**





PRACTICAL FARMERS OF IOWA  
**COOPERATORS'  
PROGRAM** Farmer-Led Research



**2021**

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## Economic and Soil Health Impact of Contract Grazing Cover Crops

### In a Nutshell:

- The practice of cover crop grazing provides economic returns, and farmers wonder if benefits to soil health follow suit. Economic returns are realized within a year's time, while soil health impacts seemingly are slower to manifest.
- It is common for nearby cattle and row crop farmers to partner in order to graze cover crops. Nick Smith grazed his cattle on Tim Daly's cover crop fields. The pair kept cover crop records and Nick sampled soil in April of each year.

### Key Findings:

- Both cooperators profited from grazing cover crops within the year of planting. Smith profited an average of \$158.47/ac. Daly profited an average of \$27.14/ac.
- Soil samples from April 2020 and 2021 showed more microbial respiration and organic matter in the field in which cover crops were grazed compared to the field that did not have cover crops.

### BACKGROUND

"We wanted to determine the economic and soil health impact of the fields where we contract graze. This is something we've been doing for a few years and we wanted to quantify the benefits for our neighbor Tim," said Nick Smith, who grazes cover crops and corn stalks in a field owned by his neighbor, Tim Daly. Not only do cover crops protect the soil, but profits can be achieved when livestock graze cover crops.<sup>[1,2]</sup> It is also known that grazing cover crops can provide benefits to soil health, but the effects are longer term<sup>[1]</sup> and require proper grazing management. To



### Cooperators

Nick Smith – Epworth  
Tim Daly – Farley

### Funding

Iowa Natural Resource  
Conservation Service (NRCS)

**POSTED  
1/21/2022**



# COVER CROP Guide



## Cover Crops for New Adopters

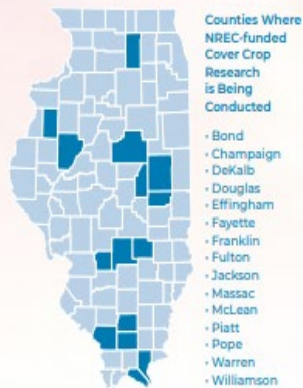
A compilation of observations and recommendations from researchers funded by the Illinois Nutrient Research and Education Council

2021 Edition

## Speaking of new publications...



2021 Edition



### Topics Covered

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### Notes

The observations and recommendations included here are based upon multi-year and multi-location projects funded by the Illinois Nutrient Research & Education Council (NREC) and a panel of experienced cover crop specialists. While a printed document is restricted to what is known at the time of publication – in this case December 2021 – NREC will refine this document on our web site as new research substantially changes our recommendations.

**The purpose of this publication is to encourage the use of cover crops, and NREC's enthusiasm for these recommendations are based upon science.**



# Important Considerations When Growing Cereal Rye Ahead of Soybeans

A number of midwestern universities have web pages that explain what you need to know about herbicide carryover.

Here is an excellent resource from Purdue:

<https://extension.entm.purdue.edu/newsletters/pestandcrop/article/soil-residual-herbicides-and-establishment-of-cover-crops-in-the-fall/>

**Residue distribution at harvest:** It's often said, "a crop season starts with the residue coming out of the back of the combine." Properly sized residue that is evenly spread across the width of the area being harvested creates uniform field conditions. A mat of residue next to a strip of bare ground will make all aspects of management more difficult, whether it is establishing a cover crop or managing the cash crop that follows.

**Planting date:** You can plant cereal rye from early September through the first week of November in any part of the state. Do not plant via unincorporated surface applications after late October. Aerial seeding of cereal rye might be practical starting mid-late August depending on crop stage and soil moisture.



This photo shows that cereal rye residue is not allowing weeds to emerge.

# Cover Crop Planting Options

Planting and incorporating seeding methods generally produce more uniform and predictable stands compared to aerial or surface applications.

## Pre-Harvest Seeding

### Aerial seeding

Skilled pilots can uniformly broadcast cereal rye into standing corn. However, where needed, we advise you to establish up to a 100-foot buffer on the end rows or field boundaries to avoid off-target seed applications. This will keep seed from falling into fields or areas where you (or your neighbor) don't want it. Seed germination from aerial applications is more consistent when these conditions are present:

- Wait until corn dry-down has started and sunlight penetration on the soil surface reaches 50%.
- Fly on seed when the soil is damp and a substantial rain is likely in the coming days.

### High clearance applicator

You can apply cover crops into standing corn with a high clearance applicator equipped with a cover crop seeder. This method has proven very effective at several NREC research sites. Again, an open canopy from the crop drying down along with moist soil will create a better environment for stand establishment. Minimal corn will be damaged during the operation and usually only when the applicator turns.



Aerial seeding of oats and radish into standing soybean prior to maturity.



This high clearance sprayer was modified to include an air seeder. Drop tubes place the seed under the upper canopy. This works for

# Harvest Seeding

## Air seeder

A newer cover crop establishment method that shows promise is to mount an air seeder on your corn head or combine. Seed is dispersed while corn is being harvested, saving time and money.

**Here's how it works:** Cereal rye is blown from the seed hopper through individual hoses mounted under each row snout and scattered before crop residue is sized and deposited by the corn head. In-cab controls automatically adjust seeding rates based on ground speed and start/stop the flow of seed when the corn head is lowered/raised. We recommend a minimum seeding rate of 40 lbs/acre. Commercially available hoppers have capacities to hold up to 80 acres worth of seed. A seed tender is used for filling.



