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One Conversation at a Time

As a parent, I teach my son that every story has two sides. As a leader in sustainable agriculture, I also find myself having to remember that every day. Too often, we miss our opportunity to tell our side of the story — the story of the American farmer, the progress that has been made in sustainability and the groundswell of new efforts underway to further success in sustainable agriculture. Though most consumers are at least three generations removed from the American farm, they are showing increased interest in learning where their food comes from and knowing more about the farmers who produce it.

So how do we start the conversation?

Authenticity, coupled with facts, is a great place to start. Put a few statistics, such as the percentage of family-owned farms in the U.S. (98%), coupled with your own family farm story, into the conversation. I have been amazed to learn how many of our customers are operating farms passed through generations all the way back to the Homestead Act of 1862!

Knowing the facts about your farm exponentially increases public interest. That story is better told with robust on-farm record keeping, which also helps tell your environmental sustainability story. Tell people about the practices you use to improve soil health or optimizing production through technologies such as genetically modified seeds.

For the big picture, in this issue, you can grab a few data points on the differences between organic and conventional crop production. And, as in every issue, we share information regarding American agriculture’s commitment to strong, economically sustainable production.

Every one of us has opportunities to tell our story in a genuine way, inviting conversation and further developing relationships between farmers and consumers. By taking time to listen and understand other perspectives, then sharing our own stories, we can build farmer-consumer relationships one conversation at a time.

Liz Hunt
Head, Sustainable and Responsible Business
Syngenta

“Every one of us has opportunities to tell our story in a genuine way, inviting conversation and further developing relationships between farmers and consumers.”

PHOTO: FARMHER, INC./MARJI GUYLER-ALANIZ
Viewfinders
Farmers use satellites and drones to focus their management decisions.

Instead of spending hours trudging through wheat, barley and potato fields hoping he gets a good idea of what overall field health looks like, Brad Nielson takes a bird’s-eye view, saving him time and boot tread. Aerial imagery aids diagnosis for Nielson, an agronomist for Walters Produce in Newdale, Idaho, making his scouting more efficient.

“In a year like this, imagery pays for itself in crop quality and crop health,” he says. Nielsen relies on FarmShots™, a satellite imagery platform that integrates scouting and variable rate prescriptions for farmers, agronomists and retailers.

“We have center-pivot irrigation on almost every acre, but we must be good stewards because the Northwest is in a major drought,” he says. “We’re trying not to over-irrigate, but we can’t afford to under-irrigate either. We’ve used FarmShots to try to find inconsistencies in our watering patterns.”

With center-pivot irrigation, a partially plugged or incorrectly sized nozzle is detrimental, but those issues are hard to recognize from the ground before crop damage occurs. Using satellite imagery, in this case FarmShots, Nielson takes a daily look at how fields respond to irrigation and the toll taken by abiotic stressors. If the imagery starts showing stress in a circular pattern, for example, he knows to look closely at the irrigation system to find the source of the stress.

Management With a Bird’s-Eye View
Drones and satellite imagery are increasingly popular as farmers strive to be more sustainable and cost-efficient. Because these tools provide a whole-field perspective, they help guide management decisions that must be made at harvest.
“When you think about the size and scale of some of the farms we see today and how much physical scouting one person can do, drones and satellite imagery make it possible to manage the crop despite those limitations,” says Rob Austin, North Carolina State University precision agriculture specialist. “They can cover a lot more acres.”

As farms consolidate, Austin anticipates that the use of drones or satellites — and possibly the two synergistically — will increase. (If you’re wondering which one would be a better fit for your farm, see the side-by-side comparison at the bottom of this page.)

Drones require more of a do-it-yourself approach than satellite imagery does. Drones also have more restrictions and a greater learning curve. Austin warns potential operators to be sure to understand state and Federal Aviation Administration requirements before investing in drone technology.

**What To Expect With Satellites**

Because satellite imagery isn’t a do-it-yourself tool, it’s important for users to understand their options. For FarmShots specifically, several different types of images are available.

“The satellites provide an aerial view of what’s happening on the ground,” says Gina Sanson, FarmShots product marketing manager. “One of the most beneficial images is NDVI [normalized difference vegetation index]. It measures plant health by determining how much light a plant is absorbing versus how much it’s reflecting.”

NDVI and other algorithms being applied to images means you’re not simply relying on the naked eye to recognize color difference in fields, Nielson explains. This simplifies input decisions, harvest decisions and other plant health choices that may impact your bottom line each season.

“You can look at an image with some of these algorithms and filter out the noise that comes from having bare dirt in the field like in the early season,” Nielson explains. “This gives us a better idea of the actual plant health.”

Nielson participated in a pilot project this past year that evaluated the value of daily high-resolution imagery. “This year we’re getting an image every day. Because FarmShots is getting photos processed and back to us quicker, it’s been very meaningful as we make decisions. That’s why we used FarmShots this year — they had faster turnaround time on images,” he continues. FarmShots promises to offer satellite imagery in a simple and straightforward interface that’s easy to understand. In addition, it’s mobile, desktop and tablet friendly. Users can take scouting notes, find problem locations with GPS tracking, and allow agronomists and input suppliers limited access.

Like the images created by drones and satellites, the future for this technology is clear — and only getting better. Whether in response to growing farm sizes, tight farm economics or the desire to be more sustainable, the use of an eye in the sky may help put money in your hand.

**Story by Sonja Gjerde**

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Higher Yields Start With Healthy Soil

Two experts share tips for improving soil health to increase sustainability and profit potential.

Q. Please define the primary factors that affect soil health.
A. Wayne Fredericks, farmer in Osage, Iowa: In row crop farming in my area of northern Iowa, the intensity of tillage, presence of soil cover and year-round living roots, use of multiple plant species, and, if available, the integration of livestock all affect soil health.

A. Doug Wolf, environmental safety technical expert, Syngenta: Soil health integrates physical, chemical and biological factors that impact productivity, environmental quality and profit potential. It’s assessed through multiple interconnected indicators. I consider soil organic matter (SOM) to be the most significant soil health indicator because it plays a primary role in numerous soil functions such as soil structure, water use, nutrient cycling and availability, agrochemical fate and transport, and biological activity and biodiversity. SOM is sensitive to land use and agronomic management practices such as tillage, cover crops and crop rotation.

