WHEAT

Kansas is the nation's leading wheat producer with records of wheat production predating statehood. Currently, Kansas is the world's best source for hard red winter 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 world. 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 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 increase additional global opportunities and spur demand for Kansas wheat. Finally, consumer shifts away from gluten and carbohydrates may 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.

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 predating statehood. There are indications that wheat was produced in the region as early as 1839. In 2020, 6.6 million acres of wheat were planted, and 6.25 million acres were harvested with an average yield of 45 bushels per acre for total production of 281.3 million bushels. This accounts for 8.0 percent of the state's total agricultural receipts and 15.4 percent of the nation's total crop. The state also ranks in the top threein flour milling capacity.

According to a Kansas Department of Agriculture IMPLAN economic model, the estimated direct impact of the wheat industry is $1.5 billion in output and 3,793 jobs. Including indirect and induced effects, the total impact of the industry on the Kansas economy reaches $2.7 billion in output and 11,247 jobs.

Currently, Kansas is the world's best source for hard red winter wheat and is identifying new hard white varieties. The hard white varieties account for more than three percent of the wheat grown in the state. The overall hard white 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 and international 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 data becomes more readily 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. Additionally, there are opportunities to utilize new and novel data approaches, such as blockchain technology, to add value throughout the supply chain.
Breeding	Wheat breeders are learning more about wheat genetics every day and working to use that information to build better varieties. By using gene-editing technology such as CRISPR-Cas9 technology, Kansas State University researchers can accelerate the rate of improvement in wheat variety traits. With the recent completion of the sequencing of the wheat genome, wheat breeding is entering a "golden age" of exponential growth. The Kansas wheat breeding 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.
Central Location	Kansas is a great central hub location for enterprises looking to serve the entire United States.

Factor	Implications for Growth and Development Opportunities
Consumer Demand	Opportunities exist to expand the frozen dough market based on preference for convenience products and overall consumer demand.
Dietary Trends	The Kansas Wheat Commission is an active member in the Wheat Foods Council, which promotes the use of wheat in the diet, including whole grain hard white and whole grain red. Research continues to show the importance of including whole grain foods in a healthful diet. Some consumers are pushing for healthier food with cleaner labels and fewer additives — wheat can help fill this demand.
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 or is needed in a crop rotation.
Hard White Wheat	New varieties of hard white wheat are being released and offer an opportunity to expand Kansas' production diversity in the state. These new offerings not only allow for unique marketing opportunities, but also feature enhanced genetic traits and disease resistance. High Plains Platinum is an excellent example of the opportunities available in this realm.
Leadership	Kansas is home to world-renowned leaders in the wheat industry, including leaders at K-State's agronomy department, the Wheat Genetics Resource Center, Kansas Wheat, etc., with many active grower leaders across the state serving or having served nationally.
Policy Environment	Kansas tax law allows 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. 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. The Farm Storage Facility Loan (FSFL) program provides low-interest financing to producers that wish to build or upgrade facilities to store commodities on farm. Additionally, in Kansas there are 8-year property tax waivers available for on-farm grain storage.
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 and more than 1.2 billion bushels of commercial grain storage.

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
Consumer Demand	Global consumption is forecast at 789 MMT, up 2% from 2020/2021 marketing year (USDA World Wheat Supply and Demand Situation report, May 2021). U.S. diets have reduced wheat consumption by approximately ten percent since 2000 as some people have shifted away from consuming carbohydrates.
Critical Infrastructure	There is a need for more unit train loading and container loading facilities, especially in the western half of the state. 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. Container loading facilities would allow Kansas wheat producers the ability to market identity preserved wheat. 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 and on-farm storage needs to exist and handlers must understand its importance. Additionally, education must be provided on the potential economic impact and price advantage of a shift in wheat varieties and this information must be shared. A great way to add value to Kansas wheat is by 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. 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.
Dietary Trends	The 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. Standardized marketing claims for advertised characteristics such as gluten-free, natural, organic, local, etc. could help consumers better understand the products they are buying.
Education of the Scope of the Industry	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 the belief that all wheat, particularly hard red winter, is equal and its single use is flour for baked goods. It is a current challenge to share bake and research trial data and provide information to the appropriate parties, taking into account all of the steps in the supply chain.

Challenge	Details of Challenge
Global Opportunities	Increasing global demand for white wheat should be addressed through the development and adap tation of new high performing varieties. 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, while increased production will make it more widely known and available. 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. 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. 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. Our competition 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.
Identity Preservation	Farmers and grain handling firms need the ability to keep classes separate (i.e., hard red winter and hard white), but also keep GMO and non-GMO separate in the future. 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.
Policy	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. 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. Though not unique to Kansas, there exist significant challenges due to federal laws and regulations, including: the New Green Deal, the Endangered Species Act, 30x30 Proposal, burdensome Occupational Safety and Health Administration regulations and more. 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.