A stalk devastator is added.



Individual hoses are mounted under each row snout.

# Post-Harvest Seeding

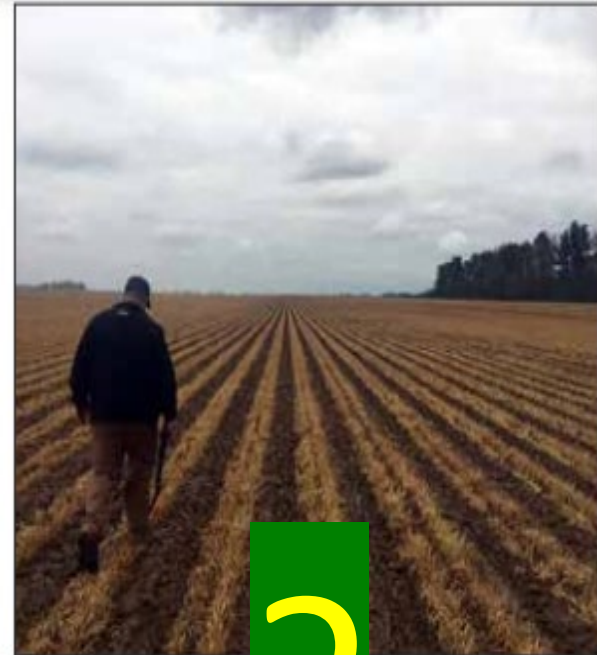
## Surface application with fertilizer

If you uniformly fertilize the field (no variable rate), cereal rye can be blended with the dry fertilizer. An air-flow machine is preferable to a spinner-spreader, but not required. You may need to consider making a light tillage pass, as surface residue can interfere with seed-to-soil contact, but success has also been achieved without this step. **Be Mindful** – complete cleanout of cover crop seed from

**Additional Strategy:** Many producers are initially concerned about cereal rye growing aggressively in the spring and “getting away” from them before it can be terminated. A concept unique to drills or planters is they allow for **precision cover crop planting**. This method helps manage cover crop residue by creating defined paths for spring planting of your cash crop. The pictures on the right from Southern Illinois show cover crops seeded by adapting a drill to coordinate with 30” row spacings (top), and an operator who utilized a 15” row width planter that seeded the cereal rye, followed by a strip-till bar (bottom). These techniques require tractors with RTK guidance. effective. Labor and machine costs need to be considered when using these methods.

## Vertical tillage tool with attached seeder

...is a similar concept to the combine/air seeder combination. A seed hopper with distribution tubing is mounted onto a vertical tillage tool. As you travel across the field, seeds are distributed and incorporated into the residue and soil.



# At What Rate to Plant?

## Seeding Rate

We encourage starting with the lower end of recommended seeding rates, especially for drilled/planted and harvest seeding methods. Also, earlier planting dates require less seed, as plants have additional time to allow for fall growth and tillering.

The phrase “one day of growth in September is equal to three days in October” comes to mind. As you become more comfortable with cover crops, you can adjust your seeding rates based on your own experiences. Use the table below as a guide to determine the appropriate cereal rye seeding rate based upon your choice of seeding method.

Seeding rates can be adjusted depending on the desired goals of the cover crop program. For example, use higher seeding rates if grazing cover crop fields or if a high biomass late termination plan for improved suppression of summer weeds.

## Cereal Rye Seeding Rates Ahead of Soybeans\*

Drilled seeding rate .....	40-60 lb/acre
Broadcast seeding rate with shallow incorporation .....	40-70 lb/acre
Aerial seeding rate .....	50 lb/acre
Seed count .....	18,000 seeds/lb

$$40 * 18k / 43560 = 16 \text{ seeds/ft}^2$$

Higher rates should be used if you are planning to graze the cover crop.

*\*These rates are based on high-quality seed with germination rates of 85–98%. Based on fall growth and tillering, earlier planted rye (September) can use lower seeding rates than rye planted later in the fall (November). Seed cost and quality can vary significantly. Obtain quotes in the summer from 2-4 reputable suppliers. Seed is available in 50 lb bags and mini-bulks.*

# Termination Options

## Timing

Some growers will want to terminate cereal rye before planting soybean. Be aware that with adequate moisture and warm conditions, cereal rye can double in size in 10 days. Cover crop termination at or after planting requires enhanced management. If cover crop goals include benefits such as improved weed suppression or enhancing aspects of soil health, then later termination closer to, or at, planting should be considered.

## Terminating with Herbicide

A full label rate of glyphosate applied to actively growing cereal rye provides excellent control. An application made in March should not contain any additional herbicide active ingredients. If you intend to plant soybean within 2-3 weeks of termination, you can include a residual soybean herbicide with the glyphosate. Always consult your crop advisor to develop a complete, season-long herbicide program.

## Terminating At/After Planting Soybeans

A planned termination near or after planting can be a legitimate and effective management strategy. This concept helps achieve objectives like maximum nutrient sequestration and weed control.



Terminating cereal rye with Gator sprayer.



Terminating cereal rye with boom sprayer.

