A Warming Climate Brings New Crops to Frigid Zones

Longer growing seasons help lead northern farmers to plow up forests for crops such as corn that were once hard to grow in chilly territories

By Jacob Bunge
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LA CRETE, Alberta—The farm belt is marching northward.

Upper Alberta is bitter cold much of the year, and remote. Not much grows other than the spruce and poplar that spread out a hundred miles around Highway 88 north toward La Crete. Signs warn drivers to watch for moose and make sure their gas tanks are filled. Farms have produced mostly wheat, canola and barley. Summers were so short farmer Dicky Driedger used to tease his wife about wasting garden space growing corn.

Today, Mr. Driedger is the one growing corn. So are many other northern-Alberta farmers who are plowing up forests to create fields, which lets them grow still more of it. The new prospect of warmer-weather crops is helping lift farmland prices, with an acre near La Crete selling for nearly five times what it fetched 10 years ago.

One reason is the warming planet and longer growing seasons. Temperatures around La Crete are 3.6 degrees Fahrenheit warmer on average annually than in 1950, Canadian federal climate records show, and the growing season is nearly two weeks longer.

“A few degrees doesn’t sound like much,” said Mr. Driedger, 56, who has farmed for three decades in the area roughly as far north as Juneau, Alaska. “Maybe it doesn’t make such a big difference on wheat or canola, but on corn, it sure does.” In August, he watched a tractor-size tiller yank tree roots from the earth, which were to be piled up and ignited in giant bonfires to create new fields.

It is hard to predict precisely the effects of a changing planet, but the world of business and finance is trying to put prices on it. Agriculture is among industries on the front lines because a warming climate changes the crops that farmers can plant, affecting the productivity and value of their land.

Agricultural giants such as Bayer AG , Cargill Inc., DowDuPont Inc. and Bunge Ltd. are pushing to develop hardier crops, plan new logistics networks and offer new technologies designed to help farmers adapt. DowDuPont, maker of Pioneer brand seeds, said its scientists are developing crops that mature faster and in drier conditions for farmers in regions growing hotter. It is marketing weather services to help farmers better anticipate storms and weather-driven crop disease.

Along with water availability, "no challenge is more important to our industry—and our world—than climate change," said DowDuPont agriculture-business head James Collins in an October speech.

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Shifting weather patterns and rising temperatures are altering what crops farmers can plant. In the last of a three-part series on climate, we examine how advancements in AI and genetics could help farms battle drought and crop disease.

Warming temperatures are expanding regions suitable for wine grapes, according to a 2018 study in the journal Nature Climate Change. That may require vineyards in places like France to switch to more heat-tolerant varieties grown in Greece, said Elizabeth Wolkovich, a University of British Columbia associate professor who led the study.

Warming has helped increase U.S. corn harvests, delivering more than one-quarter of the yield growth across corn-belt states since 1981, according to a study published this month in the Proceedings of the National Academy of Sciences. Those gains may be harder to sustain as temperatures increase further, and climate shifts already are working against yields in some corn-producing regions, the report found. Overall, climate change-driven heat, droughts and soil erosion will likely diminish U.S. agricultural production, according to the latest installment of the U.S. National Climate Assessment, issued Friday.

> Among the most striking effects on agriculture is the farm belt's shift northward. The leading edge is in Canada.

Higher temperatures are helping farmers transform prairie provinces, once home predominantly to wheat, as they dedicate more acres to corn and soybeans. Wheat still dominates, but its acreage hasn't grown over recent decades.

Canada's corn acreage, meanwhile, has climbed 20% over the past decade, while soybean acreage has roughly doubled, government data show. Before 2013, provinces such as Saskatchewan and Alberta grew no significant amounts of soybeans, according to Canadian government data. Now soybeans cover 425,000 acres in those provinces.

"I look for places that don't yet grow soybeans, that will eventually grow soybeans," said Joelle Faulkner, chief executive of Area One Farms, a Toronto investment firm that buys land in partnership with farmers.

