



Building Food System Integrity

The key to feeding a world with an uncertain future is to lean into smart and sustainable agriculture.

The Economist Impact's 2021 Global Food Security Index (GFSI) report notes that global hunger has been steadily rising since 2014, and it labels climate change and resource depletion as pressing challenges to food systems everywhere. The report makes clear that the prioritization of sustainable farming practices is crucial to addressing these challenges. Corteva Agriscience is committed to not just improving the sustainable products and services available to farmers but also working closely with the food industry to identify new solutions to food security. It believes food and agriculture must work together to improve the resilience of our global food system.

Corteva has a balanced and globally diverse pipeline of innovation solutions. These solutions, coupled with the company's market presence and agronomic expertise, provide farmers with resources needed to optimize their yields and livelihoods while conserving resources and sustaining the land.

Meeting the Challenge

Food security is defined by the Food and Agriculture Organization of the United Nations as the state in which people at all times have physical, social, and economic access to sufficient and nutritious food to meet their dietary needs for a healthy, active life. This same definition is used by Economist Impact in their GFSI report. The report zeroes in on developing nations as areas offering the greatest potential to boost the world's food systems: "Food security will come through establishing an enabling environment in rural areas, especially in Africa, Asia[,] and Latin America."

But the challenges inherent in creating such an enabling environment are rife in subsistence economies. Attaining this level of food security has proven elusive even in places like the United States. The hunger-relief group Feeding America reports that 87% of rural U.S. counties had the highest rates of overall food insecurity, as stated in the GFSI report.

These findings underscore the importance of Corteva's work to support farmers with tools, technologies, and information that conserve resources while sustainably helping boost yields.

Best Practice Training

Corteva has committed to training, as part of its 2030 Sustainability Goals, and over the next ten years expects to educate 25 million growers on more productivity-optimizing best practices, soil health, and nutrients and water stewardship. The company plans to reach this goal by leveraging its science expertise, technology, operational facilities, and deep agricultural knowledge to collaborate with the food industry to solve difficult problems. Corteva soil experts and agronomists are educating producers on the relationship between soil health, plant health, and micronutrient availability—while providing essential information about how to amend soils with inputs already available to them. They're also sharing best practices in field management and soil conservation, such as planting without tilling the soil, sowing cover crops, and crop rotation. Corteva actively supports a wide variety of desired agriculture systems — regenerative, sustainable, organic and conventional — that help prevent erosion from wind and water and keep nutrients where plants can access them.

And in some cases, Corteva Agriscience is helping farmers break entirely new ground. In Italy, the company's experts are working with researchers at the University of Milan to enhance the bio-fertility of soils. The project uses innovative DNA sequencing and molecular techniques such as DNA-metabarcoding to characterize biodiversity to help determine the biological quality of the soil and evaluate the impact of human activities.

The goal is to sequence DNA in the soil to identify fungi, bacteria, and metazoans—in an effort to validate a new approach to understanding the diversity of organisms present in the soil and its biological quality. The innovative system is focused on enabling farmland to become more productive.

Nitrogen Management

Sustainable, high-yield agriculture includes practices that focus on nutrient management. Found naturally in soil and in most commercial fertilizers, nitrogen helps plants thrive—but heavy rains and irrigation can wash away this vital nutrient, releasing it into aquatic ecosystems. Farmers can help stabilize nitrogen through field management practices that maintain soil structure and prevent erosion. Investment in irrigation infrastructure and riparian buffers (land along streams or waterways taken out of production) addresses some run-off concerns—but farmers can make a difference there as well, by deploying effective agricultural management practices such as split applications, using nitrogen crop models, cover crops and crop rotation.

Technologies that help stabilize nitrogen in crop soils help, too. Corteva offers a portfolio of products and services to help farmers manage soil health and nutrients.

Corteva nitrogen stabilizers with Optinyte™ technology,¹ are scientifically proven to keep nitrogen in the root zone longer, ready for crop uptake, helping to maximize crop yields while reducing denitrification and decreasing the amount of greenhouse gases released into the atmosphere. In April, the company and Symborg, an expert in microbiological technologies, announced an agreement around a microbe-based nitrogen fixation product in the United States, Canada, Brazil and Argentina. Through the agreement, Symborg is providing an exclusive distribution license to Corteva for the endophytic bacterium *Methylobacterium symbioticum*, which works with the plant to secure needed nitrogen from the atmosphere. Corteva's product, Utrisha™ N nutrient efficiency optimizer,

works in natural field conditions, adapting to the plants' growth needs and helping to sustainably maximize crop yield potential.

