

An “Alternative Crop” to Enhance Source Water Protection – A New Idea in Wheat Country



Most people I visit with seem a little surprised to hear that most small to medium sized towns and rural water districts don’t “treat” the water that is sold to their customers. I explain that chlorine is added and maybe a sequestering agent is injected to control iron and manganese, but usually, nothing is removed. I probably should make a greater effort to explain that the natural world, with its soils and fine sands, usually does a better than adequate job of filtering harmful bacteria and viruses from the water millions of people drink in the United States.

With that said, however, Kansas doesn’t have an overabundance of areas that we can call natural and undeveloped. We can’t put total reliance on the natural systems of plants and soils and fine grained aquifers to stop everything from reaching the well and ultimately the customers. Human activities introduce a number of potential contaminants in quantities that can overcome the natural system.

Years ago, the Conservation Reserve Program, or CRP, allowed highly erodible and other environmentally sensitive lands to be enrolled in a program where farming on a described tract of land could be suspended for a period of time, up to 10 or 15 years. These lands in Kansas were planted to native grasses to hold the soil, provide wildlife habitat and improve water quality.

Iowa Rural Water Association’s Source Water Specialist Lisa Walters attended the Lincoln-Pipestone Rural Water System Kernza® Field Day in Pipestone County, Minnesota, in September of 2018. Kernza® is a trademarked variety of wheatgrass, a very distant cousin of wheat. Notice that the seeds are not neatly arranged in a head like annual wheat. (Photo courtesy of Lisa Walters, Iowa Rural Water Association.)

Since the introduction of this program in 1985, other conservation options have been introduced which provide some of the same benefits with less land taken out of agricultural production. Buffers between streams and fields have been popular in some places. Buffers to catch and hold runoff and sediment are also in place around fields where there is no stream.

Cultivated land within 2,000 feet of public water supply wells have been eligible as “environmentally sensitive land” for many years. A few water systems in Kansas have taken advantage of this. One water system in the process of drafting a source water protection plan has identified a

private tract of land near one of its wells as having good potential to be converted into pollinator habitat. If successful, an article will be printed in this publication in the future which explains the process and benefits of this project.

An “alternative crop”

The focus of this article is a little different. Instead of outlining the benefits of removing land near wells from agricultural production, this article will show an emerging

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alternative crop that deserves to be discussed and considered. If agricultural land can be kept in production and protect water quality, this might result in the proverbial win-win.

The Land Institute (<https://landinstitute.org>) was founded on the banks of the Smoky Hill River south of Salina, Kansas, in 1976. Founders Wes and Dana Jackson saw a need for research that would provide crops and agricultural methods that would mimic nature, and at the same time, still feed us and keep our communities intact. For over 40 years, the Land Institute has been breeding crops and studying how different plant communities beneficially work together. Work has been done to create varieties of perennial wheat, sorghum, legumes and sunflowers that can reduce energy and fertilizer inputs. They are also supporting research to develop perennial rice. Most exciting to me is the commercialization of Kernza®, a perennial grain of domesticated Intermediate Wheatgrass.

Kernza® is not wheat, but a distant relative of the grain that made Kansas famous. It is a trademarked hybrid of Intermediate Wheatgrass, which has the scientific name *Thinopyrum Intermedium*. Historically, wheatgrass has been used for forage. It is a perennial plant, and was originally found in central to southeastern Europe to Asia Minor.

According to the Land Institute, the USDA and the Rodale Institute did some breeding of wheatgrass to develop an improved hybrid. In 2003, the Land Institute started their program of plant breeding to create a wheatgrass capable of producing a marketable grain. In 2011, they were able to trademark the improved hybrid with the Kernza® name.

After 15 years of breeding, planting, growing, harvesting and repeating, Kernza® produces grains about 1/5 the size of a typical wheat grain. The Land Institute hopes that in a few years, significant progress will be seen in grain size, shatter resistance, threshing ability and yield. The future already looks bright for the marketing of this specialty crop. The small amount of Kernza® flour available now is used in restaurants in California, Ohio, Minnesota and Missouri. While it's not wheat, the amount of gluten in the grain is reduced,



This is a recent photo of alternating rows of alfalfa and Kernza® in a test plot at the Land Institute near Salina, Kansas. Research continues on the mixing of different plants to study their compatibility. Are there advantages two crops share when grown together or are there disadvantages such as the hosting of pests and disease that affects one plant but not the other?