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On Area One land where farmers have planted soybeans, farmers' profitability has grown 30% over three to five years, boosting the land's value by roughly the same amount, she said. The spread of warmer-weather crops, she said, represents "the less negative effect of climate."

While U.S. corn-belt land prices stagnate, per-acre prices across Canada climbed 8.4% in 2017, according to Farm Credit Canada, an agricultural-lending firm, more than doubling over the past 10 years. In northern Alberta, farmland prices rose 11.5% last year to an average 2,030 Canadian dollars ($1,548) an acre.

> That is still a long way from the average $7,326 for an acre of Iowa's rich, black soil, according to Iowa State University research in 2017. But it's catching up.

Near La Crete, a quarter-section, or 160 acres, of farmable land in 2017 sold for C$325,000 to C$350,000, up from C$65,000 to C$80,000 in 2008, the county assessor's data show. Local real-estate agent Eva Krahn-Richmond said she has seen sales this year of up to C$400,000.

Other factors, too, are making it easier to grow crops whose increased yields and often-higher market prices make land more valuable. In some areas, land prices are rising in part thanks to low interest rates and because some farming families are looking for additional land to support their children.

Canadian farmers differ on whether the rising temperatures noticeably affect their harvests year to year and on how much they can plan around the warmer summers.

D'Arcy Hilgartner is raising a small amount of corn and soybeans among his canola and wheat fields near Camrose, Alberta. He said temperatures may be increasing, but it is too subtle to make

much of a difference on his farm. “I remember hot summers as a kid,” he said.

But agricultural and weather researchers say warming is having a demonstrable effect on Canadian farming. “We’re seeing crops grown in places they’ve never grown before,” said Ian Jarvis, program director for the Group on Earth Observations Global Agricultural Monitoring Initiative, an international project using satellites to track agricultural production.

Researchers at Alberta’s University of Lethbridge in 2015 estimated the province’s growing season had expanded by between two and five weeks a year, and that its average annual temperatures were two to 5.5 degrees Fahrenheit higher, than in 1950.

The area’s potential to raise soybeans and corn are enticing investors such as Joshua Sawchuk, who oversees Canadian farmland investments as part of Manufacturers Life Insurance Co.’s $3 billion global portfolio of farm assets.

“When we’re looking at investments we’re always looking at crop rotations, and what the rotation’s going to be in 10 years,” Mr. Sawchuk said. He said he is looking for opportunities among the shifting crops and weather patterns of western Canadian provinces including Alberta.

With farmland prices rising, it makes sense to create more of it. House-size piles of branches and roots stretch away from northern Alberta’s Highway 58. Orange signs along the road warn drivers of smoke.

Farmer Bill Boese in August stood on lumpy dirt that had once supported towering spruce and poplar trees. He said longer growing seasons help him raise better-yielding canola varieties, making each acre he clears potentially more profitable. He bought 1,200 acres three years ago in a private sale, and despite rising prices, he said demand remains robust among local families who want to let their children stay farming. “We’re all tied back to the land.”

Down the road in the 639-person hamlet of Fort Vermilion, Dr. Jacob Marfo counts each year’s frost-free days. Dr. Marfo oversees the Mackenzie Applied Research Association, a farmer-managed nonprofit, where he raises test plots of corn, soybeans, canola and vegetables. In a decade, he said, higher temperatures and faster-maturing seeds will see corn replace oats on many of the area’s fields.

As the region’s narrow window to plant corn neared last spring, Ron Wieler’s corn-planting machine—one of just a few in the area—was rapidly booked by corn-curious farmers. “I’m almost maxed out,” said Mr. Wieler, who is also Pioneer’s local seed salesman.

Seed and pesticide giant Bayer, which bought U.S. seed purveyor Monsanto this year, is breeding corn plants to be faster-maturing to produce crops in cooler climates. Those efforts help farmers in borderline areas take advantage of climatic shifts.

