



Driving Force for Change  
*Statewide*  
2018 Annual Report

**KANSAS STATE**  
UNIVERSITY®

College of Agriculture

**K-STATE**  
Research and Extension

# Introduction

## Kansas Agriculture Statistics

Largest employer

**246,877**

(13% of entire workforce)

Total economic contribution

**\$67.5 billion**

which accounts for

**44.5%**

of the Kansas economy

Provided by Kansas Department of Agriculture

## From the Dean and Director

K-State Research and Extension represents Kansas State University, the state's land-grant university. We provide trusted, practical information to help individuals, businesses and communities solve problems, develop skills and build a better future.

We share unbiased, research-based information through multiple channels:

- » Events across the state and on campus
- » Publications, radio, videos and news releases
- » Social media, webinars and websites

We also multiply our resources by training youth and adult leaders, as well as volunteers, and partnering with state and local agencies.

The College of Agriculture prepares students for productive lives that contribute to agriculture, society and the economic competitiveness of Kansas. Our students work alongside top scientists in labs, fields and greenhouses and participate in numerous leadership, internship and international-study opportunities.

Our vision is to be a Top 5 college of agriculture and a global destination for education, research and extension. This report highlights a few examples of how we contribute to healthy communities, families and youth, as well as a sustainable, competitive agricultural system.



*John D. Floros*

– John Floros, dean of the College of Agriculture and director of K-State Research and Extension

# Fast Facts

We support the university's **land-grant mission**



Have a presence in all **105 counties**



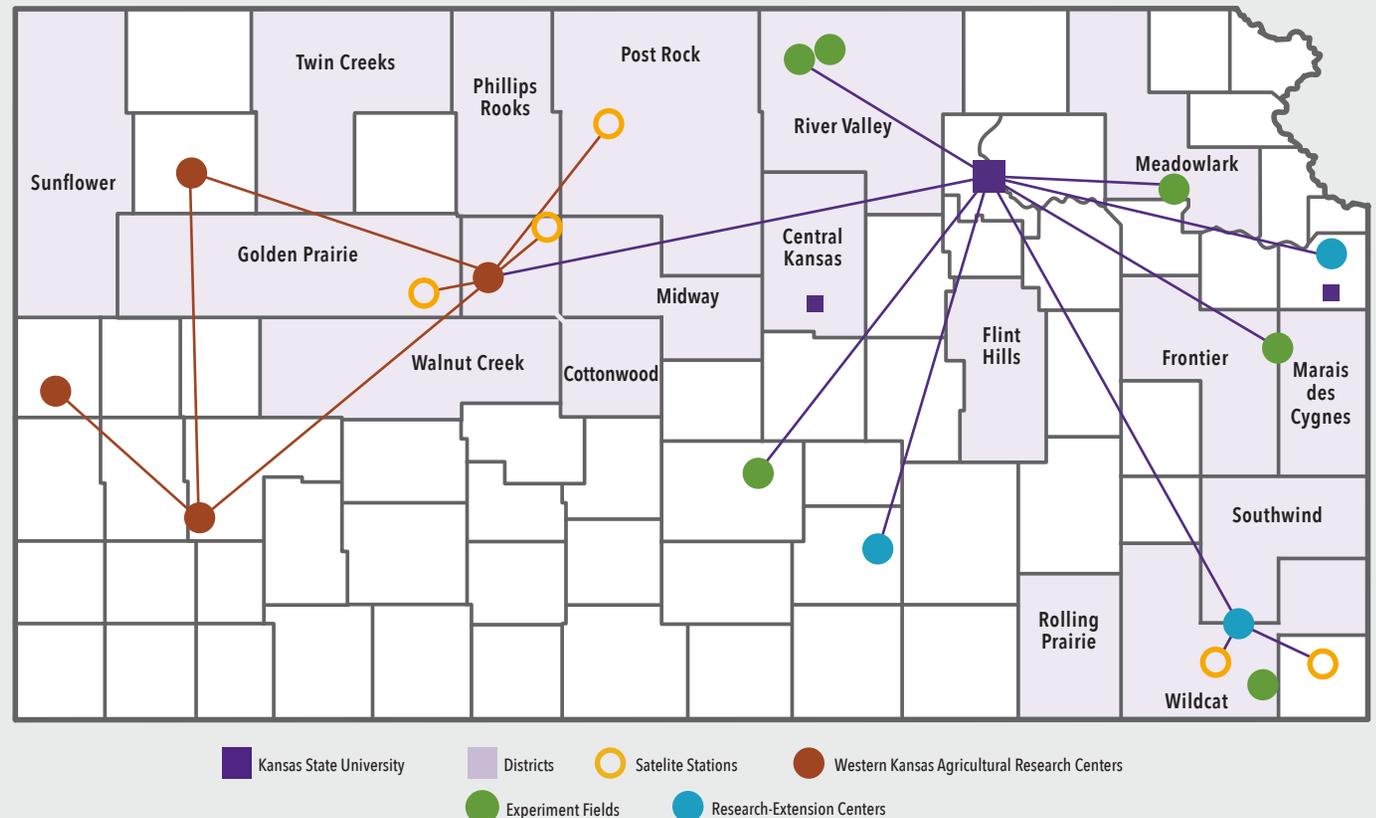
Fund research projects in **20 departments** across **5 colleges**

