



WHEAT

EXECUTIVE SUMMARY

Kansas is the nation's leading wheat producer with records of wheat production actually predating statehood. Currently, Kansas is the world's best source for hard red wheat and is identifying new hard white varieties. Increasing demand for whole grain white bread and other whole grain products by the American consumer is conducive for growth of this wheat class. Kansas' natural resources such as climate, soil and rainfall along with its central location make Kansas ideal to grow wheat that can be distributed to the nation. Kansas is home to world-renowned leaders in the wheat industry, both in public education entities and in private innovative enterprises. Some of these organizations have been integral to the development of new wheat genetics and advocacy initiatives.

Although the wheat industry has experienced great success, it does still face some challenges which can prevent continued growth. Ever-depleting sources of groundwater for irrigation continues to be a threat to farmers, particularly in some regions of the state. A number of policies, both local and federal, could threaten the financial stability of longtime wheat farmers. Expansion of the wheat sector will depend upon a skilled workforce, particularly in seed technology, irrigation research and technology and flour milling. Growth in wheat production will require improvements to storage and transportation, especially to accommodate export around the world. Access and adaptation to international markets will open up additional global opportunities and increase demand for Kansas wheat. Finally, consumer shifts away from gluten and carbohydrates has potential to decrease demand for wheat products.

Great potential exists in the Kansas wheat industry, and a strategic growth plan developed by key partners from throughout the sector can be a valuable step. Coordinated efforts by private and public stakeholders to fund research and outreach can keep Kansas wheat at the forefront of the industry. Continued focus on state and federal policies that encourage effective use of resources and protect grain development is critical. Adaptation to new markets, like frozen dough, and to new opportunities, like big data, will keep the wheat industry a thriving part of the future of Kansas agriculture.

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STATUS

Kansas has long been known as the Wheat State, and with good reason: Kansas is the nation's leading wheat producer with records of wheat production actually predating statehood. There are indications that wheat was produced in the region as early as 1839. In 2015, 9.2 million acres of wheat were planted and 8.7 million acres were harvested with an average yield of 37 bushels per acre. This accounts for 12 percent of the state's total agricultural production and 15 percent of the nation's total crop. The state also ranks first in flour milling capacity.

According to estimates prepared by the Kansas Department of Agriculture and based on the Implan economic data model, the wheat industry in Kansas has a direct output of over \$1.53 billion and creates 2,780 jobs in the state. Through indirect and induced impacts, the industry supports a total of 9,329.2 jobs and creates a total economic contribution of approximately \$2.6 million.

Currently, Kansas is the world's best source for hard red wheat and is identifying new hard white varieties. The hard white (HW) varieties account for more than two percent of the wheat grown in the state. The overall HW market appears to be ending its consolidation phase and is now entering a steady growth phase. Increasing demand for whole grain white bread and other whole grain products by the American consumer is conducive for growth of this wheat class. The largest increases are likely to be in contracted acres as domestic millers look to guarantee supplies.

OPPORTUNITIES

In order to develop a strategic growth plan for the wheat industry, it is important to understand the areas where Kansas has a comparative advantage and the best opportunities for growth or expansion.

| Factor | Implications for Growth and Development Opportunities |
|-------------------------|---|
| Big Data | As more and more data becomes available related to cropping systems, there are increased opportunities to use the data to improve profit margins for wheat, thereby increasing its economic impact and the number of farmers interested in growing wheat. |
| Breeding | <p>Wheat breeders are learning more about wheat genetics every day and working to use that information to build better varieties.</p> <p>The Kansas infrastructure is very attractive for growth. Kansas is home to the best research and positioned well for the future, with potential marketing channels for high-yield bread wheat, hard white wheat, durum and historical attributes (heritage) which are starting to pique consumer interest.</p> |
| Central Location | Kansas is a great central hub location for enterprises looking to serve the whole United States. |
| Consumer Demand | There exist possibilities to expand the frozen dough market based on convenience products and consumer demand. |

OPPORTUNITIES (cont'd)