# Cover Crops

## *Think a “Systems” Approach*

To maximize the potential benefits of a cover crop program, it is important to manage the cover crop as part of the total production system and not merely as an additional input to an existing cropping system. Depending on the goals associated with the decision to utilize cover crops, consideration should be given to aspects of the total production system such as, the herbicides applied to the previous crop, what cover crop species will be used, timing of seeding the cover crop, seeding method, the row crop that will be planted in the spring, spring weather (is it excessively wet/dry?), and cover crop termination strategies/options. Just planting a cover crop in the fall can accomplish basic goals of reducing erosion and nutrient loss, but attention to the other details mentioned is necessary to ensure the cover crop acres successfully transition into productive and profitable row crop acres during the next season.

*When cover crops have failed, it is often due to being managed only as an additional input, rather than as part of a modified production system.*



**corn  
on  
corn**

**HEL**

**Poor  
drainage**

**CCs are  
rarely the  
missing  
puzzle piece  
on your farm**

**livestock**

**NT/strip-till**

**small grains,  
silage...**

**fall  
herbicides**

**fall  
tillage**

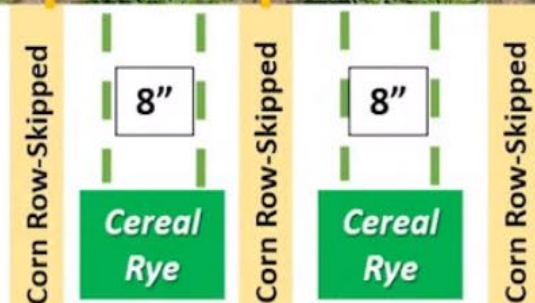
**Other  
pieces  
strongly  
impact  
success**

# PRECISION COVER CROPPING CAN INCREASE SUCCESS

What is **PRECISION COVER CROPPING**???

- 1) Selection and management of cover crops to achieve specific objectives
- 2) Strategic placement of cover crops in specific fields or parts of fields
- 3) Planting of cover crops with a precision planter
- 4) strategic placement of cover crop rows in relation to other cover cover rows and/or the following cash crop rows (often using GPS guidance)

# Precision Planted Cover Crops



## Potential Benefits

- Non-intersecting growing zones for cover and cash crops
- Potential reduce in seeding rate
- Gives flexibility with spring termination
- Could reduce N immobilization
- Could increase spring warmup in cash crop growing zone.

Sadeghpour et al. (2021) found that cereal rye planted at half the seeding rate (only 2 rows planted out of 4) produced as much biomass and accumulated as much N but allowed for more rapid soil warming in the skip-row zone.

# Precision Covers Save Seed Costs



**Tim Recker (Arlington, IA) precision plants cereal rye @ 25 lbs/a on 15" rows using the same A-B lines used for his corn crop**



**SPRAY-DOWN SKIP ZONES.** Matt Griggs creates skip rows by using a hooded sprayer to terminate the cover crop in the row where the cash crop is going to be planted about two months later. Then at planting he sprays the entire field, flattens it with a roller-crimper and then plants directly into the terminated cover crop.

# For poorly drained soils, consider Strip Till with Cover Crops



# Skip rows reduce risk associated w/ later termination



**TABLE 6. Results as affected by termination date of cover crop seeded in twin-rows at Loran Steinlage's in 2018.**

COVER CROP TERMINATION DATE	SEEDLING DISEASE INCIDENCE (%) <sup>a</sup>	CORN STALK NO <sub>3</sub> -N (PPM) <sup>b</sup>	CORN YIELD (BU/AC)
Apr. 23 (25 DBP)	3	73	238
May 18 (At-planting)	3	44	240
May 31 (13 DAP)	5	71	227
<b>LSD</b>	<b>12</b>	<b>43</b>	<b>25</b>

DBP = days before planting corn; DAP = days after planting corn.

Within columns, values that do not differ by the least significant difference (LSD) are considered statistically equal with 95% confidence.

<sup>a</sup> Seedling disease assessed on May 25 (17 days after planting corn).