Rank **4<sup>th</sup>** in Best Colleges for Agriculture Sciences in America by *Niche.com*



## Grand challenges

During a strategic planning process with our stakeholders, K-State Research and Extension identified five grand challenges facing every Kansan: global food systems, health, community vitality, developing tomorrow's leaders and water. Our research and extension efforts focus on addressing these challenges to help better our state, country and world.



*Agricultural research facilities are located throughout the state to accommodate climate and soil variability.*



# Global Food Systems

To feed and sustain a growing world population, we develop innovative practices that benefit Kansas, our nation and the world. Through innovative research in areas such as genetics, disease prevention and food security, we help agriculture be more profitable, sustainable and efficient.

Hosted 50<sup>th</sup> annual Swine Day, sharing swine research with

**400** attendees.

**4,185**

downloads from recent swine, cattle and dairy research reports. Using New Prairie Press, authors can track which articles are most helpful to producers.

## **Swine research benefits producers, economy**

### **What we are doing:**

Animal scientists conduct research that helps advance how pigs are raised. In the past 20 years, K-State researchers have improved best practices in genetics, artificial insemination and feed nutrition. According to the U.S. Department of Agriculture, the United States is the world's third-largest producer and consumer of pork products. The Kansas Pork Association reports there are nearly 1,000 hog farms in Kansas, accounting for more than \$427.5 million in gross market value and 600 million pounds of pork.

### **Our impact:**

The swine nutrition group is well-known for research that focuses on converting feed to pork in the most efficient way possible. K-State research has helped to advance the swine industry over the past 20 years, during which time the number of pigs marketed per sow rose from an average 14 to more than 22; pigs grow 30 percent faster on about 20 percent less feed per pound of gain; and the average number of pigs weaned per litter has grown from 7 to almost 11. For the average sow, producers get about 80 percent more pork. Genetics have helped improve breeding success and reduce the mortality rate of newborn pigs.

*"We make better decisions on our farm because I can get help from K-State. They review the science, help me understand what we're doing, and then monitor and figure out if something is right. They do a good job of sharing their knowledge and bringing it to a practical level for those of us in the field."*

*– Michael Springer, managing partner of Springer Family Farms, Sycamore, Kansas*





## Technology advances wheat-breeding process

### What we are doing:

The world's population is expected to reach nearly 10 billion by the year 2050. The U.S. Agency for International Development Feed the Future Lab for Applied Wheat Genomics, headquartered at K-State, has the ability to help meet the world's need for more food by developing improved wheat varieties that can be grown in Kansas and around the world. The lab's researchers are developing new technologies and improved breeding approaches in India, Pakistan and Bangladesh to speed the wheat innovation rate in Kansas and the United States.

