2022 ISSUE

KANSAS STATE UNIVERSITY

College of Agriculture

AgReport

PHOTO DAN DONNERT
LOCATION MANHATTAN, KS

AgReport

2022 Issue

College of Agriculture and K-State Research and Extension

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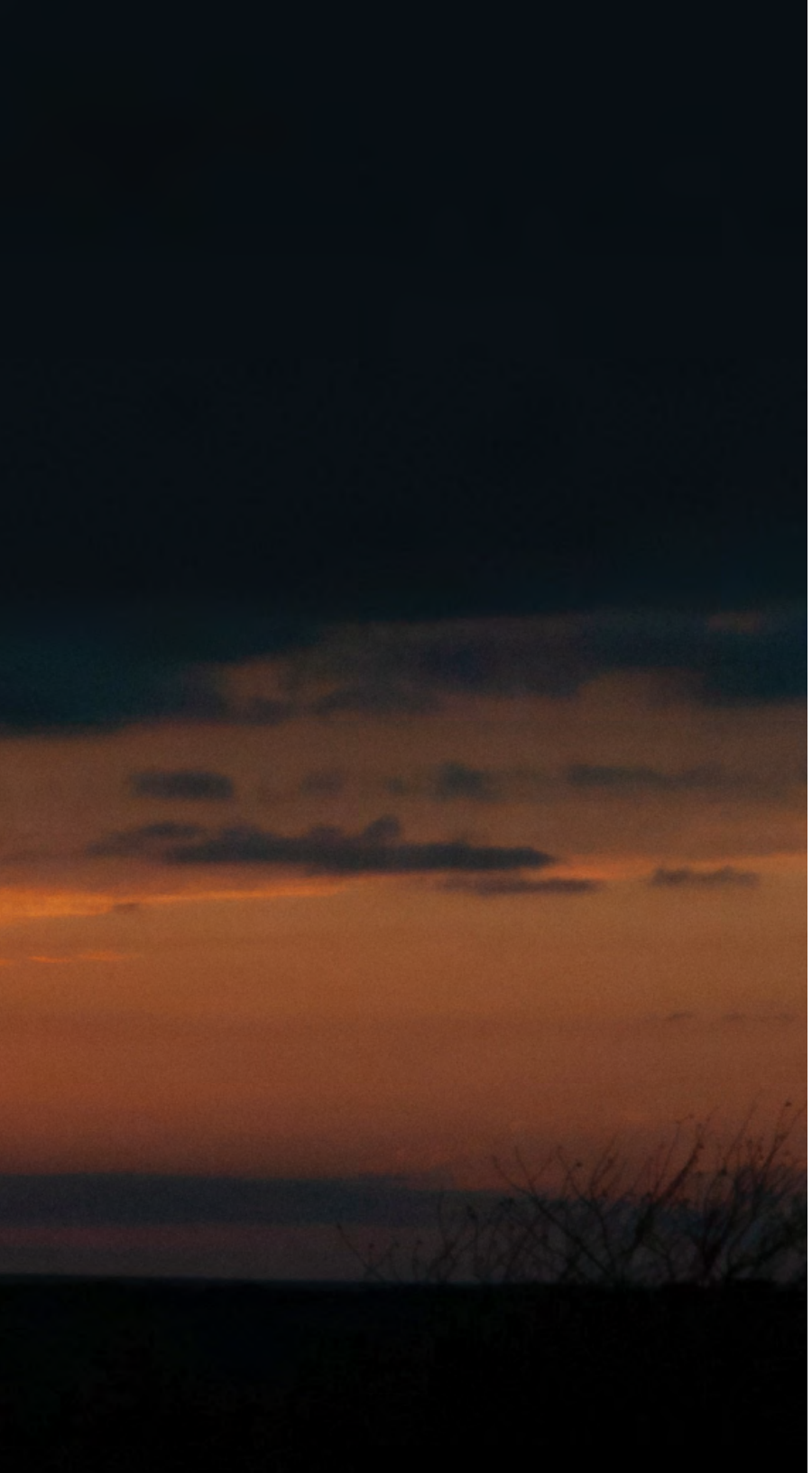

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PHOTO DAN DONNERT
LOCATION PRESIDENT'S OFFICE, ANDERSON HALL

Dear Friends,

THE DIVERSITY AND REACH OF AGRICULTURE IN KANSAS

The rich diversity of Kansas is not lost to any of us who call this great state home. We are the United States' intersection of east and west, and north and south. The biodiversity of our climates, from the Ozarks in the southeast to the arid high plains in the northwest, has helped enable Kansas State University's College of Agriculture to become what it is: one of this country's top-10 agriculture schools. We are a global leader in emerging food and agricultural innovations and discoveries.

This college's expertise, and the reach of our research and extension organization, is a critical tenet of the university's new and ambitious Economic Prosperity Plan, which is to add 3,000 new jobs and $3 billion in new investments into the state within the next 10 years. We believe we can achieve these goals, primarily because we still are steadfastly focused on educating the next generation's agricultural workforce and leaders, while counseling and supporting the efforts of entrepreneurs, farmers, ranchers and businesses that form the economic engine of agriculture in Kansas. Areas of impact include food systems, digital agriculture, biodefense and many more.

Agriculture contributes $67 billion to our state's economy and approximately 238,000 jobs. Combining the Economic Prosperity Plan with our other wide range of research will only further stimulate innovation, investment and other public and private partnerships to help solve the challenges we face here at home and abroad, such as the looming global food crisis due to the war in Ukraine. By doing so, we will create more interesting and innovative professional opportunities for Kansans and better serve the world today and tomorrow.

This year's issue of the AgReport includes a variety of stories of how we are working across many different industries, always with the dual focus on current and prospective positive agricultural impacts. I'm excited for what the future holds for our faculty, researchers, extension service professionals and students as we approach the next quarter of this century.

J. Ernest Minton

J. Ernest Minton,
Dean, College of Agriculture
Director, K-State Research and Extension

PHOTO DAN DONNERT
IN THE PHOTO ERNIE MINTON
LOCATION KANSAS STATE UNIVERSITY STOCKER UNIT

A Global View from the President's Office

On February 14, 2022, Richard Linton began his tenure as the 15th President of Kansas State University. Most recently, he was dean of the College of Agriculture and Life Sciences at North Carolina State University, and prior to that position, he served in various faculty and leadership positions at other land-grant universities.

