



The Future of Agriculture is Resilient

Innovations and Solutions for Creating a Food Secure Planet

A surprising development in the 2021 Global Food Security Index (GFSI) report from Economist Impact included the rate at which highly developed nations have contended with factors that moderately or severely curtail food production. For example, the Economist Impact report notes that while growing nations have faced drought many years, wealthier, highly developed countries like the United States and Australia are now struggling to prevent the desertification of their fertile farmlands.

These difficulties are part of the reason why, according to the Economist Impact report, food insecurity continues to rise in 2021. This increase, the report notes, is in part due to the results of climate change, including an increase in the prevalence of damaging pests. The COVID-19 pandemic is also a factor, although hunger has been on the rise since 2014—long before the beginning of the pandemic.

After a decade of progress, gains in reducing global hunger have been reversed, and the global number of undernourished people rose from 690 million in 2019 to 720–811 million in 2020. The GFSI, a data-driven model produced annually by Economist Impact, examines food availability, affordability, quality, and safety, as well as natural resource resilience across 113 countries in Asia Pacific, Europe, Latin America, Middle East and Africa, and North America. Corteva Agriscience, dedicated to science-based solutions that help improve crop yields and the lives and livelihoods of farmers, has sponsored the GFSI since its inception.

The 2021 Economist Impact report stresses the need for “sustainable intensification,” or the use of

innovation and technology to produce more food with a smaller environmental impact. In developing these strategies, however, human needs and challenges growers face must be considered. This will require broadening the scope to include environmental resilience as well as “social and economic criteria such as self-sufficiency, equity, profitability, trade, and infrastructure to support smallholder farmers,” as the Economist Impact report states. The report also asserts that it’s critical to address climate change more generally, ensuring that homes and infrastructure are also resilient.

The Economist Impact report suggests that innovation should come from both public and private sectors. New tools, data and technology all play a role in increasing food production efficiency and reducing the impact of environmental threats. When these investments strengthen access to the market and agricultural financial services, they can have a direct impact on reducing hunger, according to the report analysis.

According to the Economist Impact report, political and economic stability is crucial to food security, and so is resilience. One manifestation of that, food safety nets, need improvement, per these findings. Despite a global increase in hunger and an increase in the number of food safety net programs, just under half of countries in the GFSI are struggling to fund these resources.

As sponsor of the GFSI, Corteva recognizes the imperative to improve food security. Corteva provides solutions that farms and farmers can use to increase their resilience while addressing challenges to global food security.

Invest in Food Security to Invest in the Future

According to the Economist Impact report, challenges associated with climate change and the impacts of the COVID-19 pandemic, coupled with political unrest in parts of the world are expected to have an impact for years to come. Agricultural resilience, the report notes, is the key to protecting food security and human health for generations to come.

The ability to weather the sometimes-unpredictable challenges of our changing world is critical to all of us. However, agricultural resilience is of particular importance to those most vulnerable to food insecurity, including women, children, and migrant workers. These were also the groups hit hardest in 2020 by the COVID-19 pandemic according to the 2020 GFSI report.

The Economist Impact's 2021 GFSI report revealed climate change remains an urgent concern. A warmer climate and resulting events are causing land degradation, desertification, and interrupting planting season in many countries. This includes the degradation of farmland in Australia and the United States, as well as crop failures in nations across the development spectrum. Despite this, the lowest scores were seen in the pillar that considers natural resource risk and resilience to climate change. This indicates the need for global investment in solutions focused on addressing climate resilience.

And that includes innovating tools farmers need to adapt. With hardier crops, new tools and training, farmers will continue to navigate global challenges and work toward a food-secure future.

Resilience Begins with Superior Technology

Corteva Agriscience is helping to build resilience with initiatives aimed at both farms and farmers. The company's advanced seed breeding helps crops not only withstand the extreme conditions that threaten food production worldwide, but also thrive, helping to optimize yields in the face of drought, insects, and disease.