### Our impact:

Plant pathologist Jesse Poland uses unmanned aerial vehicles to gather trait information of candidate wheat varieties. The UAVs, or drones, buzz through fields taking pictures of every plant in the field — a 20-minute process compared to many days when done by humans. The technique will help U.S. breeders decrease the amount of time needed to bring higher-yielding and higher-quality wheat varieties to U.S. growers.

*"Wheat farmers across the High Plains rely on improved genetics to help address production problems such as combating disease, drought and stresses. We are very fortunate to have high-level scientists and geneticists at K-State using advanced technologies to identify improved varieties and genetics to Kansas wheat growers."*

*— Mike McClellan, Palco wheat farmer and Kansas Wheat Commission Board chairman*

K-State graduate student Daljit Singh

Conducted

# 70

meetings on weed control for

# 4,500

growers, crop consultants and other agriculture clientele.

# 3

wheat varieties released this year  
— Zenda, Larry and Tatanka

# 5,000

homeowners submitted soil samples for testing and fertilizer recommendations





# Global Food Systems

Home to **4**  
Feed the Future Innovation Labs

Provide training for  
**15,370**  
private pesticide applicators and  
5,844 commercial applicators

K-State research helps Kansas  
ranchers maximize profits. Beef  
cattle ranching and farming  
contributes

**\$8.9 billion**  
to the Kansas economy.



## ***Kansas leads the nation in sorghum production***

### What we are doing:

Sorghum contains more antioxidants than blueberries, chocolate and red wine, and Kansas leads the nation in grain sorghum production. The Center for Sorghum Improvement, based at K-State, brings together the expertise of researchers, growers, processors and other industry representatives from across the state and around the world to boost production and capitalize on the inherent benefits of this drought-tolerant crop.

### Our impact:

- » The center, led by Sarah Sexton Bowser, set goals in 2016 to boost the average U.S. sorghum yield through plant breeding and field-level management; increase demand; and decrease the price discount sorghum sells for in relation to corn.
- » Researchers, food processors and dieticians are looking for ways to use sorghum in U.S. diets to take advantage of sorghum being gluten-free and high in antioxidants.
- » The Feed the Future Innovation Lab for Collaborative Research in Sorghum and Millet was established at K-State in 2013 to explore ways to improve production systems and distribution chains to make sorghum and pearl millet the crops of the future.

***"The No. 1 thing growers are using K-State Research and Extension for right now is those pop-up problems, like sugarcane aphids. The first call we're going to make is to extension. That's true if it's an early freeze, a late freeze ... any production issues we have throughout the season. That's some of the best value we see."***

***– Clayton Short, Saline County sorghum grower, Kansas Sorghum Commission vice chair and National Sorghum Checkoff Program secretary***



Ramasamy Perumal, sorghum breeder at the  
Agricultural Research Center – Hays



Water drainage without cover crops



Water drainage with cover crops

## Cover crops and fertilizer management improve water quality

### What we are doing:

Scientists test water runoff from corn and soybean fields at the Kansas Agricultural Watershed Laboratory south of Manhattan. The 22 acres of cropland are divided into 18 plots, each about the size of a football field. Researchers track the runoff of sediment, phosphorus and nitrogen as it snakes its way to local streams and rivers. Poor water quality affects nearby land values. When cities pay more to clean drinking water, it ultimately means a bump in water bills for homeowners.

### Our impact:

A research team led by agronomist Nathan Nelson is using winter cover crops, such as triticale, rapeseed or winter wheat, and 4R nutrient management (Right source, Right rate, Right time, Right place) to protect and enrich the soil, reduce phosphorus loss and improve water quality. The team found that planting cover crops can reduce soil loss, or erosion, by 70 percent compared to land where cover crops are not planted. Subsurface placement of phosphorus fertilizer can reduce phosphorus loss by more than 25 percent. Reducing soil and phosphorus loss helps protect public waterways and improve long-term productivity of Kansas farm ground.