Q. How does tillage affect soil health, and what are the benefits of reducing tillage?

“Because my soil health was improving, I was raising more bushels per inch of water as the years progressed. This improvement far exceeded the change in normal trend-line yields, and the key was focusing on organic matter.”

—WAYNE FREDERICKS
Farmer
Osage, Iowa
A. Fredericks: Tillage reduces soil carbon, which was verified in the recently released results of a 12-year study conducted at Iowa State University. On my farm, after discontinuing full-width tillage over 20 years ago, I have seen an increase in SOM at a rate of 0.1% per year.

A. Wolf: Conventional tillage generally has a detrimental impact on soil health, especially compared to reduced tillage because it causes SOM to decompose more rapidly and disrupts the soil structure of the soil root zone. Continual conventional tillage tends to accelerate soil erosion, which has an adverse impact on soil health. Reduced tillage has been associated with increased aggregate stability, SOM, water-holding capacity, soil microbial and fungal abundance and biodiversity, reduced runoff and soil erosion, as well as economic benefits such as reduced fuel and labor costs.

Q. How can a farmer measure the impact soil health has on yield and profit potential?

A. Fredericks: I shared 18 years of digital yield and weather data with the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS), Ames, Iowa. This team of researchers did a deep-dive analysis of my farm’s information, and they were able to document reduced yield variability and improved water-use efficiency within the fields, which translates to overall improvements in yields and profit potential.

A. Wolf: Syngenta is assessing the impact of soil health on yield and profit potential through projects like Bin Buster. ... The Bin Buster project assesses on-farm agronomic productivity and profitability on two commercial farms in Illinois growing corn under selected treatments. I am part of a team collaborating within the Bin Buster project to evaluate soil health and sustainability parameters on both farms using Cornell’s Comprehensive Assessment of Soil Health analysis.”

—DOUG WOLF
Environmental Safety Technical Expert
Syngenta

A. Fredericks: First, farmers should look to eliminate tillage. I went to no-till soybeans and strip-till corn. You can also add cover crops to the rotation and look to plant into green cover crops, thus extending the time for them to accumulate biomass. This is important because SOM is the key to healthy, resilient soil.

A. Wolf: Strategies to increase SOM typically center on residue management systems coupled with stover and compost/manure management to yield a net accumulation of SOM. SOM, which is typically less than 5% by mass of agricultural soil, increases soil fertility as it acts as a reservoir for macronutrients and trace elements that release during microbial degradation, improving soil structure and aggregation, increasing available water-holding capacity, and enhancing soil biological diversity and abundance.

Q. How does soil health affect available water for cropping systems?

A. Fredericks: Looking back at the 18-year study by the USDA ARS of my farm’s data, the biggest revolution was an improvement in water-use efficiency. Because my soil health was improving, I was raising more bushels per inch of water as the years progressed. This improvement far exceeded the change in normal trend-line yields, and the key was focusing on organic matter.

A. Wolf: Soil aggregate stability is a critical indicator of soil health. Soil aggregate stability is largely dependent on SOM and biological activity and typically increases as they increase. Stable soil aggregates increase plant-available water by increasing the amount of pore space, water infiltration and the soil’s water-holding capacity, contributing to decreased runoff and erosion. Stable soil aggregates and the associated pore space also promote crop root growth and penetration within the soil root zone.

Q. What are some strategies to increase organic matter in soil, and why is that important?

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Top Ag Export Market Under Threat

Policy shifts in Mexico signal deep decreases in ag trade with the U.S.

On Dec. 31, 2020, Mexico’s President Andrés Manuel López Obrador issued a decree with major implications for U.S. farmers. He announced Mexico was phasing out the use of genetically modified (GM) corn for human consumption and banning the use of glyphosate. So much for a “Happy New Year.”

“It’s a serious threat to American agriculture,” says Kevin Ross, a sixth-generation corn grower from Minden, Iowa, and chairman of the board of the National Corn Growers Association (NCGA). “It’s something we haven’t seen before in our relationship with Mexico, which is a top export market for U.S. corn.”

Obrador’s goal in signing the decree, the equivalent of an American presidential executive order, is to help Mexico achieve self-sufficiency and food sovereignty. The decree calls for the phasing out of GM corn by January 2024.

The GM announcement is just one troubling factor in the U.S. relationship with its southern neighbor. Trade with Mexico also is slipping because of other regulatory action — or inaction.

High-level government officials in Mexico have put together a list of 80 crop protection products — including atrazine, 2,4-D, neonicotinoids and pyrethroids — that Mexico considers hazardous. They will likely be put, like glyphosate, on a ban list. Currently, 2,000 delayed pesticide registrations are awaiting approval in Mexico. “These delays have created an estimated $500 million loss in U.S. sales of crop protection products from 2015 through 2019,” says Mary Kay Thatcher, senior manager of federal government and industry relations at Syngenta.

The Mexican government hasn’t approved any biotech traits since Obrador took office in 2018. “Like some European leaders, Obrador follows the precautionary principle,” says Ryan LeGrand, president and CEO of the U.S. Grains Council (USGC). The precautionary principle, often used by the European Union, bases decisions on potential hazards rather than science.

Obrador’s decree is not based on a comprehensive risk assessment. “This is a troubling shift within Mexico’s regulatory processes because it sidesteps science,” says Rosy Brummette, manager of public policy for the NCGA. “We don’t want this to set a precedent.”

While Mexico wants to become self-sufficient in corn production, without glyphosate or biotech traits, Obrador’s decree doesn’t follow international trade rules. “Mexico’s failure to approve any biotech traits and Obrador’s decree regarding GM corn and glyphosate are contrary to the United States-Mexico-Canada Agreement (USMCA),” LeGrand says. “This can’t stand.”

“We must resolve the Mexican trade dispute. Ensuring that major export markets are willing to buy U.S. grain lets us continue developing new technologies that benefit farmers.”