A decade ago, Monsanto's fastest-growing corn needed about 80 days to mature for harvesting, said Dan Wright, who oversees Bayer's Canadian corn and soybean research from Guelph, Ontario. Next year, he aims to begin selling corn that will mature in 70 days, targeting farmers in places like Saskatoon, Saskatchewan and Red Deer, Alberta. For corn and soybeans, the company's two biggest crops by sales, he said, such areas represent the "edge opportunity."

Canadian grain company Viterra Inc., owned by Glencore PLC, this fall is offering for the first time to buy soybeans at its Grimshaw, Alberta grain facility, a company official said. In Camrose, Alberta, a grain terminal owned by Cargill this year will buy soybeans from local farmers for the first time, the company said.

A Cargill spokeswoman said the company sees improved seeds driving much of Alberta's soybean expansion and is also evaluating the impact of a changing climate across dozens of business lines, which include transporting and processing farmers' crops around the world. "Today, the U.S. corn belt is in Iowa, Illinois, Indiana," Cargill CEO David MacLennan said in a 2016 interview. "In 50 years, it may be in Hudson Bay, Canada."

Bunge, a major U.S. agricultural trader and processor, incorporates climate analysis into its long-term strategy, including in its 2015 deal with the Saudi Agricultural & Livestock Investment Co. to invest $200 million in Canadian grain storage and transport assets. Those facilities buy corn and soybeans from Canadian farmers, along with wheat and other crops.

Australia's GrainCorp Ltd. and Japanese farm cooperative Zen-Noh Group in 2017 opened the first of four planned Canadian grain-shipping facilities capable of storing 35,000 metric tons of crops each. Warren Stow, the joint venture's president, said the companies anticipate improved seeds, better farming techniques and warming temperatures will boost Canada's crop production.

On Canada's rugged Pacific Coast, at the Port of Prince Rupert 40 miles south of Alaska's southern tip, trains pull grain-filled hopper cars through the Coast Mountains. They unload into waterfront storage bins at the remote port town of 11,733, raising dust as crops pour into vessels' cargo holds. Rain frequently drenches the peaks jutting up against the country's deepest ice-free seaport.

The ship-loading facility, benefiting from expanding harvests on Canada's western plains and regulatory changes to the way grain companies can ship crops, has nearly doubled its agricultural exports since 2008. The port, which channels farm goods to Asian markets, last year added capacity to handle more soybeans and lentils.

"It used to be viewed as an overflow port," said Nick Fox, president of Prince Rupert Grain Ltd., which operates the terminal. Canada's changing climate, in part, is boosting harvests and will likely push more crops toward the terminal, Mr. Fox said. Improvements the company is making

to its terminal will allow it to handle corn and soybeans as farmers gravitate toward those crops, he said. The port's location, he said, is "very strategic."

Canadian farmers still worry about the weather, as farmers tend to. Southeast of Edmonton, Alberta, Jake Vermeer walks along a row of signs that mark a half-dozen corn varieties. It is the eighth year that Mr. Vermeer's family has been raising corn, test-growing varieties tailored to Canada's short growing season.

Mr. Vermeer's family manages 2,500 acres and a large dairy. An acre of corn can produce more than twice as much grain for Mr. Vermeer's cows than feed crops such as barley.

Since 1950, the growing season around Mr. Vermeer's farm has increased by 17 days, according to federal weather records. If climate change simply meant warmer temperatures, it would be a big boost to Canadian farmers, Mr. Vermeer said. But unusually long dry spells and harsher storms may also make farming more uncertain. "It's a tough one, because how do you predict it?"

Near La Crete, an early frost struck Mr. Driedger's cornfields in early September, cutting short its growth and diminishing this winter's feed supply for his cattle.

Mr. Driedger wasn't discouraged. He said he is considering buying his own corn planter, which would let him immediately put seeds in the ground when springtime conditions turn favorable, and capture more warm weather.

"The weather's tricky," he said, "just as tricky as ever."

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