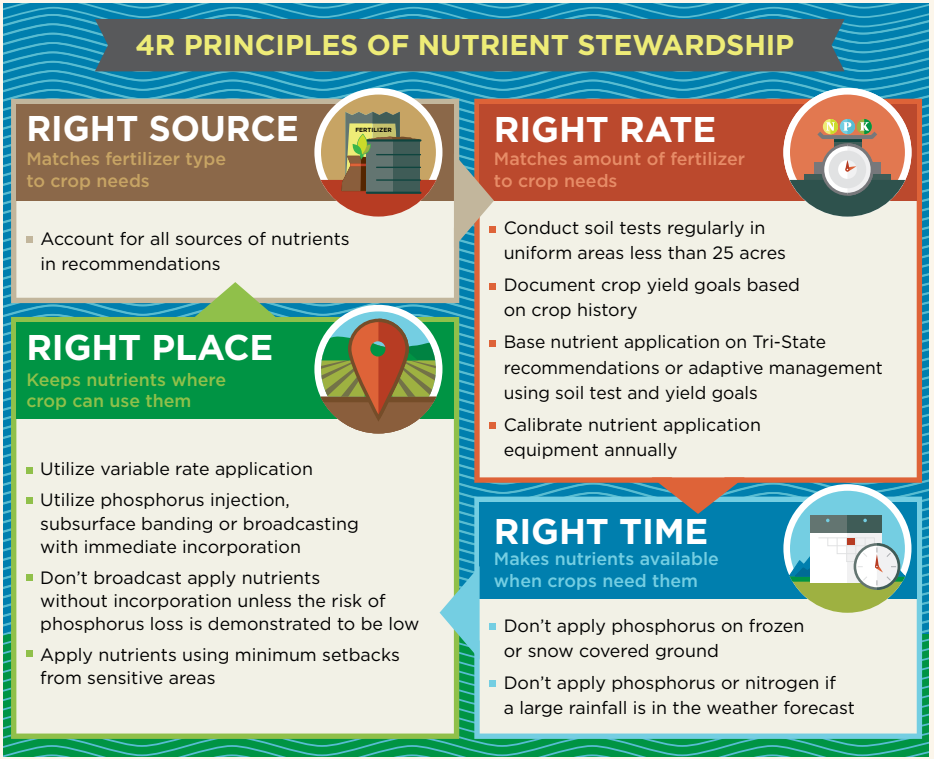
Farmer Stories

Farmers share how they're creating
a lasting legacy for their families,
their communities and nature.

4R Nutrient Stewardship and Soil Health



Farming in a way that is profitable, productive, and protects water quality requires management decisions and conservation practices that work together in the field, at the edge of field, and beyond the field.

In this edition of *Farmer Stories*, we feature five farmers in the Western Lake Erie Basin who share their conservation experiences and decisions in the field with soil health and 4R Nutrient Stewardship.

Soil health practices refer to management decisions that include planting cover crops, changing crop rotations, and using minimal tillage or no-tillage to create a healthy soil ecosystem that supports a sustainable and thriving crop.

4R Nutrient Stewardship refers to sustainable management of commercial fertilizer and manure by using the Right Source of nutrients, placed at the Right Rate and Right Time, and in the Right Place.

Acknowledgements

Agriculture is a leading industry in Ohio, Indiana and Michigan. Agriculture here is made up of many families and small business owners. The average farm size in Ohio and the surrounding area is under 200 acres. Each farm is unique. The farmers featured in this brochure share their own experiences to help us better understand what motivates them to choose conservation on their farms.

We would like to show gratitude to the five farmers who dedicated their time to share their stories for this publication. The Nature Conservancy would also like to show appreciation to all farmers who are making choices to be good stewards of our soil and water resources for current and future generations.

The stars in this image represent the five farmers in Farmer Stories that are located in the Western Lake Erie Basin.

DOUG DARLING

High Yields Using Conservation Tillage

Doug Darling is not afraid to experiment with new approaches to farming. Science fascinates him. So much so that when his boys were young he would leave NASA press releases about new discoveries in the universe next to their morning cereal bowls, telling them "always be curious in life; be unafraid to try new endeavors."