—MARY KAY THATCHER
Senior Manager of Federal Government and Industry Relations
Syngenta

(Above): Kevin Ross, a National Corn Growers Association leader and Iowa corn farmer, strongly supports unfettered access to the Mexican corn market.

PHOTOS: (LEFT TO RIGHT) MARK FINKENSTAEDT, IOWA CORN GROWERS ASSOCIATION
The Stakes Are High

Mexico provides a major market for U.S. corn, and policies that potentially impede this are very concerning. “Mexico has been one of our most reliable markets for corn and is almost always our No. 1 or No. 2 export market,” Brummette says.

During the 2018–2019 marketing year through April 2020, U.S. corn exports to Mexico accounted for nearly 40% of total U.S. shipments and hit record-high values, according to the U.S. Department of Agriculture’s (USDA) Economic Research Service (ERS). In addition, the United States supplied 96% of Mexico’s total corn imports in 2018–2019.

Of the 20.4 million metric tons of corn Mexico imported from the U.S. during the 2018–2019 marketing year through March 2020, 95% was yellow corn, the ERS adds. To replace these imports, Mexican farmers would need to dramatically increase domestic production.

The USGC has no plans to stop promoting U.S. corn in Mexico. “We’re moving full speed ahead with export marketing programs,” says Heidi Bringenberg, assistant director for Mexico, USGC.

This approach provides important benefits for Mexico, where more than half of the citizens live in poverty. Since Mexico is a feed-deficit country, U.S. corn imports help feed poultry and swine, providing protein sources that boost the food security of the Mexican population.

Despite Obrador’s decree, there have been no trade disruptions yet. “In fact, U.S. corn exports to Mexico have increased in the past year,” says Cary Sifferath, senior director of global programs for the USGC.

What’s Next?

Going forward, America can’t cede U.S. trade policy to foreign governments, Ross says. “The NCBA is working with our industry partners to push a unified message through the appropriate diplomatic channels and educate members of Congress about this key issue.”

Agriculture and agribusiness leaders, including Syngenta, are working with the Office of the U.S. Trade Representative (USTR), the USDA and industry partners to challenge Obrador’s decree. Thatcher says there is, unfortunately, a unique complication since no one has yet been nominated, let alone approved, to serve as the USDA Undersecretary for Trade and Foreign Agricultural Affairs.*

“We must resolve the Mexican trade dispute. Ensuring that major export markets are willing to buy U.S. grain lets us continue developing new technologies that benefit farmers.”

Sifferath is cautiously optimistic that the situation will resolve itself in a way favorable to U.S. growers. “Through the years, I’ve heard many world leaders say their countries are going to become self-sufficient,” he says. “I’ve yet to see anyone do this successfully.”

*As of Oct. 8, 2021.
Premix formulations help fight resistance and benefit sustainable crop production.

By Michael Santos
Tavium® Plus VaporGrip® Technology herbicide is a powerful premix that helps keep these midseason cotton rows clean in Turon, Kansas.
IN 2018, soybean and cotton farmers were contending with glyphosate-, ALS- and PPO-resistant weeds, especially Palmer amaranth and waterhemp. Residual herbicides and multiple post-emergence applications followed by additional expenditures of time and money on mechanical removal of weeds were often necessary. Commodity prices were low; margins were tight; and growers had little room for error on input decisions.

Although commodity prices have taken a turn and are at historic highs in 2021, weed resistance continues to persist and grow throughout the U.S.

One notable difference is the availability of premix formulations. “The need to apply multiple herbicide sites of action simultaneously to manage our most troublesome weedy pests is extremely important — premixes can help ensure that a grower achieves this goal,” says Stanley Culpepper, Ph.D., extension weed scientist at the University of Georgia. “For example, if dicamba and Dual Magnum (S-metolachlor) are applied as a premix, then that ensures both a post-emergence and residual product with activity against our most troublesome pest, Palmer amaranth, is used, making for a more sustainable program.”

Pete Eure, herbicide technical product lead with Syngenta, lists some of the fundamental benefits premixes bring to farmers. The packaging is more convenient, as farmers don’t have to store multiple jugs. Premixes also reduce the margin for error because applicators aren’t measuring and tank-mixing various products in the field or at the shop. The active ingredient (AI) components are formulated so farmers don’t have to worry about compatibility issues. In addition to all these advantages, premixes can target the same weed at multiple sites of action, so if the weed exhibits resistance at one site, the product may still be effective at another site.

Older Al’s Are Sometimes “New”

New Al’s don’t come around very often. Common wisdom is that the golden age of herbicide Al discovery has passed. More often manufacturers reformulate tried-and-true chemistries into new products, as with Tavium® Plus VaporGrip® Technology herbicide. New premixes offer the ability to optimize the product formulation. An optimized formulation can improve weed control and crop safety, and reduce drift and off-target movement. In many cases, inert ingredients and surfactants play a critical role in a product’s performance.

Dicamba received its first registration in 1967, and metolachlor came along nine years later in 1976. At its best, reformulation takes two or more chemistries that target weeds, diseases or pests along different pathways and creates a new product that is strong enough to meet today’s resistance challenges.

Culpepper explains that it’s more important for a chemistry to be new to the targeted weeds than new to the market. “Even with older sites of action,” Culpepper says, “that doesn’t mean that in my fields I’ve used all of the available chemistries. In essence, it’s a new site of action if I’ve never used it on a respective field, which makes that product potentially very valuable.”

As Culpepper points out, it’s not the registration date of an Al that matters. An older Al that is effective can be just as important as any other tool in the toolbox. Diversity in management options gets more important every day when it comes to weed control.

Premixes Fight Fungicide Resistance

James Hadden, Syngenta fungicide technical product lead, says a good premix fungicide should provide an enhanced spectrum of activity to control diseases that a single chemistry may miss. “You want to use two different sites of action, typically, and hit the fungus from two different flanks,”

“Even with older sites of action, that doesn’t mean that in my fields I’ve used all of the available chemistries. In essence, it’s a new site of action if I’ve never used it on a respective field, which makes that product potentially very valuable.”