| Factor | Implications for Growth and Development Opportunities |
|--|---|
| Feed Stuffs | Combining the natural attributes of Kansas that make it a good place to grow wheat such as climate, soil and rainfall with the well-established cattle feeding sector creates potential for increased use of feed wheat. Feed wheat is a potential alternative to corn or sorghum in areas or farming operations where wheat is a better fit. |
| Hard White Wheat | New varieties of hard white wheat are being released and offer an opportunity to expand Kansas' production diversity in the state. |
| Leadership | Kansas is home to world-renowned leaders in the wheat industry, including leaders at the Kansas State University Department of Agronomy, the Wheat Genetics Resource Center, Kansas Wheat, etc., with many active grower leaders across the state serving or having served nationally. |
| Policy Environment | <p>Recent changes to the Kansas tax code have reduced state tax burdens on the Kansas agricultural community. Some of the key changes include a state income tax exemption for partnerships, LLCs, Limited Liability Partnerships, Sole Proprietorships and Subchapter-S Corporations and a sales tax exemption for farm machinery and equipment and various ag-based inputs. These state tax code provisions make Kansas a more attractive state for growth or expansion.</p> <p>At the federal level, Kansas is fortunate to have elected members of Congress who strongly support the wheat industry. The Kansas congressional delegation will play an important role in influencing positive changes related to federal regulations or legislation, international trade, federal taxes, transportation rules, natural resources and more.</p> |
| Reputation | Kansas is known around the world for high quality hard red winter wheat. |
| Supporting Institutional Infrastructure | Kansas has a solid foundation throughout the entire wheat production community. Long known as the Wheat State, Kansas has the infrastructure to go along with it including a strong road and rail network, more than 1 billion bushels of commercial grain storage, and the largest flour milling capacity of any state in the nation. |

SUCCESS STORIES

Key successes in this industry:

- The Kansas Wheat Innovation Center is a farmer-owned center that brings together all facets of wheat production and uses on the K-State campus. The facility is a great testament to the importance that Kansas places on the wheat industry.
- The Wheat Genetic Resource Center provides a world renowned gene bank and does cutting edge foundational research regarding wheat genetics. The center is now being privately funded as part of a National Science Foundation Center in which industry has come together to supply funds and provide direction for the work of WGRC.
- A Federal State Marketing Improvement Program grant was awarded to KDA and the Kansas Wheat Commission for the hard white wheat initiative. The initiative seeks to develop improved branding for Kansas hard white wheat.
- K-State has developed nine new varieties targeted specifically for success in Kansas within the last six years.
- Private investments in unit train facilities in central Kansas have improved the ability to take advantage of lower freight rates for unit trains and move Kansas wheat efficiently across the country.

CHALLENGES

While Kansas is poised for major expansion in the wheat sector, the following factors represent challenges serving as barriers to achieving the objective of the strategic growth plan.

| Challenge | Details of Challenge |
|---------------------------------------|---|
| <p>Consumer Demand</p> | <p>Global usage is over 700 million metric tonnes. U.S. diets have reduced wheat consumption by approximately nine percent since 2000 as people have shifted away from consuming carbohydrates.</p> |
| <p>Critical Infrastructure</p> | <p>There is a need for more unit train loading facilities as the cost of freight continues to rise; being able to take advantage of price discounting for the use of unit trains would be advantageous for moving Kansas wheat to end users around the country as well as to ports for export.</p> <p>In order to see significant growth in the hard white wheat sector in Kansas, the ability to segregate wheat types (red versus white) in commercial storage needs to exist and handlers must understand its importance.</p> <p>A great way to add value to Kansas wheat is turning it into Kansas flour. Additional flour milling in Kansas would increase demand as well. Flour mill location is most influenced by the cost of transportation to the customer and the cost of wheat transportation.</p> <p>As the demand for Kansas wheat around the world grows, having access to a port is critical. Currently much of the wheat leaving Kansas, particularly southeast Kansas, travels to the Port of Catoosa in Oklahoma to be transloaded onto barges. Keeping the port in good repair, and maintaining and increasing its grain handling capacity, is important to Kansas wheat producers.</p> |

CHALLENGES (cont'd)

| Challenge | Details of Challenge |
|---|--|
| Dietary Trends | <p>Recent increase in demand for gluten-free products by consumers has the potential to decrease demand for wheat products at retail. Gluten-free has moved beyond health needs for a small percentage of the population into a dietary fad resulting in much misunderstanding about gluten, where it comes from and what advantages it brings to food.</p> <p>Standardized marketing claims for advertised characteristics such as gluten-free, natural, organic, local, etc. could help consumers better understand the products they are buying.</p> |
| Education of the Scope of the Industry | <p>The wheat industry must work to increase the knowledge of farmers and consumers about different uses for the grain and use of different varieties to achieve desired characteristics. The challenge today is a belief that all wheat, particularly hard red winter, is equal and its single use is flour for baked goods.</p> |
| Global Opportunities | <p>Maintaining more agronomic traits and building them into varieties that are good for milling and baking will create desire for Kansas wheat around the world, and increased production will make it more widely known and available.</p> <p>Regulatory approval of new seed technology around the world is important as Kansas farmers look to take advantage of the latest advancements to improve yield and meet worldwide demand.</p> <p>Access to international markets for wheat products is key to growing the industry. Resistance to free trade agreements at the federal level can hinder this access.</p> <p>The overriding export problem is the lack of a champion to sell Kansas wheat. Kansas needs a better relationship with the people selling wheat from the U.S. and Kansas shippers need to be able to make sales to foreign buyers. Russia is our biggest competition and often wins on pure price decisions around the world, so Kansas has to supply superior quality that buyers are willing to pay more in order to get.</p> |
| Identity Preservation | <p>Farmers and grain handling firms need the ability to keep classes separate such as hard red winter and hard white, but also keep GMO and non-GMO separate in the future.</p> <p>Kansas has a strong hard red winter brand reputation around the world that can be built upon, but export blending makes it difficult to truly source 100 percent Kansas wheat for shipment to other countries.</p> |

