Kansas 2020 AG GROWTH

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SORGHUM

Kansas leads the nation in sorghum production. Sorghum is a versatile, multiuse crop well suited for Kansas agriculture. Sorghum is among the most efficient crops in conversion of solar energy and use of water, and it 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 gaining popularity in food products as a whole, nutritious grain, 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 to realizing sorghum's full potential. The export market is a significant part of the sorghum industry, with the majority going to China. 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 promotes innovations for all segments of the sorghum industry and builds additional research partnerships. Statewide support for producers within the sorghum sector is welcome. Overall, collaboration between public and private stakeholders within the sorghum industry is important in the development of a strategic growth plan.

STATUS

Sorghum — a grain, forage and 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, 362 million bushels of sorghum were harvested in 2017. In 2018, sorghum was planted on 5.7 million acres with 365 million bushels harvested. Of the 21 sorghum-producing states, Kansas ranks first in sorghum acres with 2.65 million followed by Texas, Colorado and Oklahoma. The states in the sorghum belt lie across 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 $750.9 million and creates 1,615 jobs in the state. Through indirect and induced impacts, the industry supports a total of 5,380 jobs and creates a total economic contribution of approximately $1.3 billion.

Globally, Kansas sorghum's top export destinations include China, Spain, Mexico, Taiwan, and Burma (Euromonitor, 2018 trade data).

Sorghum is also gaining popularity in food products in the U.S. because of its gluten-free and non-GMO properties. Sorghum is a suitable substitute for wheat, rye and barley for those who cannot tolerate gluten. Sorghum can be milled and 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. Planting trends for 2018 indicate total sorghum acreage has increased over 2017. In August, NASS reported sorghum for grain in Kansas acreage was up 8 percent or 2.65 million acres.
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 Program) 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.

Factor	Implications for Growth and Development Opportunities
Industry Research	In April 2016, the United Sorghum Checkoff Program, Kansas Grain Sorghum Commission and Kansas State University announced a cooperative agreement to increase grain sorghum productivity and expand markets. This partnership created the Collaborative Sorghum Investment Program (CSIP) and provides funding for long-term research and the development of marketplaces, attributes, qualities and other factors capable of increasing demand for sorghum bushels. CSIP aims to increase the average national yield from 61.95 bushels per acre to 100 bushels per acre by 2025 by funding research in beneficial areas such as over-the-top grass control and yield improvements involving breeding program developments and field-level management techniques. Long-term research areas such as seed innovation and information management will also be addressed, including the development of new and novel genetic traits and application in market development. The program works to develop marketplaces, attributes, qualities and other factors capable of increasing demand to 1.25 billion bushels of sorghum by 2025. This includes the expansion of international markets, domestic food use, livestock feeding, ethanol production, specialty products, and more. In addition, tools, information and other factors will be developed in an effort to decrease the trading discount of sorghum to corn from 4.6 percent to 2 percent by 2025.
Industry Value	Value is virtually equal to corn for ethanol and livestock feeding, both of which are robust markets in Kansas.
Marketing	Developing new markets for sorghum is key to strengthening demand. Today's export market consumes a majority of sorghum followed domestically by livestock feed, ethanol production, food industry and the pet food industry. Sorghum has a low glycemic index and is high in antioxidants. Sorghum is also categorized as an ancient grain, it is gluten-free, and it has potential to fight cancer, high cholesterol and obesity (USCP, 2018). Sorghum is a versatile grain that is nutritious and easy to use and provides fuel a body needs (complex carbohydrates, B-complex vitamins).
Value-Added Product	New uses for sorghum and sorghum coproducts include green chemicals, aquaculture, insulation, packing peanuts, millers and bakers, and even cat litter (USCP, 2018). The United Sorghum Checkoff Program invests in a market development research portfolio. Kansas producer interests also include supporting market development research specific to human food, identity preserved, and value-added product development with the potential for a Kansas-branded sorghum product.