—STANLEY CULPEPPER, PH.D., Extension Weed Scientist University of Georgia
Members of the Syngenta formulation team work in the lab to make sure the products delivered to growers remain stable through real-farm scenarios such as temperature shifts and sprayer applications. From left to right: Andrew Pearson, Matthew Cottle, Adam Voisard, Katie Oshige, Felisha Vestal and Xinyun Wen.

PROTECT EXISTING TOOLS

Expert chemists create specific formulations to preserve the efficacy of the herbicide technologies for the long run, explains Pete Eure, herbicide technical product lead with Syngenta. That expertise is a significant, but sometimes overlooked, benefit of choosing a premix over tank-mixing individual active ingredients (AIs). While AIs may be the power behind a product, they must be chemically formulated to function on the farm. This is especially important in premix products where formulation chemists must consider and test how AIs interact with one another and other compounds in a product. Product formulations need to retain stability through real-farm scenarios like temperature shifts and being put through sprayers for application. Farmers need products that are as stable and effective in the field as they are in the lab. Expert formulation chemists are the ones making that happen.

“Our herbicide premixes enable growers to reduce the likelihood of resistance development,” says Eure.

Syngenta designs premixes to protect existing chemistries. Robust use rates reduce the occurrence of weed escapes and the proliferation of resistant seed. Premixes developed with full use rates deliver better performance, greater consistency and prolonged efficacy of herbicide chemistries.

“We’re making it simple for a grower to use multiple effective sites of action in their crop system,” Eure says.

Of course, farmers need broad-spectrum management options today, Eure notes, but they also need to preserve the tools available to ensure profit potential in the future.

Fight Herbicide Resistance With Premixes

As with fungicide premixes, the challenge for developing new weed management premix products is producing formulations that target multiple effective sites of action and spread out selection pressure. Premixes don’t just deliver weed control results in the short term.

“When we develop a new premix at Syngenta,” says Eure, “we come with multiple effective sites of action and AIs. What this allows us to do is deliver broader-spectrum, more consistent control of problem weeds like Palmer amaranth and waterhemp.”

Tavium Plus VaporGrip Technology herbicide is an example of putting that theory to work in the field. The first premix of dicamba and S-metolachlor, Tavium delivers two sites of action for both contact and residual control of tough weeds.

This multipronged approach protects farmers’ yield potential not only in the year the herbicide application is made, but also in the following year because it reduces weed seed production. That’s very important because that reduction means a smaller weed seed bank in that field and easier weed management decisions in the coming years.

he says, “so you get better potency against the diseases.”

Pest resistance is a matter of natural selection, and premixes use that to their advantage.

“The resistant mutants are already out there in nature,” says Tyler Harp, technical product lead with Syngenta. “The fungicide is just selecting for them.”

When a fungicide is applied and kills all the spores of a targeted pathogen except for that one existing mutant, that mutant no longer has any competition. Now it is going to flourish and reproduce to create a new generation that has the resistance mutation.

“But if you have a premixture with three sites of action, it spreads the selection pressure across all three fungicides, and finding a mutant out there that will be resistant to three different sites of action is extremely rare,” Harp explains.

The best fungicide premixes will give growers both a curative and a preventive function, managing pathogens before and after they germinate.

“A lot of the formulations Syngenta is putting out now have longer durations of control, and they’re preventive in nature,” Hadden says. “We like having the curative in combination with the preventive. You’re knocking out some of the disease that started but also extending the length of control.”

According to Harp, it’s always important to have good resistance management but especially so in crops like corn and soybeans where only one or two fungicide applications may be made in a season.

“A premix in those markets is like having it all and maximizing stewardship in one application,” Harp says.

Read articles online at syngentathrive.com/farmproduction.
Organic and conventional systems have roles to play — and challenges to overcome — in commercial food production.

By Karen Potratz
Eric Thalken, operations manager at Burkey Farms, was chosen to oversee the transition from conventional to organic crops at the Dorchester, Nebraska, farm because of his previous experience with organic vegetable production in Pennsylvania and at an organic dairy in Wisconsin.

“We spend less on crop seed, fertility and chemicals but more on equipment, labor and cover crops than an average farm in our area.”

—ERIC THALKEN
Operations Manager
Burkey Farms
Dorchester, Nebraska
a society that often fosters an us-versus-them mentality, U.S. agriculture embraces a diverse food system with roles for both conventional and organic farming.

“The majority of conventional and organic production practices are the same,” says Timothy Coolong, Ph.D., Extension vegetable specialist at the University of Georgia. “Growers plant, harvest and try to use cultural practices to minimize losses. The only differences are the tools they use to fertilize crops and control pests.”

Organic production represents less than 1% of U.S. crop acres. The U.S. Department of Agriculture (USDA) reported just under 5.5 million organic acres in 2019 compared with 894 million acres of conventional crops. But organic demand is on the rise, reports the USDA, with some consumers willing to pay as much as three times more for organic food, depending on the product.

Adopting Organic Production
Two farms committed to organic production are Braga Fresh Family Farms, based in Salinas, California, and Burkey Farms in Dorchester, Nebraska.

The 14,000-acre Braga Fresh Family Farms enterprise grows broccoli, celery, cauliflower, lettuce and other fresh vegetables at multiple locations in California and Arizona. The operation started growing organic produce about 25 years ago. Roughly 70% of the crop is now organic, says Adrian Garcia, an in-house pest control adviser with Braga Fresh Family Farms.

Some 1,700 miles away, Burkey Farms is a relative newcomer to organic production. After experimenting with organic production on two quarter-sections in 2016, the owners of the 2,000-acre farm decided to convert entirely to organic production the following year. The last of Burkey Farms’ acres achieved organic certification in 2019. Today’s organic crops include feed- and food-grade corn and soybeans, yellow peas and forages.

Responding to Market Conditions
The two farms have different reasons for going organic, all based on market factors.

“Consumer demand for more organic vegetables has driven the company in that direction,” Garcia says. “In the volatile produce market, premium prices for organic crops vary depending on demand and availability in a particular week.”
“Consumer demand for more organic vegetables has driven the company in that direction.”

