

Cover Crop Conversations

A Collection of Articles from
the PRACTICAL FARMER



PRACTICAL
FARMERS
of Iowa

Notes from the Field: Farmer Stories on Cover Crops

Cover crops are one practice, a piece of a much larger puzzle, to find lasting solutions to reduce erosion, prevent nutrient runoff, increase soil organic matter, reduce reliance on purchased inputs and retain productive lands for generations to come.

They start a conversation about practices that can benefit the land while improving every farm's bottom line. If cover crops are the conversation starter, where can farmers and land stewards go from there?

Today, more than ever, farmers need practical and sustainable solutions to be resilient in the face of extreme weather, rising input costs and increased nutrient loss. Cover crops are key to helping farmers navigate these challenges.

Within these pages, you'll find firsthand accounts of challenges, triumphs and practical advice from farmers using cover crops. You'll hear about opportunities for financial gains through grazing, stories of retaining water and soil, and more.

At Practical Farmers of Iowa, we know making farms resilient doesn't come from a single practice or one-size-fits-all advice. It comes from farmer-to-farmer connections and learning from each other's experiences. It comes from solutions outlined in these stories – ones that fit both the land and the people who work it.

Whether you're new to cover crops or have been planting them for years, we hope you'll read this and feel inspired, gain insights and leave with a renewed curiosity about how cover crops could work for you.

Dig in – and don't hesitate to reach out to our cover crops team if you have questions. We're here to support you every step of the way.

Let's keep growing together.

Taylor Hintch
Field Crops Education Manager
Practical Farmers of Iowa



Table of Contents

	Page 4 Grazing Covers Yields Green (Autumn 2021 Issue) Six years of research by PFI farmers shows grazing cover crops pays off.		Page 12 Putting Soil to the Test (Spring 2024 Issue) Many PFI farmers have noted that cover crops boost their field access. A new PFI on-farm trial aims to back those claims with data.
	Page 6 The Proof is in the Soil (Winter 2022 Issue) PFI farmers are testing if they can lower nitrogen rates without hurting yield on fields with long-term soil health practices.		Page 15 After the Flood (Summer 2025 Issue) Some farmers are choosing cover crops in the wake of more frequent extreme-weather events.
	Page 10 Economic Engines (Spring 2023 Issue) Cover crop seed businesses are helping farmers like Ryan Gibbs improve their farms, communities and the environment.		Page 18 Sharing Values, Exchanging Ideas (Autumn 2025 Issue) Two generations of the Pelzer family share values and ideas across the years as they steward their farm for the future.

► **Cover photo:** While standing a field of alfalfa, Katherine De Boef (right) discusses her management practices for the grass-finished beef herd she and her husband, Ben, raise to curious event attendees including Bruce Carney (far left) and PFI staff member Beth Waage (center). The De Boef's hosted a PFI field day on Aug. 25, 2025, on their farm near Montezuma, Iowa.

About Practical Farmers of Iowa

Practical Farmers of Iowa was founded in 1985 as an organization for farmers. We use farmer-led investigation and information sharing to help farmers practice an agriculture that benefits both the land and people.

Practical Farmers is a leader in bringing positive change to Iowa agriculture because we realize farmers are the primary experts in the field of agriculture, and we are aware that Iowa farmers want to learn from each other.



About the Practical Farmer Quarterly Magazine

the Practical Farmer is a quarterly magazine published as a benefit of membership in Practical Farmers of Iowa. Through engaging stories and photos, our aim is to share the knowledge and experiences of PFI farmers, build a strong and connected community of members and supporters and celebrate our collective efforts to build resilient farms and communities.



Scan here or visit bit.ly/pfimagazine to read more articles on our website.

As an organization, Practical Farmers' mission, vision and values are central to the work we do each day.

- **Our Mission**
Equipping farmers to build resilient farms and communities.
- **Our Vision**
An Iowa with healthy soil, healthy food, clean air, clean water, resilient farms and vibrant communities.
- **Our Values**
 - Welcoming everyone
 - Farmers leading the exchange of experience and knowledge
 - Curiosity, creativity, collaboration and community
 - Resilient farms now and for future generations
 - Stewardship of land and resources

► Visit practicalfarmers.org to learn more.



Grazing Covers YIELDS GREEN

By Meghan Filbert

Six years of research by PFI farmers shows
grazing cover crops pays off

We continue to crunch the numbers and it's safe to say that grazing cover crops pencils out. Practical Farmers has conducted on-farm economic research on this topic since 2015. We have collected data from different scenarios: grazing with gestating cows and cow-calf pairs, finishing steers grazing cover crops adjacent to their feedlot, experimenting with different cover crop mixes and contract grazing of cover crops involving both a cattle and row crop producer. Each unique situation resulted in positive net returns for the farmers.

Cows and Calves

Four farmers shared their cover crop and grazing records so PFI's Cooperators' Program team could calculate the economic impact of grazing gestating cows and cow-calf pairs. Wesley Degner of Lytton, Iowa; Bill Frederick of Jefferson, Iowa; Zak Kennedy of Atlantic, Iowa; and Seth Smith of Nemaha, Iowa, submitted data from 2019 to 2021.

Each farmer grazed cereal rye between their corn and soybean rotations, and the bulk of grazing took place from November to December and again from April to May. When cows are out grazing during these months, farmers have to feed less hay (or other stored feeds) – and saving money on hay translates to profits.



Cows and calves grazing at Dry Creek Red Angus.

Across the four farms, profits ranged from \$37 to \$124 per acre. On average, farmers saved \$2.68 per animal unit (1,000 pounds of animal) per day in hay expenses when grazing cover crops. Over the entire cover crop grazing season, farmers saved a total dollar amount ranging from \$3,000 to \$31,000 in feed expenses.

Wesley Degner, who was new to cover crops at the start of this project, now has six years of experience under his belt. "We're planning to continue grazing cows on cereal rye that we aerial-seed around the Labor Day timeframe each year," he says. "It makes our life easier in the winter. We have less feed costs and grazing gives the cows exercise before spring calving."



Ben Albright



Nick Smith's cows graze on a rye, oat and radish cover crop mix in Tim Daly's cornfield.



Nick Smith

Feedlot Steers

While grazing cover crops is becoming standard practice for cow-calf producers, it has been implemented to a lesser degree in feedlots. Ben Albright of Lytton proved how a cover crop field adjacent to his feedlot could provide supplemental forage simply by opening a gate and letting finishing cattle graze the field.

