



Agriculture's Greatest Challenge

Growing enough food to feed a hungry world will create new opportunities for America's farmers. But it also means greater volatility and uncertainty for your financial future.

9,000,000,000

It's a daunting number of people to feed by 2050. Can the world's farmers meet the challenge?

By Charles Johnson, Wednesday, September 7, 2011

Welcome to the greatest challenge ever to face agricultural producers.

About seven billion people now live on the planet. Over the next four decades, the equivalent of more than one and a half Chinas will be added, and, by 2050, world population will hit nine billion, the Food and Agriculture Organization of the United Nations (FAO) projects.



Over the next 40 years, a sea of people will create unprecedented demands to boost food production around the world. Photo: Bob Krist/Corbis Images

Those people have to eat. Many, particularly in China and India, have more disposable income than ever and want additional protein in their diet. At the same time, demand for corn to make ethanol may continue to increase. All of this means grain production needs to double in 40 years, the FAO says. It will be an unprecedented market opportunity for farmers and ranchers who can rev up production systems to meet the challenge.

"The future is extremely bright for the U.S., where farmers should see higher-than-historic prices. It will still be a commodity business, and there will be a lot of volatility around that trend line, but things look very positive long-term," says Robert Thompson, who through the years has served as Purdue University's agriculture dean, the World Bank's director of rural development and USDA's assistant secretary for economics, among other positions.

Agricultural ministers of the G20 countries focused on food security at the Paris meeting this summer, calling for more research and improved productivity to reduce supply volatility. About the same time, the Global Harvest Initiative group (www.globalharvestinitiative.org) issued a report outlining a \$90 billion annual shortfall in agricultural research funding. That gap makes the task of doubling agricultural productivity in 40 years a formidable one, says William Leshner, the group's executive director.

Mutual resourcefulness. Yet, it's crucial the world's farmers find ways to do it. "We have the tools to be successful in meeting the great global challenge of our time—to essentially double agricultural production to meet the demands of the nine billion who will crowd our planet in the year 2050," says Jim Borel, DuPont executive vice president.

To do that requires "collaborative ingenuity," he says, with agribusiness companies, universities, government researchers and agricultural producers working together to find solutions.

"The highly productive U.S. agriculture sector has played a key role in meeting global demand in the past

and will continue to do so as producers innovate and adopt new technologies," says Doug DeVries, Deere & Co. senior vice president of agriculture and turf global marketing services. "And that innovation must continue to meet society's future needs."

Adds DuPont's Borel: "As an innovation industry, we should adopt principles of creativity from our agricultural past and other fields in our technological present. With collaborative ingenuity, I am confident that we will build solutions that will surpass agricultural trend lines. In this case, historical trends are not, I believe, a speed limit on the future."

Breaking those barriers may mean changing how we do business. "We have to come out with technologies that drive improvement going forward," says Jennifer Shaw, head of sustainability for North America at Syngenta. "If we stick with today's practices, we may never get there. We have to develop outcome-based metrics. What are the practices and new technologies we could develop that move the needle further toward these outcomes?"

Meeting the new demand curve will require every bit of efficiency farmers and ranchers can muster. Doubling production with the same amount of water used today, or even less, will be necessary.

Food prices, which have spiked and caused periodic riots in developing nations since 2007, will most likely continue climbing. Oxfam International, a British charity whose goal is to "find lasting solutions to poverty and injustice," estimates that demand for food will increase 70% by 2050, while the prices of key commodities like corn will rise 120% to 180% by 2030.

Quantum leap? Along with pumped-up demand, can U.S. crop yields increase at an appreciable rate? Corn yields since 1980 have increased annually by an average of just under 2 bushels per acre. For soybeans, the trend is 0.4 bushels. After 5,000 years of plant-breeding work to get to this point, is it reasonable to expect a huge leap in a couple of decades?

Robb Fraley, Monsanto chief technology officer, thinks so. He predicts 2000-level corn and soybean yields will double by 2030 not only in the U.S., but in countries where farmers have access to current and anticipated seed choices. That means national yield averages of 400-plus-bushel-per-acre corn could be commonplace on prime Corn Belt soils. Fraley says the boost will come from a combination of factors, including genetic improvement, biotech traits, improved farm-management practices, seed and fungicide treatments, and even architectural changes in the plant itself.

"Plant breeding is going through a complete renaissance. The industry has made remarkable advances the last few years," Fraley says, pointing out the importance of using gene mapping. "Ten years ago, the best plant breeders used to keep track of a dozen or so gene markers. Now they look at thousands of markers. In a couple of years, they'll track every gene in corn."

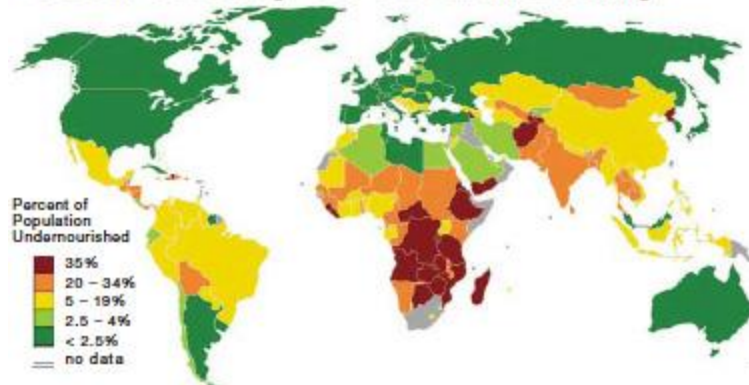
Gerald Tumbleson, a corn/soybean grower in Sherburn, Minn., and former National Corn Growers Association president, thinks yields will indeed double by 2030, but he won't be satisfied with that. "We're increasing corn yield but have done it with traits and the same germplasm. I want to see a quantum leap in germplasm," Tumbleson says. His ideal corn hybrid: A 4-foot-tall plant with two ears instead of a 10- or 12-foot stalk with one ear. "The reason we need it is water, which is going to be a critical issue," he continues. "We can do that if we put efforts to it. Corn has the potential to make an ear at every leaf."

