Sorghum

Executive Summary

Kansas leads the nation in sorghum production, which is a versatile, efficient, multiuse crop well suited for Kansas agriculture for many reasons. Sorghum is among the most efficient crops in conversion of solar energy and use of water, and is very drought tolerant. Grain sorghum has traditionally been used for livestock feed and in the production of ethanol, both in the U.S. and in international markets. Sorghum is also gaining popularity in food products as a gluten-free substitute for other grains, and in the production of beverages and syrup as well as in pet food products. State and national sorghum advocacy organizations provide strong leadership in the promotion of sorghum domestically and worldwide. Ongoing research is creating even more possibilities for the sorghum industry.

Although sorghum's advantages are numerous, some challenges still exist as barriers to realizing sorghum's full potential. The export market is a significant part of the sorghum industry, with the majority going to China; the stability of the China market for grain sorghum is unknown. Costs associated with transportation, particularly internationally, can be burdensome to producers. Human food-grade sorghum remains a very small percent of Kansas sorghum production, which means it receives less focus within the market, although potential is high in that area.

A long-term growth strategy to expand the impact of sorghum in Kansas will rely on input and discussion among key partners in the industry. A centralized large-scale research center would promote innovations for all segments of the sorghum industry, and additional research partnerships would be key. Statewide support for producers within the sorghum sector would be welcome. Overall, collaboration between public and private stakeholders within the sorghum industry is important in the development of a strategic growth plan.

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STATUS

Sorghum — a grain, forage or sugar crop –— is among the most efficient crops in conversion of solar energy and use of water. Sorghum is known as a high-energy, drought-tolerant crop. According to the National Sorghum Producers, grain sorghum has traditionally been used for livestock feed and in a growing number of ethanol plants. Sorghum produces the same amount of ethanol per bushel as comparable feedstocks and uses one third less water. In the livestock market, sorghum is used in the poultry, beef and pork industries. Stems and foliage are used for green chop, hay, silage and pasture. A significant amount of U.S. sorghum is also exported to international markets where it is used for animal feed, ethanol and other uses.

In the United States, 7.1 million acres of sorghum were planted in 2014. Of the 21 sorghum-producing states, Kansas ranks first followed by Texas, Oklahoma, Colorado and Nebraska. These states are included in the Sorghum Belt, an area from South Dakota to South Texas that offers a quality dryland growth opportunity.

According to estimates prepared by the Kansas Department of Agriculture and based on the Implan economic data model, the sorghum industry in Kansas has a direct output of approximately $842.3 million and creates 1,531.5 jobs in the state. Through indirect and induced impacts, the industry supports a total of 5,135.7 jobs and creates a total economic contribution of nearly $1.45 billion.

Sorghum is also gaining popularity in food products in the U.S. because of its gluten-free food and non-GMO properties. Sorghum is a suitable substitute for wheat, rye and barley for those who cannot tolerate gluten. Sorghum is used to make both leavened and unleavened breads. In Sahelian Africa, it is primarily used in couscous. Various fermented and unfermented beverages are made from sorghum. It can be steamed or popped and is consumed as a fresh vegetable in some areas of the world. Syrup can also be made from sweet sorghum.

OPPORTUNITIES

In order to develop a strategic growth plan for the sorghum sector, 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
Acreage	Nationally, the total number of sorghum acres harvested annually is still low in comparison to other commodities (wheat, corn, soybeans). Increasing market share will draw more attention to sorghum and sorghum by-products.
Industry Leadership	Kansas has strong leadership on the state (Kansas Grain Sorghum Commission and Kansas Grain Sorghum Producers Association) and national (National Sorghum Producers and United Sorghum Checkoff Board) levels. One can deduce that Kansas is in a positive situation when considering votes needed to allocate funds for market development, renewable research proposals and crop improvement projects.