On June 28, AgReport hosted a sit down with President Linton and Dean Minton to discuss not only the College of Agriculture and K-State Research and Extension, but also the state of all things agriculture locally, regionally and globally. We've included an edited recap of their conversation in this year's AgReport. To view a video of their in-depth discussion, please visit **kstate.ag/LintonMinton22**.

WHAT DIFFERENTIATES K-STATE FROM OTHER GREAT AG SCHOOLS?

Dean Minton: There are a number of agricultural schools that focus on the original land-grant mission; however, Kansas State, in particular, takes the mission very seriously. We have an obligation to stakeholders to address the things that are important to both the state and the region, and I am not sure that continues to be captured by other land-grant universities. So, I am very proud of Kansas State for really holding to the original land-grant mission.

PHOTO DAN DONNERT
IN THE PHOTO PRESIDENT RICHARD LINTON AND DEAN ERNIE MINTON
LOCATION ANDERSON HALL

DID YOU KNOW...

Land-grant universities have played a critical role in nearly every major research advancement related to agriculture in the U.S. and made it possible for millions to attain a college degree. The land-grant university system began in 1862, when President Lincoln signed the first Morrill Land-grant Act to help endow a college in every state. These colleges were designed to be more affordable; provide a practical education relevant to the needs of the people; and offer education, research and outreach.

LEARN MORE AT: k-state.edu/wildcatway/land-grant/

President Linton: Dean, I would follow up and agree. I've now been at five different land-grant institutions and was most recently the dean of the College of Agriculture and Life Sciences at NC State. I think what I've seen in the first few months that I've been here is that connection between our stakeholders and our communities in the state is much stronger than what other land-grant institutions have had.

I'm also super proud of what I'm seeing in the state relative to research and extension connections.

WHAT ARE THE GREATEST CHALLENGES FACING GLOBAL AGRICULTURE TODAY?

Minton: Well, I think that land-grant universities have a particular charge to help solve global hunger. And, we have food insecurity, even here in Kansas. But as a globally engaged institution, we have a particular responsibility to really address global food needs, sustainability and resilience among food-producing countries, to help ensure food security globally.

Linton: I would add a few other things I think that are important. Certainly, water and water resource management – not only nationally and globally, but especially here in Kansas – is a big and important issue. Labor, I think industry would say, is maybe its number one issue and challenge.

I think there are not enough people who truly understand where their food comes from, and I think it's important to educate consumers about all the great work that we do to ultimately fill their dinner table.

Minton: President Linton, you hit upon a great point. Kansas is still very much dependent upon the Ogallala in terms of driving economic activity in the southwest part of the state. We really do need to help Kansas agriculture address water issues long term – and that will be challenging. But like so many other things, we cannot let the enormity of the challenge get in our way of helping to solve it.

DID YOU KNOW...

For more than 20 years, the Kansas Center for Agricultural Resources and the Environment (KCARE) has been partnering with producers, municipalities and other important water users to identify and implement science-based solutions to improve water quality and conserve its use.

LEARN MORE about KCARE's work on page 32.

HOW COULD THE COLLEGE OF AGRICULTURE BE BETTER EQUIPPED TO ADDRESS THESE GLOBAL CHALLENGES?

Minton: We have dedicated faculty who are really driven to solve problems. However, the cost of doing business, including paying salaries of faculty and staff, is continually increasing. Further, the funds we have available to do those kinds of things haven't

... developing more partnerships with our international research collaborations will be critically important ...

increased at the same pace as the costs. So that's a challenge. Finding more funds or hiring the workforce that we need to really cover the costs to address those key situations is going to be a challenge going forward.

Linton: I think this state is very fortunate that we're so globally engaged. I know for years I've admired the international reputation that Kansas State has. I think moving forward to the future, developing more partnerships with our international research collaborations will be critically important, as an example, in water resource management.

In Israel, they do this better than anywhere else in the world. But I think just reaching out and building further collaborations with entities that can help us be stronger and better makes a whole lot of sense. And, we need to work together to find what those collaborations are today and what those collaborations can be in the future.

BUILDING ON THAT, HOW CAN THOSE ACTIONS IMPACT THE PEOPLE ON CAMPUS?

Minton: An example is our deep engagement with countries that are associated with our Feed the Future Innovation Labs. Professor Tim Dalton has recently published a peer-reviewed paper that demonstrates quite conclusively that the spill ins back into Kansas from our global engagement are pretty impressive.

So, I think we continue to do those kinds of things. We make sure we share these stories – because this is one that there are questions about and it clearly has tremendous benefits for Kansas, the region and our global engagement.

PHOTO DAN DONNERT
IN THE PHOTO DRIP IRRIGATION SYSTEM
LOCATION FLICKNER INNOVATION FARM, MOUNDRIDGE, KS

DID YOU KNOW...

Feed the Future Innovation Labs are central in finding solutions that reduce global hunger, poverty and malnutrition. What Feed the Future scientists learn is shared not only with the developing countries they serve but also with U.S. colleagues, producers and agribusinesses. In a recently published paper, K-State ag economist and author Tim Dalton found that every $1 invested in international agriculture research and development at U.S. universities provides a return of $8.52 in economic impact.

Linton: I think an important part to think about is that we must remember the land-grant mission. The mission is about research, teaching, extension and engagement to benefit citizens, in this case in the state of Kansas. But as we do our research and as we do our extension, we need to be thinking about the things that we do for the state, but also how what we do can benefit us nationally and globally. As we go after global projects, we take what's learned and bring it back to benefit the people of Kansas. And, I think that message is really important on the up flow and on the down flow.

WHAT FACTORS INTERESTED YOU IN THIS POSITION?

Linton: My interest in Kansas State University started because of the rich heritage of the land-grant university. It's, I think, one of the few land-grant institutions in the country that is really living out the land-grant mission, as Dean has already described.

In Kansas at Kansas State, it's all about the importance of making the lives of people in Kansas better.

Minton: Since you've arrived, President Linton, in our engagement with our stakeholders, you've seen a lot of optimism in the state and untapped potential of what we may be able to do going forward. And I think that's going to be a tremendous benefit for us.

Linton: Another reason I looked at Kansas State is I think there's incredible opportunities right around the corner. As I think about it, agriculture and food systems come way toward the top of the list because they are such an important and vital part of our economy. Almost 50% of our economy includes agriculture, food systems and life sciences, and there's going to be ways that we can enhance these moving forward.

WHAT DID YOU KNOW ABOUT K-STATE'S COLLEGE OF AGRICULTURE WHEN YOU WERE DEAN AT NORTH CAROLINA STATE?