*“Dr. Nelson’s timely research with cover crops in combination with fertilizer best management practices is providing farmers with quantifiable results and clarity on ways to improve water quality without sacrificing productivity. Not only do farmers benefit from this research but also all the communities in the watershed clear to the Gulf of Mexico.”*

*– Justin Knopf, Gypsum farmer and Kansas Association of Wheat Growers vice president*

We develop and implement programs to help maintain and improve water quality and quantity by pioneering new practices and techniques; researching high-priority water issues; facilitating meetings among local, state and federal officials; and effectively communicating research results.

7

tribal colleges,

6

land-grant universities, and

3

federal agencies attended regional water summit.

5

watershed specialists help improve water quality across the state





# Developing Tomorrow's Leaders

Our adult and youth leadership programs prepare leaders who will shape the future of our state, country and world.

## 98%

job placement for graduating seniors

## \$1.45 million

awarded in academic scholarships

## 24%

of students come from cities of 50,000 or larger



## *K-State prepares students for future careers*

### What we are doing:

The College of Agriculture is preparing the next generation of agricultural leaders through classroom engagement, hands-on learning and student leadership. Our highly ranked programs go hand-in-hand with excellent advising. On average, each advisor works with about 25 students.

### Our Impact:

- » The college offers 16 undergraduate majors, 14 minors, five certificates and 10 graduate programs. A new pet food option in feed science and management prepares students for jobs in the \$8.34 billion Kansas pet food industry.
- » Spring/summer 2017 marked the largest graduation class of 436 students.
- » By participating in college and university organizations, students expand their network and build lasting friendships with fellow students and faculty members, as well as participate in professional activities that often lead to future career opportunities. Students develop leadership skills through 38 college organizations and 21 competition teams.
- » Examples of recent student competition success — National Champion Livestock and Meat Evaluation Team, World Champion Horse Judging Team, National Champion Crops Team and Reserve National Champion Livestock Team.

*"My life has been transformed by the College of Agriculture. I have been encouraged to pursue different opportunities, mentored by faculty and provided support from alumni. I will graduate with lifelong friends, a focused career objective and confidently equipped with knowledge and skills."*

*— Jeffrey Hadachek, senior in agricultural economics, Cuba, Kansas*



Sarah Savinski, student majoring in swine nutrition



Walker Koons and Affton Schlochtermeyer feed orphaned calves

## Local 4-H'ers care for calves orphaned by wildfires

### What we are doing:

Kansas 4-H has a long history of bringing out the best in youth, through experiences both planned and unplanned. When raging wildfires destroyed property and killed thousands of beef cattle in southwest Kansas, 4-H clubs stepped in to care for the youngest survivors. Clubs joined forces to shelter and raise orphaned calves. The necessary feed and supplies were either donated or provided by the host families. Once the calves were healthy and the producers were ready to take them back, the calves were returned to the ranchers.

### Our impact:

- » Kansas 4-H members fed and cared for more than 100 orphaned calves while ranchers focused on rebuilding their operations.
- » The calves were fed three times a day, calves and pens were cleaned daily, and older 4-H'ers applied burn cream and administered medication.
- » At least 10 clubs in multiple counties took part in the effort. Some calves were shown at local fairs.
- » Parents helped move heavy supplies and provided supervision.
- » What started as a crisis bloomed into an endeavor that benefitted calves, ranchers and 4-H families.

*"Our son Colman is a 4-H member who cared for one of the calves from the Rhodes Ranch. The experience helped him overcome some obstacles with his ADHD. My husband and I will never be able to thank the Rhodeses enough for what they gave to our family and especially to our son."*

*– Tonya Mousel, Meade County 4-H parent.*



Through 4-H, we empower young people to have confidence, know how to work well with others, endure challenges, stick with a job until it is done and give back to their community.