The fresh forage allowed Ben to back off the amount of total mixed ration he fed to his steers, saving an estimated \$0.05 per animal per day. This added up to an average savings of \$46 per acre – or \$16 per animal. In total, Ben saved an average of \$3,850 in feed each year by giving his cattle access to cover crops, and without sacrificing animal gain or carcass quality. "The numbers show that grazing covers is a no-brainer for cattle producers," Ben says.

Different Cover Crop Mixes

Mark Glawe of Garber, Iowa, has experimented with planting and grazing different cover crop mixes. In one field following an oat and pea crop, he planted a nine-species mix that included mung beans, crimson clover, winter peas, pearl millet, cereal rye, sorghum-sudan grass, turnip, rapeseed and sunflowers. In other fields he planted cereal rye and oats.

The cost to establish a cover crop totaled \$62 per acre for the nine-species mix, and \$38 per acre for the rye and oats. "Only four or five species did really good in the nine-species mix," Mark says, "because they seemed to drown out the less vigorous ones." He has determined that his preferred mix would include cereal rye for spring grazing, oats for fall grazing, turnips ("because cows love them"), sorghum-sudan grass and pearl millet.

Overall, Mark ended up reaping more profit from his less expensive cover crops due to vigorous growth and large windows of opportunity for spring grazing. Mark's profits ranged from \$41 to \$403 per acre. "Out of the last 10 years, 2020-2021 was my best year yet," he says. "On average, I profit about \$50 per acre each year. Usually I don't get that much spring grazing, but spring 2021 was dry, so we weren't having to take the cows off because of rain."

Another perk is that Mark's profits help subsidize the cost of cover crops in fields he is unable to graze for one reason or another. Cover crops are important on Mark's farm, which is located on D and E slopes in Iowa's Driftless region. In the standard hillslope classification system, a slope's steepness – which influences how quickly water will run off, as well as potential for soil to erode, among other things – is described using the letters A to F, where D slopes are "strongly sloping" (at an angle of 13-18%) and E slopes are "moderately steep" (at an angle of 19-25%). In Clayton County, Mark says his neighbors are catching on. "Last year [the county] had 2,000 acres of cover crops seeded, and two-thirds of those acres were used for grazing," he says.

Contract Grazing

Farmers Nick Smith of Epworth, Iowa, and Tim Daly of Farley, Iowa, have been partnering for at least 10 years. Nick grazes a cover crop medley – which consists of cereal rye, oats and radish – on Tim's row crop fields. Nick and Tim split the cost of cover crop seed and application, which equates to about \$19 per acre for each farmer. The situation works out to be profitable for both parties. Tim receives the cover crop cost-share payments and also benefits from reduced herbicide passes, which saves him money. Nick benefits from the feed value.

Over the last two years, Nick has profited an average of \$133 per acre, Tim an average of \$27 per acre. Nick and his brother Ted are more than willing to put up temporary fences, move cattle from field to field and haul water through the winter because these things are drastically cheaper than feeding hay.

Learn More:

Each of these scenarios is summarized from on-farm research trials. Detailed economic data can be found in the accompanying research reports on our website, practicalfarmers.org/research.

The Proof IS IN THE SOIL

PFI farmers are testing if they can lower nitrogen rates without hurting yield on fields with long-term soil health practices

By Stefan Gailans

Improving soil health has been a top priority for PFI farmers since our inception. While the terms people use to refer to soil health have changed over the years, PFI members have been leading the way since the 1980s in adopting soil health-promoting practices like ridge-till, diverse crop rotations, adding grazing livestock and planting cover crops to keep living roots in the ground.

Some of the earliest on-farm research projects in PFI's Cooperators' Program focused on these topics, as well as how to apply less manure and fertilizer. Now, Practical Farmers members are leading the way once more by participating in a next-generation on-farm soil health experiment.

Practical Farmers of Iowa is heading an on-farm research project involving 20 farms across Iowa looking at whether farmers who have been investing long-term in soil health-promoting practices can reduce the amount of nitrogen fertilizer they apply to corn without sacrificing yield.

"The results of these trials drastically improved our farms, and overall, they played an important role in building and maintaining PFI's farmer-to-farmer network."

– Vic Madsen

Midwest and southeast U.S. have found that as soil health metrics like organic matter, active carbon or microbial activity improve, crops need less nitrogen fertilizer to thrive. A healthy soil is rich in nutrients; adding nitrogen fertilizer just doesn't do much good.

The results are adding heft to the Natural Resources Conservation Service's dynamic definition of soil health as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans." For farmers, the results mean that as they improve their soil's

health, they may be able to reduce the amount of fertilizer they need to get the same yields – a win for the environment and their net returns.

History of Trialing Nitrogen

The current project got underway in fall 2021 – but it isn't the first time PFI members have tackled the question of fertilizer use on the farm. The farm crisis of the 1980s that helped usher PFI into existence forced many farmers, and early PFI members, to take a hard look at their farming practices. While some farmers survived the crisis by farming more land ("getting big"), many more could not afford to purchase or rent more acres, and were forced to "get out."

But several of PFI's early members took a middle approach: They thought that by cutting the most expensive input costs – such as nitrogen fertilizer – they could improve profit margins enough to get by. From 1988-1993, farmers participating in PFI's newly established Cooperators' Program conducted 57 trials that compared their typical high fertilizer rate with a reduced rate of their choosing. Across sites, the average difference between high and low rates was 56 units of nitrogen per acre.

In 88% of those trials (50 of the 57), the farmers involved found that applying the high rate offered no statistical advantage to corn yield – and that in most cases, they were applying more nitrogen than they needed. "We felt like we were 'on a mission from God,' to quote the iconic line from the popular 1980 movie, 'The Blues Brothers,'" says Vic Madsen, who farms near Audubon, Iowa, and participated in those early fertilizer trials.



Alec and Rachel Amundson examine how red clover is improving their soil.



Fertilizer factory! Nodules on red clover roots indicate nitrogen fixation.

"We learned that we could save money and improve our bottom lines by reducing application rates, and feel better about being stewards of the environment in doing so," he says. "The results of these trials drastically improved our farms, and overall, they played an important role in building and maintaining PFI's farmer-to-farmer network."

Since those first trials in the late 1980s, more than 250 farmers have conducted nearly 1,500 research trials on their farms. Today, the Cooperators' Program brings together a community of curious and creative farmers from across the agricultural spectrum who take a scientific approach to improving their farms.

The Next Generation

Alec and Rachel Amundson, who farm with Rachel's family, the Norbys, near Osage, Iowa, weren't even born yet when the first PFI nitrogen trials got started in the late 1980s. But farming practices that focus on soil health and water quality have long been important on their family farm and in their area.

