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A man pauses while working a corn field near Ciudad Obregon, northern Mexico Oct. 7, 2008. After the pioneering agronomist, Norman E. Borlaug, introduced his "green revolution" of hardier seeds and chemicals in this region more than 60 years ago, he was credited with saving hundreds of millions from starvation worldwide. Today, in a global food crisis of lagging productivity and punishing prices, world leaders are calling for a second revolution, but it won't be that easy this time, experts say. (AP Photo/Alexandre Meneghini)



In food crisis, Mexican valley offers lessons

By JULIE WATSON – 1 day ago

CIUDAD OBREGON, Mexico (AP) — On the walls of some farmhouses here, a photo of a one-time Iowa farm boy hangs along with a portrait of the pope. The American long ago wrought a kind of miracle in the wheat fields of this valley, one that today's world hungers for anew.

After the pioneering agronomist, Norman E. Borlaug, introduced his "green revolution" of hardier seeds and chemicals in northern Mexico's soil more than 60 years ago, he was credited with saving hundreds of millions from starvation worldwide. Today, in a global food crisis of lagging productivity and punishing prices, world leaders are calling for a second revolution.

"These are life-and-death matters that we must confront," says U.N. Secretary-General Ban Ki-moon.

But Borlaug's scientific heirs say it won't be so easy this time, especially in Africa, where food production is growing only 2 percent a year, while population expands by 3 percent.

Even here in Mexico, in this vibrant wheat belt crisscrossed by tractors and crop dusters, farmers are in a daily struggle. Climate change is blamed for more frequent droughts, hotter temperatures and the spread of new plant diseases. The cost of fertilizers has tripled, and their overuse has depleted soils, spewed more greenhouse gas into the skies and polluted water with farm runoff.

"It was a clearer agenda when Dr. Borlaug was here: The goal was to produce more food, period," said Tom Payne of the Mexico-based International Maize and Wheat Improvement Center. "Now our agenda has kind of brought in a lot of different facets that make it a lot more difficult."

Matthew Reynolds, a wheat physiologist at the center, said the next green revolution needs to mix tried-and-true technologies with sustainable practices, or the world will be fighting famine again in another 50 years.

"We applied the Industrial Revolution model to the green agricultural revolution and we went a little bit too far in that direction, and now we have to back off a bit and respect the fact that the plants and the soil are biological," he said. "They are not engineering problems. They're more complex."

The center in Texcoco, near Mexico City, was the outgrowth of Borlaug's work here in Sonora state's Yaqui Valley, where he developed his seed varieties and launched his revolution, giving farmers in the developing world 20th-century technology — disease-resistant crops, fertilizers, fungicides.

His innovations were credited with staving off Asian famine in the 1960s and allowing harvests to outpace population growth for 40 years, and won the Iowa-born plant breeder, now 94 and ailing, the Nobel Peace Prize.

That first revolution targeted large-scale growers like those in the Yaqui and in India, so the world could double its food production quickly by blanketing fields with high-yielding varieties of wheat and rice.

Today's crisis epicenter lies instead in the countless small subsistence farms of sub-Saharan Africa, where peasants grow corn, a sensitive crop, on rain-fed plots.

Borlaug-inspired programs are trying to lift those farmers' productivity, but resources are short, and roads and other infrastructure weak. Meanwhile, global grain prices that skyrocketed in the past two years have pushed millions more Africans below the hunger line. Since midyear those prices have declined, but they remain at historically high levels and many food items — from the Philippines to east Africa to Central America — have become prohibitively expensive.

Oil prices, market speculation, bigger appetites in China and other industrializing nations all contributed to that price spike. But experts looking ahead see further trouble globally: the lag in growth of per-acre farm output, water shortages, shifts in agricultural zones and rainfall patterns because of global warming.

The small farmers of Africa, likely to be hardest hit by these problems, may be worlds away

from growers here who spend their days in air-conditioned pickups reading messages on their BlackBerrys. But there are lessons to be shared.

