2022

Conservation Legacy Awards


Stayton


Burchfiel


Fredericks


Johnson

Honoring Farmer Achievements in Modern Agriculture that Enhance Sustainability

Sponsored by

ASA American Soybean Association

BASF We create chemistry

BAYER

Nutrien

OUR SOY CHECKOFF℠

VALENT

Craft Conservationists

Regional award winners infuse dedication into their sustainable farm practices

Spirited conservationists are passionate about advancing soil health, protecting water quality and implementing production practices that sustain their farms environmentally, economically and socially. This year, the American Soybean Association (ASA) 2022 Conservation Legacy Awards program honors four such stewardship leaders, recognizing their efforts to continue to hone their craft of sustainable farming.

We congratulate these exceptional soybean farmers, each a regional winner of the ASA 2022 Conservation Legacy Awards:

Northeast
Grier Stayton

South
Shane Burchfiel

Midwest
Wayne Fredericks

Upper Midwest
Jamie and Brian Johnson

The conservation commitment and sponsorship support from ASA, BASF, Bayer, Nutrien, the United Soybean Board, Valent, Farm Journal and Top Producer make the award program possible.

Some of our sponsors share their thoughts as they honor the conservation achievements and the agriculture sustainability practices of this year's recipients:

"American farmers care deeply about the land and have a long history of working hard to grow crops in a sustainable manner, with a focus on continuous improvement. Farmers want to protect their legacy and preserve the environment for future generations," said ASA President Brad Doyle, a farmer from Weiner, Arkansas. "The Conservation Legacy Award recipients are shining examples of how U.S. soybean farmers are dedicated and responsible stewards of the land."

"As farmers continue to tackle the biggest job on Earth—feeding an ever-growing population—it's more important than ever to incorporate sustainable agriculture practices that conserve and preserve our land," said Paul Rea, senior vice president, BASF Agricultural Solutions North America. "The farmers being recognized with this year's ASA Conservation Legacy Awards are indeed leading the way in these important initiatives, and BASF is honored to acknowledge the positive impact they're making."

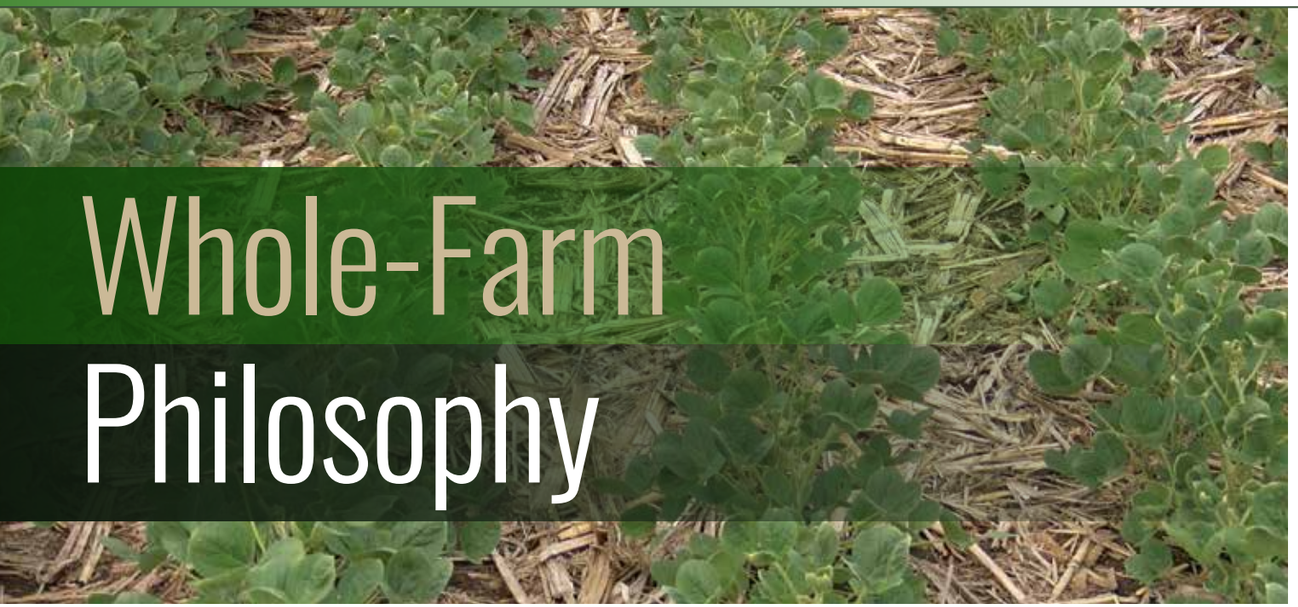
Head of Industry Affairs for Bayer, Martha Smith, adds, "We know that farmers are uniquely positioned to help feed, fuel and clothe our growing population while addressing climate change through how they manage land and natural resources. Through innovation and new opportunities for farmers, it's important that they benefit from the impactful work they're doing and that they are incentivized for not only what they produce, but how—and their positive impact on the environment."

As an Iowa soybean grower, a United Soybean Board Executive Committee member and a farmer-leader, Tom Oswald knows the importance of sustainability practices, "Good stewardship, new technologies tailored to my production needs and best practices combine to minimize my farm's environmental footprint while pushing my operation's sustainability needle forward."

"At Valent, we believe conservation is key within grower operations to improve and maintain healthy soils for the sustainable production of food and fiber," according to Leslie Garcia, manager of sustainability and stewardship for Valent U.S.A. "We define a sustainable operation as one that maintains or increases productivity while protecting people and the environment over multiple generations," she says. "Valent proudly recognizes those farmers who are building a lasting legacy of conservation at home and within their communities to remain sustainable for years to come."

