How Collaboration, Curiosity and Innovation Protect Crops

Growing fruits and vegetables is a labor of love and legacy for many farmers. They understand the decisions made today to protect their crops have important implications for the future — of their operations, the industry and the environment. But while farmers strive to be forward thinking, the realities of raising fruit and vegetable crops require focus on here-and-now problems.

Fruit and vegetable farmers rely on industry partners to have an eye on the future of crop protection — to be working diligently on a pipeline of effective, responsible solutions that will allow them to continue growing produce the world relies on.

The team at Corteva Agriscience embraces this role for fruit and vegetable farmers, seeking to develop future-focused solutions to address the array of challenges that come with producing bountiful, beautiful foods for our plates. The Corteva approach to innovation begins with the needs of farmers, is informed by continually asking questions and is inspired by a drive for better answers.

Working together to identify crop threats and farmer needs

Ideas for innovation at Corteva Agriscience don't begin in the boardroom, but in the field. "In order to be successful, we have to anticipate farmer needs," says Marc Fisher, the West and Central U.S. Field Science Leader at the Corteva Woodland Field Station. "And we have to generate those ideas far in advance. The only way to do that is to be present with the farmer. To be with them at the farm gate, kicking clods and listening to what they have to say in the field, to 'break bread' with those who are breaking ground, and find what their solution needs are."

For the fruit and vegetable farmers who grow food for direct consumption, those needs are wide-ranging and numerous. These farmers need to produce food that is high quality (both in appearance and taste), nutritious and affordable. They need to produce it in a way that uses fewer resources so they can be good stewards of the land and their livelihoods. They need to produce food that will be acceptable in the global marketplace, meeting a myriad of trade regulations and food chain expectations. And they need to do all of this in ways that can be sustained for generations to come. Innovations in crop protection present an opportunity to help fruit and vegetable farmers in all of these areas.

Researchers estimate that upwards of 78% of fruits and 54% of vegetables would be lost without crop protection technologies.[1] Fisher adds, "Fresh markets require a fruit or a vegetable that is perfect. And only crop protection products can really help farmers reach that goal."

Corteva recognizes that getting to these solutions requires collaboration with an array of industry stakeholders. First, there are farmers, many of whom participate in a global network of on-farm trials and research with Corteva. We also engage with third-party researchers, such as those at university extension programs, who provide an objective view of on-farm issues and pragmatic assessments of solutions and options. Our collaborative approach extends to partners in the food chain, such as regulators and consumers, who help us understand their needs and concerns. These connections help put our innovations in the best possible position to be positively accepted in the marketplace.

Curiosity drives discovery

With farmer needs identified, the drive to discover answers revs up. "At Corteva, we are extremely curious," Fisher says. "We have this vibrant, exciting group of employees that are thrilled and excited to find that next new solution for the farmer. They look forward to discovering something new. They stay up late at night, they get up early in the morning; they're just excited and thrilled to be there, searching for new technologies, discovering new solutions to farmer problems." Corteva Agriscience has a vast network of field researchers whose job is to continually ask questions in search of solutions for crops from potatoes to peppers and tomatoes to tree nuts. "My motivation for bringing new ideas to work every day is my desire to help farmers succeed," says Gabi Carmona, an Entomologist and Field Scientist at Corteva. "That's my goal every single day."

Carmona works with Fisher at the Corteva Woodland Field Station in California as part of a cross-departmental team that performs lab and field tests. At research stations such as this one, and on real-world farms that are part of research trials, Corteva deploys some of the latest and most sophisticated technologies to gather data. Farmers participating in trials get a sneak peek at next-generation tools and a chance to gain more in-depth insights.

"Farmers don't always have access to the most recent

technology that can help them gain deeper knowledge about their crops," says Andres Reyes, Research Scientist and Incubator Site Lead at the Woodland Field Station. "People scouting fields have a limit. Flying a drone, identifying the areas where you need to intervene, can be a lot more efficient."

"A typical 20-minute flight can generate thousands of high-quality data points," Reyes says. At Woodland, where the team studies tree nut groves, robots are deployed to navigate dense canopies where drones and satellites are unable to penetrate. Soil analysis technology is used to monitor what's happening below ground. "We use sensors that can get into the soil and can tell us what the roots are doing, what the water situation is, and how the plants are extracting water from the soil," says Reyes.

Data like this helps researchers better understand the challenges facing crops — pressures of diseases, weeds, insect pests and the environment — to then innovate solutions with maximum effectiveness and minimal footprint.

Innovations with impact

In the fruit and vegetable market, quality is king. Innovative crop protection solutions that help farmers grow blemish-free produce allow them to demand higher value in the marketplace and meet consumer expectations. "When we think about vegetables, mainly we want a clean leaf, right? That's what we want in our salad," says Carmona. "So, the threshold that we can support for any pest that feeds directly on the leaves is zero."

For consumers and the food chain, however, the story of fruits and vegetables is more than skin deep. Increasingly, they want to know how that pretty produce was grown. They want to feel confident it was farmed in ways that maintain food safety and environmental sustainability. To help meet these demands, Corteva Agriscience develops crop protection solutions that are highly targeted, effective at very low use rates and have minimal persistence in the environment. As Carmona explains, "We want our compounds and technologies just to reduce the pest population that needs to be reduced. We don't want to have any impact on beneficial insects and microorganisms."

By reducing effects on non-target organisms, crop protection solutions from Corteva also help maintain natural balance and biodiversity on fruit and vegetable farms. Over time, this can lead to more self-sustaining environments that may require fewer inputs from farmers. Many of the newest solutions from Corteva, including our portfolio of biological products, are either natural substances themselves or derived from nature, developed to have environmentally favorable profiles. Innovations also include new modes of action, which help reduce the risk of pests, diseases and weeds that are developing resistance to current crop protection products. Having more options for modes of action helps ensure available crop protection solutions remain effective.

Corteva strives to ensure new products exceed regulatory mandates. Corteva only brings products forward for commercialization once they're proven to solve real on-farm needs effectively while meeting strict criteria for safety and sustainability. When farmers can grow more food while using less land, water, fuel and other inputs, it's a win for their livelihoods and the planet.

A continuing cycle

At Corteva Agriscience, the process of collaboration, curiosity and innovation is constant — it doesn't end when a crop protection product launches in the marketplace. Products are regularly evaluated, and Corteva field scientists and sales personnel stay in contact with farmers and crop consultants. This communication provides opportunities to improve existing solutions and dial in management techniques around products to fit real-world uses.

"The idea is to remain connected," says Carmona. "To make sure that we are working closely with farmers first, to see how the product and technology is performing, to make sure they know how to use the technology and that we are maximizing its effectiveness. Then we make sure we are available to answer any questions as they arise."

By working together, asking more questions and always looking out for better ways to protect crops, Corteva helps fruit and vegetable farmers remain productive and sustainable, enabling them to continue their legacies of growing beautiful and nutritious food for all of us to enjoy.

[1] Zhang, WenJun, Jiang, FuBin and Ou, JianFeg. "Global pesticide consumption and pollution: With China as a focus." Proc. Int. Acad. Ecol. Environ. Sci. 1 (August 28, 2011): 125-144.

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