Challenge	Details of Challenge
Talent Development and Quality of Life	Growth in the wheat sector, particularly in seed technology, flour milling, and irrigation research and technology, will require a skilled workforce, which continues to be a significant challenge through the entire agricultural industry. In addition, low unemployment rates in some parts of the state can make it difficult to find a reliable, year-round workforce. Beyond needs for specific job training and talent development, ensuring a long-term ability to recruit and sustain a high-quality workforce will require the state to consider issues surrounding quality of life in rural communities, including topics related to having a robust economy of support businesses necessary for the agriculture industry, strong schools, access to health care services, affordable and quality housing, and more.
Water	Wheat farmers rely on ever-depleting sources of groundwater for irrigation, especially in the heavy wheat-producing region of western Kansas.
Yield vs. Quality	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. Wheat breeders currently lack the ability to quickly test for protein functionality. If we could rapidly identify the protein our customers need, breeders may be able to develop a high-performing wheat variety that can realize both yield and quality.

SUCCESSES

Key successes in the wheat industry:

- The Kansas Wheat Innovation Center (KWIC) is a farmer-owned center that brings together all facets of wheat production and research located on the Kansas State University campus. The KWIC expanded in March 2018 and again in September 2020 to increase its capability to house critical wheat research dedicated to cutting edge wheat genetic improvement for wheat farmers.

- The Wheat Genetics Resource Center at the KWIC provides a world-renowned gene bank and completes 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 the WGRC.

- K-State, as a member of the International Wheat Genome Sequencing Consortium, published a detailed, high-quality description in August 2018 of the complete genome of wheat in the journal Science, paving the way for improved varieties of wheat. This project was funded by USDA-NIFA and NSF, as well as additional work from USAID and the Kansas Wheat Commission.

- A Federal State Marketing Improvement Program (FSMIP) 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 through the High Plains Platinum marketing platform.

- Over 80% of the wheat acres grown in the U.S. have some tie back to Kansas State University, either in the genetics they use, or that the breeder or technicians were trained at the university. KSU's wheat breeding program released 10 new wheat varieties since 2016. 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.

- Kansas Wheat Commission Research Foundation's Fields Forward research fundraising campaign was launched in 2019. Funds raised through the campaign will be used for three different purposes: fields of study, fields of research, and fields of the future.

- Kansas State University received $1 million to establish the International Wheat Yield Partnership's Winter Wheat Breeding Innovation Hub. The hub partners will seek ways to stack desirable traits into elite winter wheat varieties making the wheat more resistant to pests, disease or drought, thus improving yield potential. The hub is a public-private partnership between national and international wheat breeding programs, government organizations and industry.

- In June 2020, the Kansas Wheat Commission held its first ever virtual trade team with customers from Brazil. The customers had the opportunity to learn more about the current wheat crop, growing conditions and harvest progress updates.

- A Federal State Marketing Improvement Program (FSMIP) grant was awarded to the FarmUS Consortium to develop market access to consumers of college campus food service for Kansas-grown sorghum and wheat.

- In November 2020, Kansas State University researchers, in collaboration with the international 10+ Genome Project led by the University of Saskatchewan, announced the complete genome sequencing of 15 wheat varieties representing breeding programs around the world.

Wheat

GROWTH OBJECTIVE:

Increase demand for Kansas wheat both domestically and around the world to help ensure profitability for the Kansas wheat industry. Expand on the world-renowned Kansas reputation for hard red winter wheat by offering identity preserved hard red winter while also expanding into hard white and durum varieties.

OUTCOMES & ACTION ITEMS

Leaders from throughout the Kansas wheat industry will continue to collaborate in the development and implementation of a long-term strategic growth strategy with input and discussion among key partners. Industry-identified desired growth outcomes, initially developed in 2016 and expanded to include action items, will be implemented by industry and key partners and updated annually at the Kansas Governor's Summit on Agricultural Growth. Following are the proposed action items to continue building on the achievement of the wheat sector desired outcomes.

High Priority Outcomes

Sustained public/private partnerships which support research, particularly in wheat variety development. These partnerships would include Kansas State University, Wheat Genetics Resource Center, USDA Center for Grain and Animal Health Research and others which have the public and private support necessary to advance this research.

ACTION ITEMS:

- Research existing relationships with other grain companies (ADM, Skyline, etc.).
- Focus on needs of the demand side, not just industry supply.
- Set up a "Strategy Summit" to align a plan, timeline, funding needs/resources, then expand outreach and alignment of resources.
- Maintain the state and nationally funded university research commitments.
- Maintain the checkoff funded research commitment.
- Grow the WGRC with the National Science Foundation private investment strategy.
- Leverage commodity funding with federal funding such as NSF and USDA-NIFA to increase overall funding for research.
- Increase partnerships with public companies (food processing) and health companies to advance research that identifies the allergen for celiac disease and remove it from wheat genetics to create a new variety that is celiac allergen-free.
- Partner in projects such as organic wheat and identity-preserved, share existing work, and build from it.

Identity preserved wheat for customers around the world.