—ADRIAN GARCIA
In-House Pest Control Adviser
Braga Fresh Family Farms
Salinas, California
For Burkey Farms the decision was purely economic. Eric Thalken, operations manager, says premium prices for organic crops have created positive returns on investment for the operation in most years, after taking land, labor and input costs into consideration.

“We really looked pretty smart when we sold organic corn for $9 per bushel and conventional corn was at $3.10,” Thalken says. This year, he says organic corn prices reached $10 per bushel for corn and $30 per bushel for beans — a significant price advantage, even with relatively high commodity grain prices.

The organic price differential often narrows, however. In fact, price trend lines crossed in 2010, with conventional grain capturing higher prices than organics.

“When price spread narrows, growers often leave organic or slow their transition to organic, leaving a gap in supply,” Thalken says. “This leads to large price increases in subsequent years, such as in 2014 when organic corn prices hit $12 per bushel.”

Dealing With Pest Control Limitations
Weed, disease and insect control are shared challenges for organic growers. They have limited pesticide options — only those approved by the Organic Materials Review Institute (OMRI).

At Burkey Farms, weed control starts with biological practices, namely cover crops on every acre, every year. Mechanical weed control follows and typically requires two cultivations and two passes with a rotary hoe, on top of three tillage passes for cover crop planting preparation, cover crop incorporation and a finish pass prior to cash crop planting. In a rainy year, weeds can get the upper hand.

“Some years you will get beaten by weeds,” says Thalken of producing organically. “For example, in 2019, an extremely wet year, field conditions did not allow us to complete all mechanical weed control passes.”

At Braga Fresh Family Farms, in-season weed control is often done by hand. Over the past three years, the farm began to rely on robotic weeding machines to save labor and remove weeds more effectively.

“Scanners on the robots identify what is a good plant and what is a weed,” Garcia says.

To control insect pests, Braga Fresh Family Farms purchases thousands of beneficial insects for release into the field by drone. Beneficial species, such as parasitic wasps, lacewings and Aphidoletes (a predatory midge) reproduce and feed on harmful pests.
While these strategies work well in the West, it’s nearly impossible to keep ahead of constant pest pressure in tropical climates.

“Organic production is difficult in a state where it rains most every afternoon,” says Mike Aerts, director of science and regulatory affairs at the Florida Fruit & Vegetable Association (FFVA). Hot, humid weather fosters insect reproduction, weed growth and fungal diseases.

“Biopesticides work to a degree, but growers would need to spray nearly every day to keep up. That may not be economical,” Aerts says. Because of these difficulties, organic represents a small percentage of acres in Florida.

**Shrinking Yields, Growing Costs**

Despite strides to improve organic tools and practices, yields still lag. USDA data from 2016 show conventional crops out-yielded organics for every U.S. crop except forages.

On Burkey Farms, organic corn yields often average 210 bushels per acre, while conventional farmers in the same area can expect up to 245 bushels per acre.

Production costs for organic agriculture can vary widely. In California, Garcia estimates that costs to grow organic vegetables are 20% to 25% higher than non-organic, due to added pest control steps and higher labor costs.

Fertilization is a huge variable. Commercial organic fertilizer is expensive, and it’s difficult to reach the necessary nitrogen levels. Burkey Farms saves on fertilizer cost by applying hog manure. As with conventional crop producers who rely on manure for fertilizer, there is a risk of a damaging buildup of sodium and potassium in the soil. Growers can alleviate concerns about nutrient imbalance through a balanced soil fertility program.

“We spend less on crop seed, fertility and chemicals but more on equipment, labor and cover crops than an average farm in our area,” Thalken says. “Overhead can be slightly more with increased costs of administration.”

**Assessing Environmental Impacts**

Environmental impacts of agricultural production vary by practice. With lower yields, organic production requires more land to generate the same amount of food. According to a 2016 analysis of USDA yield data, if all crops switched to organic production, more than 100 million more farmland acres — an area the size of California — would be needed to achieve the same crop output.

OMRI-approved pesticides have impacts, too. Copper sulfate is commonly used by organic farmers as a fungicide, especially to control downy mildew in grapes, potatoes, tomatoes and apples. Although a natural compound, copper sulfate can accumulate in the soil and harm soil microbes, according to the Genetic Literacy Project, a nonprofit organization promoting science literacy.

However, professional organic crop producers are aware of the limitations of copper sulfate and adjust accordingly, Thalken says.

For example, Burkey Farms helps alleviate these impacts by applying a product with copper octanoate as an active ingredient.

“We commonly use two quarts per acre per year on corn only,” Thalken says. This rate equals 0.08 pounds of metallic copper equivalent per acre, and a 200-bushel-per-acre corn crop takes up 0.10 pounds per acre, so buildup potential is alleviated, he says.

The multiple passes for weed control in organic production consume more fuel and increase soil compaction. Disturbing the ground with mechanical weed control also can erode soil and damage soil health.

“A good conventional grower using no-till and cover crops, fertilizing properly and managing the weed seed bank may have less overall environmental impact than an organic grower,” says Tim Mundorf, director of soil management at the Central Valley Ag cooperative in York, Nebraska. (See sidebar article, “Support for a Niche Ag Market,” this page.)

**Calling the Shots**

Whether growing crops conventionally or organically, all farmers share in meeting expectations for sustainable food production.

“Increasingly, consumers are interested in understanding where their food comes from. It’s important to help consumers understand the benefits and implications that come with organic production and know there is a fit for both organic and conventional farming methods,” says Liz Hunt, head, sustainable and responsible farming at Syngenta. “At the end of the day, the population is growing. We need to make sure we are meeting these needs in a way that optimizes land and input use.”

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**Support for a Niche Ag Market**

Areas with expanding organic production open opportunities for the ag retail community. Central Valley Ag (CVA) cooperative, based in York, Nebraska, established an organic division in 2018 in response to interest from its member-owners in eastern Nebraska, northwest Iowa and north-central Kansas.

“Ninety-nine percent of the cooperative’s business is in conventional agriculture. But a lot of growers are either trying organic or looking at the price premiums and wanting to try it,” says Tim Mundorf, CVA director of soil management. “We believe both farming methods have a place. Our job is to provide value to our growers, whether organic or conventional.”