Again, we congratulate these regional winners of the ASA 2022 Conservation Legacy Awards and appreciate the support of our sponsors, who make the award program possible.

"Farmers want to protect their legacy and preserve the environment for future generations."
—ASA President Brad Doyle, a farmer from Weiner, Arkansas



Whole-Farm Philosophy

South Dakota farm couple's conservation plan integrates crops and cattle

Conservation-first decisions drive the whole-farm philosophy adopted by Jamie and Brian Johnson, a fourth-generation farm couple from Frankfort, South Dakota. The Johnsons have been farming for 15 years, continuously tweaking their sustainable crops-plus-cattle approach.

"The diversity in our system allows us to consistently be productive because not every year is the same, and not every crop is great. When you have a diverse blend of crops and livestock, you reduce your risk and can take advantage of weather and market changes," says Brian. "Integration is a long-term goal for us to continue improving our conservation."

Brian's great-grandfather established the Johnson homestead after moving from Sweden more than a century ago. The original quarter has grown to 1,800 acres of cropland and 500 acres of grassland. Brian's parents, Mickie and Alan, passed on their passion for resource optimization.

The Johnsons' present crop rotation includes corn, soybeans, small grains and cover crops that are planted following small grain harvest for maximum growth potential.

Maximizing Cover Crop Contributions

"Cover crops improve the soil profile, build organic material and place root systems where the next year's crop can take advantage of subsoil nutrients left there," Brian explains.

The Johnsons experiment with many species of cover crops to increase water infiltration while providing nutrients to the soil and growing feed for the cattle. They retrofitted a planter to better seed cover crops into bio strips, planting in 20-inch rows. Tillage radishes break up soil compaction, while vetch and lentils provide nutrients to the soil. Brian is considering adding faba beans to the mix as a nitrogen source when corn is the next crop to be planted.

"Our corn and soybean yields have been steady or increasing each year during the last 10 years, and I attribute a lot of that to our soil health improvements," Brian adds.

Working with the Natural Resources Conservation Service (NRCS), the Johnsons enrolled in the Conservation Stewardship Program (CSP) in 2009 to address soil erosion and salinity. They also enrolled in the Conservation Reserve Program (CRP). Since 1986, the Johnsons have been 100% no-till and have seen soil health and water infiltration improve. Crop residue minimizes erosion and runoff, allowing the full vegetative cover to insulate and repair deficient areas.

The Johnsons also use management zones to soil sample every other year, and this directs the multiple applications of nitrogen they use in-season at the right times. They switched to variable-rate nutrient application in 2004 to better manage input efficiency.

"It's allowed us to be more cost-effective, more economical, but also more profitable. By placing the nutrients precisely, we are not overusing or wasting fertilizer resources," Brian explains.

Manure also plays a role in fertilization. Soil sampling the year before corn or soybean planting confirms adding phosphorus or potassium is usually not needed.

"By using some biological nitrogen, we decrease our commercial fertilizer nitrogen need. My goal is to reduce our nitrogen use ratio in corn to 0.6. Right now, we're at 0.7-0.9," Brian says.

With technology and shifting farming practices come other opportunities,

including prescription seeding rates. Prescriptions for the following crop are made based on sampling and yield goals. They rely on a variety of trait seed for different crops to manage weeds. Brian scouts the fields regularly throughout the growing season, which, together with the crop diversity, naturally eases pest management and substantially reduces pesticide use per acre.

"By incorporating rye, for example, after corn we can change how much herbicide we have to use in the spring on soybeans," Brian explains. "All corn and soybean acres receive a preemergence herbicide and are followed by a postemergence application of glyphosate, if necessary. The ability to change herbicide modes of action with crop rotation has allowed us to have a solid weed management program and avoid any resistance issues to date."

Beefing up the Cattle Component

The Johnsons have discovered synergy with their crop rotation and cattle herd. The family has 110 head of registered and commercial Angus cattle that are released onto the fields for grazing cornstalks in the fall or for grazing mature cover crops, wherever possible.

Jamie is the one who encouraged raising more cattle and improving the grazing side of the operation. Grazing the stubble and cover crops build up soil microbes, while the manure and urine are the catalysts that make the regeneration process work more quickly.

"It all comes together. You get that diversity and the nutrients that help reduce your input applications," she says. "The hoof action spreads and incorporates manure, further enhancing the cooperative relationship between the cattle and the land. The goal is to provide higher quality forage for the animals and make sure the land is not being overgrazed."

Brian sees it as "free" grazing. "When you're grazing cornstalks, you've already produced your corn crop, and that dry matter is there," he explains. "As long as the cattle are there at the right time, you don't add any compaction. It's a great, cost-effective way to feed livestock."

"Cover crops improve the soil profile, build organic material and place root systems where the next year's crop can take advantage of subsoil nutrients left there."

— Brian Johnson, Frankfort, South Dakota

Although the cattle enterprise is the smaller portion of the overall operation, the Johnsons are no less committed to its stewardship and conservation. Grass acres account for about 20% of their total acres, with native grasses making up more than 80% of that. They carefully monitor pasture and grazing conditions to preserve grass regrowth and weed prevention, too.

"I think integrating livestock back onto the land has really upped our game with organic matter reducing input costs," says Jamie. "It's more management as far as physical labor, like putting up a fence, but it's less management on the other side. It is really a great partnership."

Enriching Soil and Water Health

Jamie has become a soil health champion, speaking out about the opportunities and challenges of partnering a crop operation with a cattle enterprise.