Linton: One of the things deans do is they learn what's going on everywhere else around the country. I had done a lot of work at Kansas State University 15 years ago when I was a faculty member at Purdue University. So, I knew a lot about Kansas State University and knew about the people, and I knew about the strength of agriculture.

I am also very good friends with the former dean and very good friends with the former provost. They did what they could to continually update me on the great things happening at Kansas State University. I think there's a lot to be very proud of relative to research and extension at the College of Agriculture at Kansas State University.

I got a chance to learn more about you, Dean Minton, through the Food Systems Leadership Institute. I was a former graduate and the dean was a student in the program, who reached out to me for a mentorship opportunity. And of course, I got the opportunity to learn a whole lot more about Dean Minton and about Kansas State and where he was at that time.

And that was a big factor in me looking at where to look to be a president and a lot of confidence in the College of Agriculture and a lot of confidence in Dean Minton's leadership.

DID YOU KNOW...

The Food Systems Leadership Institute is dedicated to developing leaders prepared to advance the 21st century food system. The institute offers a series of core leadership competencies so participants are better prepared to lead change; and understand and influence complex, diverse food systems. The program is offered by the Association of Public and Land-grant Universities, funded by the W.K. Kellogg Foundation, and offered at North Carolina State University.

WHAT HAVE YOU LEARNED ABOUT THE COLLEGE OF AGRICULTURE AND RESEARCH AND EXTENSION THAT YOU DIDN'T KNOW WHEN YOU INTERVIEWED FOR THE JOB?

Linton: I think the biggest piece that I've learned is 'they are ready to go'. I think they are ready to take the next step. I think they are excited that there is a president that comes with a lot of land-grant experience and with a background in agriculture and food systems.

So, I think maybe there is a confidence at a higher level than there's been for many years because we just haven't had this ag expertise in the president's office. I think the timing is right. I think the opportunities for agriculture are right now – today, and I think it's a perfect marriage.

I feel good about where I'm placed as a president and the College of Agriculture should feel very good that it has a person in place that's done this before and worn the same boots that you, Dean Minton, have been in for the last several years.

PHOTO COURTESY K-STATE ALUMNI ASSOCIATION
IN THE PHOTO THE PRESIDENT IS HOLDING ON TO OSCAR AT OSCAR'S COFFEE SHOP IN HOXIE, KS.
L TO R: KEVIN NALETTE, INTERIM CHIEF OF STAFF; CHERI MENSE; PRESIDENT RICHARD LINTON; MICHAEL MENSE; SCOTT FOOTE; MICHELLE FOOTE; KERRY WEFALD, SENIOR DIRECTOR OF DEVELOPMENT; ALAN FANKHAUSER, ASSISTANT DIRECTOR OF ALUMNI PROGRAMS.
MENSE AND FOOTE FAMILIES WERE THE EVENT HOSTS.

Minton: You know, one of the things I have found particularly encouraging is that you reached out to us several months ago to make sure we held the week of June 20th open to tour Kansas and visit with a lot of different people, including some prominent agricultural producers in the state.

And as we interacted at various times along that route, I continually learned new things from producers who I have known for years as they interacted with someone for the first time and shared their experiences and the scope of their operations.

Linton: It has probably been the most important work that I have done since I've been on the job for the past four and a half months – spending a week visiting external stakeholders, mainly in the western part of the state. Of course, as dean you learn that showing up is half the battle and that listening is the other half of the battle.

If you show up and listen to the ideas our stakeholders have, and you start to build and grow, they will be able to help support you with advocacy. I think that's critically important. I think especially in this state and especially after COVID, when we were all so disengaged, that reengagement is going to be so vitally important. We're not going to be able to grow agriculture in the way we think we can without that strong engagement and advocacy from our stakeholders.

Minton: I sense that people are hungry for reengagement after the pandemic.

WHERE DO YOU SEE THE COLLEGE OF AGRICULTURE IN THE NEXT 3 TO 5 YEARS?

Linton: My goal is to make Kansas State the best land-grant university that it can be. I have the same expectation for the College of Agriculture to be the best research, extension and

teaching organization at a land-grant university in the country. I'm expecting us to grow, and we have lots of exciting new initiatives.

We're looking at bringing in interdisciplinary clusters of faculty, which will help support agriculture and food systems. We're trying to create a better environment for faculty and staff through new facilities. I think these new initiatives and new facilities and doing the things that our stakeholders really want and need, we become a much better institution than we already are today.

And, so that's my hope for Kansas State and that's my hope for the College of Agriculture as a part of Kansas State University.

Minton: You know, I think one of the things that you've been able to do is really bring to the forefront the things that we knew to be true – and that is often innovation and that moving the body of knowledge forward occurs at the interface of different disciplines.

Encouraging that kind of work is going to be important to solving really challenging problems going forward.

Linton: Let's take an example, such as water resource management. You are probably going to need agronomists. You are probably going to need water specialists. You might need someone from the business school, maybe someone from social sciences, and maybe a geologist, who all need to work together. If it's data analytics, you might need an agronomist or you might need an animal scientist, but you might need someone from computer science or someone from mathematics to be able to help you understand how to use this complex data to be able to inform decisions.

DID YOU KNOW...

The Gordian study found 69% of ag buildings at land-grant universities "are at the end of their useful life." Upgrading these buildings would cost $11.5 billion, while replacing them would be $38.1 billion.

SCAN HERE TO LEARN MORE

The future of solving the grand global challenges in agriculture is around interdisciplinary work and a connection with private-public partnerships. And, I think if we can make those things happen, Kansas State University and the College of Agriculture will become much stronger.

Minton: I think, too, if you think about just really moving that concept forward, we may be hiring faculty members in, for example, the Department of Agronomy, who may not even have gotten their advanced degree in a Department of Agronomy. So, we are sort of mixing up disciplines perhaps going forward. And in doing so, advancing science even faster.

Linton: And, that's okay, in fact, that's very okay – because that is our future.

DO YOU WANT TO TAKE THIS OPPORTUNITY TO ADDRESS THE NEEDS FOR INFRASTRUCTURE?

Linton: Nationally, I think there's a big challenge that we have relative to support our faculty and staff with the infrastructure facilities for both the on campus and off campus work that we do. In February 2021, the Association of Public and Land-Grant Universities contracted with Gordian, a provider of construction cost data, which evaluated the need for facilities both on and off campus.

