

Bringing What's Out There Home

James C. Schaap
Dordt University

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BRINGING WHAT'S OUT THERE HOME



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Whenever Dr. Lee De Haan ('95) and The Land Institute (TLI) score major publicity for Kernza, the perennial grain they've been developing, De Haan's phone rings.

People want to know what he's up to because they find Kernza as biologically fascinating as it is environmentally blessed. When he graduated from the University of Minnesota in 2001, De Haan came on board at TLI in Salina, Kansas, to work on the institute's whole menu of perennial grain projects. It didn't take

long, however, before he found himself concentrating on Kernza.

You may have read about Kernza in *National Geographic* (twice, in fact) or in the *New York Times* or *Washington Post*, or maybe, more recently, heard about it on NPR. It's a perennial crop capable of

producing enough grain to be harvested successfully *and* be a viable forage for successive seasons in the right climate. One late summer planting will yield three to 10 harvests of an earth-friendly grain that grows from grass and tastes like wheat, a new domesticated crop bred from wheatgrass.

What perennial Kernza offers environmentally is staggering: potentially, it promises to use one-sixth (maybe less) of a farmer's average herbicide use, and it requires a fraction of the time to plant. When it eventually becomes widely available, prices for Kernza seeds will drop when compared to the seed required for a harvest of its annual cousins. What's more, if De Haan and his Kernza researchers are right, our air and water may well be significantly cleaner, precious carbon will remain in the soil, and wildlife will find their way into far more abundant habitat. People who hear about Kernza call Dr. Lee De Haan at TLI because they want to know more about it—and how they can get ahold of it.

For those calls, he has, right now, the same answer: not a lot of Kernza seed or grain or flour is available, because while the full-time work De Haan began a decade and more ago has created wonderful opportunities, to produce a product for sale on a mass scale (thousands, even millions of tons) will require more research, much of it genetic, and significantly more development.

"We need to scale it up," he says. "The first step is genetics, because genetics can continue to improve on yield." For De Haan, that means more time in the lab, more time selecting and sorting individual plants, and more time-consuming research. "If tiny seeds fall to the ground at harvest, it means fewer seeds in the bin," he says. "Those problems and others like them need to be fixed genetically."

WHAT IS KERNZA?

Kernza was developed from an undomesticated distant cousin of the kind of annual wheat varieties that, every season, are grown from Missouri to Manitoba, and west to the Rockies. While Kernza is still in development, it is blessedly eco-friendly and may well increase food production around the world in ways that can as yet only be imagined.

Perennial grains like Kernza have immense root systems that find nutrients far out of reach for their annual cousins. What's more, those extensive roots hold onto and even build more organic matter in rich prairie soils, thereby serving as insurance against erosion, while offering abundant and wonderful habitat for wildlife. And, they promise cleaner ground water, requiring less fertilizer use.

JAMES CALVIN SCHAAP (70)



Kernza plants help to build soil health, retain clean water, sequester carbon, and enhance wildlife habitat, according to The Land Institute.

What the many phone calls make clear, however, is that all of the work he's been doing at TLI has not been in vain. That there is need for perennial grains is something he's never questioned; that there is such concentrated demand is new. In some ways, he says, the development of Kernza is ahead of schedule, so far ahead that its availability

right now can't keep pace with the demand.

In 2007, a grant from the U.S. Department of Agriculture allowed the Kernza crew to plant it in an ordinary farm field, harvest it in July, then fill up a semi with Kernza grain that was milled in western Kansas to yield 5,000 pounds of flour. "I took some home," he says, "and we made just about everything we could think of." His initial taste testers included three home-schooled kids and his wife, Sheila (Rasmussen, '95), who, he claims, pull no punches on his creations—it's just thumbs up and thumbs down.

But Wes Jackson, the man whose vision created TLI, loved the chocolate cake De Haan had baked and told him to make another one just like it for a board meeting. One of the board members, the founder of the Chipotle restaurant chain, had employed a Chicago baker to mix up some rolls for the meeting, too. The board gave it all some sweet reviews. Soon enough, Chipotle had some restaurants create tortillas with Kernza to see what their customers thought.

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All went well. People in the know at Chipotle, and elsewhere, like Kernza; but even today, there simply isn't enough of it to make it a standard ingredient.

General Mills—Gold Medal Flour, Bisquick, and almost anything with the name Pillsbury—came to TLI, inquiring about Kernza. General Mills' need for flour is immense—Wheaties, Rice Chex, Cocoa Puffs, Captain Crunch, and every last kind of Cheerios, after all. Every year General Mills, all by itself, buys a significant portion of all the wheat produced in the nation.

General Mills' particular story helps clarify the nature of the rising interest in what De Haan and TLI are up to. Recently, General Mills wrote up its own corporate objectives with regards to sustainability: by 2050, they want to be "carbon neutral."

That is demanding. Their corporate concern, De Haan says, is with their consumers, of course; but it emerges from "a commitment to be doing new and sustainable things for problems created by climate change." Since any chaos in the wheat community will affect their viability, they clearly see the need to examine brand new technologies like Kernza, flour that can be milled from perennial grains.