CHALLENGES (cont'd)

| Challenge | Details of Challenge |
|-------------------------------------|--|
| <p>Policy</p> | <p>Maintaining the flexibility farmers have in how they depreciate capital purchases as it relates to federal income taxes is critical for management and planning. Any changes that reduce that flexibility or threaten to reduce it compromise farmers' ability to plan expenses.</p> <p>Farm families work their whole lives to build and maintain the family farming operation including the acquisition of land. Being forced to sell hard-earned assets to satisfy estate taxes is a devastating blow to family farmers particularly beginning farmers. The estate tax is the number one cause of the breakup of multigenerational family farms and ranches.</p> <p>Though not unique to Kansas, there exist significant challenges due to federal laws and regulations, including: Waters of the U.S., the Endangered Species Act, burdensome Occupational Safety and Health Administration regulations and more.</p> <p>U.S. Department of Agriculture Animal and Plant Health Inspection Service is currently working on a biotech policy which may include double haploids as biotech versus traditional breeding. This type of process regulation is ineffective and unjust. Attention should be paid to the end product and whether genetic modification has actually occurred or not.</p> |
| <p>Water</p> | <p>Wheat farmers rely on ever-depleting sources of groundwater for irrigation.</p> |
| <p>Workforce Development</p> | <p>Growth in the wheat sector, particularly in seed technology, irrigation research and technology and flour milling, will require a skilled workforce, which continues to be a significant challenge through the entire agricultural industry.</p> |
| <p>Yield vs. Quality</p> | <p>The balance between yield and quality is an old struggle for wheat breeders insofar as determining how much yield to sacrifice to incorporate good milling and baking quality traits or how much quality to sacrifice in order to boost yield. The marketplace is not currently signaling much value for quality in terms of price.</p> |

NEXT STEPS IN STRATEGIC DEVELOPMENT

The development of a long-term growth strategy will require input and discussion among key partners. The following strategies have been identified as next steps in developing a strategic growth plan for the wheat.

| Focus Area | Solution |
|----------------------------|---|
| Big Data Management | <p>Big data is a major subject facing the wheat industry. Big data provides opportunities to get ahead of some of the environmental issues and is also attractive to federal-level funding. Second generation precision ag will be based on data with varieties tailored to soil type. Industry capacity to handle data is limited currently. There exists a big opportunity to be the ag tech center of the country and growth in big data is a good way to keep talent in Kansas.</p> |
| Federal Policies | <p>Continue to monitor and take appropriate action on policies that could adversely affect the wheat industry such as Waters of the U.S., the Endangered Species Act, Occupational Safety and Health Administration regulations, trade agreements, the future Farm Bill, crop insurance, dietary guidelines, nutrition policy, etc.</p> <p>Encourage a blend standard that allows for some hard white wheat in hard red wheat or hard red wheat in hard white wheat. This will help eliminate significant logistical challenges for grain handlers when it comes to embracing hard white wheat. The next step is starting the conversation with the Federal Grain Inspection Service.</p> |
| FSMIP Grant | <p>Implement activities of the Federal State Marketing Improvement Program grant, including promotion of HW wheat through website, logo creation, educational meetings for producers and more. The Kansas Wheat Commission is coordinating the implementation in cooperation with KDA agriculture marketing.</p> |
| Industry Outreach | <p>KDA will identify potential partners and establish a schedule for strategic growth plan meetings. KDA will also proactively reach out to key industry leaders and major processors in Kansas regarding the development of a strategic growth plan.</p> |
| Irrigation Research | <p>Continue to push the envelope on what's possible in the realm of irrigation technology to increase efficient delivery of water to wheat. Use the momentum and action items of the <i>Vision for the Future of Water Supply in Kansas</i> to ensure effective prioritization of irrigation research. Work with K-State to establish a degree program in irrigation engineering.</p> |