It was a big challenge for me at North Carolina State University. We were the third worst in the country relative to needs. We started thinking about facilities, new facilities on campus, repair, renovation of facilities on campus, and then also the infrastructure that we had throughout the state with our research and extension centers.

Dean Minton, what are your thoughts about what we should be trying to do here in the state of Kansas?

Minton: Well, you know, we are similarly challenged with a good number of our facilities here on campus and off campus being built in the 1950s and 1960s. And many of those facilities are really aging out, particularly in terms of mechanical systems.

We initiated a facilities master plan a few years ago. COVID interrupted that. Now with your arrival and your experience at North Carolina State, I think we are really on the cusp of making progress toward those needed goals.

And you're exactly right, both on campus and off campus, as you saw in your tour, the kind of diversity we have with agriculture across the state and the need for regionally located research and extension centers that address local problems. I am optimistic and I think that we've got a great future coming up.

Linton: You know, I think, too, we have some opportunities this year with a strong state budget. And as a part of the state budget, there are dollars that are going to be put in place to be able to support ag innovation. And we're working very hard to be able to collectively build out interdisciplinary research and education facilities that would be able to help better support our faculty.

It's going to take some state dollars, it's going to take philanthropy, and it's going to take support and advocacy from our commodity groups around the state. But I'm hoping that this is a catalyst and step one for what we can do to better help support our industry in the state of Kansas.

Minton: I couldn't agree more. I think the opportunities really are once in a lifetime for us here.

Linton: This is a once in a lifetime opportunity. I can tell you, when I was in North Carolina State, we also had a once in a lifetime opportunity that absolutely changed the complete trajectory of not only the College of Agriculture and Life Sciences at NC State, but for the university as a whole.

And it's my hope that some of those best practices we can utilize here in Kansas to do some of the same things.

Minton: I, again, couldn't agree more. I think as deans of academic colleges, we must advocate certainly for the advancement of the well-being of your college. But I think as leaders, we also think about the institution as a whole and the kinds of things we can do to move it forward.

Linton: So, we should say thank you and go 'Cats, right?

Minton: Go 'Cats!

WEFALD RELISHES ROLE AS AG ADVOCATE

Kerry Wefald believes she's in the business of "building networks." Named the KSU Foundation's senior director of development for the College of Agriculture in April, Wefald said she sees her role as connecting the college with people who have a desire to support its mission – advancing agriculture; protecting natural resources; increasing economic activity; and improving the lives and livelihoods of all Kansans through education, research and outreach.

"K-State's College of Agriculture is one of the nation's premier schools of agriculture," said Wefald, an alumna of the college's Ag Communications program. "Our alumni and friends understand the value of the work being done here, and they want to support the college in ways that make a difference. I will serve as the bridge to connect them with the best possible avenue to give – whether that is an outright gift of cash or grain, or a more complex gift of real estate or through a will or trust."

Wefald spent the majority of her career in agricultural-related positions. Most recently, she served as the director of marketing and advocacy for the Kansas Department of Agriculture and earlier as executive director of the Kansas FFA Foundation.

"I love the agriculture sector," Wefald explained. "Agriculture supports the most basic and important needs of all people – food, water and natural resources. I returned to the College of Agriculture to help elevate opportunities in agriculture, such as bringing awareness to the needs of securing additional support for student scholarships, faculty support and agriculture infrastructure. A thriving agriculture sector is key to keeping our Kansas economy strong."

Wefald's commitment to agriculture started early. She was raised on a diversified crop and livestock farm in Linn County and was active in both 4-H and FFA before attending K-State.

"The agriculture landscape evolves quickly, and today it's critical that each of us are at our best – that current students and future agricultural advocates receive a great education in the classroom and know that engagement opportunities continue later in life through extension outreach and research partnerships," said Wefald.

"The more we connect and support each other, the easier it will be to find solutions to keep agriculture strong. We must push forward together."

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785-775-2090

STORY ANNIKA WIEBERS
PHOTO DAN DONNERT
IN THE PHOTO KERRY WEFALD
LOCATION DEEP CREEK ROAD

A VOICE TO BRING AWARENESS

Antonia Broyaka thought she was hearing fireworks when the first bombs began to explode in Kyiv, Ukraine. She and her husband were preparing for work and getting their children ready for school from their home in Vinnytsia, a city approximately 170 miles from Kyiv. When they turned on their television and learned cities across the country were under attack, Broyaka remembers telling her husband, Volodymyr Lapshov, again and again that it just couldn't be true.

In two days, Lapshov was driving his wife and their children, 15-year-old Oleksandra (Sasha) and nine-year-old Maksym (Max), to the Polish border. Lapshov could only drive his family and not leave with them, because he enrolled in the Ukrainian military and could be called up at any moment.

"Our focus is on protecting our children at all costs," explained Broyaka. The decision meant leaving her husband and parents behind, giving up her position as dean of faculty for Economics and Business at Vinnytsia National Agrarian University and embarking on a dangerous journey that would take them to friends in Poland.

Broyaka remembers packing a backpack for herself and each of the children. "That's all we could take," she explained. "In each bag, I put a couple changes of clothes, some food and water, a little money and contact information for my husband and parents in case during the trip my children somehow got separated from me or something happened to me and they were on their own."

The typical five-and-a-half-hour trip took 24 hours, because people living along the route blocked the road or dug trenches to keep tanks out. Broyaka remembers feeling very exposed, because they were out in the open and there was traffic gridlock so they could not move quickly to protect themselves if attacked.

They made it to Poland unharmed, but in less than three weeks Broyaka and her children left Poland and traveled to Manhattan, Kansas, where two decades earlier she had come to study as a Ukrainian Fulbright scholar. When they arrived, they moved in with friend Sharolyn Jackson, a family and consumer sciences specialist for K-State Research and Extension.

"I had made many wonderful friends at K-State, and they encouraged me to come," explained Broyaka. "Our friends in Poland were so kind, but I knew I needed to put as much distance as possible between my children and the Russians. I am convinced the Russians will try to advance beyond the Ukrainian borders."

Broyaka is an agricultural economist and throughout the spring she volunteered, giving seminars to students, faculty and the public on the global impact of Russia's Ukrainian invasion. In mid-June, she received her work visa and began a new job as an

STORY SUSAN SCHIFF
PHOTO DAN DONNERT
IN THE PHOTO ANTONIA BROYAKA
LOCATION KONZA PRAIRIE SCENIC OVERLOOK

agricultural economics specialist for K-State Research and Extension.