"I think what has been done historically to native grasslands is more impactful on the future than anything in the past," she explains. "Tearing up pastures to plant corn created problems with natural land use, resulting in salinity issues, not just for our kids but for generations to come."

As the family's CRP contracts began to expire in 2020, they chose to use most of the acres for grazing instead of reenrolling in the program. By micromanaging smaller tracts adjacent to pastures and cropland, the Johnsons believe they will further improve soil health while adding value to the operation through increased livestock integration. That includes seeing high levels of microorganism activity, plentiful earthworms, and a soil structure with prevalent micro- and macropores. Organic levels are currently around 4% and their goal is 6%.

"Soil health benefits start with the ability to absorb as much water as possible. It's about holding capacity for years when you need it," says Brian. "With a healthy living soil, you can get through drier years and build a system that has diversity above- and below-ground."

Besides CSP and CRP, the Johnsons participate in the Environmental Quality Incentives Program (EQIP) and Wildlife Habitat Incentives Program. Some of the CRP acres are located on the edge of sloughs, which creates a buffer strip with vegetation filtering water before reaching the wetland. Wildlife is abundant, along with bee and butterfly-friendly species planted by Jamie to improve pollinator habitat. A contract through EQIP provides the renovation of an existing Elm tree shelterbelt and 1,800 feet of new trees along the sides of their calving pasture.

"Our plan is to install new water tanks with a new well and a mile of water pipeline to furnish fresh water for the cattle," explains Brian. "This improves the location of the water source and conditions for controlled grazing. Two stream crossings and a new fence will expand rotational grazing options and make forage production on cropland more accessible."

Keeping Improvement Options Open

Ultimately, the Johnsons' goal is to leave the farm better than they received it. They will continue to reduce input use and increase productivity through conservation management.

"With crop diversity, livestock integration and conservation practices, we believe the landscape will withstand any challenges Mother Nature may impose," adds Brian. "We want to be more efficient without purchasing more acres and by adding value with livestock."

With evolving seed technology, Brian is considering soybean trait selection changes. They currently plant about 75% glyphosate-resistant and 25% dicamba-tolerant soybeans. As new herbicide traits are available, they will have a broader range of weed control options.

"I don't know if we're doing a lot different; it's just we're willing to try new things and learn from that and from people that may be smarter than we are," Brian says. "In the end, this is still a business. We must be able to make money, but we have to be conservation-minded as well. Being productive, profitable and sustainable is really the goal for us."

"We have four children, and we want to pass this on to them," adds Jamie. "We are passionate about what we do and want to create a legacy of nurturing the land."

"With a healthy living soil, you can get through drier years and build a system that has diversity above- and below-ground."
—Brian Johnson

Accidental Conservationist

Iowa farmer turns tillage happenstance into a way of life

Wayne Fredericks calls himself the "accidental conservationist." When he started farming in 1973, he believed a fully conventional tillage operation was the only way to go. But after nearly 20 years, Mother Nature stepped in and upended those plans on the Osage, Iowa, farm, turning Fredericks into a lifetime proponent of all things conservation.

"Our land needed the plow to raise soybeans successfully, or so I thought," he says. "For the first 19 years, I plowed all my cornstalks ahead of soybeans, and I worked all my soybean stubble ahead of corn. In the winter of 1991, I was faced with a challenge I had yet to encounter. My farmland froze early, and I had not gotten my cornstalks plowed. What was I going to do?"

On the advice of his John Deere dealer, Fredericks planted his soybeans with a drill the following season. The crop performed well, weeds were under control and a smooth harvest led to strong yields. Fredericks never looked back, and today after almost 50 years farming with his wife, Ruth, the 756-acre farm of corn and soybeans is in a no-till/strip-till rotation. The farm also includes about eight acres of pollinator habitat enrolled in the Conservation Reserve Program (CRP).

"Strip-till corn came about a decade after no-till. The technology evolved and showed very real promise for those of us farming in colder, wetter climates," says Fredericks. "I live and farm 'just south of the North Pole,' where many farmers believe it is too

"What starts out as a practice on your farm eventually becomes a way of life. Conservation becomes a state of mind."
—Wayne Fredericks, Osage, Iowa

cold to practice no-till or to plant cover crops. I have proved them wrong."

Fredericks says his goal became one of setting an example for other farmers by successfully showing that no-till and cover crops work, sharing information he learned and trying to make a dramatic difference on a large scale. As part of that effort, in 2008 he began working on replicated strip trials with the Iowa Soybean Association's (ISA) On-Farm Network.

"To date, I have done over 100 replicated trials," he says. "In 2016, while serving as president of ISA, Iowa was amid the Des Moines Water Works lawsuit against three northwest counties over nitrate levels in the Racoon River. I immediately moved from 50% to 100% in planting cover crops, and I knew from water sampling that it would dramatically reduce nitrates in tile drainage water. Everything we do on land affects someone else's water downstream."

Fredericks has seen positive results on his soils as well. "We learned early on that there was a huge reduction in the amount of organic matter in our soil under tillage. In a long-term study that looked at some of our farm, we nearly doubled our organic matter in 30 years after we quit conventional tillage and went to no-till, strip-till and now, cover crops," he says. "Organic matter helps build soil structure and can supplement additional moisture needs when it gets dry."

Monitor and Manage Nutrients

Fredericks also began focusing on his fertility program to enhance water quality. He now keeps nitrogen rates near Iowa State University's (ISU) Maximum Return to Nitrogen (MRTN) values.

"Our nitrogen applications are split three ways; using about 30 pounds in a dribble band behind the planter, 30 pounds as a carrier with our burndown herbicide application and the balance side-dressed with a coulter applicator approximately three inches deep in early June," he says.