NEXT STEPS IN STRATEGIC DEVELOPMENT (cont'd)

| Focus Area | Solution |
|------------------------|--|
| Project Funding | Secure funding for WGRC through KDA agriculture marketing budget enhancements. This will ensure that the state of Kansas can continue to be an active investor in WGRC and all of the research WGRC is conducting. |
| Water | Continue implementation of the action items identified in the Kansas Water Vision, including continued outreach related to increased adoption of voluntary, flexible water conservation tools like Water Conservation Areas and Local Enhanced Management Areas. Work with K-State to implement area groundwater specialists in the Cooperative Extension Service. |

OPPORTUNITIES TO EXPAND PRESENCE

Initial list of potential opportunities:

- Engage industry leadership in hard white wheat production and marketing.
- Ensure space for refrigerated storage at intermodal facilities for frozen dough products.
- Expand targeted marketing of quality grain by industry to domestic and international markets looking for specific quality characteristics.
- Consistently be the top producer of hard red winter wheat.
- Establish goals and targets for hard white wheat production and utilization.
- Work on opportunities to add value to bushels to make them worth more.

OBJECTIVE

Based on feedback and information gathered from stakeholders and key partners at the Agricultural Growth Summit in August 2016, specific growth objectives for the Kansas pork industry will be developed.

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KANSAS STRATEGIC AGRICULTURAL GROWTH WHEAT — NOTES

MEETING SUMMARY

From April to July 2016, Kansas Department of Agriculture executive and agricultural marketing team members met with wheat producers and industry representatives. Industry members identified for the one-on-one conversations represented both small and large operations and ranged in geography throughout the state. Many expressed that state climate, land and natural resources, and the ability for wheat to serve a dual purpose here make Kansas a good place to grow. Common themes of challenges impacting the growth of the wheat industry in the state included the lack of further processing facilities and markets and the need for further investigation on different uses for wheat.

Consumer

- Need to create better value for wheat
 - Have to do something transformational in the higher value segment (i.e. use genetics to make a higher value product)
 - The Wheat Genetics Resource Center will be critical (provides genetic diversity to breeding program and market demand)
 - Food industry is ready for something transformational in wheat/flour
 - Could create some great export demand as the only source as well
- Kansas is known worldwide as the Wheat State; known for good quality wheat
 - However, there is a noticeable price difference between Kansas and other wheat sources
 - How do we leverage the brand reputation of Kansas wheat?
 - Global usage of wheat is high, but U.S. usage is not so good
 - How can we create local demand?
- Export blending makes it difficult to source a specific wheat
- There doesn't appear to be a steady demand for white wheat right now
 - Biggest opportunity is to increase the market demand
 - Volume is our friend
 - Should we ship finished product overseas vs. shipping wheat?
- There is no champion to sell Kansas wheat
 - We need to have a better relationship with the people who are selling wheat from the U.S.
 - How do we get tools to Kansas shippers to make sales to foreign buyers?
 - Russia is our biggest competition (Kansas wheat industry value is most impacted by what happens with Russian wheat)

Wheat



- Market demand for traceability and identity will grow going forward
- For growth of the Kansas wheat industry, hard white wheat needs to be promoted (international markets available)

Finance and Capital

- Access to capital is critical
- Finance can be a challenge due to some national regulation changes

Research

- Big data is the next big thing the industry will have to tackle
 - How the industry gets ahead of some environmental issues
 - Attractive to federal-level funding capacity to handle data is limited
 - Good way to keep talent in Kansas
- Kansas has good researchers and they're doing cutting-edge work, but the state needs to make sure they have the resources to get it done (ensure resources for research)
- Growing diversification in wheat
- May be beneficial to focus on uses of wheat vs. increased production
- Research brings public and private money from within and without Kansas
- There is a struggle with balance of yield and quality traits (very few economic signals show that quality is important at this point)
- Research can easily be tied with market pull, where it exists
 - Genomic selection gives the ability to keep producing good characteristics while skill keeping up with other latest developments

Rules & Regulations

- Need a blend standard that allows red in white or white in red (hard white wheat)
 - This would eliminate the logistical issues for grain handlers
- Kansas grain dealer license is more friendly than some surrounding states
- Weights on trucks crossing borders is an issue
 - Different weight allowances
 - The necessary permitting when overweight
- Cross-state reciprocity is important
- Kansas fertilizer tonnage tax rate is much higher than some neighboring states
- Could have new regulatory hurdles coming
 - APHIS working on biotech — could include double haploids as biotech vs traditional breeding
 - Process regulation is a challenge — should pay attention to the end product

Transportation and Infrastructure

- Kansas infrastructure is very attractive for growth (home to the best research and positioned well for the future)
 - May have some new marketing channels coming (high-yield bread wheat, hard white wheat, durum, historical attributes-heritage)

Water and Natural Resources

- Feed wheat has some potential, but needs further investigation

Workforce and Quality of Life

- Need information technology basics taught in high school

Potential Action Items

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