"My dad and uncles, who we now are transitioning the farm from, were some of the first ones to start things like no-tilling and strip-tilling," Rachel says. "With other farmers in the neighborhood, they started doing cover crops and saw the benefits." Soon after the Iowa Nutrient Reduction Strategy was released in 2013, a group in the Rock Creek Watershed, where the Amundsons farm, was the first in the state to create a watershed plan specifically tailored to addressing the goals laid out in the new strategy.

As in the 1980s, keeping the farm going is the main reason the Amundsons focus on soil health. But environmental stewardship is another key motivating factor, just as it was for the previous generation of PFI members. "As the next generation coming on, we want to continue that," Rachel says. "Hopefully our farm can last for many generations. We like to kayak on Rock Creek. We like to boat on the Cedar River, and to us, to have those quality bodies of water around us, we know we're making a difference with cover crops."

Now, Rachel is a partner in Sponheim Sales and Services, a local business that strives to help farmers adopt conservation practices like cover crops, strip-till and no-till. Since becoming involved in the business, the Amundsons have begun to grow more small grains, like oats and rye, for cover crop seed, opening the door to growing a "super cover crop" – red clover.

Red clover is often planted either at the same time as oats or interseeded into a young stand of rye. After the small-grain crop is harvested in the middle of the summer, the clover takes off, capturing the full power of the summer sun – and more importantly, fixing nitrogen that can be used by the subsequent corn crop.

(Continued on page 8 →)

“We’re trying to learn how much nitrogen we actually get out of a clover crop like this in our system,” Alec says. “For us, nitrogen is one of the largest expenses in growing corn, behind land and seed costs. Something like [red clover] that’s actually putting nitrogen into the soil, it’s fixing nitrogen cheaper than we can buy it. The clover is just pulling it out of the atmosphere and making it available for us.”

As prices for nitrogen fertilizer started climbing over the past couple of years, and echoing questions that animated PFI farmers in the 1980s, Rachel and Alec started wondering: Could we reduce our nitrogen rate and save money? Enter PFI nitrogen trials 2.0.

Nitrogen Trials 2.0

For this newest PFI-led fertilizer project, PFI staff recruited farmers, including the Amundsons, who have been using soil health-promoting practices for at least five years. Using a replicated strip-trial design, farmers are comparing their usual fertilizer rate with a rate that is reduced by 50 pounds of applied nitrogen per acre. If they can maintain corn yields at the reduced rate, results might spark confidence to reduce (or at least question) fertilizer rates going forward, much like what happened for the original cohort of farmers who trialed fertilizer rates.

To some degree, this project is asking: Is the ability to reduce nitrogen fertilizer without losing corn yield a simple yet robust test of soil health? The project’s premise echoes the sentiment of the idiom “the proof of the pudding is in the eating” – in a sense, it suggests that how well the crop performs with less fertilizer is a reflection of the soil’s health.

And what if the reduced rate ends up lowering corn yields and financial returns? The farmers will still have gained valuable information: They can probably be satisfied that their typical rate is the right rate for their farm. Knowing this could encourage them to adopt more soil health-promoting practices in the hope they could eventually reduce that fertilizer rate (and expense).

Cost Savings and Environmental Benefits

Scientists have long shown that soil health-promoting practices pay off in the long run by reducing soil erosion and improving soil-water infiltration. And while the original nitrogen trial participants of the 1980s saw that improvements in water quality accompanied cost-savings, this new generation believes there’s a benefit to the climate. Cutting

back on rates of manufactured nitrogen significantly lessens the greenhouse gas emissions associated with their farms.

As Alec says, legumes “fix” or capture nitrogen from the atmosphere, converting the element into a form plants can use. Commercially produced nitrogen fertilizer mimics that process synthetically – but with a high energy toll. The Haber-Bosch process – the industrial process invented over 100 years ago to artificially fix

nitrogen – accounts for 2% of global carbon dioxide emissions. As we look to improve the resilience of our farming systems, green manure crops – like red clover – will play a big role in a truly climate-smart agriculture. See “Green Manure Crops and Nitrogen” on PFI’s YouTube channel (youtube.com/PFIVideos) to watch a video explaining how this works.

But the short-term benefits of planting clover, and other soil health-promoting practices, may not be visible right away. If research could show short-term advantages, like saving money on nitrogen fertilizer, more farmers might be swayed to adopt soil health practices.

Year One Results

By mid-November 2022, results from 12 trials showed that in half of them, farmers found a \$25 per acre financial advantage, on average, from reducing their fertilizer rate. Other participants saw declines in both corn yield and financial returns from reducing their fertilizer rate.

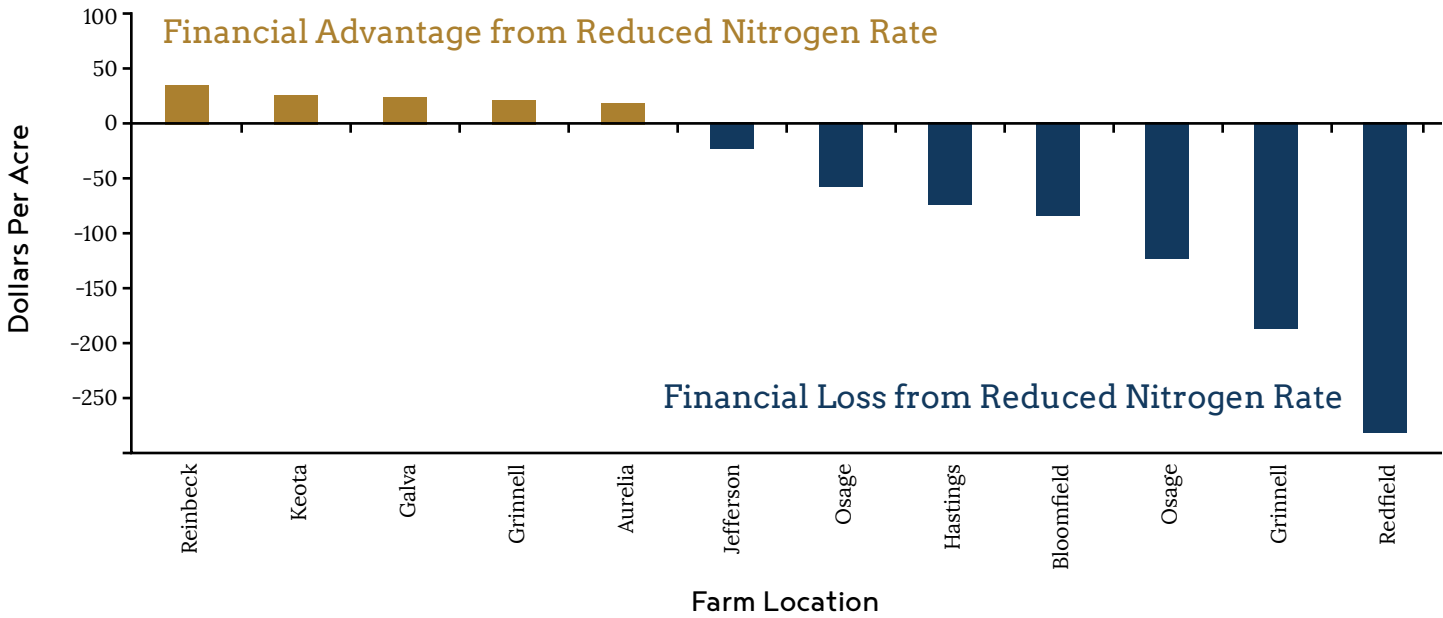
Jon Bakehouse and Alec and Rachel Amundson took these results as a sign that reducing their fertilizer rate by 50 pounds per acre might have been too large of a cut from their typical rates. “Normally, we wouldn’t have even tried reducing [nitrogen] by 50 pounds,” Jon says. The research trial setting, however, made it possible for him to take risks he wouldn’t otherwise have felt comfortable with by testing that aggressive fertilizer cut in just a small area.

