Making Agriculture Resilient to Climate Change

Hardier crops, data-driven forecasting, and better prepared farmers help food systems weather drought, deluge, and disease

No one can forget the images coming out of Kenya throughout 2020: Swarms of locusts blackening skies and boiling up from croplands as farmers and their families fought to save their food supply from a plague not seen in 70 years.

Tragically, these farmers did not succeed. The United Nation's Food and Agriculture Organization estimates that the crop devastation caused by trillions of thumb-sized locusts in 2020 has put some 42 million people across ten countries in Africa and Asia at risk of severe, acute food insecurity.[1] And that estimate doesn't take into account the crop loss these regions suffered due to drought, flooding, and the fall armyworm.

Food insecurity is on the rise globally, according to the just-released Global Food Security Index (GFSI) 2020 report—in part because climate change gives pests and disease increased opportunity to breed, feed, and proliferate. The GFSI, a data-driven model produced annually by the Economist Intelligence Unit (EIU), examines food availability, food affordability, food quality and safety, and natural resource resilience across 113 countries in Asia Pacific, Europe, Latin America, Middle East and Africa, and North America. The 2020 report stresses the importance of addressing food insecurity by taking on structural inequalities with effective policies. But in calling out climate change, environmental, and resource challenges, it also recognizes the potential for agricultural innovation to improve food security by strengthening food system resilience. With science-based solutions that help farmers maximize crop yields while minimizing resource inputs, Corteva Agriscience, sponsor of the GFSI, is helping farms and farmers to better manage climate change—potentially reversing the downward trend in food security that the report documents.

Climate challenges, agriscience solutions

Food security, defined as the state in which people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life, is one of many prerequisites for political stability and economic health. As tracked by the GFSI across 59 indicators, it has declined worldwide since 2019, undermined by extreme weather but also by factors such as income and gender inequality, conflict, and the absence of governmental safety nets. According to the current EIU report, food insecurity remains highest among women, children, and migrant workers. These were also the groups hit hardest in 2020 by the COVID-19 pandemic, whose livelihoods were destroyed, thus limiting their access to affordable food and adequate nutrition.

The report highlights climate change, however, as a formidable threat to food security for all of us. In addition to the crops destroyed by the locusts still ravaging East Africa and parts of Asia, climate change is causing devastating droughts in Latin America and flooding in East Asia. Extreme weather is also degrading fertile farmland and soils in Australia and the United States, two of the world's major exporters of grain and vegetables. "A warmer climate and resulting events are causing land degradation, desertification and interrupting the planting season in many countries," notes the EIU report, citing crop failures in Central American countries like El Salvador, Guatemala, Honduras and Nicaragua as

well as developed countries like Australia, Norway, and Slovakia.

Farmers need support in adapting to these new conditions. They need hardier crops. They also need tools and training that can help them manage risk and mitigate disaster.

Resilience begins with superior seed

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, ensuring healthy harvests in the face of drought, insects, and disease.

Foremost among Corteva's contributions is AcreNextTM 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.

Superior seeds make farms more resilient; so too does technology that helps farmers combat the pests and pathogens on the rise due to climate change.

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 an 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.[2]

Corteva's success in boosting Africa's crop yields stems from the research and development conducted at its new technology hub in Delmas, South Africa. The Delmas Center accelerates multi-crop product development by drawing on a network of testing locations around the continent, as well as the combined germplasm expertise of Pioneer's and PANNAR's researchers. A research facility in Hoogekraal complements these activities by focusing on developing drought tolerance in regional staple crops. In addition, an insectary—the largest private facility in Africa—enables researchers to develop management strategies for pests not only common to African farms but, in some cases, unique to the continent.[3]

Superior seeds make farms more resilient; so too does technology that helps farmers combat the pests and pathogens on the rise due to climate change. Corteva Agriscience is arming smallholders with Sprout®, a mobile app launched by PANNAR seed in Africa in 2015. With its PlantDr feature, the Sprout app lets farmers upload and share pictures of diseased plants with PANNAR's team of plant pathologists so that they can analyze their crop. At the same time, the app helps PANNAR alert other growers in the same area to disease threats. Similarly, Threat ID, part of the Pioneer Seeds app, helps farmers rapidly identify threats (pests, disease, and soil and water deficiencies) and fix them before they take hold.

A Concerted Effort

With its digital tools, superior seeds, and education and training initiatives, Corteva is committed to empowering the 50 million smallholder farmer customers it reaches each year with technologies that help them adapt to changing weather patterns, intensifying pest pressure, and pathogens. Smallholder farmers are some of the most vulnerable populations in the world when it comes to climate change, and they are also some of the most food insecure. Building the resilience and improving the food security of Corteva's smallholder farmer customers and their communities is critical to improving global food security.

Yet the 2020 EIU report makes clear that building resilience requires concerted, coordinated, and ongoing efforts—not just by private enterprises, but also by government and non-governmental organizations (NGOs), and not just in the realm of innovation, but also in policy change and resource allocation. While climate change exacerbates food insecurity, so does gender and income inequality, political conflict, poverty, and a pandemic.

That's why Corteva sponsors the GFSI. The annual independent research report produced by the EIU helps enlist public and private actors in tackling the formidable challenges posed by a growing population, dwindling natural resources, and a changing climate. With its rigorous data and multifactor analysis, the index quantifies the problem of food insecurity country by country, region by region—a vital step in understanding the underlying drivers and informing improvement efforts.

GFSI 2020 underscores the urgency of acting now, collectively, to secure our food supply from the risks posed by climate change. This urgency reinforces Corteva's commitment to do its part as an agricultural innovator. With science, ingenuity, and humanity, Corteva is building resilience into the farms and farmers at the heart of our food supply—and bolstering food security for generations to come.

Why Corteva Agriscience Sponsors the GFSI

The Global Food Security Index (GFSI) is produced annually by the Economist Intelligence Unit (EIU), an independent research entity. 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 eight-year sponsorship of the GFSI aims to support these efforts.

GFSI 2020 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 is doing its part. Its solutions make food systems more resilient, smart, and sustainable, helping secure the global food supply and increase global food security.

Footnotes:

1. http://www.fao.org/emergencies/crisis/desertlocust/en/
2. https://www.cimmyt.org/projects/drought-tolerant-maize-for-africa-dtma/
3. http://news.agropages.com/News/NewsDetail---22315.htm