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Read “Is Organic Healthier? What Science Says” at syngentathrive.com to learn about the nutritional aspects of conventional and organic foods.
While still a relatively small agricultural sector, organic production has surged in recent years with sales of $9.9 billion in 2019, an increase of 31% in three years. Agricultural professionals generally agree that both conventional and organic agriculture have roles to play in meeting consumer and downstream market demands. Today, many growers employ both agro-nomic practices on their farms. However, misinformation about farming practices runs rampant among the public. Knowing a few key facts about the differences between conventional and organic farming practices can go a long way toward helping people understand the importance of various agro-nomic practices.

The Big Picture
Despite its rapid growth, organic agriculture is a niche market within the broader U.S. farm economy.
Yield Differences

10%-18% lower yields result from organic agriculture.3

100 million+ more acres would be needed for organic agriculture to grow the amount of food currently produced by conventional agriculture.4

Cost Differences

7%-13% higher labor costs are required by organic agriculture.3

47% higher costs on average for consumers who purchase organic products.5

Organic Agriculture’s Environmental Challenges

50%-70% more greenhouse gas emissions would be released if all agricultural production were converted to organic agriculture.6

37% higher potential for eutrophication (excessive richness of nutrients in a body of water) and 13% greater risk of acidification (dangerously decreased pH level in a body of water) result from organic farming runoff, posing serious threats to aquatic life.7

Conventional Agriculture’s Progress

Modern pesticides have enabled U.S. growers who use conventional agronomic practices to increase farm output by 300% on 10% less land since 1950, preserving 120 million acres for wilderness and for other purposes.8

Conventional no-till farming can decrease soil erosion up to 98%.9 No-till farming practices also reduce labor costs.10

Pesticide toxicity has declined 98% since the 1960s.11

Footnotes


Breanna Chavez is starting a new chapter in her life. Chavez, the 2021 valedictorian at Harmony High School in Big Sandy, Texas, and first in her family to attend college, is in her first semester at Texas A&M University — and she has a little help from Syngenta.

Chavez is one of six students who earned a $2,500 scholarship and a donation to the charity of their choosing through the Syngenta Accelerating a Generation Scholarship program, which is managed by the National FFA Organization (FFA®).

Chavez directed her donation to the Texas FFA Foundation and looks forward to the next steps in her agricultural pursuits. “This scholarship means the opportunity to attend college as a first-generation college student,” she says. “It’s a real self-esteem booster to know that an organization on the national level believes in me.”

Chavez saw the importance of nutrition in order to live a healthy life through her agriculture courses and time in FFA. She is majoring in nutrition to help people and because it’s a strong platform for agricultural advocacy. “Throughout my time in FFA, I completed Agriscience Fair research projects and even won nationals with my studies regarding nutrition. It became clear that my passion for this topic is desperately needed,” Chavez says.

Charities around the country are benefiting from the hard work and dedication of these young scholars.

Another 2021 scholarship recipient, Madison Hargarten of Winchester,
Indiana, directed her donation to the Winchester Community Garden. She says she’s happy pursuing her passion for agriculture, and the scholarship helps relieve financial stress as she heads to Purdue University to major in agricultural economics. “I love being immersed in agriculture, whether that’s being in the barn or mentoring younger kids,” Hargarten says. “Doing something every day that makes me this happy reassures me in my career path decisions. This scholarship is helping me achieve my goals.”

**Rewarding High-Yielding Talent**
A talented group of students applied to the 2021 Syngenta-funded scholarship program. In addition to Chavez and Hargarten, selected winners and their designated charities include:

- **Leah Hudson** from Topeka, Kansas; Kansas State University student majoring in agronomy and crop science; designated charity: Kansas 4-H
- **LeAnne Pace** from Mount Hope, Alabama; Auburn University student majoring in environmental science; designated charity: Lawrence County Alabama Cattlemen’s Association
- **Leslie Webb** from Greenwood, Delaware; University of Delaware student majoring in environmental engineering; designated charity: Delaware 4-H Foundation
- **Elise Wilkins** from Tekoa, Washington; Montana State University student majoring in agricultural business management; designated charity: Second Chance Ranch of Spokane

Like Chavez and Hargarten, these talented students are excited about using those talents to improve the industry they love.

Kim Weseli, senior regional director of the National FFA Foundation, sees bright futures for these scholarship recipients. “The possibilities for these winners are limitless. They’re our future scientists, community leaders, national politicians, farmers feeding the world, front-line heroes and the list goes on,” Weseli says.

**Looking Forward**
Stewarding the next generation is an agricultural tradition that keeps the U.S. agricultural industry strong. “It’s essential for students to feel supported in agriculture because the industry must train the next generation of agricultural leaders,” says Pam Caraway, communications lead for Syngenta. “The strength of our industry is the people who lead it. Investing in the next generation is a path to continual growth as we keep working to raise the level of crop performance, enhance the land through our stewardship and develop new technology to help us provide food, fiber and fuel to the world.”

Visit [ffa.org/scholarships](http://ffa.org/scholarships) to learn more about this year’s scholarship winners. The next generation of future ag leaders can also apply for the 2022 scholarships at this same web address beginning Nov. 1.

**STORY BY ADAM BAKST**
A Partnership’s Bright Future

The seed treatment business between Brandt and Syngenta is expanding to help growers reach their goals.

“We have access to top Syngenta Seedcare specialists and scientists who explain how the products benefit growers,” says Kyle McClelland, seed and technical agronomy manager for Brandt. “It’s invaluable for us to have that level of dialogue because we can bring that information to our customers, separating insight and knowledge from the noise in the marketplace, and help them make the right decisions.”

For over a decade, Illinois-based retailer Brandt has provided quality Syngenta products to their customers, worked with Syngenta to resolve agronomic issues and built a level of trust that set the stage for an expanded partnership. Now Syngenta supports most of the Brandt seed treatment business. This didn’t happen overnight. The two companies built the decision on a long-standing relationship and their common goal — helping growers succeed.