Land Institute Mission Statement:



When people, land, and community are as one, all three members prosper; when they relate not as members but as competing interests, all three are exploited. By consulting Nature as the source and measure of that membership, The Land Institute seeks to develop an agriculture that will save soil from being lost or poisoned, while promoting a community life at once prosperous and enduring.

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Stems of Kernza® plants showing the ripening seeds produced in a Land Institute test plot.

and therefore it bakes differently than traditional flours. Craft brewers in Oregon, Washington and Minnesota have been using Kernza® grains as well. Locally, Salina's Blue Sky Brewery was the first to brew beer with Kernza®. They use a small amount with traditional grains to make their Crank Case IPA. In 2017, General Mills announced that they would be buying Kernza® from the Land Institute and selling it under their Cascadian Farm brand.

Perennial Intermediate Wheatgrass germinates in the fall and grows best in cooler temperatures. Seeds are produced in late summer. Initial commercial production will likely occur in the northern United States before a warmer-temperature tolerant Kernza® is available.

The reason this article appears in KRWA's magazine is the apparent compatibility of Kernza® with public water supply wells. Annual crops require tillage and herbicides to control weeds. When annual crops are planted, there are no roots. It takes time and water for these roots to grow, to ultimately absorb and deliver minerals and water to allow plant growth and reproduction. Perennial plants grow deeper roots and live for many seasons, and does not require the annual weed control and cultivation.

The Land Institute has banners, posters and brochures with a side-by-side comparison of an annual wheat plant and a Kernza® plant. While the Kernza® shows some taller above-ground height, it is the deep and dense roots that are so very impressive. Annual wheat may have roots that extend about six inches below the surface of the soil. Kernza, being a perennial plant, has roots that will go more than 15 feet

below the surface if the soil is at least that deep. It is probably an anecdotal comment until more research is done, but it is said that nitrates don't leave Kernza® fields. Hopefully, research will be done when Kernza® is grown in wider distribution, to show that nitrates don't leave fields horizontally or by deep percolation. Until then, we can probably be safe in our assumption that more deeper and denser roots mean less fertilizer loss.

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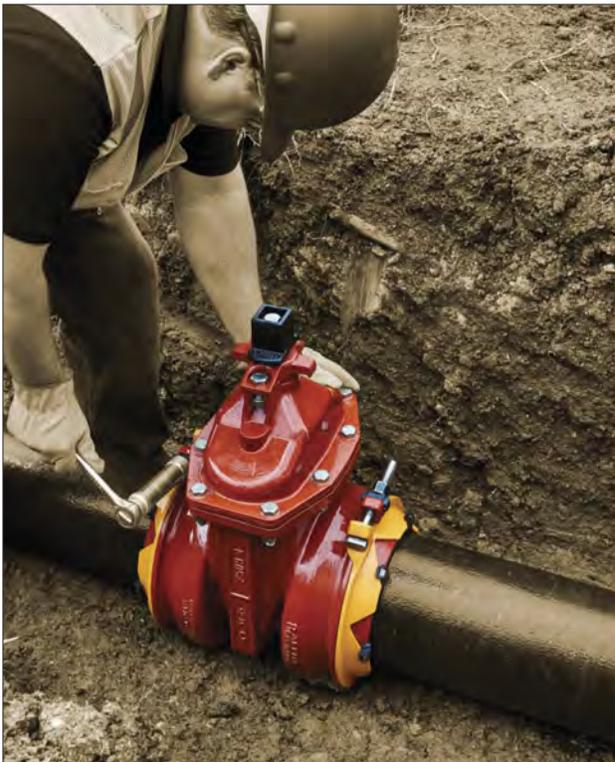
Bags of Kernza® kernels highlight the difference between those that have been cleaned and those that have not.
 (Photo courtesy of Lisa Walters, Iowa Rural Water Association.)

Three state rural water associations have been learning and then teaching and promoting the benefits of growing Kernza® in recent months to public water supply systems. Iowa Rural Water Association, Minnesota Rural Water Association and South Dakota Rural Water Association all participated in a field day at one of the Lincoln-Pipestone (Minnesota) Rural Water System wellfields, where Kernza® has been planted and harvested to protect the aquifer from nitrate impairment. Participants were also invited to sample Kernza® beer and Kernza® brownies.

If your water system is located somewhat near Salina, has grain production near your wells, and the owner of the cultivated land near your wells is one who likes to try new ideas in agriculture, let me know if you would like to see if

this new crop will work to enhance your source water protection. While the focus of the Land Institute and others is to bring this crop to market where they know it has the best chance to succeed, maybe research will find a Kernza® variety that thrives in Kansas. I'd be excited to try to bring all of us together to find a win-win solution.

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