Since arriving in Manhattan, Broyaka has warned about the impact the war would have globally.

“This war will cause widespread hunger as Russia makes it extremely dangerous for our farmers to continue their work and they block our ports so the food we produce can’t leave our country,” said Broyaka.

Ukraine is considered the “breadbasket of Europe” and produces 8% of the world’s wheat export, 13% of the world’s corn export and a third of the sunflower oil trade. The American Farm Bureau confirmed that in 2021, Ukraine exported more than $27 billion in agricultural products to the world. Its top export markets were the 27 nations that comprise the European Union, plus China, India, Egypt and Turkey.

The World Bank calculates that because of this conflict there could be a 37% jump in food prices. For every 1% increase, the World Bank estimates, 10 million people are thrown into extreme poverty.

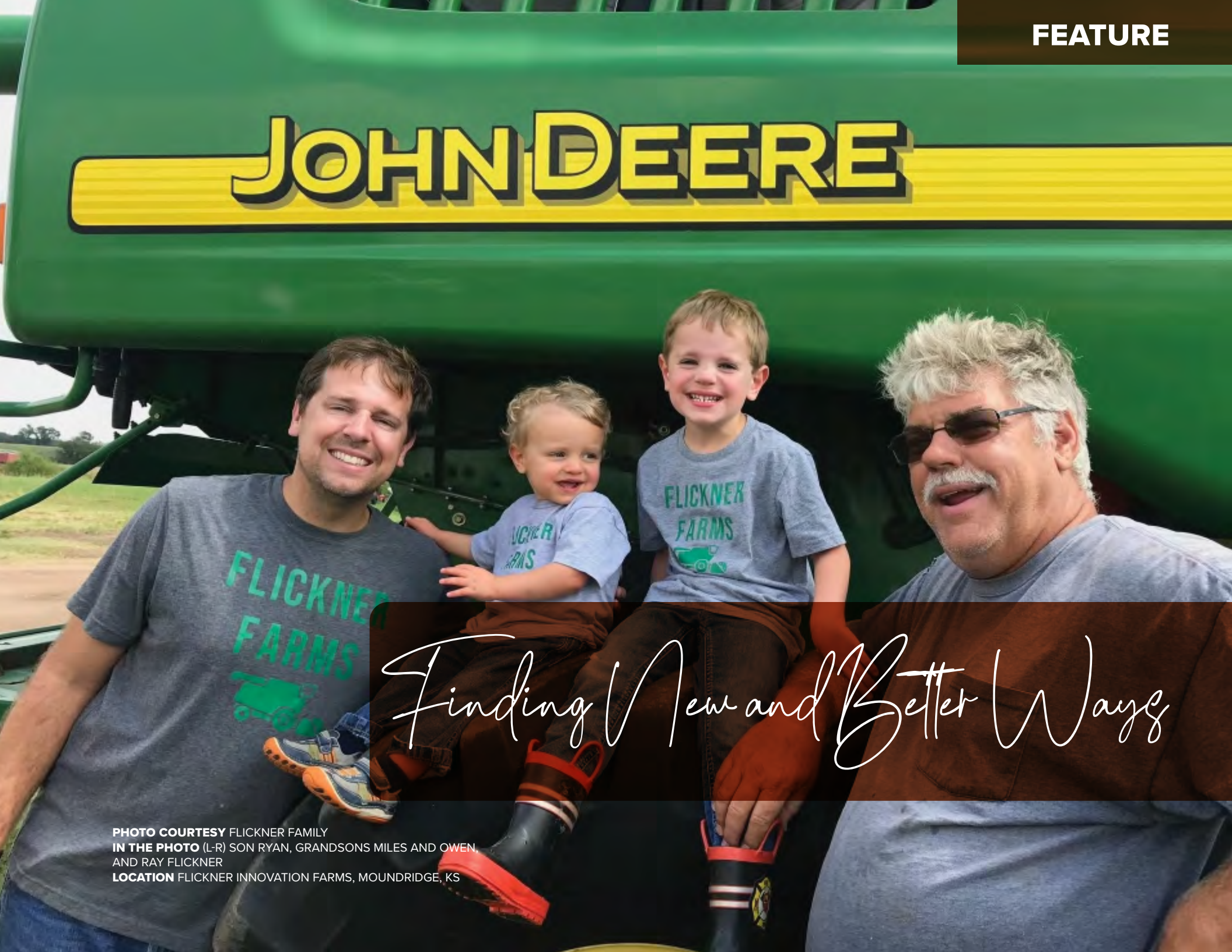
Broyaka believes the Russians want to acquire Ukraine for many reasons, including how it would enable them to manipulate other countries politically.

“Countries, like the United States, must find ways to increase their food production and exports to protect import-dependent countries from future food crises and political unrest,” Broyaka warned. “Otherwise, millions will go hungry and the food shortage will allow Russia to blackmail poorer countries by withholding food grown in Ukraine and Russia.”

As Broyaka restarts her career at K-State, her children are adjusting well to life in Manhattan. Sasha entered Manhattan High School as a sophomore this fall and plans to be active in the school choir. Max entered fourth grade with the many friends he has made at Amanda Arnold Elementary School.

Broyaka is grateful to still be able to talk by phone with her husband nearly every day. Lapshov continues to work for a logistics company in Vinnytsia, but much of his time is spent helping other women and children escape by driving them to the border, and delivering food and medicine to those unable to get supplies on their own.

Sharolyn Jackson created a GoFundMe page to help the Broyaka family transition to life in the United States at gofundme.com/f/help-ukrainian-refugee-family-start-a-new-life**.**



Finding New and Better Ways

PHOTO COURTESY FLICKNER FAMILY
IN THE PHOTO (L-R) SON RYAN, GRANDSONS MILES AND OWEN, AND RAY FLICKNER
LOCATION FLICKNER INNOVATION FARMS, MOUNDRIDGE, KS

FLICKNER FAMILY OPENS FARM TO K-STATE RESEARCH

Ray Flickner trusts in the idea of balance. On one side of the scales, he places his respect for family history in Moundridge, Kansas, where he is the fifth generation of Flickners to work that patch of land. On the other side is his enthusiasm for innovations and cutting-edge advancements that can improve sustainability for natural resources. And the fulcrum holding these two ideals steady?

It's the hope for the seventh generation of Flickner farmers.

