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Inside the Bread Basket: A Look at Growing Grains in Kansas

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Inside the Bread Basket: A Look at Growing Grains in Kansas

Abstract

Kansas has always produced large wheat harvests but over the last few years Kansas has experienced smaller and smaller wheat harvests, and these smaller harvests could be due to weather, food allergies, or issues with sustainability. One grain that also has a history of growing in Kansas is sorghum and the use of sorghum in human consumption is growing because the grain is naturally gluten-free and the crop is able to grow in harsh climates. Also, the non-profit research organization The Land Institute is looking to create a perennial sorghum crop that would be a sustainable option opposed to traditional sorghum crops. A perennial sorghum crop would be sustainable, grow good in Kansas's climate and the grain would be naturally gluten-free. These factors could change the way that wheat and sorghum are grown across Kansas and in the future more and more sorghum-based products could be hitting grocery stores soon.

Cover Page Footnote

The Faculty Adviser for this Honors Project was Farrell Jenab, Ed.D.

The state of Kansas has been known for its waving wheat since becoming a state in 1861. Flashing forward over one hundred and fifty years into modern day, Kansas is still looked at as a grain producing giant. In 2017 Kansas produced 7.7 million acres of wheat, and while the number is astonishing this is the lowest recorded wheat harvest in Kansas in the last 60 years (Hoener). Kansas farmers do not just grow and sell wheat though. One other top producing grain in Kansas is sorghum, which is gaining popularity because the grain grows well in Kansas's unpredictable climate and has a fall harvest opposed to an early summer harvest like wheat. Another advantage of sorghum is that it is naturally gluten-free, adding to its mainstream appeal. Although wheat is the top producing grain in Kansas, wheat production is decreasing due to issues with weather, sustainability, and food allergies, making way for other grains like sorghum to be produced for human consumption.

A large percentage of the general public is infatuated with eating foods that are sustainably grown and millions of Americans are diagnosed with celiac disease. In 2007 I was diagnosed with celiac disease and since that day I have been on a mission to find a grain that has a similar taste and texture to traditional wheat flour. Not far into my "search" for a replacement to traditional wheat flour to use in baking, I crossed paths with sorghum flour. The advances that have been made in sorghum have made it nearly impossible to taste a difference from traditional baked goods. Before Kansas was producing sorghum, which tastefully changed baked goods and people's lives...the land in Kansas was a wheat growing giant.

Kansas got its wheat waving ways when German Mennonites settled into Kansas in the late 1800s. As settlers moved westward into the area that is current day Kansas, German Mennonites in the 1870s brought with them "Turkey Red," which is a hard winter wheat.

(Broomfield 13). This group of Mennonites were accustomed to working together as a family, harvesting wheat crops season after season in their homelands of Germany, Russia, and the modern-day area of the Ukraine. Not only were they accustomed to working together as a family harvesting wheat crops, but they were also accustomed to a similar climate in their homeland. To this day Kansas still produces more wheat than any other state across the country, but the overall harvest yields are not what they once were.

The biggest reason farmers are calling out low wheat harvests is due to the rough weather the last few harvest seasons. Multiple Kansas farmers have gone on the record saying that wet weather has caused delays that are nearly impossible to overcome the last few years (Hoener). Weather may not be the only reason for lower and lower wheat harvests across Kansas. Two national “food trends” are sustainability and gluten-free diets that have reached new levels of success and could be part of the reason wheat harvests are reaching new lows.

Sustainable agriculture is the idea of growing and producing foods to meet society’s needs without dissipating natural resources. (USDA). In 2015, The Johns Hopkins Center for a Livable Future worked alongside Greenberg Quinlan Rosner (GQR), worked to find a percentage of Americans who believed that sustainable agriculture is important. Their study found that 92% of people polled viewed sustainability to be important in food production. (JHSPH). A large amount of people feel as if the current processes of modern-day farming is hurting the environment. It can be hard to know if the public push for sustainability has in turn actually hurt wheat production or not over the last decade, but it seems possible.

The push for sustainability and the idea of finding a perennial grain that could be an answer to people’s hope of sustainable agriculture. In 1983 The Land Institute in Salina, Kansas, started working on creating a perennial wheat grass that they have trademarked as “Kernza.”

Kernza is a cross breed of intermediate wheatgrasses and the Land Institute's goal for the grain is to one day be grown across the country as a sustainable grain option. The Land Institute is a non-profit organization whose main focus is in research and development and they currently do not sell the grains that they produce.

They do however have a partnership in place with Patagonia Provisions to make a Kernza beer called "Long Root Ale" and within the last few weeks they have announced a charitable partnership with Cascadian Farm which is owned by General Mills. Kernza products are expected in late 2019 (The Land Institute, "Perennial Crops/ Kernza"). While Kernza production is relatively new and still in the research stages, the Land Institute has a great start at feeding the world...one pint at a time.

The Land Institute has a great history of working towards sustainability but in reality, their perennial grains have yet to reach profitable yield sizes. Along with low harvests, the grains that the Land Institute work with have a hard time surviving multiple seasons (Bickel). Also, the Land Institute does not just work with growing perennial wheat grains. They also have a large portion of their research dedicated to finding a perennial sorghum crop. Sorghum is gaining popularity in human consumption because the grain is naturally gluten-free. With the amount of people in the United States who are diagnosed with celiac disease or chose to follow a gluten-free diet, this is creating a demand for gluten-free grains to be produced.

The number of Americans who have celiac disease and the impact this number has on wheat production is a little easier to gauge opposed to how public opinion on sustainability effects wheat production numbers. Around 3 million Americans have been diagnosed with celiac disease; this means that this group of people cannot consume grains

that contain gluten (The University of Chicago Medicine). When a person is diagnosed through a blood test with celiac disease, this means that their small intestine cannot properly digest gluten and can lead to the small intestine being damaged. Gluten containing grains include wheat, barley, and rye, and people who are diagnosed with celiac disease normally choose to follow a gluten-free diet (Celiac Disease Foundation).