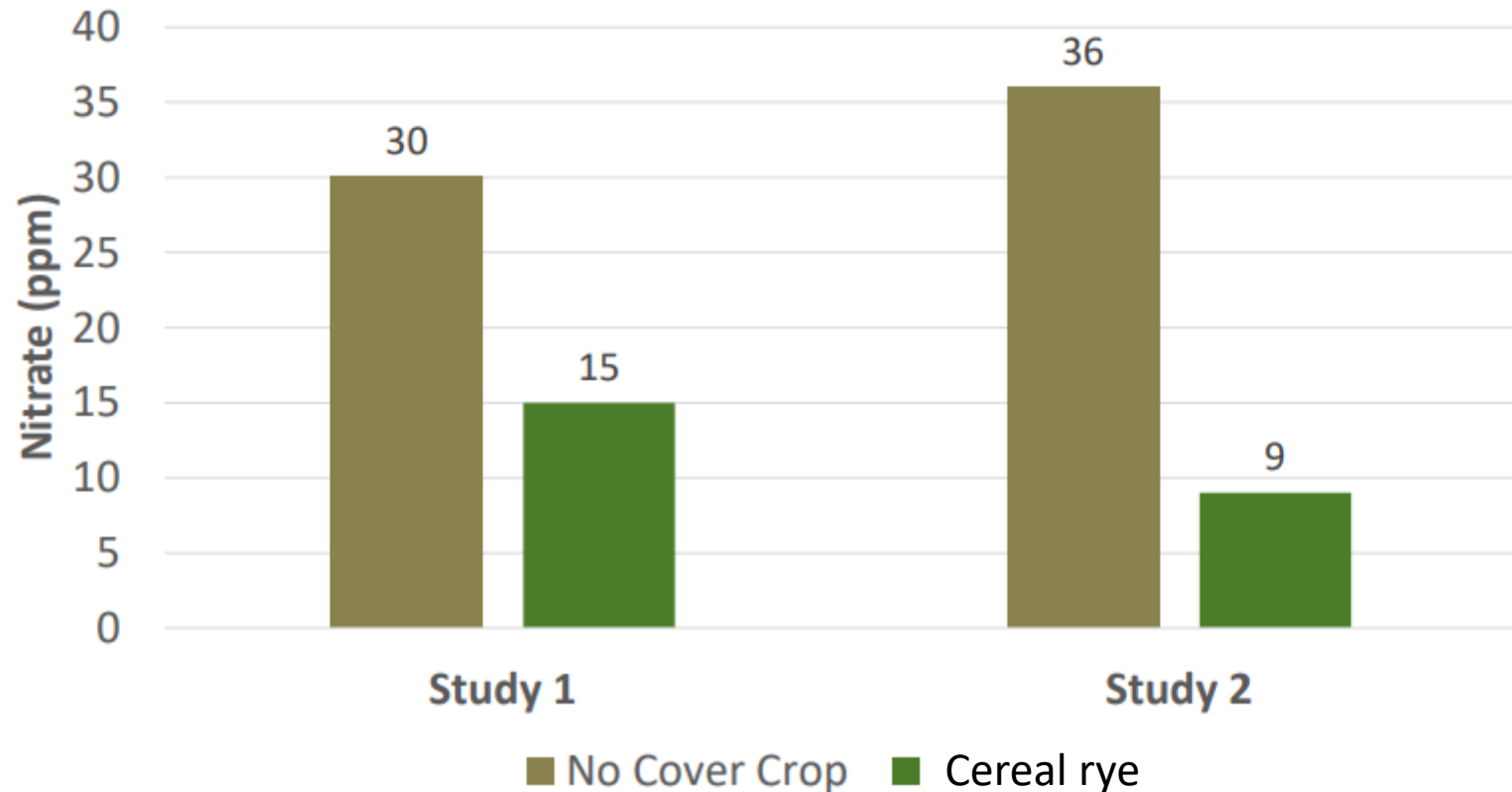
<sup>b</sup> Stalk samples collected on Oct. 25, after corn reached physiological maturity.

# CC trial data from the IA Soybean Association's On-Farm Network

Year	Landform Region	Crop District	Watershed	County	Crop	Trial Type	Trial Detail	Avg. Yield Difference bu/acre
2008	Des Moines Lobe	5 (Central)	Middle Des Moines	Boone	Corn	Cover Crop	Rye vs Untreated	No large yield losses after the first year
2008	Southern Iowa Drift Plain	7 (South West)	One Hundred and Two	Adams	Soybeans	Cover Crop	Rye vs Untreated	
2011	Iowan Surface	6 (East Central)	Maquoketa	Jones	Corn	Cover Crop	Rye vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	Tillage Radish vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax CHARLOTTE mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax DOVER mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax TALLADEGA mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax DOVER mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax TALLADEGA mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax CHARLOTTE mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax CHARLOTTE mix vs Untreated	0.5
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax DOVER mix vs Untreated	
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax TALLADEGA mix vs Untreated	
2013	Iowan Surface	2 (North Central)	Upper Cedar	Mitchell	Soybeans	Cover Crop	Rye vs Untreated	

Negative CC effects on corn are caused by 2 main manageable factors:  
**N immobilization**  
**and/or root pathogens**

# Cover Crops Sequester Significant Nitrate During Early Yield Formation Stages



Sources: Soil Sci Society Jrn 79:1482-1495, 2015; Agronomy J 111:1-11, 2019

# Rx when planting corn into CCs

30-50% of total N  
at or soon after  
planting

*prioritize nitrate-N*

Acharya, J., Bakker, M.G., Moorman, T.B., Kaspar, T.C., Lenssen, A.W., Robertson, A.E. 2018. **Effects of fungicide seed treatments and a winter cereal rye cover crop in no till on the seedling disease complex in corn.** Canadian Journal of Plant Pathology. 40(4):481-497. <https://doi.org/10.1080/07060661.2018.1506503>. DOI: <https://doi.org/10.1080/07060661.2018.1506503>

**Interpretive Summary:** Cover cropping is a valuable conservation practice that reduces sediment and nutrient losses from agricultural systems and improves soil quality. However, farmers using cover crops need to adjust management to minimize risks and maximize benefits of this practice. For example, the risk of seedling disease may be higher for corn planted following a winter rye cover crop,

**Our experiments confirmed the potential of rye cover crops to elevate disease pressure on corn seedlings when conditions are cold and wet. Among several potential corn seedling pathogens, organisms belonging to the genus *Pythium* appear to be most important in causing corn seedling disease after rye cover crops. We also found that seed fungicides that contained the active ingredient metalaxyl were the most effective.**

As a new practice in corn rotations, it is important to identify which fungicide seed treatments are most effective with this management practice. Additionally, by testing different fungicides with active ingredients that are more effective against particular seedling pathogens we will be able to identify which micro-organisms may be most important in causing corn seedling disease following rye cover crops. We performed a series of experiments in which corn seeds were given fungicide

**Most farmers work w/ service providers to make decisions about inputs**



**Fortunately, growing #s of service providers are experienced w/ CCs!**

<https://4rplus.org/>

# 4R Plus is ...



**Launched by a grant from CF Industries, 4R Plus is being guided by a coalition of agricultural and conservation organizations as a part of the Iowa 4R Plus program to support farmers' efforts to implement precise nutrient management and conservation practices that boost soil health, crop productivity, and profitability.**