Darling follows his own advice on his family's 1,600-acre Monroe County, Michigan farm, testing out conservation practices to boost yields and save money, like no-till, cover crops and the 4Rs of nutrient stewardship. "Any time a farmer can look at new practices," he says, "there's the opportunity to improve on what we're doing, or improve profitability, because in order for us to continue farming long term, we have to be profitable."

Darling follows a standard crop rotation of corn, followed by soybeans, followed by wheat on his sixth-generation family farm. The rotation optimizes nutrients and fertilizer use and controls plant diseases. The Darlings also grow a small amount of hay, and until 1991 raised dairy cows.

For economic reasons, Darling's father started no-till in 1981. "When you look at $1.90 corn and expensive diesel fuel, every time you run a piece of equipment over a field, it's costing you money," says Darling. Today about three-quarters of the Darling farm is no-till. The remainder is deep-tilled, on a rotation basis, usually after wheat.

Conservation tillage has many benefits, says Darling. "We've found that no-till can be just as profitable, and in some cases more profitable than doing it conventional." Two years ago, he recalls, a no-till field yielded 193 bushels of corn per acre, while an adjacent, deep-tilled field yielded only 191 bushels per acre.

No-till improves the soil and makes it looser. "It's a little easier for the plants to get their roots down to where the nutrients are," he says. Crop residues left on the field also help retain the moisture in dry years and minimize soil erosion.

About a decade ago, Darling began experimenting with cover crops. Today he uses a four-way mix that includes radish, clover and rye, planting after the summer wheat harvest. Sometimes he'll deep-till those fields if the ground hasn't frozen to capture the nitrogen in the cover crops deeper in the soil while they're still green.

Cover crops "capture and keep the money that's in the bank, the nutrients that are in the soil," says Darling. "They add organic material and help mellow the soil—and it's the right thing to do for the environment."

To further keep nutrients on their farm, the Darlings work with a certified 4R company and employ practices such as applying liquid fertilizer to corn at planting time close to the seed. For soybeans, they use a foliar feeding system with liquid potash that applies the fertilizer directly on the leaves right where the plant needs it. They test their soil at least every three years.

Darling also devotes 49 acres to grass filter strips, the "simplest, easiest, least expensive thing a farmer can do to help mitigate nutrient runoff," he says.

More broadly, Darling's farm is certified by Michigan's Agriculture Environmental Assurance Program (MAEAP). Darling says the program is cost effective. "Just about any farmer that's gone through the MAEAP process will tell you they found it saved them money, or made them more productive, or it minimized their cost or risk."

Indeed, the sum of Darling's conservation practices—and curiosity—pays off; he's regularly awarded for having the highest corn yields in Michigan for both no-till and minimal till.

ALLEN DEAN

Healthier Soils to Feed a Growing Population

As a young farmer, Allen Dean had few resources but ample grit. Apprenticing taught him how to farm because he wasn't born into it. So, when he realized he couldn't afford the four-wheel drive tractors and equipment needed for tilling, he made the bold decision to try no-till.

That was in 1980. Dean planted his first no-till corn field behind the woods on his farm, where nobody could see it. "It wasn't the way to farm," says Dean. "We kind of hid it."

Dean, now age 66, is 100 percent no-till on his 1,900-acre farm in Williams County, Ohio, where he grows soybeans, wheat and winter barley. A cover crop enthusiast, Dean also runs a side business, producing and selling cover crop seeds and helping farmers learn how to use them. He practices the 4Rs of nutrient management and says he's amazed at the changes he's seen in his soil over four decades.

Economics got Dean started on no-till, but in time he realized its benefit for reducing soil erosion. "That was a really big plus back in those years," he says. "We always watched water leaving fields carrying nutrients and sediment, and we knew it wasn't good."

Fourteen years ago, Dean got into cover crops because "something was still missing." Organic matter was increasing very slowly in his soil, and he wasn't satisfied with his erosion control.