The demand is there, but no one knows better than De Haan what it will take to be able to meet that demand.

Today, TLI has plots of Kernza planted in experimental fields all over the continent, from Vermont to Utah, and throughout

the traditional pillar of wheat-growing areas in the northern Plains states. They know it will grow from Canada to southern Kansas, but still need to determine where specifically it will produce most bountifully—and when and why.

There's no question about the flour produced from Kernza grain. People claim it's sweet, and De Haan's own baking has proven it will do fine in the oven, make stupendous chocolate cake. The problem right now is getting the grain in sufficient bulk from the field to the dining room table. The cost of production at present is too high for ordinary farmers, given its smaller yields. Despite De Haan's decade and

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more of work, Kernza isn't yet the environmentally-sound option to seed crops he's confident Kernza will become. But it may be sooner than some might believe.

But then there's the phone. When he started at The Land Institute, the dream seemed way, way "out there." To critics, all perennial grains seemed far more a fantasy than a possibility. But today, people keep calling, some of them with ample economic means, enough to help fund research.

And then there's this. Not long ago, De Haan went to Europe to meet a number of people at a conference set up to bring together researchers working on perennial grains. While there, someone suggested that he visit a university in Belgium, where professors and students were working specifically on Kernza.

He stopped for a moment, stunned. Once upon a time he could count on one hand the number of people



A Kernza plant's roots can reach 10 feet or more beneath the soil surface—more than twice the depth of annual wheat roots.



The Land Institute says Kernza grain grows best in cooler northern latitudes.

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investing time and research into the development of Kernza, probably knew every one of them, in fact. There he was, in Europe, being told that research scientists in some Belgium university, people he didn't know and had never met or even heard of, were doing work he had no idea was going on.

For a long, long time already, De Haan has dedicated his professional life to Kernza, the development of perennial grains as a means of making agriculture—and all of our lives—more environmentally sound. It was an interest of his for a long time, but at TLI it became a calling, for which, he says, he's probably especially fit.

"I love working on a project like this," he says, "something that's going to take a long time, something that's as demanding as Kernza is, but something that promises what it does, real rewards."

By experience, by predilection, and by passions, it seems clear a Minnesota farm boy turned world-class researcher discovered in Kernza a job, a calling designed for him—or that he was designed for it.

Career counselors like to say that a *calling* is the place where your passion and gifts connect with the world's needs. Dr. Lee De Haan would look up from his lab work, smile, and undoubtedly nod his assent.

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KERNZA IN THE DORDT PRAIRIE

It's been here for years already, just about as long as Dordt has had its own prairie. One can assume that Dr. Lee De Haan didn't have to twist his brother's arm too far to talk Professor Robb into some research-and-development space.

Back then, on any walk through the prairie east of the campus, you could not have missed the Kernza plot; but today, you need to look just beyond the south end of the soccer field, where, come July, a tall and healthy field of row crops—mostly Kernza—stands up proudly.

Dordt's research contribution to the development of perennial grains, as Biology Professor Dr. Jeff Ploegstra explains, helps examine the way a northwest Iowa environment affects "genotype interactions, overall yield, and changes to soil microbiology."

Dordt's research plot is one of many. "One can imagine," Ploegstra says, "that plants that have improved yield in Kansas may not actually perform better if grown in Iowa, and vice-versa." Thus, sections of Dordt's research plot are testing various seed types, to see "how temperature, precipitation, disease vectors" affect growth and yield of the grain, as well as the bacteria and fungi of the soil itself.

Drop by sometime. The plot is quite beautiful—in more ways than one.



PHOTO SUBMITTED

Pictured are the Rog and Dorothy De Haan family—Greg ('88), Dorothy ('61) Roger ('60), Robb ('85), Susan ('88), and, in front, Lee ('95).

THE DE HAAN FAMILY

Lee De Haan says he was just a kid when his dad and his brothers started talking about perennial grains. From their farm near Hollandale, Minnesota, Dad and brother Greg went off to Rochester, Minnesota, one night to hear Wes Jackson speak. Jackson, the long-time president of The Land Institute, was—and still is—a trusted, booming voice in sustainable agriculture.

They came back fascinated, but fully conscious of the fact that a radical move toward perennial grains would require years of research and development, as it has. That speech was 35 years ago.

Meanwhile, brother Robb ('85) and his family were spending three years in Africa for Christian Reformed World Missions. When Robb came home, he made clear what he'd learned about African agriculture: what was needed badly was "different kinds of plants."

Lee says he was only a kid back then, but he remembers that for some time thereafter the whole idea of "different kinds of plants" kept finding its way into discussions during chores and around the dining room table, often enough that De Haan couldn't help but be interested himself.

When Robb and his family returned from their three-year term in Africa, he went to graduate school at the University of Minnesota, where "different kinds of plants" continued to be his interest and his academic focus, so much so that he told his graduate committee what he wanted to do for his thesis was work on perennial grain, specifically high-yielding Illinois