4-H members and families organized **90** community service projects for the 4<sup>th</sup> annual 48 Hours of 4-H

**74,837**  
youth participate in 4-H programs





# Health

A vibrant economy starts with a healthy population. We define health as a person's physical, mental and emotional well-being. Our programs promote behaviors that improve quality of life, healthy development and active behaviors across life stages for all socioeconomic groups.

Health care costs for people with diabetes are

**2.3**  
times higher

**1 in 10**

Kansans have been diagnosed with diabetes

## *Lifestyle changes reduce impact of diabetes*

### What we are doing:

One in 10 Kansans 18 and older has been diagnosed with diabetes (90-95 percent have the preventable Type 2 diabetes), which increases the risk of stroke, heart disease, kidney disease, blindness and lower-limb amputation. K-State Research and Extension offers Dining with Diabetes, a national extension program designed to boost the health and wellness of Kansans with Type 2 diabetes and help educate those challenged with diabetes, their family members, caregivers and others who support them.

### Our impact:

Forty K-State Research and Extension family and consumer sciences agents are trained to offer the Dining with Diabetes program; 25 agents have implemented the program across the state.

The program offers two-hour weekly classes over four weeks. Lessons include:

- » the best self-care methods for those who have the disease
- » healthful food choices including familiar foods
- » low-impact physical activity
- » food sampling
- » cooking techniques using herbs, spices, reduced-fat foods and artificial sweeteners

*"The main reason I started the Dining with Diabetes program is that my dad and brother are diabetics, and I had a 5.5 blood glucose level and needed to make some changes. Through the program I changed how I eat, cut out processed food and haven't had a pop in over a year. It has helped me immensely."*

*– Ed Dutton, oil field lease operator, Elkhart, Kansas*





## Counselors help seniors navigate Medicare options

### What we are doing:

More than two dozen K-State Research and Extension agents at county and district offices serve as counselors for the Senior Health Insurance Counseling for Kansas, or SHICK, program. They help senior citizens explore all options available to them through Medicare plans.

“We’re here to provide guidance, to help consumers make informed choices,” said Susie Latta, a family and consumer sciences agent with K-State Research and Extension’s Marshall County office. “We’re not selling anything; we’re not paid to point people in a certain direction.”

### Our impact:

- » Statewide, K-State Research and Extension SHICK counselors advised 7,482 constituents, saving them a grand total of \$4,245,340.
- » Of the 350 SHICK counselors assisting Kansas citizens, 31 are also K-State Research and Extension agents.
- » In 2016, Marshall County agent Susie Latta assisted more than 700 constituents as a SHICK counselor and helped save them about \$215,000.
- » As SHICK counselors, agents can leverage the opportunity to offer assistance on nutrition, exercise and other topics.

*“After visiting with K-State Research and Extension agent Erin Petersilie, who is also a SHICK counselor, my husband and I were able to realize combined savings of about \$5,000.”*

*– Virginia Schneider, Rush County resident*

# 55

certified Stay Strong, Stay Healthy instructors help seniors improve balance, strength and flexibility

Master Food Volunteers donated

# 10,058

hours worth \$242,800



# Community Vitality

We help residents and all communities – rural, suburban and urban – grow and prosper. We energize community groups and aid local businesses by providing leadership, research-based expertise and technical assistance to make communities better places to live and work.

Kansas Forest Service staff worked fires in

# 15

states including Kansas

# 1,203

Extension Master Gardeners donated 100,000+ hours worth \$2.2 million

## ***Equipment, training aid rural fire departments***

### **What we are doing:**

K-State Research and Extension directs the Kansas Forest Service. In addition to trees and programs supporting tree growth, the Kansas Forest Service oversees fire management programs across the state, providing training, excess property distribution, prevention materials, grant funding and consulting for the state's 486 rural fire departments.

One way the Kansas Forest Service increases the state's fire departments' capacity is the federal excess property program. This program serves as a conduit for fire departments to be loaned excess federal property – generally military vehicles and fire equipment that have been outfitted to serve their needs. The property remains under federal ownership. When it is no longer needed, the equipment is returned to the forest service for reassignment or disposal.