For Alec, the project has provided important data to back up his and Rachel’s thoughts on nitrogen application. “It was a great way to verify our thinking of how to cut fertilizer when planting corn after clover,” he says. “We learned where and how we might save money on nitrogen.”

Based on their respective results, both Jon and the Amundsons think that reducing their fertilizer rates by 20 or 30 pounds per acre would have been the sweet spot. The mixed results aren’t that surprising because all the farms involved are approaching the trial from their own unique standpoints: different typical rates, different crop rotations, different local climates and existing soil properties. In other words, everyone involved sits at a different point in their soil health journey. Some have found that they can afford to cut fertilizer rates; others have learned that they’re already applying a suitable rate or have room to improve their soil’s health – or both.

“I knew we could grow good corn with less nitrogen,” says Sam Bennett, one of the farmers to see a cost benefit from cutting nitrogen. “But knowing what happens when corn runs out of nitrogen, I habitually over-apply fertilizer. This trial helped give me the confidence to take a deeper look at what rates I’m planning to apply.” ■

“Something like [red clover] that’s actually putting nitrogen into the soil, it’s fixing nitrogen cheaper than we can buy it. The clover is just pulling it out of the atmosphere and making it available for us.”
– Alec Amundson



Corn pays when the amount of grain produced brings a financial return greater than the costs spent to produce the corn. As of mid-November, five sites reported a financial advantage from reducing fertilizer rate to corn: Reducing their fertilizer rate reduced their production costs but didn’t harm their corn yields. Seven other sites reported financial losses from reducing their fertilizer rate: Though they reduced their fertilizer expense, corn yields and financial returns were also reduced.

Economic Engines

Cover crop seed businesses are helping farmers like Ryan Gibbs improve their farms, communities and the environment

By Taylor Hintch

Cover crops are many things. During the cold months of winter and early spring, they're like green shrouds and sponges, safeguarding soil from scouring winds while living roots soak up nutrients left unused by summer crops.

In the wet warm season, they are soil anchors during heavy rain. To soil compacted by heavy wheels, they are like drills, boring breathing spaces into the hardpan. To livestock, they are nutritious forage, while to soil microbes, they are harbingers of soil health – a visible cue to unseen transformations happening below ground.

For farmers like Ryan Gibbs, cover crops are also economic engines. Beyond their other benefits, these crops are increasingly underpinning new farm business enterprises that have local and far-reaching impacts.

Growing the Farm With Cover Crops

Ryan and his wife, Kristy, raise corn, soybeans, cereal rye, buckwheat, feeder cattle and contract and pasture pigs at Gibbsfield Farms near Worthington, Iowa. In 2019, they added a new enterprise – Gibbsfield Ag – to provide cover crop seed and services to farmers in their area of northeastern Iowa.

“The seed business ties in hand-in-hand with my farming operation,” Ryan says, “because we are growing cover crops on our farm and I’m able to share what I’ve learned with my customers.”

Ryan grows rye and buckwheat for seed, and he handles all the custom cover crop application for Gibbsfield Ag himself. To provide customers with a full array of seed options, the business also relies on relationships with other local seed companies, like Iowa Cover Crop, to reliably offer over 100 varieties of seed. “My busiest time is in the fall, he says, “when I’m delivering and planting cover crops into the night and combining [crops on my farm] all day.”

He and Kristy got started with cover crops in 2017, as part of a farm transition to no-till that included adding cover crops to their farm. The following year, Ryan started working as a dealer for Iowa Cover Crop. “The second year, we expanded again and put in an LLC to protect ourselves,” Ryan says.

Gibbsfield Ag has expanded rapidly since then. Ryan now uses a 30-foot grain drill to do custom seed applications and hires



Ryan and Kristy Gibbs with their children

aerial seeding for some of his customers. His neighbor also cleans seed for him, and he is continually adding storage and other infrastructure to build capacity.

“I wanted to expand my operation with a different crop aside from corn and beans,” Ryan says. “Since I was already a seed dealer, I had a market for my own cover crop seed.”

In 2022, with his cover crop seed business growing, Ryan enrolled in PFI’s Cover Crop Business Accelerator. Participants in the program, which is run in partnership with Iowa Soybean Association, receive customized business support about how to build a viable business plan, market to customers and set strategic goals.

“We were looking at income expansion and were asking: Where should we invest or expand to get the best return on investment?” Ryan says. “We got some great advice through this program.”

Driving Healthy Soils and Resilient Communities

Nurturing more cover crop businesses like this is a key reason why PFI and ISA started the Cover Crop Business Accelerator in 2020. Not only do these businesses help farmers diversify their incomes, they create new opportunities in rural communities. Vitally, they are also helping farmers plant cover crops on more acres – which is essential for Iowa to reach water quality goals spelled out in the state’s nutrient reduction strategy.