Iowa Soybean Association Conservation Agronomists: (left to right) Dustin Brucker, Rosie Roberts, Ryan Johnson and Joseph Wuebker. (Photo credit: Iowa Soybean Association)

## ISA's new conservation agronomists assist farmers and ag retailers with conservation efforts

September 24, 2021 | [Kriss Nelson](#)

# **ISA Senior Field Services Program Manager Ellison says the team is tasked with 3 primary goals:**

- 1. Deliver conservation opportunities to farmers by providing technical knowledge and connecting farmers with financial assistance, such as cost share programs.**
- 2. Build the sales agronomist relationship by utilizing their network and relationships with farmers to promote agronomic and conservation discussions.**
- 3. Be the in-house technical expert the sales agronomist and farmer rely on.**

**PCM is the premier conservation program of the Illinois Corn Growers Association.**



**Great things are also happening in IL!**

**We seek to enhance the effectiveness of conservation for the farm operation, while helping reduce complexity and manage the risks associated with practices.**

🔍 Search ...

**Currently, PCM staff work with farmers in >30 counties in IL and 10 counties in KY, representing >250,000 acres of row crop agriculture.**

# The Business Case for Conservation

*Cost-Benefit Analysis of Conservation Practices*



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Precision Conservation Management



**Jennifer Jones**

**Started work on 1/4/2022**

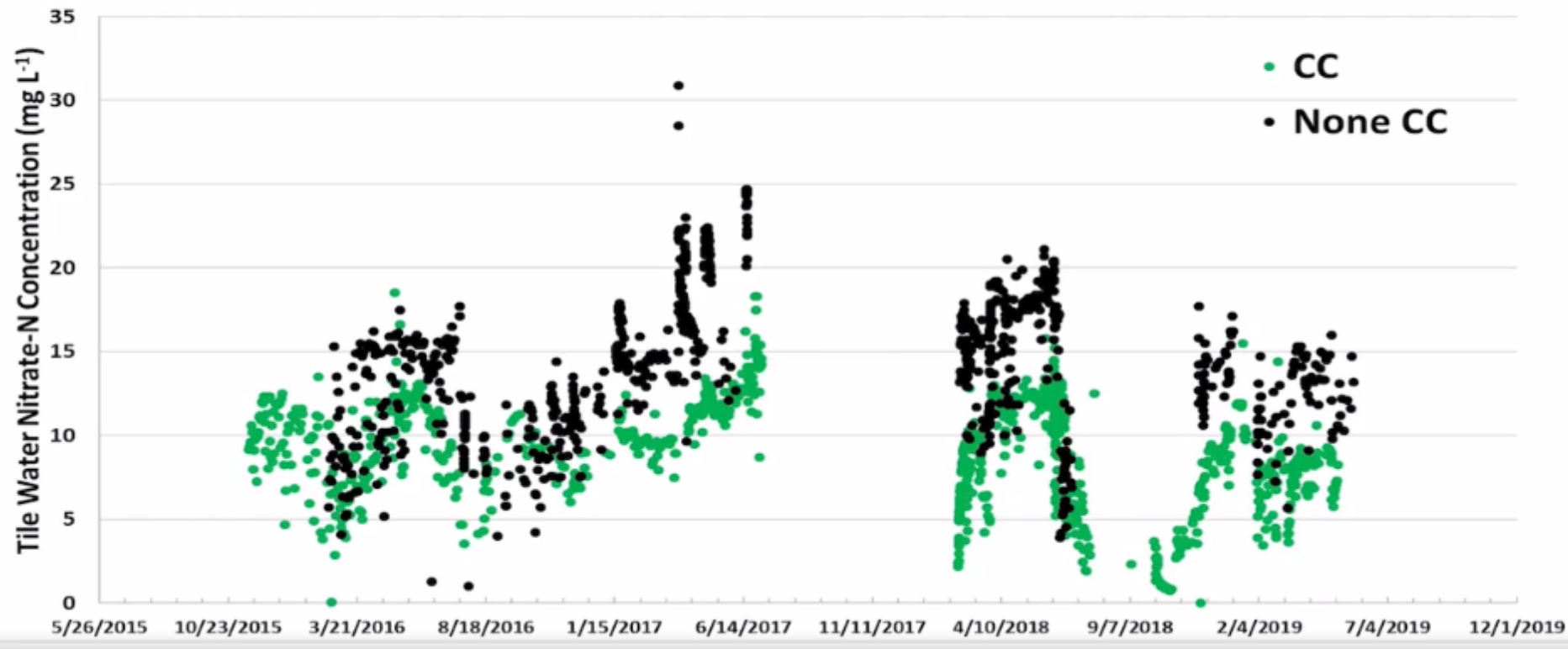


**Megan Miller**

As Agronomy Managers for the **Illinois Soybean Association**, Jennifer and Megan work on behalf of Illinois soybean farmers in the development and the implementation of conservation agricultural research and outreach programs. They support research efforts and helps communicate both in-field and edge-of-field research and validation studies to ISA's farmer audiences; lead demonstration of conservation agriculture practices; and raise awareness of best management and continuous improvement practices for conservation agriculture in Illinois.