Fostering Growth

Wade Meteer, sales representative for Syngenta, first performed a needs assessment for Brandt and determined a path forward. The path included a direct line to The Seedcare Institute™, a Syngenta network of facilities that test seed treatment performance in controlled environments to match the needs and requests of customers. The Institute’s U.S. facility, located in Stanton, Minnesota, worked directly with Brandt employees and performed a live demonstration of Syngenta Seedcare™ formulation technology to answer questions and highlight benefits.

Meteer praises Brandt for its customer focus. “Brandt works in the interest of growers to maximize their potential return on investment. Syngenta resonates with that mindset, and our seed treatment products fit this shared goal,” Meteer says.

McClelland knew he could depend on Meteer and the Syngenta team’s product knowledge and support to help deliver top-notch customer service to growers. Before McClelland moved up to his current role with Brandt, Meteer sometimes accompanied him on calls.

“Our customers trust us to make the right decisions for their farms,” McClelland says. “I think when they rely on us that heavily, it’s helpful that we can rely on the people at Syngenta.”

—KYLE MCCLELLAND
Seed and Technical Agronomy Manager, Brandt

Dave Byrum, Syngenta Seedcare specialist and technical resource for Brandt, emphasizes the value of collaboration. “Wade and those at Brandt have built a rapport and trust with each other, so broadening the Syngenta seed treatment portfolio was a true team effort,” Byrum says.

Brandt and Syngenta worked together for years bringing crop protection products to farmers; however, developing the seed treatment business was new territory. The long-standing partnership gave McClelland confidence that whatever challenges arose, Syngenta would provide the solutions needed to help keep his customers and their operations profitable.

Meteer says expanding the seed treatment business with Brandt requires frequent conversations reevaluating the partnership’s objectives. Working together successfully means learning what each company needs and how to achieve their goals.

Building Trust

While mutual company objectives are important, a successful partnership goes beyond aligning business
goals. The participants must also build trust among one another. McClelland takes pride in the fact that Brandt is a family-owned business that works with people who also care about their customers.

“When someone has the character, professionalism, knowledge and integrity of Wade Meteer, you do business with that person,” McClelland says.

Meteer emphasizes the role communication plays in his work with Brandt. When a Brandt employee calls him with questions, he’ll either have answers or find someone who does and report back quickly. Syngenta agronomic support teams constantly test and refine product recommendations in local geographies. Meteer says the information those teams provide is crucial in helping him give quick and accurate answers to the questions he receives.

For the past three years, nearly all of the seed treatment products Brandt has carried have been from Syngenta. While Syngenta is proud of that achievement, there’s always room for improvement and better understanding.

“Maintaining the partnership requires not losing sight of what got us there. We still do yearly technical update meetings with Brandt from an agronomy and application service standpoint,” Byrum says. “We treat them like the top-shelf customer they are.”

Discovering Superior Performance
The personal bonds between the companies are strong, but Brandt wouldn’t partner with Syngenta if Syngenta didn’t provide top-tier products. McClelland is impressed with Syngenta seed treatments’ field performance as well as the convenience from a treatability, stability and packaging standpoint.

CruiserMaxx® Vibrance® insecticide/fungicide seed treatment and Saltro® fungicide seed treatment are two flagship products that drive a high crop response for growers. McClelland says CruiserMaxx Vibrance offers broad-spectrum protection from the major seedling diseases challenging growers in central Illinois. “The ease of use and the treatability of CruiserMaxx Vibrance in my opinion is second to none in the industry,” McClelland says. “And with Saltro, there are fewer agronomic issues, and it’s a no-brainer to use it on the majority of our acres here at Brandt.”

With room to grow, excellent company relationships and proven product performance, this partnership is poised to provide solutions to farmers’ challenges for many years.

“We follow through on what we promise,” Meteer says, “and that’s what drives this long-term relationship.”

EDITOR’S NOTE: This article is part of a continuing series celebrating the strong partnerships that help propel agriculture forward. Find related stories online at syngentathrive.com/community.
NEW PRODUCTS

Newest AgriPro Brand Wheat Varieties a Great Fit for the Northern Plains

Syngenta has announced two more exciting AgriPro® brand wheat varieties for 2022 planting — AP Smith and AP Gunsmoke CL2.

AP Smith is a hard red spring variety that is widely adapted for the northern Plains. With superior standability and straw strength, its combination of high protein and high yield potential gives growers the opportunity to maximize their potential economic return.

For the western northern Plains, AP Gunsmoke CL2 is a medium-maturity hard red spring variety that allows growers to use Beyond® herbicide in their production systems to control weeds when necessary. Both varieties offer above-average tolerance to bacterial leaf streak and Fusarium head blight.

Backed by more than 50 years of wheat-breeding expertise, AgriPro brand wheat varieties offer best-in-class disease packages, leading agronomics and outstanding yield potential.

To learn more, visit agreiprowheat.com.
AgriPro brand wheat varieties — which offer superior disease packages, top-tier agronomics and exceptional yield potential — set growers up for a successful harvest, such as this one underway at grower Kevin Capistran’s farm in Crookston, Minnesota.

Percentage of yield improvement with new AgriPro brand wheat varieties when compared to current varieties

3-5%

The Big Number

Thrive Podcasts Inform and Inspire

September 2021 marked the launch of the inaugural Thrive podcast from Syngenta. This monthly podcast brings together the latest news, farming topics and innovations to inform and inspire. The podcast builds upon the foundation of Thrive magazine through a new platform, sharing stories and interviews from the field on ag-related news and topics.

Virtual events stole the show over the past year, but finally some events are transitioning back to traditional environments. In the first podcast episode, Syngenta employees Jami Loecker, West Heartland agronomy service manager, and Ann Vail, customer event and tradeshow lead, discuss some in-person events for growers and retailers. Their discussion covers Grow More™ Experience sites, trade shows and the unique value each provides for on-farm decision-making. Listeners will also hear updates on the Syngenta Accelerating a Generation Scholarship program and the #RootedinAg Contest finalists.

Tune in each month for more in-depth conversations on agronomic topics and programs that can help with on-farm and in-field productivity and operations. Search for “Syngenta Thrive” wherever you get your podcasts to listen and subscribe.
Explore Our Biodiversity Journey
Biodiversity is essential for effective crop production and the health of our natural resources. Ensuring a sustainable food supply requires each of us to play a role in preserving our land and protecting pollinators. Syngenta understands the importance of the interconnectedness of agriculture and nature and is committed to helping biodiversity thrive.