ACTION ITEMS:

- Work toward establishing container loading facilities in major wheat growing regions.
- Support financial and economic work that highlights the benefits of on-farm storage and the segregation of grain.
- Continue Wheat Quality Council work of surveying and reporting wheat conditions.
- Continue K-State Wheat Quality Lab work of testing milling and baking characteristics of Kansas wheat varieties.
- Determine customer needs and develop marketing avenues to deliver to their specific markets.
- Increase the number of acres grown under contract, thus increasing the amount of IP wheat grown.
- Leverage commodity and organizational membership resources to keep Kansas representatives engaged in outbound and inbound trade missions promoting Kansas wheat.

Increased quantity of Kansas wheat that is processed and has value-added in Kansas. Create incentives that are attractive to agriculture enterprises looking to grow in Kansas.

ACTION ITEMS:

- Create a shift mindset in how we go to market with wheat. View wheat as an ingredient and not a commodity.
- Develop relationships between growers and end users and develop more end uses for wheat. For example, build a flour mill in southwest Kansas that is focused on wheat middlings production to supplement feedlots and livestock production with flour being used for tortilla manufacturing or establish a feed mill in southwest Kansas to grind feed wheat to supplement feedlots and livestock production.
- Define value to end-use clients by identifying customer value chains and quantifying data points.
- Interview farmers, breeders, aggregators (co-ops), mills, bakeries, and bakery supply companies to understand characteristics and qualities desired in value-added products. Additional information should be obtained from K-State Research and Extension, Wheat Quality Council, and Kansas Wheat on best practices.
- Research a value-added wheat program that capitalizes on improved nutrient density from soil health and sustainable practices.
- Explore increasing production of certified organic wheat and opportunities to make Kansas a leader in organic wheat.
- Seek opportunities for fractionation of high-value bran components as human/animal feed additives.
- Develop a focused white wheat milling site.
- Establish Kansas as a reliable source of white wheat for foreign markets.

Transportation network that maximizes logistical efficiencies and minimizes cost per producer to ship wheat domestically and internationally.

ACTION ITEMS:

- Support continued development of the new transload facilities in Kansas, especially major wheat growing regions.
- Commission a comprehensive study of commodity flow and infrastructure in Kansas and through the study, explore the possibility of building a port to load barges in Kansas.
- Encourage increased state and federal funding for infrastructure improvements, e.g., adding passing lanes on major Kansas highways to better accommodate truck traffic.

Amend the U.S. Grain standards to better reflect the true attributes and functionality of the Hard White wheat class.

ACTION ITEMS:

- Propose an incremental increase in the allowable wheat of other classes in Hard Red Winter wheat.

A durum wheat variety for farmers in Kansas, to offer an alternative to Hard Red Winter wheat and to create a new production region and growing season for durum that can compete with the northern plains region of the U.S.

ACTION ITEMS:

- Continue to use checkoff dollars to fund durum research in the K-State wheat breeding program.
- Develop a spring plant durum with heat tolerance and support the use of industry and government resources devoted to research.

Medium Priority Outcomes

National reputation as a home for agriculture technology that fosters the next Green Revolution with a focus on converting research discoveries into marketable products.

ACTION ITEMS:

- Partner in the execution of the agricultural technology and entrepreneurship growth strategy.
- Promote and talk about the Wheat Innovation Center, WGRC, double haploid, CRISPR method of gene editing, etc.
- Target business recruitment to crop technology.
- Recruit businesses to fill the gap between research and application.

Regulations which are based on sound science and are supportive of business success, particularly in regard to genetically modified organisms (GMO) regulation. The double haploid process employed in wheat breeding to reduce the time required for new variety development is not genetic modification and should be defined accurately.

ACTION ITEMS:

- Provide support for additional research and sustained education, especially related to GMO labeling and gene editing.
- Engage Governor, Attorney General and congressional delegation to further the Kansas position as needed.
- Meet with federal EPA leadership and engage on issues important to the wheat sector.
- Don't work against other commodities that may or may not be GMO.
- Educate regulators and legislators at the federal level about the importance of science and GMOs to production agriculture and the nation's and world's food supply.
- Remain in contact with state and federal government on importance of not over-regulating.
- Build a contact network of those open and willing to foster sound science practices at the state and federal level.
- Grain storage in Kansas using current technology and with adequate capacity for increased production from Kansas farms.
- Work toward an increased amount of on-farm storage.
- Increase access to protein testers.
- Increase commercial infrastructure for white wheat handling and storage.
- Develop commercial infrastructure for separated storage that allows for a premium to be paid on higher protein wheat.

Low Priority Outcomes

Military veterans looking for a foothold in farming matched with established farms looking for new owners and/or operators.

ACTION ITEMS:

- Identify potential veteran farmers and their regional location preferences.
- Identify farmers looking for the next owner/operator.
- Match veterans to farms.
- Engage with potential mentors to help veterans experience hands-on learning in exchange for farm labor activities.

Significant tools available and in use by farmers to demonstrate the sustainability of wheat farming in Kansas.

ACTION ITEMS:

- Identify the industry group to take the lead on working with producers.
- Evaluate record keeping and sustainability reporting software available on the market.
- Determine best way to report sustainability data and to whom.
- Find money for sustainable production, practices, education and extension.
- Develop an online tool that defines sustainability and can then be used to measure and report sustainability.