### **Our impact:**

- » Ninety percent of Kansas is protected by volunteer fire departments —13,000 volunteers out of 16,000 firefighters statewide.
- » Deployed 793 pieces of large equipment and trucks to rural and volunteer fire departments across Kansas, worth \$26.5 million.
- » Provide equipment free of charge through a federal program administered through the Kansas Forest Service.
- » Provide salvage parts and access to new replacement parts at a greatly reduced cost.

***"The current economic climate has made it difficult for fire departments to budget for replacement equipment, and the Kansas Forest Service has been a reliable source for several years."***

***– Ken Staatz, Herington Fire Department chief***





## Looking at communities with fresh eyes

### What we are doing:

Communities in northwest Kansas benefit from a K-State Research and Extension partnership with the Dane G. Hanson Foundation. To build on the strengths and goals of the 26-county area, the foundation provides funds for strategic improvement projects to revitalize rural areas for families and businesses. Nadine Sigle was hired with grant funds as the area community vitality specialist. She knows the area and served as an agent and specialist for 24 years.

### Our impact:

- » The First Impressions project pairs similar-sized communities. A small team evaluates the other town's website then visits the community for a first-sight reaction of the downtown, residences, schools and housing.
- » After the evaluation is completed, each community meets to review the findings.
- » Project examples include improvements to: local grocery stores, walking trails, signage, parks, community upkeep, tree plantings, flag displays, facilities for local schools and evaluating new uses for empty buildings.
- » Kansas PRIDE coaches communities on how to work together on chosen projects.

*"The foundation trustees recognize that K-State Research and Extension has expertise and programs to help them fulfill their mission. Programs like First Impressions and PRIDE have been beneficial to our communities and counties because they gently help identify ways to improve and recognize strengths that can be developed further."*