Combined with digital tools such as Granular® Agronomy and Granular® Insights™, Corteva can further enable a farmer's nitrogen use efficiency with custom prescriptions and application timing recommendations for precise management. Together, these tools provide farmers with information on how to optimize efficient uptake helping to increase efficiencies with more precise management.

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Sustainable Pest and Disease Control

Corteva supports farmers' desire for greater choice and value with a balanced and globally diverse portfolio of agriculture solutions. In Crop Protection, Corteva's offerings protect more than 250 varieties of plants in more than 140 countries. Corteva is an industry leader in green chemistry, with a strong heritage that includes more U.S. EPA Presidential Green Chemistry Challenge Awards than any other agriculture company.

Today, Corteva is the leader in small molecule natural products and green chemistry manufacturing. Two technologies that demonstrate green chemistry leadership: Inatreq™ active, which is adapted from a natural product to provide a new mode of action for control of economically significant disease such as Septoria in wheat and black sigatoka in bananas, and, Rinskor™ active, which received a Green Chemistry award and has a Reduced Risk Designation and Tolerance Exemption, is giving rice farmers – as well as ranchers, turfgrass and aquatics managers, and corn and sugarcane farmers – new weed control options. Additionally, as the company has focused on expanding its portfolio of sustainable technologies, it

¹ Data based on a meta-evaluation study of Optinyte™ technology's agronomic and environmental effectiveness with emphasis on corn production in the midwestern USA

has leveraged its Crop Protection strengths and know-how in the area of biologicals, including pheromone, biocontrol, and biostimulant solutions. Taken together, these achievements point to Corteva Agriscience's strong position in sustainable chemistry.

Carbon Capture

Nitrogen management helps sustain farmers' livelihoods by monetizing the carbon and reductions in greenhouse gases that their operations produce. Healthy soils that remain covered by vegetation can act as a carbon sink, helping to reduce greenhouse gas emissions and sequester CO₂ from the atmosphere. That creates a new potential revenue source for farmers in the growing carbon markets where industries pay for offsets to their carbon emissions. Corteva's new Carbon and Ecosystems Services Portfolio creates flexible solutions to help farmers increase profitability while contributing to climate change solutions and helping meet food industry targets.

Corteva is simplifying and expanding farmers' access to carbon sequestration efforts. This means supporting high-quality protocols and standardized measurements in order to make the greatest impact at scale. An example of this is Corteva's Carbon Initiative. For the 2022 crop year, the Initiative is supported by a strategic collaboration with Indigo Ag, harnessing the power of Carbon by Indigo's advanced capabilities for measuring and verifying carbon sequestration and greenhouse gas abatement, which is aligned with industry standards. This is a meaningful step toward establishing carbon credits as a new revenue source for farmers as they consider how to increase the resilience of their operations by building soil health.

Built for the Future

Collaboration across governments, non-governmental organizations, and businesses is needed to reverse the seven-year rise in global hunger and to strengthen food-system integrity. The Economist Impact's GFSI, now

in its tenth year, highlights for policy makers, program implementors, and scientists some of the greatest threats to increased food insecurity: climate change, natural resource degradation, and population growth.

Agricultural innovation offers solutions to all three of those challenges. By helping farmers grow food sustainably, by sustaining farmers' livelihoods, and by working collaboratively with the food industry, agricultural innovators such as Corteva Agriscience are helping increase food security worldwide.

Why Corteva Agriscience Sponsors the GFSI

The Global Food Security Index (GFSI) is produced by Economist Impact, an independent research entity. GFSI is a dynamic quantitative and qualitative benchmarking model produced each year, constructed from 58 unique indicators that measure the drivers of food security across both developing and developed countries. The GFSI has proven to be a trusted resource for governments, NGOs, and private enterprise worldwide, equipping them with reliable data to take informed and meaningful action. Corteva's ten-year sponsorship of the GFSI has provided support to these efforts.

GFSI 2021 highlights the need for agricultural innovation by showing we must collectively work to address:

- The threats to agricultural production posed by climate change and natural-resource scarcity;
- The demand for not just more food, but more nutritious food —and more responsive food supply chains;
- The potential of innovation and technology to improve the sustainability of agriculture.

As an agricultural innovator, Corteva Agriscience remains focused on building a more resilient global food system, leveraging the power of its innovation, and harnessing its global scale and market presence to addressing pressing food security challenges globally.

To learn more, visit gfsi.corteva.com.

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