Dean started with radishes on a few fields, noting that while the radishes "mellowed out the soil really nicely. . . and helped our internal drainage," little gullies and rills formed on his fields after large rainfall events in the spring. That led him to add an over-wintering cover crop, planting rye with radishes the following summer after wheat. The two held the soil together better.

A few years later, he got braver and started adding other crops, beginning with crimson clover. Today Dean is up to an 18-way mix.

Recent soil tests showed organic matter on his farm at 3.6 percent, just 0.2 percent less than native soil, and far better than conventional tilled soil, at 2 percent. Water-holding capacity has also increased, and all soil erosion has stopped.

"It's just black and white," says Dean. "When we get large rainfall events and if we have water leaving our fields, the water is clean, there's no sediment leaving with it."

Viewing cover crops as "the new frontier in agriculture," Dean began helping his neighbors pick seed mixes, and plant and manage the crops. Over time he purchased large seed blending equipment, built a commercial-scale facility and custom designed an interseeder. Today he interseeds cover crops on several acres a year and sells seeds to farmers from Georgia to Minnesota. He also harvests oat, cereal rye and barley seeds.

Dean has practiced the 4Rs of nutrient stewardship for numerous years, including putting phosphorus down with seed wheat and using a variable rate fertilizer spreader. "You get a great reduction in cost," he says. "Rather than spreading fertilizer across the whole field, you just use it where it's needed." He has also installed buffer strips and grassed waterways to reduce nutrient runoff.

Beyond soil health, Dean is motivated by the environment. "It's shocking to see what's transpired on Lake Erie, as well as on other smaller lakes around here," he says, referring to excess fertilizer use contributing to toxic algae blooms.

And more broadly, "We know that we have to grow more food in the future to feed everyone," he says. "I really believe that it's going to come down to healthier soil. We know we can increase yield with higher organic matter. We've just got to continue to push that way."

Farmer Stories, Page 7

TODD HESTERMAN

Conservation Helps Weather the Storms and the Economy

Todd Hesterman prides himself on staying on top of the latest farming advancements, especially those that are outside the box. "You know, if you don't keep learning, you disappear," says the 56-year-old, fourth-generation farmer.

Hesterman began implementing soil conservation techniques like no-till on his Henry County, Ohio farm in the late 1980s. Today he practices the 4Rs of nutrient stewardship and uses drainage control systems to reduce nutrient runoff. For his next big advancement, he plans to master the use of cover crops and implement a more diverse crop rotation.

Soil health, "it's like a balanced diet," says Hesterman. "Instead of eating fast food all of the time, we've got to eat our vegetables, too. We're not in the same farming practice like my grandfather had. We're more of a monoculture, and it's not helping the life of the soil."

Today, Hesterman, aided by his father Ron and youngest son Joe, grows soybeans, corn and occasionally wheat and barley on his 1200-acre millennial farm.

Hesterman's interest in no-till was sparked by an agricultural professor at Northwest State Community College in Archbold, Ohio, in the early 1980s. Around the same time, his family was experiencing a deterioration in their soils, and so they decided to give no-till a try. The soil and water districts were offering cost-sharing on no-till grain drill planters that allowed them to experiment with the equipment before making the investment.

With no-till, Hesterman's family has seen big pay-offs, including increased soil organic matter, improved soil structure and cost savings on both inputs and labor. "It's made us a little bit more efficient, more lean and more weatherproofed to the farm economy than most."

Cutting out the costs associated with tillage (tractor, labor, fuel) reduces their overhead and leaves them with more wiggle room to weather cyclical bouts in the farm economy. And when soil scientists collect samples on the family farm, Hesterman says they're amazed at the complex structure and the earthworms they find in the region's typically clay soils.

"We had the latest planting dates of anyone around in our neighborhood this year," says Hesterman, "but I don't think we sacrificed much of anything."

Flexibility with the crop rotation is also key with no-till. "If you have a wet spring, you may not be able to go to a corn crop after wheat, because it has so much organic matter and residue," says Hesterman.

To further improve his soil's microbial life, Hesterman plans to use cover crops. He thinks they'll also help with his crop rotation. Planting cover crops after wheat will keep soil microbial activity going into the fall, he says, and that should help to break down the wheat straw more readily before the next spring.