Flickner's two young grandsons are fixtures at the farm, spending weekends catching tadpoles, investigating the progress of a beaver dam, planting trees and riding in the combine. Their youthful exuberance and love for the land and its surroundings are both an inspiration – and the impetus – for the family's conservation efforts.

"We want a profitable operation," Flickner said, "but these conservation efforts and plans are all because we believe in leaving this land in a better situation for our kids, and for their kids, than when we inherited it."

That straightforward goal is no small effort. Building on a family farming tradition that began in the late 1800s, Flickner is using every weapon in his arsenal, even creating the Flickner Innovation Farm – a unique public-private partnership working to extend the reach of standard agricultural practices while improving yields and preserving natural resources. It includes more than a dozen active partners, ranging from K-State College of Agriculture faculty, K-State Research and Extension specialists, industry professionals, the local farming community, state agencies and others.

These expanding partnerships now encompass water quality investigation, soil moisture sensors, nutrient applications, soil health, protein mapping, and more. Because the Innovation Farm provides researchers with the unique opportunity to expand their work beyond the scope of an experimental plot, Flickner manages requests every season from new and existing partners who want to test the best and brightest ideas on a functioning, progressive farm.

"We're not going to be afraid to try new things," Flickner said. "If there's science behind them, and there can be benefits for the farm and the land, then let's give it a shot and share what we learn."

WEEDING OUT THE PROBLEMS

This season, Flickner identified weed management as a key issue for Innovation Farm partners to address.

"Controlling weeds has become an even bigger issue in recent years," said Flickner. "When you look at rising costs – in both money and time – I thought now would be a good time to experiment with new technologies and strategies."

With that in mind, Flickner has set aside 40 acres to test the efficacy of what he describes as "robot weed-eaters." This system, pioneered by Greenfield Robotics of Wichita, uses automated machines to traverse the area between rows. The robots' job is simple: mow down any weeds in their path, but unlike the common tool found in most peoples' garages, this system offers farmers a hands-free solution for a weed-free field. Both Flickner and his K-State partners are excited to observe the new technology.

STORY MELISSA HARVEY

“It’s just so fun as a researcher to test cutting-edge technologies in a real-life setting,” said Sarah Lancaster, K-State Research and Extension specialist in weed science. “We’re really just using the Flickner Innovation Farm as a sandbox where [researchers] get to assess how things actually work.”

Along with observing these technology trials, Lancaster hopes to investigate how soil pH affects herbicide use on some “right place, right time” fields at the Innovation Farm. Previous soil samples in these areas indicated very low soil pH, which Flickner plans to treat with lime. This, combined with no-till, will provide Lancaster and her team with an optimal site to observe how pH stratification, or changes in pH at certain soil depths, affects herbicide degradation. She hopes that this study will provide an opportunity for experts to quantify how stratification can affect weed management for farm operations all over Kansas.

“My job is to figure out how these things fit together,” said Lancaster. “Ray brings this great perspective as an experienced producer to the table, which is so valuable for all the researchers who partner with him.”

Flickner’s focus on weeds doesn’t stop there. He hopes to implement a Harvest Weed Seed Control system, which literally pulverizes weeds and their seeds in a rolling cage mill fitted to the back of a combine during harvest. Flickner also plans to employ an unmanned aerial system with a payload capacity to target weeds, and an experimental sprayer that combines cameras with computer learning to apply herbicide only on plants the system identifies as a weed, all in the blink of an eye.

“This is definitely next-level stuff,” said Flickner. “It’s going to be an exciting summer.”

PHOTO COURTESY MELISSA HARVEY
IN THE PHOTO GREENFIELD ROBOTICS WEEDBOT
LOCATION FLICKNER INNOVATION FARM, MOUNDRIDGE, KS

LAYING THE GROUNDWORK FOR SOIL HEALTH

Not every project at the farm focuses on the frontlines of precision agriculture technology. For farmers like Flickner, unearthing the secrets to healthy soils is crucial for sustainable and profitable farming. The Innovation Farm is host to several regional and national cover crop studies.

"I shouldn't focus only on using the newest gadgets, and I don't want to fixate on conventional knowledge only," said Flickner. "We try to strike a balance between the two while following the science."

Last year, the Flickner Innovation Farm joined the Farmer-to-Farmer (F2F) Network, a statewide initiative implementing on-farm cropping system management strategies to improve productivity. This work, part of the Rainfed Agriculture Innovation Network (RAIN), specifically looks at how producers use cover crops, and how these crops can make a difference for the future of farming.

According to Carlos Pires, a Ph.D. student in K-State's Department of Agronomy and a coordinator for F2F Network, healthy soils have a wide range of benefits for farms. These include increased biodiversity, better water infiltration, nutrient cycling, and a resilience to climate variability. These benefits might not be immediately perceptible, however.

"You don't just go out and measure soil health, because some indicators can take 10 or more years to appear," Pires explained. "That's why soil health is an investment. You can't go to the store and buy it."

Pires said that the end goal of the F2F project is to generate specific, data-driven recommendations and for the data to form the basis of conversations with farmers on how they want to manage their future operations. This can include dialogues about the types of cover crops farmers want to plant, and which covers might be most beneficial for specific soil types. The work is only in its beginning phases, but Pires said that the F2F partnership with the Flickner Innovation Farm is a huge advantage for the project.

"To succeed, we want to showcase practices that can improve soil health, yes, but to do so we must group the farmers who are innovative with those who are respected. Ray Flickner is both," said Pires.

SPENDING WATER WISELY

The Flickner family has made water conservation and water quality a top priority on their farm, and there's a reason. In total, the Flickners operate 11 different water rights, two of which are considered some of the most senior water rights in the entire township, with 1955 priority dates.

"Water is an invaluable, but depleting, resource," said Flickner. "It's important to ask ourselves if we can manage things differently to make that resource more sustainable. Today's technology and knowledge means that it is possible to work smarter, not harder."

That type of object analysis leads to solutions. About 20 years ago, Flickner was among the first in the area to implement subsurface drip irrigation (SDI), and he has since converted more than 600 acres to SDI. Using this system, Innovation Farm partners estimate that Flickner used an astounding 40 percent less water annually over the last decade compared to the county average.

Flickner also keeps a close eye on water quality. When recent water tests revealed high nitrate levels in the municipal water wells, Flickner harnessed the power of his K-State Research and Extension partnerships to monitor static groundwater levels and water quality in all his wells. Along with the Kansas Geological Survey, they are working to collect baseline readings to form a basis for trend analysis. The monitoring done by this team will help develop solutions to ensure the county water supply remains drinkable into the future.