Foremost among Corteva's contributions is AcreNext® next-generation rice farming, an integrated, direct-seeded hybrid rice program. Offering seed, services, and training, the program equips farmers to raise high yield-potential rice without flooding the fields—an

enormous saving of time and water, a precious natural resource. Introduced in Asia in 2020, this system enables more resilient cultivation, precision weed control, and better farmer livelihoods.

Another initiative with vast potential to improve food security is Corteva's seed-breeding work with the International Maize and Wheat Improvement Center (CIMMYT), part of the CGIAR System of research centers working to make staple crops more resilient around the globe. One of CIMMYT's projects, Drought Tolerant Maize for Africa (DTMA), aims to increase maize yields by upwards of 30 percent in regions chronically affected by drought. Implemented by CIMMYT and the International Institute for Tropical Agriculture, DTMA brings together local farmers, seed producers, research institutions, extension specialists, and NGOs to develop and disseminate drought-tolerant hybrids, and to share technical and advisory support. Through this powerful combination of education, training, and superior seed technology, CIMMYT expects to boost grain yields by \$160-\$200 million, benefitting 30 to 40 million people throughout sub-Saharan Africa.

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Corteva has researchers on the ground, analyzing local challenges at a local level. For example, in the company's technology hub in Delmas, South Africa, Corteva's researchers are developing Pioneer® brand and PANNAR® brand hybrid seeds for farmers. In Africa, Corteva's technology hub adapts global technology to local needs—accelerating new product development for Pioneer® brand, PANNAR® brand and Corteva Crop Protection products, across multiple crops for farmers, helping them better manage yield-robbing pests and crop disease, climate volatility, and soil fertility.

Corteva Agriscience's technologies also support farmers once their seeds have sprouted and plants are established. Growers across Africa and the Middle East can now use an app called FarmFundI to identify pests and diseases as well as ways to counteract these threats. Developed by Corteva in collaboration with Plantix, the app functions even if the user is offline, which is important for those without reliable internet access.

The Economist Impact report's findings underscore the urgency of acting now, collectively, to secure our food supply from the risks posed by climate change.

Corteva's technology also helps vulnerable environments flourish outside of agricultural settings. In 2021, Corteva collaborated with the US Forest Service to eradicate invasive non-native weeds from targeted areas in the Sierra National Forest. Through targeted applications of carefully chosen herbicides, invasives like yellow star thistle and Klamath weed were eliminated, keeping the landscape healthy for native forest flora.

A Concerted Effort

With its digital tools, leading seed technology coupled with its education and training initiatives, Corteva is committed to empowering the millions of

smallholder farmer customers it reaches each year with technologies that help them adapt to changing weather patterns, intensifying pest pressure, and pathogens. Smallholder farmers represent some of the most vulnerable populations in the world when it comes to impacts associated with climate change, and they are also some of the most food insecure, according to Economist Impact findings. Building the resilience and improving the food security of Corteva's smallholder farmer customers and their communities is critical to improving global food security.

Economist Impact's 2021 report makes clear that government and non-governmental (NGO) support, including food safety net systems, as well as public/private partnerships, are crucial to building resilience. Investments are needed in research and innovation, preparations must be made to weather climate-related disasters, and natural resources need protection. According to Economist Impact, throughout this work, the focus should remain on rural areas and developing regions.

The GFSI by Economist Impact gives public and private actors essential data they can use in tackling the formidable challenges posed by a growing population, dwindling natural resources, and a changing climate. The report's findings underscore the urgency of acting now, collectively, to secure our food supply from the risks posed by climate change. This urgency reinforces the need for agriculture innovators such as Corteva. With science, ingenuity, and humanity, Corteva is supporting farms and farmers around the world, helping to address global food security challenges.

Why Corteva Agriscience Sponsors the GFSI

The Global Food Security Index (GFSI) is produced annually 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 Agriscience'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 remains focused 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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