OPPORTUNITIES (cont'd)

Factor	Implications for Growth and Development Opportunities
Industry Research	Kansas State University scientists are currently working to understand how to most efficiently use nitrogen in sorghum. K-State also researches best management practices for over-top herbicides that can be put on fields. A research hub with K-State and industry — similar to the Wheat Genetics Research Center — would effectively centralize and enhance this research. In April 2016, the Sorghum Checkoff, Kansas Grain Sorghum Commission, and K-State announced a cooperative agreement to increase grain sorghum productivity and expand markets by 2025. This partnership creating the Center for Sorghum Improvement will provide funding for long-term research and the development of marketplaces, attributes, qualities and other factors capable of increasing demand for sorghum bushels.
Industry Value	Value is virtually equal to corn for ethanol and livestock feeding, both of which are big markets in Kansas.
Marketing	Developing new markets for sorghum as livestock and ethanol feedstock is key to strengthening demand. In the livestock industry, dairies and cattle feedlots — two animal sectors plentiful to the state — are major consumers of domestic sorghum. Globally, China imports Kansas sorghum to fulfill poultry and pork feed needs. The domestic ethanol industry is volatile as supply/demand/pricing and distribution challenges arise. The U.S. Grains Council recently adopted ethanol as a new focus commodity, and the council has identified — in partnership with the U.S. Department of Agriculture's Foreign Agriculture Service and Renewable Fuels Association — an ethanol export promotion strategy for Southeast Asia, Peru, Panama, Japan and Korea. Branded products for both animal and human consumption are being embraced by the everyday consumer. Not to be overlooked, the pet food industry is utilizing sorghum in their products, too. Sorghum provides a cost competitive and nutritious ingredient for pet food companies who are using grain for carbohydrate blends. Sorghum is on the cusp of creating a permanent home in the niche-food sector.
Value-Added Product	While sorghum has historically been used for livestock feed, ethanol production and exports, it is gaining popularity as a food and pet food product because of its nutritional, gluten-free and non-GMO properties. Marketing efforts like simplysorghum.com are educating consumers on ways to incorporate food-grade, value-added sorghum into everyday living.

OPPORTUNITIES (cont'd)

Factor	Implications for Growth and Development Opportunities
Water	Research findings indicate sorghum is a less water intensive crop with dryland success.

SUCCESS STORIES

The following are a few notable success stories in the sorghum sector:

- Governor Sam Brownback has supported a funding partnership with K-State and industry to establish a sorghum research hub.
- An industry task force gave KDA two very specific objectives to help work toward: breeding research and limited water situation extension expertise.
- Sorghum has established a vibrant export market into China, mostly for poultry and pork feed.

CHALLENGES

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

Challenge	Details of Challenge
Critical Infrastructure	The costs associated with transportation and logistics is a burden for producers. In-state freight rates add expenses when distributing sorghum domestically and internationally.
Industry Market	Sorghum is naturally a non-GMO grain. It is not known whether the supply chain pricing can support dedicated market outlets for GMO and non-GMO products.
International Trade	China continues to be the number one importer of sorghum grown in the United States. The Chinese government maintains interest in domestic grain supplies by controlling pricing and access to markets. The long-term stability of the Chinese market as an outlet for Kansas sorghum is largely unknown at this time.
Policy	The National Resources Conservation Service programs do not always fit the needs of sorghum producers.
Value-Added Products	Human food grade sorghum projects make up a very small percent of overall Kansas sorghum acreage harvested. As a result, little attention and few research dollars are allocated for human-grade product development.

CHALLENGES (cont'd)

Challenge	Details of Challenge
Workforce	Lack of skilled agriculture workforce is a top inhibitor of growth and expansion for many Kansas agriculture entities.

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 sorghum industry.

Focus Area	Solution
Development	Consider development of a sorghum or multi-commodity innovation center, modeled after the Kansas Wheat Innovation Center, to implement research strategy and allow researchers access to lab space.
Industry Leadership	Some Kansas sorghum industry leaders have expressed interest in state-organized professional development for commodity commissions. These sessions could cover everything from board management to current state policy and regulation implementation.
Policy	Have KDA lead the efforts to appropriate research partnership funding during the 2016 Legislative session.
Water	Follow identified water resource priorities and objectives for sorghum as outlined in the *Vision for the Future of Water Supply in Kansas*.