The Iowa Nutrient Reduction Strategy, adopted in 2013, calls for a 45% cut in levels of nitrogen and phosphorus that move from Iowa watersheds into the Mississippi River Basin, and eventually the Gulf of Mexico, where they contribute to a vast area that’s unable to support marine life. Cover crops are one of the key practices outlined in the strategy. But farmers face a range of barriers to adding or expanding cover crop acres – including access to cover crop seed.

That’s one reason why businesses like Gibbsfield Ag are so critical.

“Cover crops contribute to rural Iowa communities by improving water quality,” Ryan says. “When farms flood, that’s the same water that travels through all of these communities taking the topsoil away.”

Keeping soil in place is one reason Ryan wants to see more cover crops in his community. But he also sees their potential to improve water quality and food systems. “Employing cover crops is part of a larger societal benefit,” he says. “Healthier soil means a better-quality cash crop, and that means more nutrient-dense food and healthier living.”

Through Gibbsfield Ag, Ryan hopes he can help customers find ways to make cover crops feasible on their farms. By addressing some of his customers’ barriers and concerns, he sees the potential to unlock a cascade of cover crop acres – with improved water quality, healthier rural communities and more resilient farms following in tow.

“For us, resiliency means making each acre the most profitable it can be while cutting back on certain inputs,” Ryan says. Diversifying rotations and revenue streams is Ryan’s approach to building resiliency on his farm. “We sell cereal rye, we have hogs, we have cattle – so even if two markets fail, we won’t ruin our business.”

Growing Pains – and Plans

Ryan’s cover crop enterprise is healthy and expanding, but as with any business, he has faced challenges.

“The most challenging aspect of the business right now is dealing with changing prices and logistics,” Ryan says, describing high trucking and fuel prices that fluctuate often.

Cover Crop Business Accelerator Program

The Cover Crop Business Accelerator program couples funding with customized business support to help emerging cover crop seed and application businesses grow and flourish. Started in 2020 between PFI and Iowa Soybean Association, the program has helped 106 businesses across Iowa to date. In 2024, these businesses seeded over 249,765 acres of cover crops and grew over 4,000 acres of seed. By providing specialized knowledge and experience, these businesses are helping to drive cover crop adoption across the Midwest.



“Our quotes were changing, and it isn’t ideal when you’re trying to make customers happy. Just trying to keep costs down and stay competitive was the biggest challenge last year.”

While Ryan maintains many partnerships with local businesses and neighbors to help spread out some of the work, Gibbsfield Ag is still owned and operated by Ryan alone. “I’m a one-man show,” he says. “I’m trying to make things efficient and balance everything with the farming operation.”

In the near future, with work already busy and growth looming, Ryan says that hiring an extra set of hands – or two – is a priority. “In five years, I would like to have a warehouse and office space, two to three employees, more capacity for marketing and finance, and online sales traffic for small-scale seed sales nationwide.”

As his business expands, another goal is getting more cover crops in the ground and sharing his knowledge with fellow farmers along the way.

“I want to increase my presence teaching people and educating farmers on the feasibility of cover crops,” Ryan says. “I have numerous farmers that I’m helping with paperwork, maps of fields, tickets for purchasing seed, planting fields, germ tests – I want to give everyone all of the information they need.”

Ultimately, Ryan’s goal with Gibbsfield Ag is about building up rural communities – with cover crops as the foundation for healthier soil and water, healthier food and healthier communities for people to work, connect and enjoy Iowa life. ■

Putting Soil to the Test

By Solveig Orngard

Many PFI farmers have noted that cover crops boost their field access. A new PFI on-farm trial aims to back those claims with data.

It's an unseasonably warm, grey December day. Dozens of horticulture, livestock and field crop farmers, many finally done with their fall harvest, gather in Ames, Iowa, for PFI's Cooperators' Meeting. They're here to connect as a community of on-farm researchers. Over two days, the farmers, often referred to as "cooperators," will present results from their 2023 on-farm research trials, share stories, ask big questions about their farms and brainstorm ideas for how to answer those questions in the coming year.

For these farmers, this annual gathering is the capstone to a year of farmer-led curiosity. Since the founding of PFI's Cooperators' Program in 1987, it's also been a defining event for PFI's farmer-led on-farm research program.

The first bustling day nears its end after hours of presentations, swapping of ideas and hearty mealtime conversation. Delivering the keynote address that evening, Sam Bennett, a field crop farmer from Galva, Iowa, expresses a view shared by many PFI research cooperators. "We're all curious," he says, "and most of us are okay doing things that aren't normal."

Growing cover crops is one way many PFI farmers are challenging prevailing agricultural norms. When grown between and alongside cash crops, cover crops can reduce erosion, hold moisture, add nutrients back to the soil and boost overall soil health. Sam has been using cover crops for a decade, and he's seen how they've helped with everything from weed control to water management in his fields.

He's not alone. Many farmers have anecdotally shared how their cover cropped fields drain more quickly after big rain events, giving them earlier access for field work – and more access across a season. To date, however, no formal study PFI is aware

of has looked at this aspect of cover crops.

PFI, along with farmers like Sam, is changing this with a new multi-year on-farm research project that seeks to answer, "Do cover crops increase the number of days suitable for field work?"

Why It Matters

The idea for the study came from PFI's senior research manager, Stefan Gailans. "I kept hearing cover crop farmers state how they were getting into their fields earlier in the spring than their neighbors," he says. He began to wonder if there was a way to back those stories up with data. PFI farmers were eager to do so. Cooperators have researched cover crops from a range of angles – from weed control, to yield impacts, to profit from grazing them – but measuring suitable field days is new.

"The data PFI farmer researchers are generating right now is not enough to sufficiently move the needle on cover crop adoption," Stefan says, referring to the glaring gap between Iowa's current cover crop acreage and the amount needed to reach water quality

goals laid out in the Iowa Nutrient Reduction Strategy. In 2022, for instance, Iowa farmers planted about 3.3 million acres of cover crops – about a tenth of Iowa's crop acres. It's a big increase from a few years ago. But it's still a long way from the 12.5 million acres recommended in the state's strategy.

Stefan thinks the new PFI project will confirm what farmers are seeing – and he hopes it inspires more farmers to give cover crops a try.

To gather data, farmers will observe their cover-cropped fields throughout the year and complete a short survey on a weekly basis that asks if they could have done field activities that week without compromising field integrity, and on which days. They'll also share several years of field history at the start of the project. PFI agronomists will then compare farmers' data to the U.S. Department of Agriculture's weekly Crop Progress and Condition reports.

The study is designed to reflect farmers' individual views of suitable fieldwork days. Each farmer will get to decide the question within their

"As a cover crop farmer, when you get comfortable with your soil and what it contains, you're going to have more confidence to get out in the field, even when the ground still has a lot of moisture."