Yaqui growers don't only swap information at local coffee shops about the best seeds and techniques. They travel the globe to share experiences on how farmers themselves pour their profits into research and participate in experiments — which is key as governments reduce spending on agriculture.

Meanwhile, seeds of the latest disease-resistant wheat varieties developed in Mexico are being shipped worldwide as another catastrophic pathogen, UG99, threatens to devastate the world's second most important food source after rice.

New varieties are developed using Borlaug's technique of "shuttle breeding." Researchers first grow prototypes in central Mexico in the summer and then rush those seeds to the Yaqui Valley for the winter, squeezing two growing seasons into one year and halving the time it takes to develop hybrids.

It's a conventional process that differs from the advanced, internationally controversial techniques of genetic engineering.

About 184,000 unique corn and wheat seeds are stored in refrigerated vaults at the research center, giving the world access to a vast library of plant genes to mix and match in search of increasing yields. Researchers found the UG99-resistant varieties by studying a random selection of 4,000 unique seeds.

But scientists worry they are hitting limits to raising yields through improved seeds. Over four decades, growth in cereal yields has slackened from 3 percent annually to about 1 percent a year. And international support for such research has been dropping.

"Now more than ever, we are remembering what Dr. Borlaug did here and watching how history is repeating itself," said Homero Melis, head of the Association of Farmers' Organizations in Southern Sonora State, where Ciudad Obregon is located. "We've simply got to produce more."

What Borlaug did here comes to life along a road, Dr. Norman E. Borlaug Street, that stretches through this proud farming city, passing food-laden supermarkets, silos, fertilizer distributors, seed companies and agricultural research stations, before giving way to vast wheat fields.

The crop scientist arrived in the Yaqui Valley in 1945 as part of a joint initiative of the Mexican government and the Rockefeller Foundation to help a wheat crop devastated by stem rust, a rust-colored fungus.

Leery of the American at first, local farmers then noticed his robust crop flourishing in experimental plots, while their surrounding fields were infested by disease. Soon they were fertilizing, planting improved seed, spraying fungicides and watching their harvests double.

In 1966, Borlaug shipped 18,000 tons of seed to large commercial farmers in India, where famine was threatening to kill millions. Within a few years, south Asia was enjoying a surplus.

Farmers here jokingly say this region underwent a "Food Rush," likening their bountiful yields to the "Gold Rush" of the U.S. West.

But then drought set in for eight years, new strains of stem rust appeared and the magic started to fade.

Yaqui Indian leaders say the chemicals have raised cancer rates among tribe members working in the fields, where fertilizer use is among the highest in the world.

Researchers have found that the nitrogen-based fertilizers spew nitrous oxide into the atmosphere — a potent greenhouse gas. Fertilizer runoff has contaminated the Gulf of California, a unique marine ecosystem where algae blooms from the nitrogen now stretch all along the sea's coast.

Nonetheless, many here remain true believers in Borlaug's science-based agriculture. Yaqui Valley producers gave \$600,000 to agricultural research this year after rains replenished the irrigation dams and they harvested a record 1.2 million tons of wheat.

"To us, researchers are like family," says farmer Jorge Orozco, pulling up a photo on his BlackBerry of Borlaug standing in front of Orozco's waist-high golden wheat during a visit to the valley last year.

Orozco, 57, is part of a new wave of farmers trying to make the valley's green revolution more sustainable. He has set aside a few rows where he won't plow before he plants, testing techniques researchers say will maintain soil moisture and boost yields.

He's also in a pilot project using the GeenSeeker, a computerized sensor that scans plants'

leaves to determine how much nitrogen they need, to avoid over-fertilizing. It may save him \$10,000 on fertilizer for his 250 acres, and researchers hope it eventually will cut nitrogen runoff by as much as 90 percent.

American engineers are developing a cheaper model to make fertilizing fields more affordable for African farmers, said Ivan Ortiz-Monasterio, a scientist at the Texcoco center. It could help save that continent from the environmental damage that happened here.

"They can learn from others' mistakes," Ortiz-Monasterio said.

On the Net:

- International Maize and Wheat Improvement Center: <http://www.cimmyt.org/>