Fredericks has monitored tile outlets for nitrates as he has made these changes and has witnessed significant nitrate reductions in fields planted to cover crops. He added the first nutrient bioreactor in the area and said the average nitrate reduction in the past six seasons was 42%. Fredericks maintains drainage tile on 65% of fields and has waterways and buffer strips.

"To minimize other nutrient runoff, we place the majority of our phosphorus and potassium seven inches deep in a band when we strip-till in the fall for corn and soybeans," he says. "By soil testing every two years, we keep close track of soil levels and prescribe only the amount of nutrients likely to give a crop response. We get better efficiency of the banded fertilizer and protect the environment while maintaining soil fertility levels and crop production."

Fine-Tune Cover Crops

Fredericks has documented fertilizer cost reductions with the addition of cover crops. Phosphate runoff is less, and more deep soil phosphate is released. He recorded $8.78 per acre phosphorus and potassium savings compared to ISU's crop budgets over the past 18 years.

"It wasn't until about 2012 that we started working with cover crops and doing experimental work for the ISA On-Farm Network, trying to learn what worked, when to plant, how to plant, how thick to plant, how to terminate, the effect on yield and more," he says.

Nearly 10 years later, Fredericks says his best practices now include fall aerial seeding with cereal rye, usually in late August or early September into standing corn. He has added oats to the mixture in the last two years to create some diversity. Most recently, he included kale for a three-way mix. Soybeans were no-tilled into the green plants that were then terminated chemically following planting. After soybean harvest, Fredericks drilled a cereal rye/winter camelina mix. Strip-till will follow and in the spring Fredericks will no-till plant a cover crop mix into those strips. Termination will follow prior to crop emergence.

"Camelina is new for us. We're looking at bringing new species in for even more diversity," he says. "That helps the soil biology. I think that is the most beneficial aspect of using cover crops. Soil biology is key to all our success and everything we can do to enhance it is a huge plus."

He also cites as benefits is an increase in air exchange in the soil and an additional four months for carbon harvest. He qualifies for a $5 per acre premium discount on his crop insurance and says his yield risk is much lower, so he can purchase less expensive insurance products, too.

He is embarking on a new cover crop venture during the next three years with Corteva. "The study is looking at perennial cover crops, particularly Kentucky Bluegrass. We have laid out the seeding plan for 33 acres set up in four replicated plots, and we will compare it to our normal seeding mix. If the practice works, it will cut down on annual seeding, a major concern," he says.

Establish a Pollinator Habitat

Fredericks has undertaken conservation practices beyond his crop fields. In 2014, he completed a farm profitability analysis to enroll in the Conservation Reserve Program (CRP).

"We found some spots in our corn-soybean rotation that were not, necessarily, always profitable," he says. "By placing them in a conservation program, we could improve our bottom-line profitability but also provide wonderful habitat for monarch butterflies and other species."

He had noticed a dramatic loss in the population of monarchs at about the same time. Since farming practices in the Midwest were partly blamed, he wanted to help protect the species. He seeded seven acres of pollinators across seven different locations and became ASA's representative to Farmers for Monarchs, an initiative of the Keystone Policy Center. The small sites also provided new habitats for wildlife. One pollinator habitat next to the farm's windbreak has added to the winter traffic of wildlife as animals find both food and protection in the area.

"Deer and pheasants are a common sight all winter long in these areas, and many fawns have been reared in our habitat," he says. "We also have a relationship with Pheasants Forever."

Never Stop Learning

In fact, Fredericks enjoys having research partnerships with many groups, such as his long-time relationships with researchers from Iowa State University and the Iowa Soybean Association.

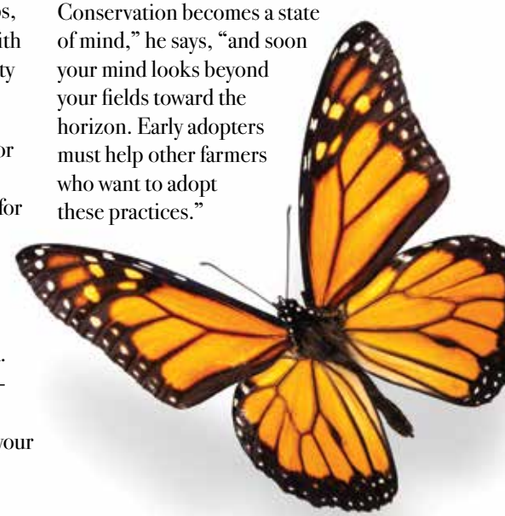
"It is fun for me to open our farm up for researchers to do long-term studies. I know we've worked with both groups for several years on in-depth soil erosion and organic matter studies," he says. "I also got to work with Dr. Jerry Hatfield from USDA's Agricultural Research Service office in Ames, Iowa. He was looking for a farmer to cooperate with them to prove that if you have long-term conservation measures on your farm, you see changes over time."

Fredericks sent 16 years of digital yield and weather data to Hatfield for analysis. Researchers looked at 10 different fields and found Fredericks had dramatically reduced yield variability.

"In other words, we took the poorer parts of the farm and made them perform better," he says. "We also learned about water use efficiency, and we were getting tremendously higher yields per inch of water. Soil changes and the expansion in organic matter over time led to soil structure improvements, allowing us to absorb better and hold more water."

Bottom line, Fredericks says he has learned that what you do on your land doesn't just stay there. Positive implications can stretch for thousands of miles.

"What starts out as a practice on your farm eventually becomes a way of life. Conservation becomes a state of mind," he says, "and soon your mind looks beyond your fields toward the horizon. Early adopters must help other farmers who want to adopt these practices."