Beyond soil health, Hesterman has also focused on nutrient stewardship since the early 2000s. He implements the 4Rs of nutrient stewardship by applying nitrogen and phosphorus fertilizers in subsurface bands.

A member of the Lake Erie Phosphorus Task Force since 2007, Hesterman participates in edge-of-field monitoring and has installed a system for controlled drainage on his farm to slow runoff of water and nutrients.

"I understand everybody has to stay in business, but I think we all need to make sure that we have these resources for the next generation and the generation after that."

"It's made us a little bit more efficient, more lean and more weatherproofed to the farm economy than most."

Farmer Stories, Page 9

BRIAN NUSBAUM

Saving Time, Machinery and Cost with No-Till

Defiance County farmer Brian Nusbaum is always looking for the $100 bill on his farm. Years ago, a Texas rancher told him that the key to surviving tough times was knowing that, "somewhere on the farm is a $100 bill. All you got to do is improve something and go get it."

Those words stuck with Nusbaum, and today he implements conservation practices like no-till, cover crops and the 4Rs of nutrient stewardship to improve and maximize his business. As a result, the 44-year-old, third-generation farmer says he sees "huge benefits" and "yield pops" on his 750-acre corn and soybean farm in northwest Ohio.

Now a county Farm Bureau president, Nusbaum didn't enjoy tillage farming growing up. "Dad would have me out on the tractor driving all day. We worked the ground three times, and I thought this is just crazy."

Then in 1987, his father became one of the first in the area to switch to no-till. The practice saved his family "lots of trips over the field, machinery and fuel costs, and time." Beyond the cost savings, Nusbaum says that no-till's big benefit is reduced soil erosion.

Six years ago, Nusbaum got into cover crops. He sees terrific advantage, from yield increases to reduced input costs, and laughs that he once thought, "Why in the world would I want to plant a weed in the field when I'm trying to kill them?"

Nusbaum's "aha" moment came during a ride in his neighbor's combine. An early adopter of cover crops, the neighbor was out combining his beans at a time when Nusbaum's beans weren't nearly ready. When Nusbaum hopped the ride, he was stunned to see the field monitor's readings.

Right then he decided to give cover crops a try and began with an experiment, planting one-half of a 120-acre farm with cereal rye that fall. The next spring, the differences were astounding. "The guys that handle my fertilizer and spray called me up and said, 'Hey, what's the difference here? You can draw a line down the field and see the difference.'" Then, at harvest time, Nusbaum saw a four-bushel difference in yield, which more than offset the rye seed costs. Soil analyses also showed higher organic matter in the field planted with rye.

While Nusbaum is pleased his clay soils no longer crust after rain, now he must plant deeper into the soil. For that he bought bigger equipment. He also shifted from 7.5-inch to 15-inch soybean rows to make it easier to plant rye into the soybeans, but that's saved him $10,000 to $12,000 a year on seed costs. He's also saved on herbicide costs, because he's cut his sprayings in half.

Nusbaum works with a certified 4R company and optimizes nutrient use through variable rate fertilizer, side dressing the corn plants with a bander and satellite technology to shut off the nozzle tip sprayer when the applicator crosses into an already fertilized zone. Cover crops have also helped him improve his nutrient exchange rate.

Nusbaum has also recently improved his farm's drainage system, channeling rainwater into tiled boxes placed on grass filter strips at the edge of fields. The system prevents huge amounts of soil and nutrients from leaving the farm.

Beyond the cost savings of these practices, Nusbaum appreciates the environmental benefit. "I want to leave our environment as good, if not better, than what I inherited."

MIKE WERLING

Cover Crops Help Shift Focus to Optimum Returns per Acre

Mike Werling doesn't mind his neighbors thinking he's a little crazy. The 61-year-old, fifth-generation farmer is thrilled that his "farming ugly" practices of no-till and cover crops are enriching his Indiana yellow-clay soils, turning them darker and prairie-like.