*– Betsy Wearing, communications coordinator for the Dane G. Hansen Foundation*

# 65

Kansas communities have completed First Impressions and

# 10

are in process

# 761

Kansas PRIDE projects in

# 79

communities



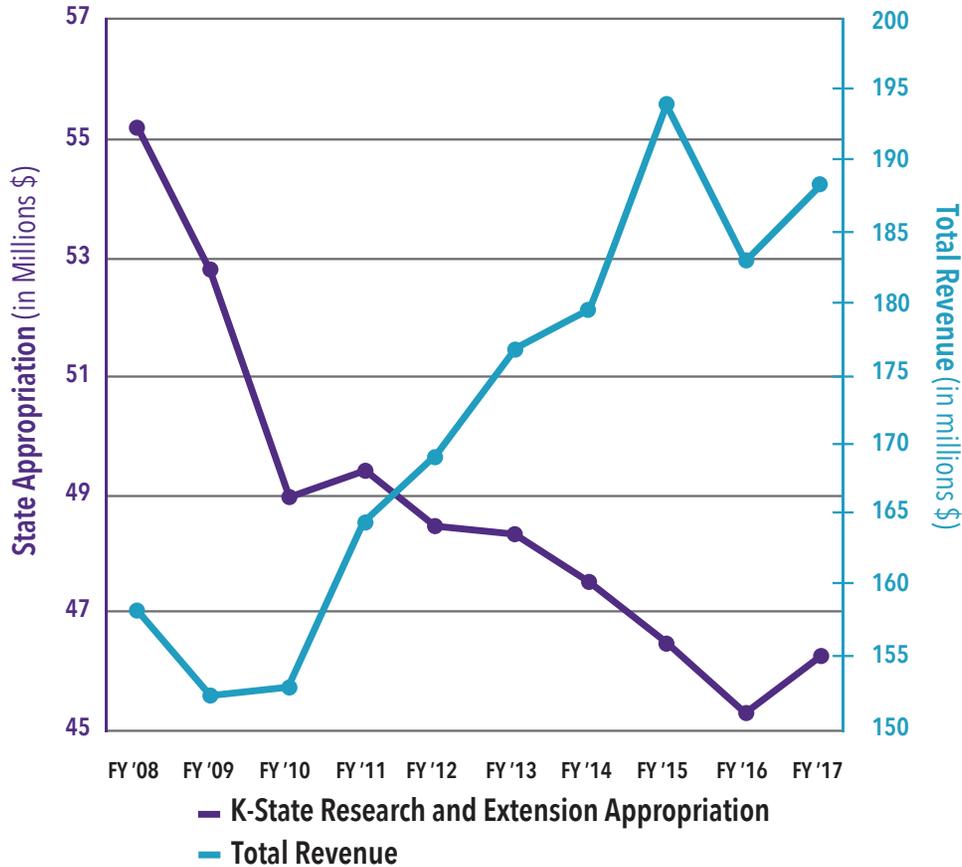


# Financial

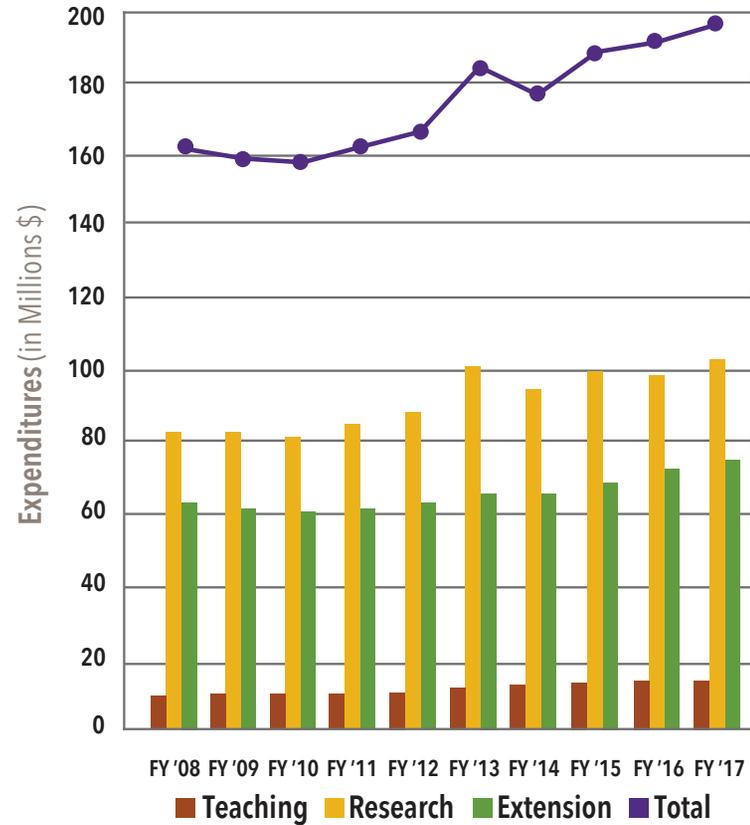
## K-State Research and Extension and College of Agriculture

Although state support has been reduced by 16 percent, from \$55.1 million in 2008 down to \$46.4 million in 2017, we have found alternative sources to increase our overall revenue by 20 percent, from \$158.9 million in 2008 to \$189 million in 2017. If our base of state funds continues to erode, we will lose our ability to compete at the national and international levels for grants, contracts and other funds.