OPPORTUNITIES TO EXPAND PRESENCE

Initital list of potential opportunities:

- Achieve 10 percent growth in acres.
- K-State can become a known leader in sorghum research.
- Increase sorghum earning potential to be a viable alternative to corn.
- Open new domestic and international markets for sorghum (human and pet food grade) and sorghum renewables.

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 sorghum industry will be developed.

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KANSAS STRATEGIC AGRICULTURAL GROWTH
SORGHUM — NOTES

MEETING SUMMARY

From April to July 2016, Kansas Department of Agriculture executive and agricultural marketing team members met with sorghum farmers and industry members. Sorghum farmers identified for the one-on-one conversations represented both small and large operations and ranged in geography throughout the state. Many expressed that the state's natural resources and environment and the services provided by K-State Research and Extension make Kansas a good place to grow. Common themes of challenges impacting the growth of the sorghum industry in the state included freight and transportation costs, access to qualified labor, and need for more sorghum research.

Consumer

- Need for "new" demand for sorghum
- Need to tell sustainability story that goes along with sorghum
- Advocating and educating the value of ag to consumers is essential — even educating those in our own rural communities
- Ag needs to unite and educate consumers about GMOs

Research

- The breadth of research located in Manhattan is hard to match anywhere in the country, but many industry members would like to see more grain sorghum and forage sorghum research in order to give producers data needed to make more informed decisions
- Need for forage sorghum seed development
- Waxy sorghum research (10% more ethanol from this variety)
- Need to make market research available to eastern half of Kansas
- Need to continue outreach efforts to research expertise
- Bringing sorghum research leaders to Kansas would be beneficial
- Services provided by K-State Research and Extension are a competitive advantage when compared to other states

Rules & Regulations

- There should be more opportunities and programs for sorghum producers with NRCS
- SAVE verification is too slow and difficult to work with when in a time crunch with seasonal labor
- Families are needed in western Kansas and current visa process does not allow that to happen easily

- Navigating the workforce regulation is difficult; there is no mentoring site or aid to work through H2A and J1 visa programs
- Property taxes are a challenge (increases of almost 200% in past few years in some parts of the state)
- When discussing crop insurance, other commodities are still positioned better than sorghum

Transportation and Infrastructure

- In order to attract top researchers to the state, access to laboratory space is essential
- Freight for grain is expensive and transportation costs in the Midwest are a challenge. Need to find a way to ship grain out of western Kansas in a more cost-effective and efficient way
- KDOT's intermodal projects are an essential component of the transportation system in the state.
- Need for up-to-date facilities, roads, rail systems (including short-lines)
- Challenges exist in CDL testing; language barriers are a problem for migrant workers
- It is a requirement to be a resident of Kansas to obtain a Class A CDL, but "resident of Kansas" needs to be defined for migrant workers
- Requiring a CDL to drive farm equipment would be devastating to the industry
- Harness systems at grain elevators must be in compliance with OSHA regulations, but some OSHA regulations may be too cost prohibitive (ex: an elevator can't rail out their grain even though they are located on a train track because they can't afford to be OSHA compliant)
- Farmers need a better understanding of how to store their grain on-farm
- Sorghum research needs further developing; creating a sorghum innovation center would be beneficial

Water and Natural Resources

- Sorghum is a good choice when considering our state's need for water conservation
- Kansas historically has grown a lot of "milo," so why do we struggle with sorghum acreage now?

Workforce and Quality of Life

- Access to qualified labor is a challenge
- Need for teaching/training technical skills in agricultural education (ex: basic mechanics/small engine problem solving, electrical troubleshooting)
- Need for employees trained in precision ag technology
- Need for program pairing younger generation with older generation
- Lack of high school-aged students' exposure to ag is an overarching challenge
- A professional development session for commodity commissions would be beneficial

Potential Action Items

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