FARMING FOR THE FUTURE

While projects from partnerships benefit current and future farm operations, the Flickner Innovation Farm takes things one step further by regularly sharing their results with other producers across Kansas so they – and their future generations – can profit from these advances.

Flickner doesn't seem to be winding down anytime soon. With additional projects, partners, demonstrations, and field days on the horizon, the Innovation Farm concept is just hitting its stride. The family's recent philanthropic gifts to K-State have also created the Flickner Family Faculty Award in Agronomy, which will provide high-quality instruction and mentorship for students at the university for years to come.

"Conservation is a long road to travel, and sometimes it gets pretty bumpy," Flickner said. "But it's a worthwhile journey, for sure."

PHOTO COURTESY FLICKNER FAMILY
IN THE PHOTO SUBSURFACE DRIP IRRIGATION (SDI) INSTALLATION
LOCATION FLICKNER INNOVATION FARMS, MOUNDRIDGE, KS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A New River of Gold from Kansas Milk

When the Hilmar Cheese Company announced in May 2021 that it would be building a cheese and whey processing plant south of Dodge City, it marked another major success for the Kansas dairy industry.

Hilmar's facility, which is expected to be operational in 2024, will create 247 new jobs. The project and associated dairy farms needed to supply the facility will bring an additional dairy farm and other support positions to the region. Hilmar officials said it represents more than $1 billion in investments to southwest Kansas.

It's the third such plant in the country for Hilmar Cheese, a company that is considered a world leader in the dairy business. Including its plants in Hilmar, California, and Dalhart, Texas, Hilmar delivers its products across the United States and to more than 50 countries.

"Dodge City was selected because it is a supportive agricultural region in close proximity to the local dairy industry," said Hilmar's chief executive officer and president David Ahlem. "The community is in a central location with critical existing infrastructure, including excellent transportation to easily reach expanding markets. And Kansas offers a business-friendly climate with a skilled labor force and strong partnerships from the State of Kansas and local Dodge City officials."

But the bottom line is milk production, and over the past quarter century, Kansas has been generating plenty of it.

DAIRY BUSINESS MAKES ECONOMIC SENSE

The Kansas Department of Agriculture reported in 2021 that the dairy industry had contributed $1.39 billion to the state's economy along with 4,018 jobs when considering indirect and induced impacts.

In 1993, the Kansas dairy herd totaled 85,000 head, producing 1.08 billion pounds of milk. Since then – largely spurred by efforts to recruit dairies to western Kansas – the numbers have grown to 168,000 cattle producing more than 4 billion pounds of milk.

In other words, Kansas dairy producers have one efficient herd. Over the past 29 years, the cowherd doubled while milk production quadrupled.

It begs the questions: Why has this sector of the state's agricultural industry exploded over the last three decades, and how did it happen?

"Abundant feed, ag-friendly policies and communities, and room to grow were the main factors in our move to Kansas," said Ken McCarty, a 2005 graduate of K-State's Department of Animal Sciences and Industry, and who was still a teenager when his parents, Tom and Judy, moved the family's dairy from Sugar Run, Pennsylvania to northwest Kansas in 1999.

Another factor, Ken McCarty adds, is location, location, location: "As my dad always tells us: 'In Kansas, we are halfway to everywhere."

STORY PAT MELGARES
PHOTO DAN DONNERT
LOCATION KANSAS STATE UNIVERSITY DAIRY BARN

The McCarty's processing plant in Rexford is one of three large processing plants currently operating in the state, with the others in Garden City and Hugoton. KDA reports that the Dairy Farmers of America plant in Garden City has enabled an estimated 47% of Kansas-produced milk to be processed in the state.

In the early 1990s, community leaders in several western Kansas towns formed a coalition to recruit dairies to Kansas, attending such major trade shows as the World Ag Expo in Tulare, California, and the World Dairy Expo in Madison, Wisconsin. Still today, the Western Kansas Rural Economic Development Alliance, known familiarly as WKREDA, continues to travel to the industry's top trade shows, encouraging dairies to come to Kansas.

"What was really driving recruiting efforts is that we had the feed supply," said George Blush, who was the dairy program inspection manager for the KDA from 1999 to 2018. "We had silage, we had corn; we had everything they needed readily available. There were a couple California dairies that came in and expanded their operations in Kansas. They said that within a few years, they could pay for a dairy just based on the cost (savings) they experienced in feed and transportation."

Over the past 29 years, the [Kansas] cowherd doubled while milk production quadrupled.

RESEARCH, EDUCATION SPURS GROWTH

Mike Brouk's 24-year career as a dairy specialist for K-State Research and Extension has put him smack dab in the middle of Kansas' dairy growth. He remembers the early part of his career when cow numbers were struggling: "That was a real low point," he said.

"It was difficult. The first thing we had to do as an industry was to convince people that it was okay to dairy in the state of Kansas, and that there was enough water and land here to be successful."

While marketing efforts were getting dairy producers' attention, K-State specialists went about doing what they do best: Brouk was involved in studies that aided cow comfort, including installing fans in barns and other heat abatement strategies. He worked on strategies to improve nutrition and forage quality, and to develop heifers that have been raised for several states and even for producers in Qatar.

Agricultural engineer Joe Harner, who retired in June 2022 after 40 years at K-State, was instrumental in designing facilities on Kansas dairies, including waste and water management systems that used sand to filter manure. Faculty on the Manhattan campus routinely conducted research that has advanced reproduction, processing and nutrition.

"If you look at work like Mike (Brouk) did with heat stress, everybody could adopt it," Harner said. "It was size neutral; it didn't matter if you were the small guy or the mega-dairy. Everyone could benefit from the work we were doing."

"John Shirley (who retired from K-State in 2005) taught me how to do feed rations the right way," said Brent Buessing, a 2003 K-State graduate who owns the 300-cow Buessing Dairy in Baileyville, Kan. "Because of what I've learned from K-State, I trust what I'm doing. I can run my rations much cheaper and still get excellent milk production."

K-State's dairy on the north side of its Manhattan campus is the "highest-producing dairy in the state," according to Brouk, adding that "there's 100 years of genetics out there." The facility houses 300 Holstein cows and 300 baby calves and heifers. Brouk said the dairy

is critical for helping K-State's team implement practices that eventually help Kansas dairy men and women.

Russell Plaschka, the agribusiness development director for the Kansas Department of Agriculture, said K-State's land-grant mission – providing objective, science-based information to the people of Kansas – "has played a critical role in growing agriculture in our state."