CAREFULLY DESIGNED TO LIFT THE WEIG HT OF THE WORLD.

A farmer's hands are a gift to this world. Tirelessly giving us the food, fuel and clothing we need. Thrown into the ring bare-knuckled to take on angry weather, elusive weeds, unwanted pests and unforgiving markets. At BASF, we want to offer our thanks and support as this year begins. Because we know these are the hands the world relies on.

HELPING YOU DO THE BIGGEST JOB ON EARTH

BASF
We create chemistry

Water Watcher

Farmer manages resources wisely in coastal plain watershed

Not many American farmers can say their operation has been in the family since the 1600s. But Grier Stayton, farmer from Lincoln, Delaware, touts his family's agricultural longevity and attributes its success to the family's detailed attention to conservation and water management.

"We have an abundance of groundwater and no issues with having a well and being able to tap into the aquifer," says Stayton. "But we have to be responsible. Part of the farm is in the Chesapeake Bay Watershed and the other side goes to Delaware Bay. I'm right on the crown, so we have many regulations. Water is the primary yield-limiting factor in the sandy loam soils."

Stayton today is the sole owner of 295 acres—including the family's original 215 acres. About three-quarters of his tillable ground is irrigated with four center pivot systems. He raises corn, soybeans and alfalfa, and adds that wheat, milo and lima beans have been grown on the farm in the past. He manages about 100 acres of woodlands, including pine and mixed hardwoods.

"I am dependent on availability and quality of irrigation water, and I am willing to at least try new practices as they apply to my operation's water management. Water conservation, efficient use of resources and generally good stewardship are considerations on 100% of the farm," he says. "Irrigation allows me to get at least one additional cutting of hay, for example.

I don't over irrigate. I monitor exactly what crop needs are. And of course, weather is a huge factor."

Cover Crop Longevity

Relying on irrigation, Stayton says his corn yields an average of 220 bushels per acre. Soybeans yield an average of 60 bushels per acre. Cover crops are seeded every fall on all crop acreage by either an aerial or ground spreader, which has created better soil tilth and weed suppression. In addition, hay is used as a permanent cover on about 18% of the farm.

"My father started farming in 1949, and I never knew a year where he didn't plant a cover crop of rye. I have always thought that was a great idea," he says. "I've been using triticale as a cover crop. I think it's beneficial as far as being able to control trapping nutrients for tillage purposes. I do practice some minimum tillage where it's needed."

Stayton sees fuel savings through no-till and minimum-till planting, given fewer trips across the fields and the reduction in labor. In addition to cover crops, drainage to ditches is managed through other nutrient management best practices that include annual soil testing, use of a manure storage shed, setbacks for manure storage and how the manure is spread.

"We are fortunate to have a strong poultry industry, which supports the grain market and provides poultry litter we can use as fertilizer," he says. "I do not raise chickens, so I depend on neighbors and other sources to obtain local broiler manure and use it based on nutrient needs."

Stayton only applies manure every two or three years. He also uses commercial fertilizer and is careful with applying only what is needed based on soil tests since overapplication affects the budget and water quality. He installed several drain tiles in areas prone to flooding, too.

Woodlands for Wildlife

While maintaining growing crops on the farm year-round is critical to Stayton's conservation plans, so also is managing the wooded property for wildlife. He leaves grass hay strips around the edge of the woodlands so deer have forage without getting into the corn and soybeans.

"It helps to have the decoy, but it's not a cure-all for sure. Wildlife is both a blessing and a curse," he says. "We can have 20 or 30 deer in the fields at a time, so that does some damage."

Stayton does offer some lease hunting for deer. In addition, he says they have a high fox population, as well as turkey, otters, game and predator birds and rabbits. He has even captured the attention of the bird-watching community for dickcissel birds, particularly.

"Wildlife appreciates the good cover, especially with the hay strips," he says. "I also maintain stands of buckwheat, sunflower and milkweed for pollinators and have planted buffers of Leyland cypress and miscanthus grass along one border of the farm. We do no clear-cutting, we reseed the loblolly pine and maintain all of the grassed clearings for the wildlife."

Knowledge to Practice

Farming isn't Stayton's only stint in agriculture. He also retired from the Delaware Department of Agriculture in 2007 as the state's pesticide administrator. He spent 32 years with the department, first as a member of the inspection service grading potatoes during the summer and then working with pesticides. He has a bachelor's degree in ag entomology and plant pathology.

"I was exposed to the university Extension service because we helped train the staff for the Environmental Protection Agency (EPA). I worked with the EPA on a number of programs, and that gave me a strong background in the environmental aspects of farming, water quality and soils," he says. "My career afforded me

> "Water conservation, efficient use of resources and generally good stewardship are considerations on 100% of the farm."
>
> *—Grier Stayton, Lincoln, Delaware*

the education and exposure to real-world issues relating to agriculture and the environment. Now I can put this knowledge into practice and pass it along to my son, who will be the next generation to farm this land."

Son Nicholas Stayton views himself as an apprentice today, spending time with his dad and learning as much as he can from him. "It's an honor to think of myself as the next steward of this property, so it's very important to keep this a family farm. I am the thirteenth generation," he says.

The Staytons are working with the University of Delaware Extension entomologist to maximize sustainable strategy to help monitor local insect populations. Grier has partnered with the Extension plant pathologist for a study to be conducted in 2022 on soil pathogens.

"There are a number of things that Extension has helped me with, including a lot of support from entomologists who have been on the farm and who have set up some field plots for pest control," he says. "I have quite a problem with Dectes stem borer in soybeans, which cannot be effectively controlled with any spray, so we're working on finding practices to try and mitigate that."