Werling began in the late 1980s to implement conservation practices on his 350-acre, Adams County farm, where he grows corn, oats for seed, wheat and soybeans. Starting first with no-till and the 4Rs of nutrient stewardship, he later introduced cover crops. Today he uses minimal pesticides and cultivates a pollinator garden on highly erodible land to support honey bees and other pollinators that are critical to plant reproduction and genetic diversity. He also employs drainage control systems to reduce nutrient runoff.

Among the many benefits Werling sees from these conservation practices, "super-charged" soil health, increased yields, lower inputs and overhead, and reduced soil erosion top the list.

Beginning with wheat and beans, and adding corn in 1994 when he got a Kinze planter, Werling taught himself how to no-till. Serendipity got him started with cover crops. One spring, Werling noted that a field with volunteer oats from the previous year's rotation before corn produced the "easiest and best" no-till corn. That convinced him to plant oats into his wheat stubble in the summertime in the fields that would go to corn the following year.

Over time he added daikon radish, crimson clover and Austrian winter peas; today he uses a 16-way cover crop mix that includes warm season grasses and broad leaves, planting in August on fields that go from wheat or oats to corn.

On his cornfields, Werling broadcasts cereal rye seed at Labor Day. The corn plants have stopped growing then and sunlight is able to reach the rye seedlings on the ground. In the springtime when the over-wintering rye reaches nose height, Werling uses a roller crimper to kill the crops mechanically, and plants soybeans into the residual grass mat.

Weather permitting, Werling plants oats and radish after the fall bean harvest.

An early adopter of the 4Rs, Werling received an award for responsible nutrient management at the 2016 National No-Tillage Conference. He also collaborated with The

Nature Conservancy on the creation of the 4R Nutrient Stewardship Certification Program for the Western Lake Erie Basin, which is now available in all of Ohio, four other states and Ontario, Canada.

More effective use of nutrients drove him in the 1980s to begin applying fertilizer at planting time, on the seed or right beside it. He keeps his nutrient levels so low, he says, there's little that can leach from his land. All the same, he's installed a two-stage ditch to slow water run-off from his fields, uses drainage water management structures to control water levels in another field, and has 120-foot-wide filter strips that capture sediment and nutrients during heavy rainfall events.

As a result of these conservation practices, Werling says, "My yields are steadily increasing just like the national averages are, but I'm not at the high end of yields. I'm at my optimum returns per acre." He explains that while he has produced up to 230 bushels of corn per acre using more inputs, his optimum yield per dollars input is 180 bushels using just 125 pounds of nitrogen—far below the average 200 to 250 pounds of nitrogen per acre used in his area.

"I'm proud," he says, "to continue what my great-great grandfather started and to be making the soil better than the way I received it."

"I'm proud to continue what my great-great grandfather started and to be making the soil better than the way I received it."

Farmer Stories, Page 13

This publication is made possible
through funding from
The Nature Conservancy and the Joyce Foundation.

The Joyce Foundation

For more than 43 years, the Joyce Foundation has supported the protection and restoration of the Great Lakes. The Joyce Foundation plays a critical role in helping to bring diverse partners together to promote sustainable agriculture and a healthy Lake Erie.

The Nature Conservancy

The mission of The Nature Conservancy (TNC) is to conserve the lands and waters on which all life depends. Founded in 1951, TNC is a leading private, non-profit conservation organization working around the world to protect ecologically important lands for nature and people. We work in all 50 states and more than 70 countries.

TNC's Ohio Chapter began working with the agriculture community in the Western Lake Erie Basin more than 20 years ago. We take a collaborative, on-the-ground approach to conservation that includes best management practices and planning for a productive and sustainable whole farm system in the field, at the edge of the field and beyond the field. We have built strong and lasting relationships with agribusiness and farming industry leaders, increasing the reach and scope of nutrient reduction solutions across the state of Ohio.

The Nature Conservancy

Connect with us and learn more

The Nature Conservancy in Ohio
WLEB Ag Project Office, Defiance, OH (419) 782-0652
Ohio Chapter Office, Dublin, OH (614) 717-2770
nature.org/OhioAg
facebook.com/groups/OhioTNCAgriculture/