Factor	Implications for Growth and Development Opportunities
Water	Research findings indicate sorghum is a less water-intensive crop with dryland success. In 2018, the Kansas Legislature allocated $150,000 for water intensification research within the sorghum industry. DropXL Sorghum is a state of Kansas effort managed by the Collaborative Sorghum Investment Program to advance sorghum technology for the benefit of Kansas farmers and Kansas water resource stakeholders. The project design and adaptive management is guided by mission alignment with the Kansas Water Vision (2015) and the Kansas Ag Growth Strategy (2018).

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. The current transportation network prohibits the cost-effective transport of identity preserved grains harvested in Kansas destined for international markets willing to pay a premium for IP.
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	In 2018, more than $38 million of sorghum exports were delivered into China, down from $53 million in 2017. Current trade disruptions between the United States and China have resulted in tariffs placed on sorghum transactions.
Policy	The Natural Resources Conservation Service and Risk Management Agency programs do not always fit the needs of sorghum producers.
Value-Added Products	Human food-grade sorghum projects make up a very small percentage of overall Kansas sorghum acreage harvested. As a result, little attention and few research dollars are allocated for human food-grade product development.
Workforce	Lack of skilled agriculture workforce is a top inhibitor of growth and expansion for many Kansas agriculture entities.

SUCCESSES

Key successes in the sorghum industry:

- The Kansas Grain Sorghum Commission, in partnership with U.S. Grains Council and the Kansas Department of Agriculture, increased the number of inbound and outbound trade missions developing and further strengthening global relationships for the state's sorghum farmers and agribusinesses.

- The Collaborative Sorghum Investment Program has led the development of a multidiscipline KSU Sorghum Crop Improvement Mission, Vision and SMART goal strategic plan during 2018.

- The Collaborative Sorghum Investment Program manages the state of Kansas $150,000 appropriated funds. The funds are supporting DropXL Sorghum, a project aiming to deliver a sorghum trait technology package (trait donors, trait markers, trait models) for traits that increase water-limited yield in Kansas.

- Kansas farmers increased planted acres of sorghum by 8.16 percent in 2018.

- The Kansas Grain Sorghum Commission developed a pipeline to fill state leadership transitions as well as support Kansas representation with strategic placement on national sorghum leadership boards, such as the United Sorghum Checkoff.

- The Kansas Grain Sorghum Commission increased education and outreach by coordinating and hosting sessions to mitigate pest tolerance and launching an educational podcast series.

- Industry representatives and leaders actively lobby for the sorghum industry as it relates to the Farm Bill, food aid, trade/tariff and industry initiatives in Washington, D.C.

- KDA led a trade mission to the Sorghum in the 21st Century Food, Feed and Fuel in a Rapidly Changing World conference in Cape Town, South Africa, in April 2018. The conference was facilitated by the Sorghum Millet Innovation Lab, housed at K-State, and attracted more than 400 researchers and business representatives from a variety of sorghum networks.

- The Collaborative Sorghum Investment Program continues to see positive results, with ongoing research oriented around sorghum grain quality and new weed control technology.

- KDA and K-State continue to execute sorghum pet food Federal State Market Improvement Grant award aims to create high value market opportunities for the pet food sector.

- KGSC, CSIP and KDA continue to develop food-grade sorghum education and marketing opportunities by strategically placing sorghum product opportunities (flaked, popped, milled, pearled) in mainstream food service locations within K-State and the University of Kansas housing and dining food service lines as well as large-scale food ingredient companies.

- EPA announced a Notice of Proposed Rulemaking for Grain Sorghum Oil Pathways (December 27, 2017) allowing sorghum oil to be converted into biodiesel. This rule will provide another much-needed market for sorghum oil.

Sorghum

GROWTH OBJECTIVE:

Expand research partnerships and strengthen Kansas' position as the top sorghum-producing state in the nation.

OUTCOMES & ACTION ITEMS

Leaders from throughout the Kansas sorghum 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 sorghum sector desired outcomes.

High Priority Outcomes

Checkoff dollar funding directed toward supporting value-added education, marketing and research. These value-added sectors would include biofuels, pet food, plastics and/or human food-grade sorghum.