Stayton also relies on Extension for the latest nutrient management advice. He is a certified pesticide applicator and schedules spraying based on economic thresholds for pests in corn, soybeans and hay. He generally monitors corn and soybeans himself for plant diseases and then consults with seed and Extension specialists to map out the best alternatives.

> "It's an honor to think of myself as the next steward of this property, so it's very important to keep this a family farm. I am the thirteenth generation."
> *—Nicholas Stayton, son*

As for weeds, Stayton scouts fields to determine what control tactics are needed. "Cover crops, no-till planting, hand pulling and timely applications of postemergence herbicides effectively control weeds with a focus on the mode of action groups to manage resistance," he says.

Ready for Generation 13

With so many aspects of sustainability ingrained in his daily decision-making, Stayton is confident he is doing all he can to ensure the farm is well-positioned to flourish in the future.

"I'm very proud of the farm and the farming history of my family. I'd like to see it keep going," he says, adding that his 92-year-old mother still lives in the farmhouse. "The farm was gifted to me from my mother, and now I have my son to help me out."

While Nicholas was not raised on the farm, he is willing to learn all he can and follow in his father's footsteps to use sound agricultural practices to keep improving the soils and sustaining the woodlands as good habitat in a region that faces increasing urban development pressure.

"That's really a big part of why I have so many deer. The farm is a haven for them. It's a place they can come and eat and not be disturbed by development," he says.

Stayton has enrolled his entire farm for perpetuity in the State of Delaware's Aglands Preservation and Planning Program. As the first farm to start a preservation district in his area, he enabled other, smaller farms to also enroll in the program.

According to the state, "preservation districts are voluntary agreements where landowners agree to continue to only use their land for agriculture for at least 10 years. Agricultural easements are purchases of development rights by the Agricultural Lands Preservation Foundation, placing a permanent agricultural conservation easement on the property."

"I am a big conservationist. I like to do whatever I can to continue to enrich the environment," Stayton summarizes. "My approach is to leave the farm in better shape than when I inherited it."

Shane Burchfiel

Weed Resistance Wrinkle

Conservation practices help Tennessee farmer navigate evolving challenges

No good deed goes unpunished. Shane Burchfiel is a strong proponent of conservation on his Dyersburg, Tennessee, farm. But it now comes with the added challenge of weed resistance.

"Evidently, we are the mecca for resistant weeds in this part of the world. It started with marestail and now Palmer amaranth. If there's a resistant weed, we've got it," says Burchfiel. "That creates a different set of challenges, but I know going back to the plow is not the answer."

Burchfiel is not afraid to try new things—he keeps what works sustainably in his plan and punts any strategies that don't. No-till is one of the success stories. The Burchfiels became no-till champions in the 1990s, switching 100% of their corn-soybean-double-crop-wheat rotation to no-till after a local Extension agent ran an effective trial on the family's farm.

Burchfiel says initially, his dad found weed control in no-till fields was just as good, if not better, than with conventional tillage. Now, with weed resistance, he is supplementing with other ideas.

"The tools to combat Palmer amaranth are shrinking, at least in soybean production. This ongoing, uphill battle is going to continue to take a multi-prong, collaborative attack," he says.

In addition to no-till, Burchfiel is more aggressive with rotating crops and herbicide modes of action. Weekly scouting and greater use of preemergence herbicides, he says, have been the way to keep resistance under control and to keep the farm productive and profitable.

"If I can accomplish goals from a yield and from a cost perspective with these strategies, that puts me further ahead," he says. "Maintaining a consistent rotation and crop balance is key for long-term success year after year from economic, environmental and equipment standpoints."

No-Nonsense No-Till

Burchfiel hasn't known any other production system than no-till since he began farming full-time 11 years ago. He graduated with a degree from the University of Tennessee in agriculture and natural resource management and worked for an ag retailer before returning to the farm. The fourth-generation farmer manages 2,000 acres of crops, including 200 acres of hardwood timber.

"We farm in a flat river bottom, where the ground is lightly rolling, and soil washes away. It ends up in the Mississippi River if we don't control it," he says. "No-till alleviates 90% of that and saves on time, saves on fuel and saves on equipment and manpower. There are countless benefits."

No-till has enhanced the soil profile since he returned to the farm, with a clear build-up in organic matter and a greater presence of earthworms today.

"You don't want to put too much where you don't need it," he says. "That's where soil sampling is good management. You want to address fertility needs by zone, field or farm rather than taking a blanket approach to everything. Some fields can be managed more intensely than others."

While most of the fields are not under irrigation, he does run irrigation pivots on 20-25% of the ground farmed. Field size is the greatest limiting factor for irrigation, as it is cost-prohibitive to put a pivot on an area of fewer than 75 acres, which is common in the region.

"We have better corn and soybean yields, and our production history consistently exceeds county averages," he says. "While weather plays a major role in that, it also is due to consistent practices of good fertility, pest management, variety selection and placement and adopting technology."

Burchfiel works with consultants to oversee soil testing. All fields are tested at least once every five years, with irrigated ground tested more regularly and aggressively. Any new fields are soil tested immediately. The highly productive ground is sampled in zones or grids to ensure the right products are applied in the right amounts and at the right time.