The 3 million people who live with celiac disease normally do not buy products containing gluten and this could have potential impacts on wheat production. While gluten free diets may not be causing decreasing numbers in wheat containing products, the number in wheat containing products also has not increased since 2000, although it is highly unlikely that this number has a grand effect on the amount of wheat the United States exports each year (Luginsland). Grains like sorghum have seen as increase in human consumption, and this has led the Land Institute to work on a creating a perennial sorghum crop.

The Land Institute started working with Kansas State University in the 1980s to create a perennial sorghum grain. Their end goal, which they feel is still thirty plus years away, is a perennial sorghum crop that is grown for human consumption (The Land Institute, “Perennial Crops/ Sorghum”). A perennial sorghum crop could be a “sweet spot” in agriculture because the grain would be both sustainable and gluten-free. The Land Institute also has a large portion of their hybridized sorghum crops grown in green houses, which cuts down on the fear of cross contamination with gluten containing crops. At the current time the Land Institute does not have any product-line connections with their sorghum crops.

Sorghum has been grown and produced across Kansas just as long as wheat has been

and is part of the top five grains in the state. Sorghum has been traditionally grown for livestock feed or ethanol production in the United States (National Sorghum Producers). The idea of eating sorghum is gaining popularity the United States because the grain is easy to grow across the Midwest and more and more foods are being made with sorghum. The National Sorghum Producers website notes that in the United States alone there are 350 product lines that are sorghum based.

While it is not uncommon for Kansas farmers to grow both wheat and sorghum the idea of sorghum being grown for human consumption is a bit of a new idea. In Kansas the best time to plant sorghum is from May-June and the crop loves high temperatures (Spiegel). Once the ground is dry enough to harvest in the fall, farmers will finish out their season by harvesting sorghum and planting their crops for next year. Currently Kansas is the top sorghum producing state across the United States, but one-third of the sorghum grown in Kansas is grown for livestock feed. In 2017 Kansas produced over forty percent of the sorghum harvested across the nation (Kansas Grain Sorghum Commission). Out of the large amount of sorghum harvested in Kansas only a small percentage of the grain is grown for human consumption.

The largest percentage of sorghum grown in Kansas is exported and the top five export buyers are China, Mexico, South Africa, Kenya, and Djibouti (Kansas Grain Sorghum Commission). The remainder of Kansas-grown sorghum is split up between livestock feed and food, seed, and industrial use. The break down by the Kansas Grain Sorghum Commission lumps the sorghum used for food, seed, and industrial into one category making the actual amount of sorghum being grown in Kansas for human

consumption unknown. Kansas has a great success rate when it comes to growing sorghum but how successful is sorghum in grocery stores?

The consumer has a strong pull in how successful sorghum can truly be in grocery stores across the nation. When it comes to gluten-free products there are two factors that matter for the consumers...that the product is free from allergens and how the product tastes. In order to find out how successful sorghum-based products could be with the general public, I created a blind taste test between chocolate chip cookies made with traditional wheat flour and chocolate chip cookies made with sorghum-based flour.

The only difference between the two cookies was the change in flours. I labeled the traditional wheat flour cookies "A" and the sorghum cookies "B" and simply asked people to try both cookies and say if they preferred cookie "A" or cookie "B" based on taste alone. I was able to survey a combined total of 33 Johnson County Community College students and faculty. I surveyed people at four separate events including a Discover the World cultural event, two separate classes, and at the Honors Student Association meeting. After adding up the results cookie "A" had 52% of the votes and cookie "B" had 48% of the votes.

Out of the 33 people surveyed no one guessed that cookie "B" was gluten-free. The two common differences people "found" were that one cookie was made with salted butter or that cookie "B" was store bought. One person surveyed felt that cookie "B" was store bought but preferred cookie "B" best and said they felt bad voting against a homemade cookie. Many people tried to see if one cookie was "saltier" than the other due to salted butter in the recipe but could never decide if one cookie had a saltier flavor or not. I also had two honors students "argue" over which cookie was better with one student claiming

that cookie “A” was “too heavy and starchy” while the opposing argument was that cookie “B” was “flat and gritty in texture.”

I was surprised that the end results were as close as they were and that no one guessed that cookie “B” was gluten-free. Going into the taste test I figured that most people would vote for cookie “A” and was pleasantly surprised to see that people actually preferred the taste of cookie “B.” Ten years ago, I do not believe the results would have been as close as they were. Over the last ten years gluten-free products have gotten considerably better and in another ten years the advancements within gluten-free products could lead to even more shocking results in taste tests.

The results of my study would suggest the future of sorghum production could play a large role in the advancements in gluten-free products. If the demand for sorghum in foods grows it could change the way Kansas farmers distribute their sorghum harvests. In the future, farmers may choose to sell their sorghum crops to food production companies opposed to companies to export or use in livestock feed. Also, in the next few decades if the Land Institute is successful in creating a perennial sorghum crop, it could be beneficial in helping farmers reach goals of sustainability.

While Kansas has a long history of waving wheat, the tides are turning due to issues centered around weather, sustainability, and food allergies. Sorghum... a top producing grain in Kansas, checks all the boxes by growing well in unpredictable climates and being naturally gluten-free. Not to forget the advancements being made at the Land Institute with a perennial sorghum crop could be the answer to sustainability issues. All of these factors are leading to plentiful future sorghum harvests across Kansas. These plentiful sorghum harvests have the ability to change people’s lives and they just so happened to change mine.

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