College of Agriculture and K-State Research and Extension Revenue

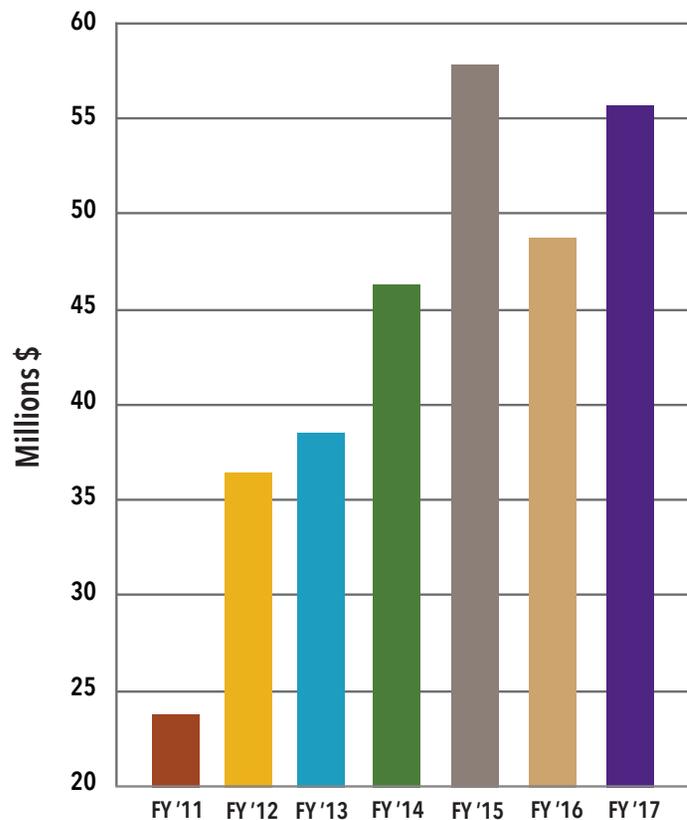


College of Agriculture and K-State Research and Extension Expenditures



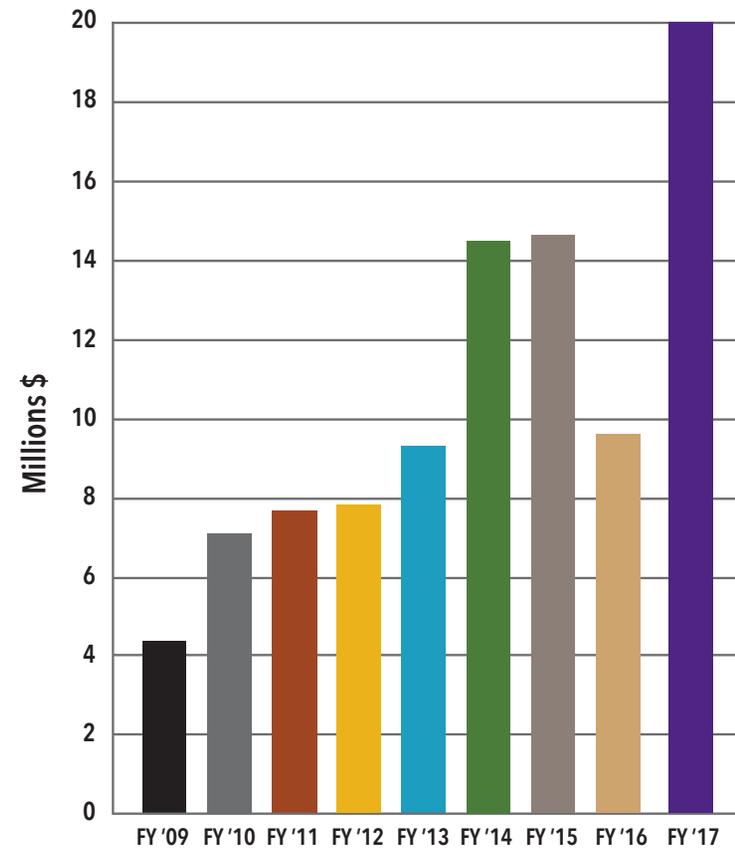
## K-State Research and Extension and College of Agriculture extramural awards

Our faculty and staff have attracted increased funding into their programs (from \$23.8 million in 2011 to \$58.7 million in 2015) to conduct research, train students, and deliver outreach and extension programs. Our competitiveness and ability to attract and retain the best faculty will be diminished if state funding continues to erode.



## College of Agriculture private fundraising

Private fundraising from philanthropic sources has increased significantly – more than four and a half times – from \$4.4 million in 2009 to \$20 million in 2017. This supplements student scholarships, faculty support and programs.



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**Kansas State University Agricultural Experiment Station and Cooperative Extension Service**

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