- Alec Amundson

own farm context. "Every farmer will look at it differently," Sam says. "I'm hesitant to go out when it's too wet because my family no-tills, so we won't be able to fix the ruts. Farmers who are tilling can fix ruts more easily."

Alec Amundson, who farms near Osage, Iowa, has participated in several on-farm trials with PFI over the past few years and also plans to take part. "As a cover crop farmer," he says, "when you get comfortable with your soil and what it contains, you're going to have more confidence to get out in the field, even when the ground still has a lot of moisture."

Getting Into the Fields

In deciding when fields are fit for work, temperature, wind and dryness

(and the risk of field fires) must be considered. Alec recognizes that cover crops can only do so much in getting farmers out in the fields sooner. "If I decide I can't spray because of wind, cover crops don't control the wind," he says. Wetness, however, is often top of mind, especially in the spring. Cover crops can soak up and hold excess moisture that would otherwise linger as puddles and mud.

Heading into the 2024 growing season, though, drought is a concern for many. Keaton Krueger, who farms in central Iowa and has been cover cropping for four years, is one such person. He's worried that cover crops could harm his cash crops in a sustained period of low rainfall by keeping the small amount of available moisture from reaching his corn or soybeans. He also had a patchy cover crop stand emerge last fall. As a result, he suspects his stand of covers this spring will be inconsistent, making field access hard to navigate on especially dry or wet days when some parts of the field might be suitable for work while others aren't.

But he's also mindful how cover crop benefits can accrue over time, potentially moderating the effects of

both too much and too little rain. "I hear from long-time cover croppers that a healthy stand of green cover will absorb moisture in its growth, and that the rate of water infiltration improves after many years." If that's true, a field that's had cover crops for many years will hold onto soil moisture better even in a drought, thus reducing the chances of dry soil blowing away on windy days or during equipment passes.

Whether fields are too dry or too wet, Keaton sums up why it matters so much to have more days for field work. "I barely have enough days available in the spring as it is," he says. "I can't risk losing any of them." Every workable day counts, he says, especially in the spring when there tends to be both more rain and more moisture from winter snow. Alec finds that when he has just a few extra days, he can be more patient when deciding when to get into the field.

Sam agrees. "I do a better job if I have all week to get it done. I take my time to do it well." And based on his own experiences, he's pretty sure of what this new study will find: "Having cover crops definitely increases time in the field." ■



Alec Amundson plants into a no-till, cover-cropped field on a damp day.



Keaton's corn following a triticale and oat cover crop. The field was strip-tilled in the spring prior to corn planting.

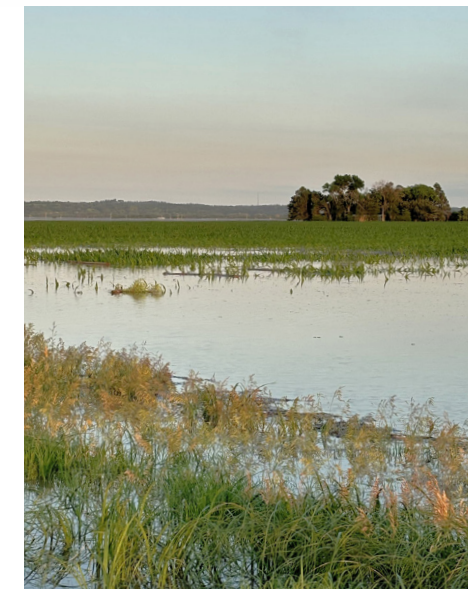


A terminated cereal rye cover crop creates a mat to help suppress weeds and maintain soil integrity for Keaton's soybean cash crop.

After the Flood

By Solveig Orngard

Some farmers are choosing cover crops in the wake of more frequent extreme-weather events.



Flood waters on Cody and Robert Geary's farm near Elk Point, South Dakota, took more than two weeks to recede and clean-up efforts lasted months beyond that. Photos provided by the Geary's.

For Robert and Cody Geary, June 2024 was one for the record books.

The father and son farm together near Elk Point, South Dakota, in a narrow strip of land less than 10 miles wide between the Missouri and Big Sioux rivers in the southeast corner of the state.

In their fields, already moist from a particularly wet spring, rainfall around the summer solstice that year was about normal. But Sioux Falls, 70 miles to the north, saw 6.49 inches of rainfall over two days, brought by a chain of intense thunderstorms. It was the highest two-day total ever recorded for the city.

Areas just south of Sioux Falls near where the Rock River flows into the Big Sioux recorded anywhere from 10 to 17 inches by the morning of June 22.

All that water was headed downriver toward the Gearys' farm.

Rising Waters

Farming in a river valley, Robert and Cody have seen their fair share of flooding. "Normally, from the time that Sioux Falls gets a big rain, we typically have a week to prepare and know what to expect," Cody says. But this series of intense storms was different. "This time, we only had two days." The Gearys run a diversified operation that includes corn, soybeans, rye, alfalfa and livestock. Their rye, planted the previous fall, was nearly ready to combine when the floods arrived. The corn and beans were just hitting their stride. In the flat, low-lying fields, they didn't stand a chance.

"When the flood hit our area, I had 200-pound calves at a farm nearby. When we pulled in at three in the morning to load them up, the water was a quarter-mile away. When we pulled out, it was about 2 feet deep, and that was in just 15 minutes," Cody recounts. Robert adds, "There was 3 feet of water over the dikes along the Sioux River and big draining ditches we've got. It was just a big wall like a tsunami."

(Continued on page 16 →)

Soybean sprouts push up through corn and cover crop residue in a no-till field on Mary and Jim Pelzer's farm near Tipton, IA on May 23, 2025.

"Normally, from the time that Sioux Falls gets a big rain, we typically have a week to prepare and know what to expect. This time, we only had two days." - Cody Geary

“Once the soil biology is ready to the degree that I want it to be, I think during those extreme weather conditions is when crops should thrive.” - *Nick Sennert, on the value of cover crops*

Like many others in the area, the Gearys’ crops were largely devastated. Of their 3,000 croppable acres, they harvested only 160 acres. They lost somewhere between 15,000 and 20,000 hay and straw bales to 18 inches of water on the ground in their sheds. Despite struggling to find the help and financial support they so desperately needed, they still found time to help local nonprofits clean up their own storm damages.