Taking strides toward sustainable agriculture helps promote an industry that can successfully feed today’s consumers while safeguarding pollinators and conserving the environment for generations to come. The Good Growth Plan highlights our ongoing commitments and initiatives to support farmers and the environment through 2025. And, with our Operation Pollinator program, we are focused on creating essential habitats to restore pollinators on agricultural land, on golf courses and within other landscapes.

We invite you to explore our new, interactive biodiversity infographic and resources by visiting syngenta-us.com/biodiversity. Together, we can help biodiversity flourish and bring plant potential to life.

UPCOMING EVENTS
As the year winds down, there are several important agricultural events to close out 2021.

**OCT. 27–30:**
National FFA Convention & Expo, Indianapolis

**OCT. 30–NOV. 5:**
American Society of Farm Managers and Rural Appraisers Annual Conference, Las Vegas

**NOV. 17–19:**
78th National Association of Farm Broadcasting Convention, Kansas City, Missouri

**NOV. 30–DEC. 2:**
Agricultural Retailers Association Conference & Expo, San Antonio

**DEC. 6–9:**
National Agricultural Aviation Association Ag Aviation Expo, Savannah, Georgia

Visit syngenta-us.com/tradeshows for information on upcoming events.
A tiger swallowtail butterfly lands on a coneflower growing in the pollinator garden at the Syngenta corporate location in Greensboro, North Carolina. Operation Pollinator helps restore pollinators in agricultural, golf course and other landscapes by creating essential habitats.

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Reducing Agriculture’s Carbon Footprint

The World Bank’s BioCarbon Fund, a pilot project, helped start carbon-credit efforts, which could one day benefit U.S. growers.

Pilot programs give organizations the opportunity to refine their approach, developing models that allow for larger-scale impacts. That was the idea behind the BioCarbon Fund, a pilot project the World Bank managed from 2004 to 2020. Public- and private-sector partners worked on the project with smallholder farmers to create accounting methods for greenhouse gas emissions and finance plans incentivizing farmers to use sustainable farming practices. The lessons the partners learned now inform carbon-sequestration and carbon-credit efforts around the world, including in the U.S.

Emission reductions in agriculture can come from a variety of activities, including reducing emissions from farming itself through steps like the improvement of input-use efficiency or from trapping carbon in the soil by means of conservation agriculture. A farmer earns carbon credits through participation in a voluntary carbon market and meeting carbon-reduction criteria. When these markets’ emitters purchase a farmer’s carbon credits to offset their own emissions, the farmer benefits financially from his or her sustainable farming practices.

In the BioCarbon Fund program, nongovernmental organizations in Zambia and Kenya facilitated interaction with smallholder farmers. The Syngenta Foundation, which focuses on bringing innovation to smallholders, provided those organizations with agronomic advice and connections to sustainable-farming solutions.

“Incentive systems are largely missing in developing countries,” says Dominik Klauser, research and development lead at the Syngenta Foundation. “We believe that if farmers produce societal benefits, they should be rewarded. Carbon credits looked, and still look, like a promising tool to do that.”

An important lesson learned from the BioCarbon Fund is that financial benefits multiply if program administrators invest in good outreach and input provision systems. For example, farmers’ productivity more than doubled in Kenya through the extension and inputs financed by sales of carbon credits through the BioCarbon Fund.

“Apart from being an investor, our role in the BioCarbon Fund also included co-creation of the first methodology for issuing carbon credits based on emission reductions from agricultural activities,” Klauser says.

In its ongoing efforts to help smallholder farmers, The Syngenta Foundation is currently working with the One Acre Fund. The program assists more than 1 million farmers in eastern Africa, improving their productivity and livelihoods through the provision of quality inputs — including seed, fertilizer and crop protection products — and extension services.

“The objective is to identify elements of the One Acre Fund’s work that can be used as a basis for partner farmers to obtain carbon payments,” Klauser says. “We have identified several promising areas of intervention. Pilots will take place in Zambia, Tanzania and Rwanda.”

Smallholders in developing countries lack access to many things North American farmers take for granted, says Paul Castle, head of communications at the Syngenta Foundation. “The Syngenta Foundation continues to help smallholders by focusing on insurance, good seed and agricultural services.”

“We believe that if farmers produce societal benefits, they should be rewarded. Carbon credits looked, and still look, like a promising tool to do that.”

—DOMINIK KLAUSER
Research and Development Lead
Syngenta Foundation

PHOTOS: SYNGENTA FOUNDATION
The BioCarbon Fund project in western Kenya focused on agroforestry systems where indigenous timber and fruit trees are planted together with crops and cover crops. Carbon dioxide is stored in both trees and soils by farmers using sustainable cultivation methods. In the future, similar carbon-credit initiatives could become a potential revenue source for U.S. growers.

Thrive is produced quarterly for a nationwide agricultural audience. Its purposes are to update readers on Syngenta products, research, services and solutions, and to provide them with the information they need to succeed in today’s complex marketplace.
We value bushels over bundles.

There’s a world of deals out there. Rebates. Bundles. Upfront savings. But while season-long “deals” can be tempting, they can actually limit your crop protection options and compromise your yield potential at harvest. At Syngenta, we know that Better Yield is the Better Deal. Talk to your local Syngenta sales rep or visit Syngenta-US.com/BetterYield to learn more.

Acuron® Corn Herbicide

5-15 more bu/A than any other corn herbicide¹

Trivapro® Corn Fungicide

14 bu/A advantage in corn over untreated fields²

Saltro® Soybean Fungicide Seed Treatment

4 bushel yield advantage in soybeans over ILEVO®³

¹ - Acuron yield advantage based on 2016 Syngenta and University trials comparing Acuron to Corvus®, Resicore®, SureStart®, 4 and Verdict® herbicide applied pre-emergence and at full label rates.
² - Yield results based on 368 non-replicated hybrid locations in the U.S. in 2016-2020.

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