ACTION ITEMS:

- Encourage state sorghum industry to award checkoff dollar funding to include research targeting a variety of market-oriented opportunities: human food, identity preserved, value-add, feed and forage, industrial use.
- Engage in consumer-focused research that documents domestic consumption trends and preferences.
- Utilize checkoff dollars to bring companies and assets together to drive more value into the crop as well as to develop potential market outlets.
- Consider development of a "Kansas branded" sorghum product to fill niche market opportunities.

Implementation of action items in the Vision for the Future of Water Supply in Kansas related to sorghum, and expanded awareness of sorghum's water use efficiency, leading to a longer usable life for Kansas groundwater and surface water sources.

ACTION ITEMS:

- Model off action steps included in the Water Vision document.
- Continue to secure research funding for sorghum water intensification research projects.

Long-term strategic plan to support the newly established Collaborative Sorghum Investment Program to include key private partners and public investment that benefit the sorghum industry and state.

ACTION ITEMS:

- Secure funding for long-term CSIP sustainability (post-ten-year mark) at Kansas State University.
- Actively support the balance of collaborative investments from the federal and state levels as well as private industry and sorghum producers.
- Continue to support DropXL Sorghum water intensification research through state of Kansas research funding allocations.
- Encourage focus on market-oriented research specific to human food, identity preservation and value added.

Livestock feed research partnerships with K-State that support the use of sorghum across Kansas agriculture sectors. These research application sectors would focus on beef cattle, dairy cattle, distiller's grains, pet food, poultry and swine.

ACTION ITEMS:

- Partner with the Kansas dairy industry to author joint research regarding usability of sorghum and sorghum silage in dairy cow rations.
- Encourage acceptability and use of published sorghum research conducted at K-State and other land-grant institutions for dairy, pork and poultry industries.
- Engage with others across the agriculture industry (beyond dairy), allowing them to be involved and add to discussions on sorghum-based products they would want to use in rations for their livestock.
- Educate and help other countries on ration creation and nutrition education.
- Educate farmers, ranchers and agribusinesses in other sectors on how to create value from sorghum.

Transportation network — including transload facilities and container load/ship — that maximizes logistical efficiencies and minimizes cost per producer to ship sorghum domestically and internationally.

ACTION ITEMS:

- Support continued development of the new transload facilities in Kansas.
- Assist in creating future options and collaborations that will allow for increased development around the transload facilities.
- Encourage increased state and federal funding for infrastructure improvements — e.g., adding increasing the availability of passing lanes on major Kansas highways (including Highways 50, 54, and 83) to better accommodate truck traffic.
- Develop an education module to teach Kansas farmers and agribusinesses about international trade, such as how other countries receive sorghum export shipments (and process paperwork).

Expansion of inbound and outbound trade missions showcasing feed and value-added market opportunities.

ACTION ITEMS:

- Leverage commodity and organizational membership resources to keep Kansas representatives engaged in outbound missions.
- Offer to organize, host, and financially contribute to offsetting costs associated with bringing inbound sorghum trade missions to Kansas.
- Expand the sorghum circle of influence when hosting inbound trade missions to improve relationships with domestic and international trading partners. The circle of influence could grow to feature not only livestock feed but also food grade, pet food, value-added, ethanol and DDGS representatives.
- Continue to build new and improve existing trade relationships.

Medium Priority Outcomes

Identity preserved sorghum for customers around the world. This can be achieved by capitalizing on the availability of shipping containers to ship identity preserved sorghum from the point of filling the container to the point of delivery.

ACTION ITEMS:

- Participate in Kansas Department of Transportation freight studies and site selection.
- Work toward establishing container facilities in all grain-growing/shipping regions of the state.
- Develop a method for identifying the location and availability of containers.

Expanded education and outreach opportunities that support industry strategic growth.

ACTION ITEMS:

- Address challenges, issues and opportunities for the industry through a strategic plan developed by the Kansas Grain Sorghum Commission.
- Lend resources and support to the organization to address needs and overcome existing challenges.
- Research existing capacity for on-farm storage opportunities and, if needed, increase opportunities for farmers to add storage capacity.
- Educate Kansas farmers regarding on-farm storage opportunities.
- Explore promotion of alternative uses of sorghum in the energy sector, including a sorghum ethanol plant and/or advancements in a wax product that could be produced through ethanol.