Not everyone agrees the seed and trait companies will coax yields beyond long-term trend lines. One prominent skeptic is Lester Brown, president of the Earth Policy Institute and author of numerous books on food, economic and environmental issues. "I don't think we're going to see doubling yields. We're too close to the limits of photosynthesis now. As long as we're dependent on it, we're constrained by that limit," Brown says.

He points out world rice and wheat yields flattened during the past decade. "Farmers have caught up with

the scientists. That doesn't mean someone won't come up with something. But it's like record times for the mile run. Runners made big cuts until that first 4-minute mile. Since then, the cuts in times have been incremental. It's a physiological thing for plants as well as animals," he says.

A WORLD DIVIDED: Food Security vs. Food Insecurity



Many of the countries with 25% or more of the population suffering from undernourishment are located in Africa and Asia.

SOURCE: UNITED NATIONS WORLD FOOD PROGRAMME, FAO

Whatever level yields eventually hit, U.S. farmers will continue using cutting-edge technology in an effort to efficiently produce more grain. As many see it, that is the only way to do business.

"We have a moral and ethical imperative to step up our efforts. If people are going to bed hungry, and you have the ability to feed them, you have to do your best to do that," says Bart Ruth, Rising City, Neb., corn/soybean farmer and former American Soybean Association president.

"I am not sure it's possible to double U.S. corn yields by 2030; that is truly an ambitious goal, and I admire Monsanto for having the courage to publicly proclaim it," says Kevin Pixley, University of Wisconsin plant breeder and leader of the corn biofortification project at CIMMYT (International Maize and Wheat Improvement Center). "I would not be disappointed if they achieve half of that, but I would be disappointed if they, and all of us in the agriculture sector, did not try.

"My main theme is that it should be doable to double yields in some of the second, third, fourth, fifth most important producing nations," he continues. "This would make a huge impact toward meeting global needs, perhaps making it non-essential to double U.S. corn yields, and perhaps representing a more worthy goal."

Productivity dilemma. How much developing nations improve their ag output remains the biggest question mark in the food dilemma picture. Right now, corn yield in sub-Saharan Africa stagnates at a level of production U.S. farmers reached by World War II.

"In many developing countries, crop yields are extremely low; they haven't started to take advantage of the scientific and technological innovations," says Gebisa Ejeta, a native of Ethiopia who is a Purdue University plant genetics professor and winner of the 2009 World Food Prize. "There is a much greater chance of increasing yield potential there if we can work on things like drought tolerance and pest and disease resistance like we have done in the developed world.

"We need to encourage private sector investment in developing countries," she adds. "Then improving yields becomes a much easier task. Just in the last seven or eight years, in regions like sub-Saharan Africa, we have seen technology making a difference in people's lives. We need to make sure there is more and more

access to it," Ejeta says.

Danielle Nierenberg, director of the Worldwatch Institute's Nourishing the Planet initiative financed by the Bill & Melinda Gates Foundation, looked at agricultural projects in 25 sub-Saharan nations over 16 weeks earlier this year. She saw lots of room for improvement but noted positive changes, as well(www.nourishingtheplanet.org).

Closing the productivity gap

Supplying enough food to meet the ever-growing appetite of the world is a colossal challenge. The United Nations estimates the world is increasing by 78 million each year, about the size of the population of Germany. According to World Health Organization figures, as many as 3.5 million people a year—or about 9,500 a day—die due to malnutrition. By the time global population hits a projected 9 billion by 2050, food production around the world must be 70% greater than today's level to close the deficit between supply and demand. This is referred to as the "productivity gap."

In 2010, DuPont created an advisory committee on Agricultural Innovation & Production for the 21st Century. It's chaired by former U.S. Sen. Tom Daschle and includes Charlotte Hebebrand, chief executive of International Food and Agriculture Trade Policy Council; Jo Luck, president, Heifer International; J.B. Penn, chief economist, Deere and Co.; and Pedro Sanchez, director of Tropical Agriculture and Rural Development Program, Earth Institute at Columbia University.

The committee issued a report in June detailing recommendations for closing the food productivity gap. It focused on three areas:

Produce more food and increase the nutritional value of food. Unleashing innovation and ensuring farmers have access to the tools they need will be essential.

Make food accessible and affordable for everyone. Barriers to moving food, such as infrastructure and government policies, must be removed.

Address the challenge in a continuously more sustainable and comprehensive way. Continuously improving agricultural products and practices to address natural resource needs and building economic and social development in key markets will be critical.

Specific recommendations called for improved public policy in the areas of trade, regulatory approval of agriculture innovations, subsidies and intellectual property protection. The committee also called on the private sector to invest in developing markets to build sustained economic growth.

"Addressing the food and nutrition needs of a growing population is the defining challenge of this century," said Daschle in a press release. "The complexity of this challenge—substantial urbanization, diminished resources, such as arable land and water, increased rates of malnutrition—are complex and can only be addressed with the kind of innovation that comes from partnerships and collaboration on a whole new level."

To see the full report, visit www.mygazines.com/issue/33253.