**Landmark study showing the large impact of widespread adoption of CCs throughout a watershed**

# Watershed Impact of Mass Cover Crop Adoption



**Armstrong - 2020**

# Carbon credit market is a Wild West, for now

Companies are creating carbon trading programs, which can benefit farmers who've yet to get started with conservation. But farmers who've practiced conservation for years are feeling like the time isn't right to jump in.



As major companies launch carbon trading programs that cash-in on policies intended to curb climate change, the conversation has switched to what a widespread carbon marketplace would look like for farmers...

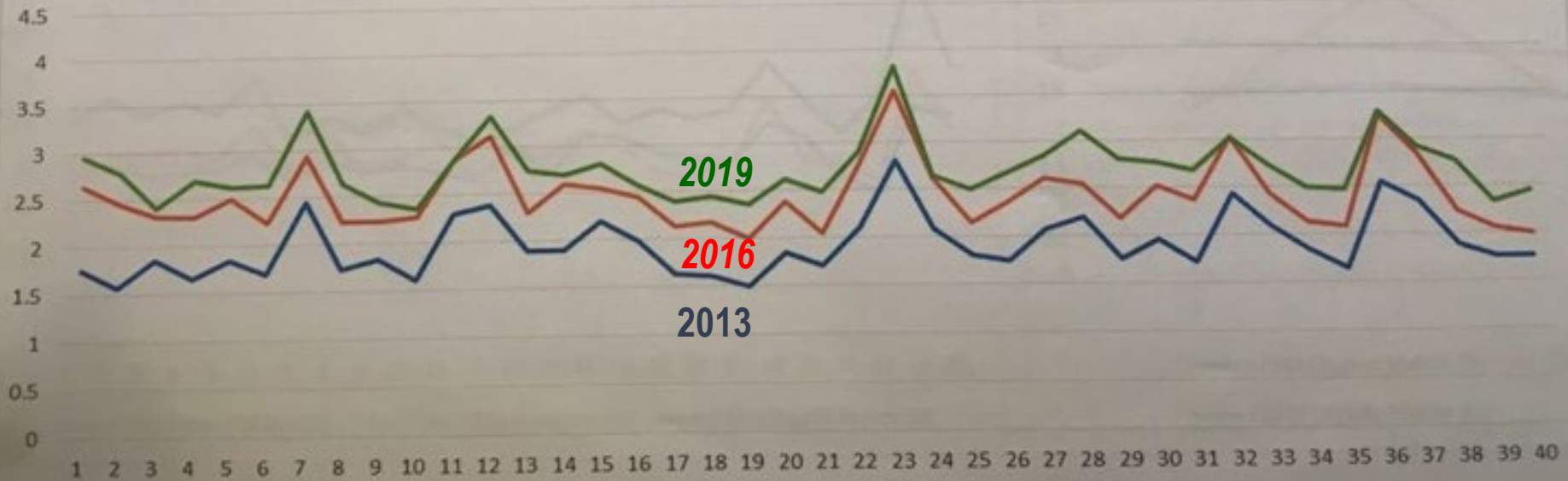
# Smiley farm in IN

Jackson-OM



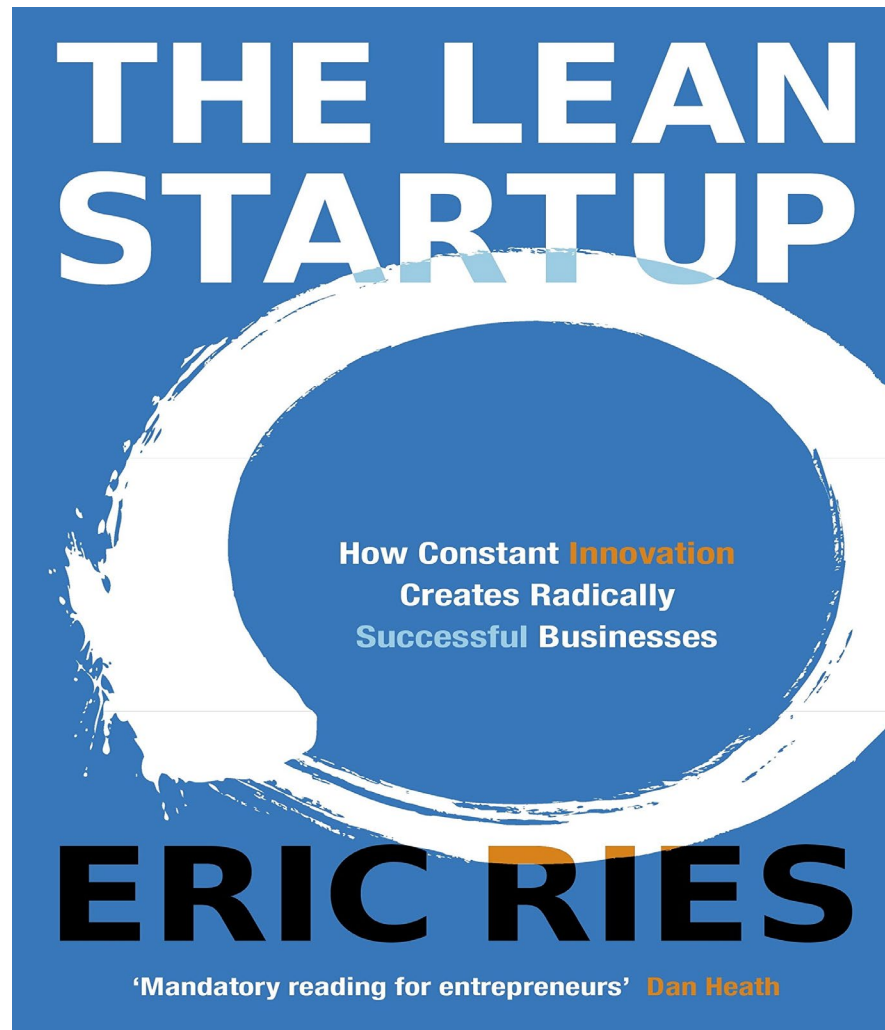
*Point sampling is allowing this farmer to track increases in SOM following adoption of CCs*