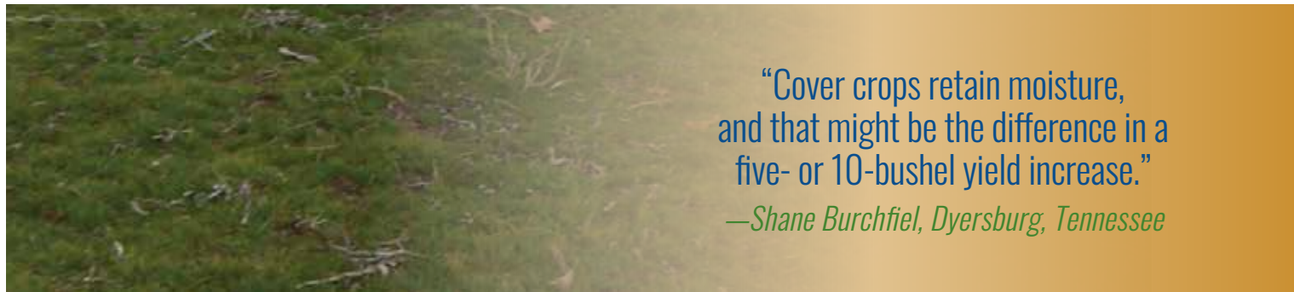
Burchfiel relies on a consultant for crop input recommendations as well. For instance, he is now using liquid nitrogen (N) and injecting it into the soil rather than applying N source(s) on top of the soil. He also uses some variable-rate applications of nitrogen, phosphorus and potassium.

About a quarter of the acreage is managed via grid or management zones, and Burchfiel hopes to increase that as technology and equipment improve. Likewise, he uses prescription seeding rates on 25% of his fields and plans to expand as software and data become more reliable.

Cover crops have become another conservation strategy that works well in Burchfiel's no-till system, especially on his non-irrigated acres. He has found that cover crops not only help address some of his weed control challenges but also help build and protect the soils from erosion.

"Cover crops retain moisture and that might be the difference in a five- or 10-bushel yield increase," he says. "With commodity prices and input costs right now, every nickel counts."

Burchfiel has used a variety of cover crop blends on a few hundred acres at a time over the last decade. Crops include cereal rye, vetch, turnips, clover, wheat and



"Cover crops retain moisture, and that might be the difference in a five- or 10-bushel yield increase."

—Shane Burchfiel, Dyersburg, Tennessee

radishes. He experiments with planting techniques, including incorporating seed with a drill and fall fertilizer applications.

Pro-Active Resource Guardian

In addition to relying on no-till, crop rotation and cover crops for soil improvement and to battle weed resistance, Burchfiel finds opportunities to enhance water and wildlife.

Burchfiel's farm boasts about 100 beehives spread out across properties to promote pollinators and to produce honey. He has incorporated terraces, catch basins and other structures and diversions for erosion control that contribute to improved soil health and minimized nutrient loss.

The farm has about 200 acres of hardwood timber, which provides a multitude of conservation benefits. "There is a lot of cypress timber that has been harvested a couple of times over the last 25 years and provides another source of income," he says. "The natural location allows the trees to grow and to flourish and to offer a wildlife habitat. I have several wildlife food plots and will leave corn or soybeans standing or plant millet and other things to feed the animals. It has encouraged deer, turkey and other animal populations and provides habitat for ducks and geese."

With a passion for attracting wildlife to the area, Burchfiel partnered with Ducks Unlimited several years ago to install culverts and risers that would allow the family to flood the bottom ground for waterbird habitat. Ducks Unlimited put the structures in at no charge, and the lowland acres are intentionally flooded with some crop standing to attract and promote duck and goose populations for hunting season right after Thanksgiving until the end of January.

"We leave the water there for a couple of weeks after hunting season. In early spring, we start to drain it off so everything will be dried in time for planting," he says. "The no-till ground stays firm all year, even with water sitting on it for two or three months at a time. You've got all the stubble and residue left there that's holding the ground together, which is what we like."

Being able to control the flow on the bottom ground gives Burchfiel the chance to direct water to the outlet when he wants to prep for crop production, making sure it does not pond up or flood.

Long-Term Stewardship Growth

As he looks to the future, Burchfiel believes dealing with weed resistance may be a long-term challenge for the farm. But he adds that conservation practices will remain one of the pillars for managing it. The farmer will take advantage of opportunities to steadily grow in size and scope.

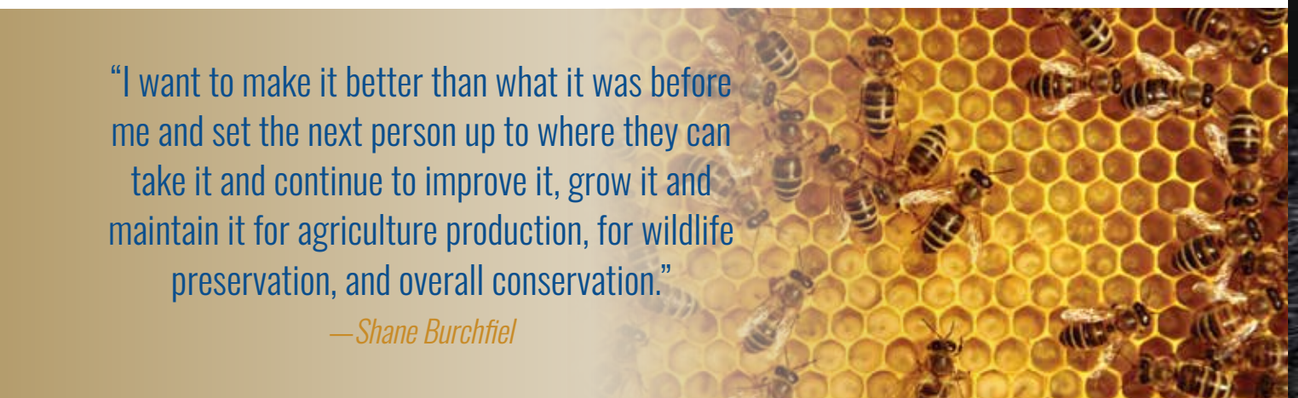
"I want to leave the door open for room to maintain reasonable growth and expansion if good prospects present themselves," he says. "Whether I own or lease the land I farm, stewardship will remain a priority. I want to improve the

land and the methods I use to improve it so that whoever comes after me to farm will be in a good position to continue on the same trajectory."