Facing the Extreme

The late-June flooding set records across much of the Midwest. But weather events are nothing new to farmers. Farmers here have always had to contend with floods, droughts, hailstorms, tornados, blizzards, derechos – and more – as they work to make a living off the land. Risk management is just another part – albeit a crucial one – of a vocation so tied to nature’s cycles.

Data shows, however, that these intense weather events are happening more often than they once were. The Iowa Department of Agriculture and Land Stewardship notes that 2024 was the most active severe-weather year yet for the state of Iowa, with a total of 939 reports of tornadoes, severe wind or severe hail. Likewise, according to the National Oceanic and Atmospheric Administration’s National Centers for Environmental Information, the number of billion-dollar weather-related disasters in Iowa has been increasing. In the 1980s, NCEI reports, the state had an average of 0.8 of these

costly events per year. This increased to an average of three per year in the 2010s. Astoundingly, in 2024 alone, Iowa had seven disasters costing \$1 billion or more.

Nick Sennert, a farmer in northwest Iowa, has noticed those extremes. He farms with two friends, Neil Krummen and Jessob Steffen, growing corn, soybeans, oats, buckwheat and winter camelina. Together, they share equipment and focus on the regenerative practices of no-till, cover cropping, animal integration and extended rotations to reduce synthetic inputs and improve soil biology. For Nick, 2024 as a whole was a noteworthy year. “We started with the wettest season on record in the spring and finished with the driest August and September on record. It was really tough.”

Nick farms near Linn Grove, Iowa, about 85 miles east and slightly north of the Gearys. Though he didn’t experience river flooding from the same severe weather event as the Gearys, Nick still witnessed damage to others’ fields. His own fields became saturated throughout the unseasonably wet May and June, which led to good yields in some areas and drowned-out spots in others.

Amidst all the rain, Nick kept his rye cover crop growing even after soybeans were planted in between the rows. “The hope was that by delaying termination, it [the rye] was going to alleviate some of that excess moisture,” he says. The soybeans



In low-lying areas of a field, excess moisture can even kill a cover crop. Nick farms near Linn Grove, Iowa, and planted soybeans into standing rye in this field. But he had to replant in many areas due to drown-out. Photo provided by Nick Sennert.

did survive, and things looked promising for many farms as the rain helped the entire state climb out of its four-year drought by July 2024. But the period of relief was brief. By September, Buena Vista County, where Nick farms, was back to being listed as “abnormally dry.” Likely as a result, his soybeans died early.

Yet, he pushed onward. Into the powder-dry dirt, Nick planted a rye cover crop, convinced of the benefits. “The diversity of roots brings a tremendous amount of soil health,” he says. “And the root exudates excite different biology to work synergistically together.”

Though he didn’t see much growth in the fall, he says he will continue planting cover crops in spite of abnormal weather events. “I’m not there yet, but once the soil biology is ready to the degree that I want it to be, I think during those extreme weather conditions is when crops should thrive,” he says. Soils with extensive root matter and high biological activity show increased water-holding capacity in wet and dry seasons, as well as a greater ability to let water filter down rather than pool on the soil’s crust.

Keeping Bases (and Fields) Covered

Back in Elk Point, Cody and Robert also had to navigate how to move forward in the wake of the 2024 floods. It was a long road. The flood water took more than two weeks to recede from their fields. Cody says, “I bet we spent close to three months cleaning up all the logs and silt, household garbage and corn stalks that floated down. It was a mess.”

The flood, however, was the impetus they needed to plant cover crops for the first time. It’s something Cody had been considering since learning about agronomy and soil health in college. In August 2024, he and Robert planted the Hi-Fly Mix from Millborn Seeds, which includes radish, rapeseed, crimson clover and annual ryegrass. Each species offers specific benefits to soil health, from reducing compaction and fixing nitrogen to suppressing weeds.

“They [cover crops] get the microorganisms going and keep them alive more than a soybean crop would after a flood,” Cody says. “We wanted to help create a healthier soil and to not have soil erosion and blowing that you see in a lot of fields today.”

Cody and Robert also planted oats and rye in some fields through August and September. While oats aren’t winter-hardy and die with the first freeze, rye can withstand the winter’s cold. This makes rye a good option for farmers who want to get more growth come spring – though Cody worries that the particularly harsh winter South Dakota experienced may have inhibited that spring growth this year. But he knows cover crops are an investment. “It’s going to take more than one year to know how much cover crops are improving the soil.”



Corn emerging through terminated red clover in Nick’s field in the midst of an especially wet spring. Photo provided by Nick Sennert.

Nick also acknowledges the long-term outlook necessary for success with cover crops. “There’s a learning curve to integrating cover crops into the system,” he says. “That may include the wettest of the wet years or the driest of the dry – and sometimes, you may experience both in the same year.”

After several years of planting cover crops and gradually adding new regenerative practices on his farm, Nick offers some advice: “As you’re approaching cover crops, start on 5% of your acres. Have adequate expectations and be ready with a Plan A, B and C before seeding your cover crops and before terminating them.” Most importantly, he maintains his positive outlook, recognizing that often one must experience failures and obstacles to truly learn and improve.

As Robert and Cody put up a dike around their farm equipment and buildings for protection in case of a future flood, it’s clear that they, too, are focused on growth and preparedness in the aftermath of their disastrous flood.

Meanwhile, the cover crops rising out of their once-soaked fields are just another sign of their resilience – now and whenever they weather the next storm. ■

Sharing Values, Exchanging Ideas

Two generations of the Pelzer family share values and ideas across the years as they steward their farm for the future

By Solveig Orngard

When Mary and Jim Pelzer first started farming together near Tipton, Iowa, they farmed the way Jim had been taught by his father.

The eldest of nine children, Jim worked hard on the farm from a young age. But as he got older, he realized there was no longer a place for him on his family farm. He and Mary found a patch of land a short distance away and started their own farrow-to-finish hog and row crop farm – one that included a fair amount of tillage, as was the norm in their area at the time.

Eager to be involved, but lacking a farming background, Mary learned various farm tasks. “I just remember when we were first farming, when we had CB [citizens band] radios instead of cell phones, it was so muddy and wet that I’d get the combine stuck,” Mary says. “One evening, I just kept calling, saying, ‘Jim, I’m stuck again.’ But I can’t think of the last time that was a big problem.” She turns to Jim, “Have you had to pull me out for years? Maybe decades?”

“Thank goodness, no!” Jim says, in a voice that echoes the stress of those moments so long ago.

Frustrated by those muddy field experiences, the Pelzers were drawn to learning about alternative farming methods. On a visit to central Iowa, they attended a field day hosted by PFI cofounders Dick and Sharon Thompson. They left feeling inspired to try something new. That spark eventually led to their incorporating no-till in the mid-1990s – a change that brought noticeable benefits.