Miers-OM



**Returning to the  
FAIL-FAST concept  
introduced at the  
beginning of this  
presentation**

The “**fail-fast**” concept was championed by entrepreneur and author **Eric Ries** in his 2011 book,



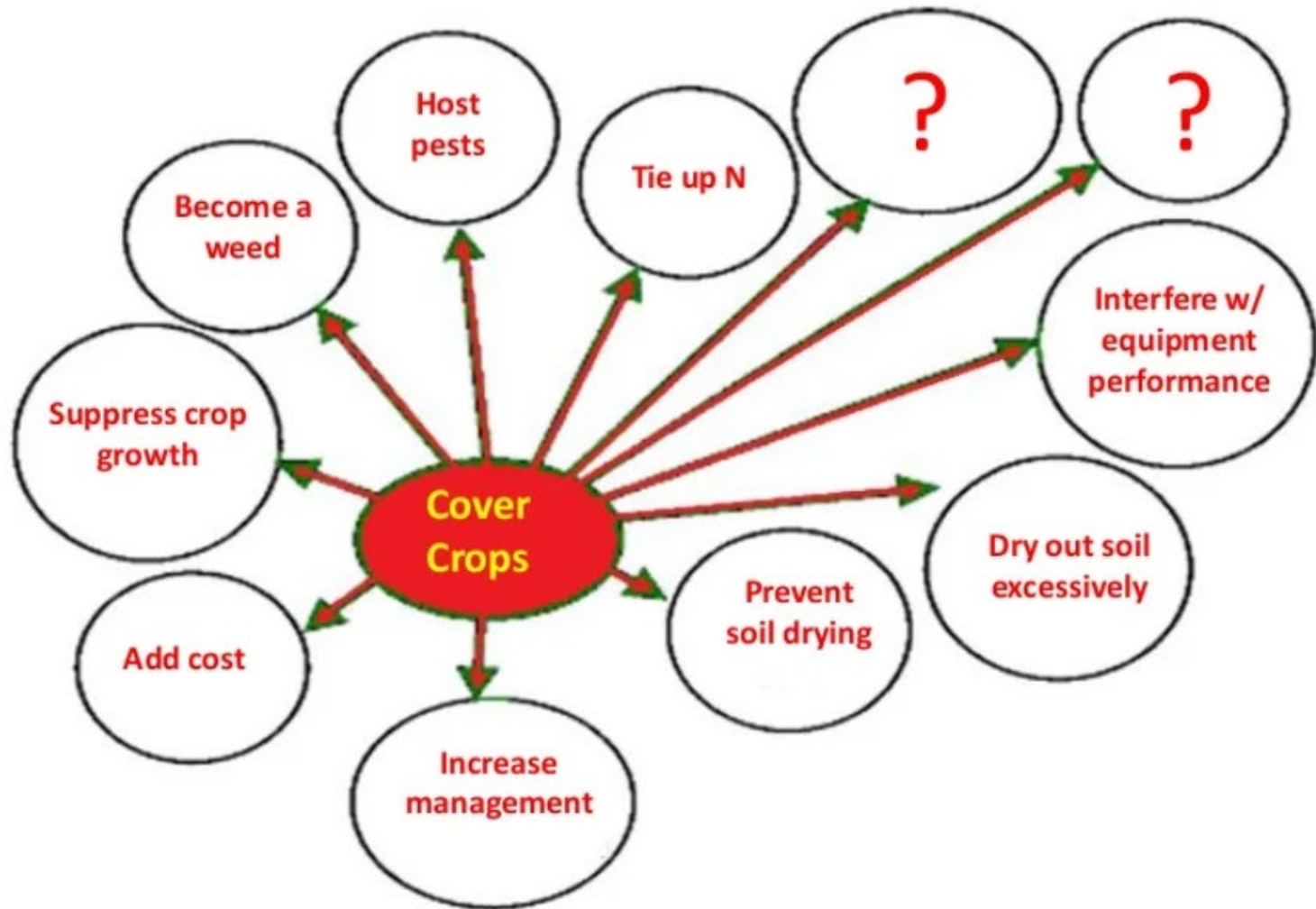
*Fail-fast* emphasizes that an agile approach guided by continuous testing minimizes the cost of failure and maximizes knowledge gained from failure, increasing the probability of eventual success.

Critics of the philosophy acknowledge the validity of cutting losses early but point out that any strategy with "fail" in the name should be avoided because the word has such a negative connotation.

Fail-fast could be referred to as "fail fast, succeed faster"



# Not all effects are positive



The **cost of failures** w/ CCs can be reduced  
and **learning from failures** can be accelerated

by greater focus on quickly identifying  
and addressing factors that increase risk

and by building strong teams

for collaborative trouble-shooting:

1:1 farmer mentoring

farmer peer groups

farmers working with conservation agronomists

farmers collaborating with researchers

Hi Ray,

Do you think the high level of payments and associated high % of farmers using CCs for 20+ years has driven CC innovation and problem solving such that MD farmers are now much better at managing CCs than 20 years ago?