Burchfiel says at this point, he is unsure who will be the next to step in and farm, but, "I want to make it better than what it was before me and set the next person up to where they can take it and continue to improve it, grow it and maintain it for agriculture production, for wildlife preservation and overall conservation, so it is economically and environmentally productive."

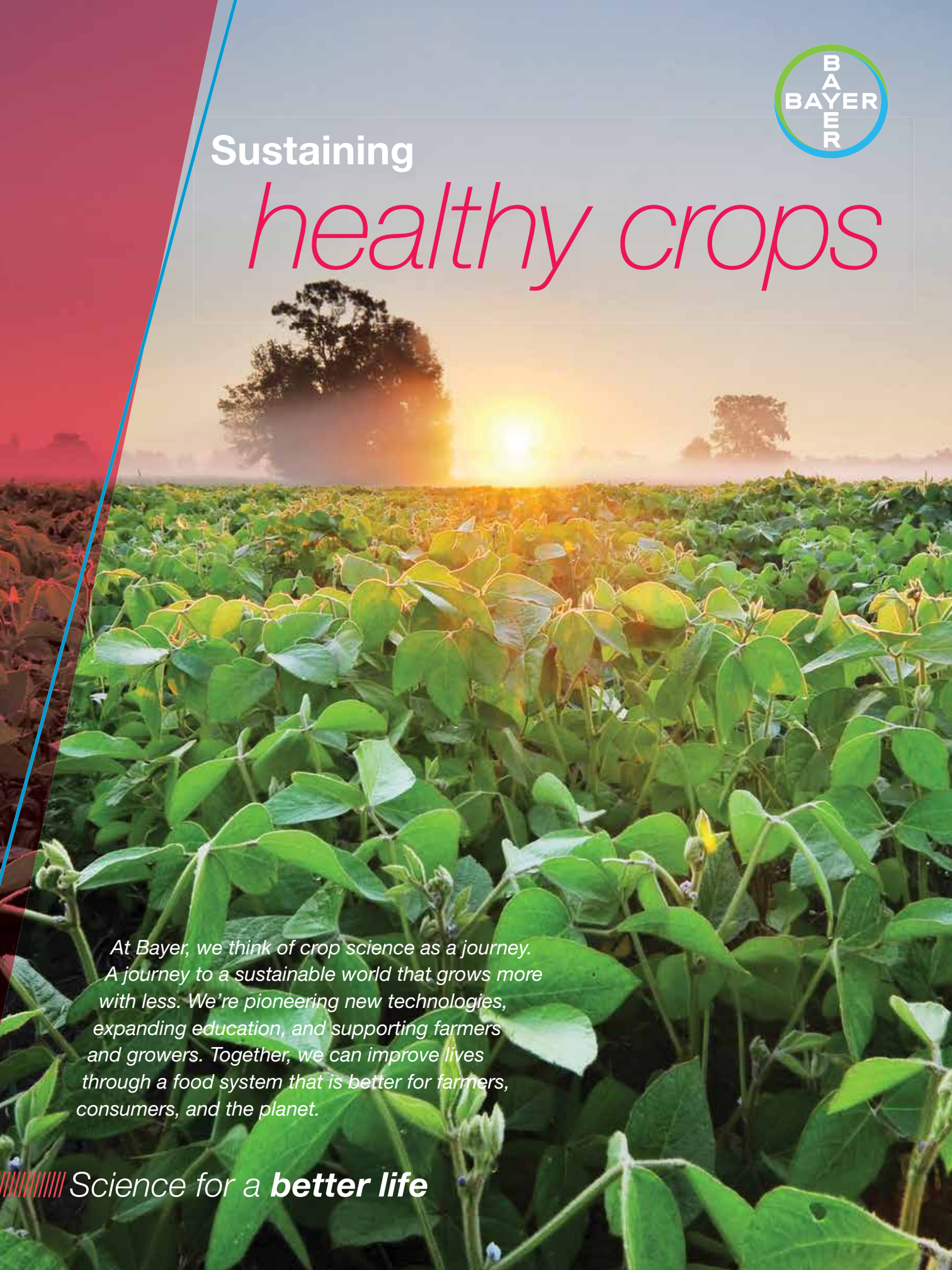
As a temporary caretaker, this Tennessee farmer says he is fortunate to have a dynamic farm with significant future potential because of what his parents and grandparents did before him.

"I want to keep that trend going with my kids, my grandkids, my nephews and nieces, whoever may be managing and working this ground 50 years from now," he says. "You work in the moment because you have to, but you need to think about the future at the same time."



"I want to make it better than what it was before me and set the next person up to where they can take it and continue to improve it, grow it and maintain it for agriculture production, for wildlife preservation, and overall conservation."

—Shane Burchfiel



Sustaining *healthy crops*

At Bayer, we think of crop science as a journey. A journey to a sustainable world that grows more with less. We're pioneering new technologies, expanding education, and supporting farmers and growers. Together, we can improve lives through a food system that is better for farmers, consumers, and the planet.

Science for a ***better life***