“On the hilly field, the water wasn’t flushing the ditches out or waterways. That really sold me on cover crops.” – Jim Pelzer, about his first time planting a cover crop.



Open To Change

Like so many farm families, the farm crisis of the 1980s had taken its toll on the Pelzers. With three young children to care for, the only way Jim and Mary could sustain their farm was to find full-time jobs. Mary began working for the local community college while Jim hauled seed corn and later worked as a rural postal carrier. Once they started no-till, they found it saved time and labor, and helped keep the soil in place.

Mary and Jim’s kids – Tracy, Kurt and Chris – grew up helping with many farm tasks. But they were also encouraged to explore other interests like theater and sports, something Jim didn’t get the chance to do. Jim and Mary showed the importance of having off-farm employment as they balanced farm duties with their other jobs.

The kids also roamed the land. They especially enjoyed the creek areas on some rented acres their parents maintained through conservation practices like filter strips and contour farming. Chris Pelzer recalls valuing conservation from a young age. “I always had an interest in soils and the environment,” he says, “I think largely cultivated from my parents.”

Chris would eventually pursue that interest at Iowa State University, where he studied environmental science. While there, he started working for an ISU agricultural research lab exploring cover crops and carbon sequestration. One year, while home on break, he brought home some hairy vetch seed and planted it in the garden just to see what happened.

Up to that point, the Pelzers had not yet tried cover cropping. But they wanted to keep reducing erosion on their hilly land. Seeing the hairy vetch grow in the garden piqued Jim’s interest and he decided to plant a rye cover crop on the steep slopes of their rental ground that next fall. That was in the late 2000s.

“Towards the end of April we had 4-5 inches of rain. On one farm where it was just bean ground the year before and no cover crop, it washed away places I’ve never even seen washed,” Jim says. “But on the hilly field, the water wasn’t flushing the ditches out or waterways. That really sold me on cover crops.”

After that dramatic event, Jim and Mary kept cover cropping – and they began to notice changes on their farm. Before cover crops, Mary recalls her frustration trying to till clay ground in their rental acres. “But that even got to the point where it was looking pretty good. And a big thing Jim noticed over the years was that all the earthworms came back.”

Bridging Field and Lab

Chris continued in agricultural research, eventually getting a position as a laboratory manager and research support specialist in Cornell University’s Sustainable Cropping Systems Lab, where he works today. In this position, he manages the field research and balances a range of responsibilities. “He’s a jack-of-all-trades in the department,” Mary says. “He puts in the crop and takes out the crop, does all the measurements, does reporting, helps write up stuff, does extension work and teaches classes.”

In his years of research work, Chris has noticed that many researchers he’s worked with don’t have the practical farm experience he does. “One thing I bring to our lab group is just having lived and worked on a farm,” Chris says. That perspective helps him stay grounded in the ultimate goal of his work. “In research,” he says, “our work should have weight if we want to make it applicable to farmers and have value in the real world.”

(Continued on page 20 →)



Jim Pelzer stands next to his rye crop to show its height at his farm near Tipton, Iowa, in May 2025.



A terminated cover crop sits aside a filter strip on the Pelzer farm near Tipton, Iowa, in May 2025.

Chris’ work also promotes an exchange of ideas with his parents. Mary and Jim enjoy hearing about Chris’ latest research, and they make a point of seeing his plots at Cornell when they visit. They all discuss new ideas of farming practices regularly on the phone. As Jim and Mary make decisions about trying new practices on their farm, Chris often chips in, noting when something sounds good but has drawbacks in reality.

“I try to be the moderating voice sometimes,” Chris says. “But other times my parents are the ones who can see the barriers or the challenges.”

Looking Forward, Going Back

A year ago, the rental farm across from Mary and Jim’s home that the Pelzers had farmed with no-till or strip-till for about 35 years was sold to a new owner. Soon after, the fields were all tilled. The trees and shrubs along the creeks where Chris and his siblings used to play and run were ripped out. Shorn of their vegetation, the creeks are now hardly visible across the field and the abundant wildlife is gone. The family mourns the loss of that land they stewarded for so long.

“I think it’s been hard for my parents because they see it every day and they are really dedicated in terms of conservation practices,” Chris says. “But as soon as the new landowners started farming it, they had a very different type of land ethic.” Mary agrees you need to make a living from the farm, but explains the philosophy she and Jim have applied to their farm. “You have to have enough return on investment to keep on farming,” she says, “but hopefully leave the land better than you found it.”

Jim and Mary continue to farm their family’s acres and wonder increasingly about how the farm will look for coming generations. As of now, their children live scattered across the country, settled into their own lives and homes. But their emotional attachment to the home farm lingers.

“In research, our work should have weight if we want to make it applicable to farmers and have value in the real world.” - Chris Pelzer



Chris and his kids help Jim with some farm work on the Pelzer farm near Tipton, Iowa. Photo courtesy of Chris Pelzer.

For now, Chris is content with his career in agricultural research and the life he leads in Ithaca, New York, with his wife and three young children. But as his own children grow, questions about the future of the family farm, and his role in it, loom in his mind. “Now having kids, I look fondly back on my childhood and what I experienced and learned growing up on a farm,” he says. “My oldest son, who is 4, has only been to my parents’ farm a couple times. But he’s always talking about going back. He loves it.”

It’s too soon to say what the farm will look like when Jim and Mary choose to retire. In the meantime, the soil in their former rental field that they built up over years of implementing conservation practices will continue to hold benefits for the new owners for a few more crop years.

The land ethic and values Mary and Jim have lived out through their many years on the farm, however, will last for generations. ■

“You have to have enough return on investment to keep on farming, but hopefully leave the land better than you found it.”

- Mary Pelzer



Acknowledgements

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PFI field day attendees circle around Daniel Sheetz at his field's edge as he shares his reasoning and methods for planting a buckwheat cover crop following oats. Sheetz hosted this event at his farm near Garwin, Iowa, on Sept. 9, 2025.

Kevin Prevo walks through a field planted with cover crops to graze following a harvest of rye for seed on his farm near Bloomfield, Iowa. The cover crop mix includes 12+ cover crop varieties including sudangrass, turnips, radishes, millet, sunflowers, buckwheat, cereal rye, clover and more.



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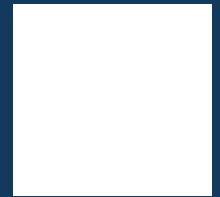
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