Joel

Definitely! Fields like these <https://photos.app.goo.gl/p9PRhXVEnQ7vXQCF9>

(aerially seeded mixtures planted early enough to produce significant biomass in fall) would not be seen 15 years ago. These are fields on two farms we did some sampling on this fall.

Still, about 90% of fields in the MACS program use a single species (usually either wheat or rye or barley) and most fields get planted after October 1.

But MD farmers are definitely used to including cover crops in their planning and systems.

The use of mixture is growing. As is the use of interseeding and earlier-maturing corn and soybean varieties.

Ray

**Turnip + barley cover flown into corn in late August**



Trey Hill of Harborview Farms: Reversing Climate ...

Watch later Share



Reversing Climate Change

Watch on YouTube

Advanced Cover Cropping Insights from Farmer E...

Watch later Share



Watch on YouTube

Trey Hill, Harborview Farms - Granular Testimonial

Watch later Share



Watch on YouTube

Sustainable Agriculture Practices at Harborview F...

Watch later Share



Watch on YouTube

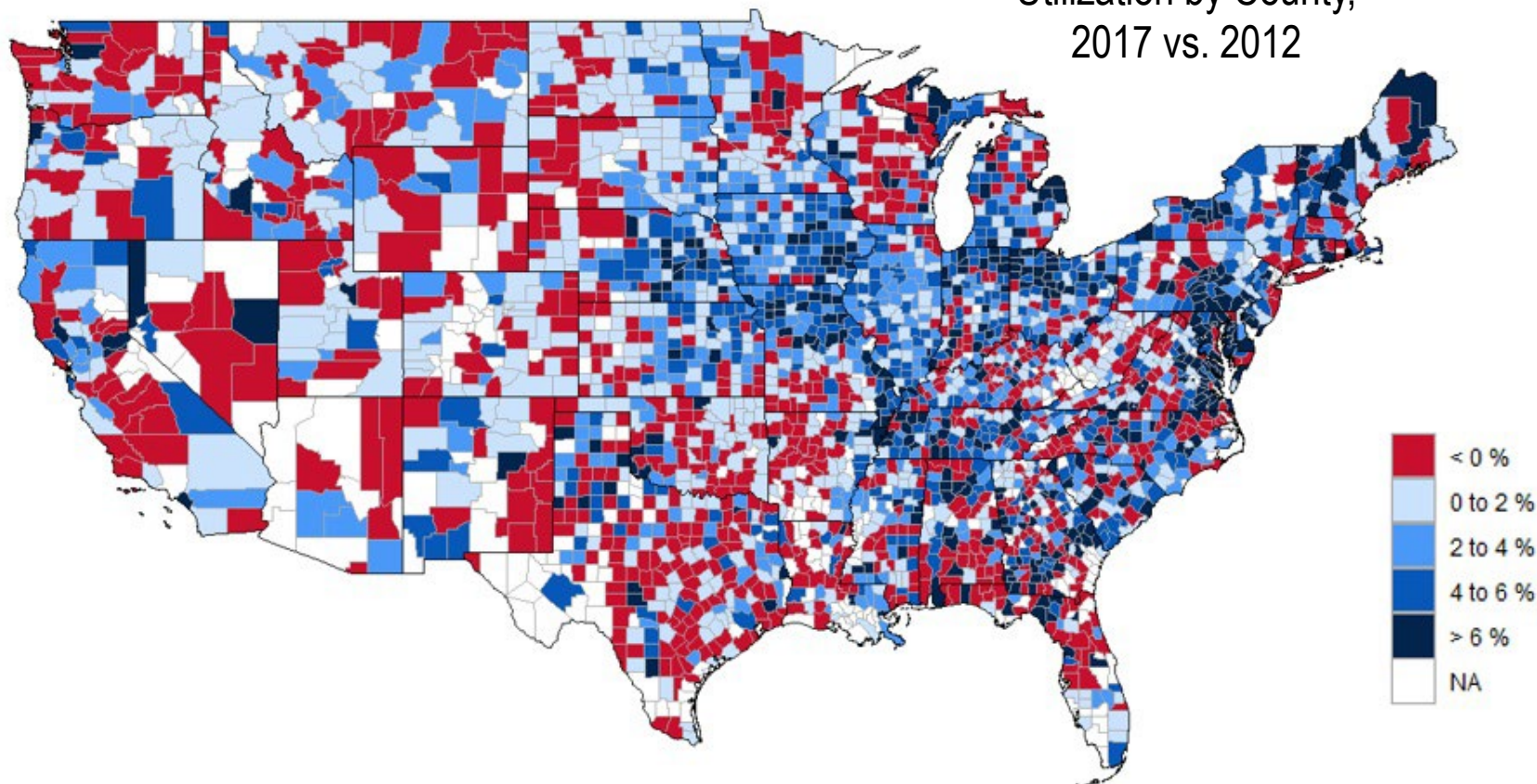


FARMS

## The Invisible Elephant: Disadoption of Conservation Practices in the United States

Wendiam Sawadgo and Alejandro Plastina

% Change in Cover Crop Utilization by County, 2017 vs. 2012



I am confident that  
the ag industry can learn  
how to use  
CCs effectively...

Hopefully we can do it  
cheaper and faster than Maryland