"We have relied on K-State's College of Agriculture to provide teaching and research in relevant areas such as food and dairy science," Plaschka said. "The agribusiness companies looking at Kansas and the dairy industry need to know that the state's land-grant university will meet the current and future needs in product development and ensure a pipeline of graduates as future employees."

EAST OR WEST? BOTH SIDES OF THE STATE ARE SUCCEEDING

Dairy's growth in Kansas has followed a familiar pattern. The western side of the state has been preferred for the so-called mega-dairies – those with 2,000 cows or more. The eastern side of the state has preferred smaller dairies. Both models seem to be profitable in Kansas.

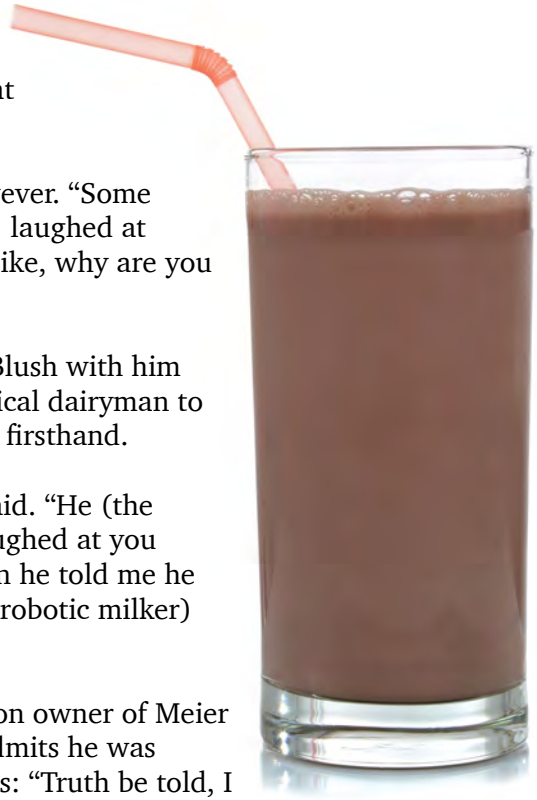
"Western Kansas attracted larger dairies because of low land prices, ample feed supply and reasonable regulations," said Orville Miller, owner of Miller Dairy near Hutchinson in the central part of the state. "The weather extremes have been a challenge for some of the dairies moving in. For the rest of Kansas, dairies tend to cluster in areas where there is feed, infrastructure and a market."

KDA's Blush said when he started as the state's dairy program inspection manager, there were nearly 3,000 dairy farms in Kansas. "Now, we have just over 200 farms."

Consolidation in the dairy industry, Blush added, follows a similar path to the beef cattle industry, in that processing plants are now being located closer to the major sources of production. Hilmar Cheese is only the latest example of this happening.

Technology has played a critical role the past 20 years, including systems that recycle water so that it is used multiple times on the farm; and automated milking systems — often called robotic milkers — that allow cows access to the milking parlor 24 hours a day, seven days a week.

"Eight years ago, I decided we needed to look at robotic milkers for Kansas," said K-State's Brouk. "It's coming, but it's not for everybody, so we need to be able to tell producers what they need to know."



It wasn't a popular notion, however. "Some dairymen who I respect a lot … laughed at me," Brouk said. "They said, 'Mike, why are you spending your time on that?'"

Brouk jumped in the car, took Blush with him to Missouri, and took the skeptical dairyman to Colorado to see robotic milkers firsthand.

"It was kind of funny," Brouk said. "He (the dairyman) said, 'you know I laughed at you when you started this,' and then he told me he needed some help installing (a robotic milker) in his operation."

Duane Meier, a fourth generation owner of Meier Dairy in Palmer, Kansas, also admits he was suspicious of the robotic milkers: "Truth be told, I

was against it. But eventually I accepted it and we tried it, and it's a good thing because as long as you do the things you're supposed to do, it really works."

Meier said his dairy is producing 93 pounds of milk per cow using the robots. "I'm pleased with that." Labor costs have been cut in half and production has increased by 25%, he said.

K-STATE FACULTY CITE TRUST AS KEY FACTOR

Despite advancements in technology and management practices, K-State's Harner still swears by old-fashioned values.

"One of the things that makes the K-State dairy team's program unique in my mind is that we spend a lot of time with long-term relationships," Harner said. "With many of the people we work with, we start on a small project that worked, and we gained trust. We kept building and building that trust. I can't think of anyone in the state that we've visited with that was one-and-done. If they were growing, we were always in on follow-up conversations."

Miller, the dairyman in central Kansas, remembers working with K-State as far as 40 years ago when the university's team was led by John Shirley and Ed Call.

"Ed Call visited our dairy several times and helped us work through problems and designed rations for us in those early years," he said. "In the 1990s, (Harner) started designing waste and lagoon systems for us, and now is helping with our robot barn. (Brouk) has done research at our farm, and helped us with financial analysis."

"All of the help with the design of projects was valuable, but maybe the largest benefit we received over the past 20 years is all the reports on the research conducted at the university."

Hilmar's Ahlem lauded his company's access to the university, too.

"We know that dairies in the area rely on K-State's research to advance the industry," he said. "The information is then shared by the extension team to improve dairy farm operations. Hilmar Cheese Company is a leader in sustainable practices and has adopted the U.S. Dairy Stewardship Commitment and goal to achieve a net zero dairy industry by 2050. Research and education is critical as our industry progresses toward these sustainability goals."

Keeping Lead in its Place

PHOTO DAN DONNERT
IN THE PHOTO GANGA HETTIARACHCHI
LOCATION WASHINGTON-WHEATLEY, KANSAS CITY, MISSOURI

RESEARCHERS AIM TO REDUCE RISK OF LEAD IN KANSAS CITY AREA SOIL

In mid-May, a half dozen Kansas State University students and faculty drove up to a vacant lot in a Kansas City, Missouri, neighborhood and within minutes, they were out of their car, tape measure and flags in hand as they made their way through a field of nearly three-foot high grass.

The mission? They were on the search for soils containing high levels of lead, an element that is known to lurk in old paint and soils. According to information from the U.S. Centers for Disease Control and Prevention, exposure to even low levels of lead can cause damage over time, especially to children. Lead exposure can stunt childhood brain development, as well as cause damage to the brain and nervous system in children and adults, among other health risks.

This area is known as the Washington-Wheatley neighborhood, just a few minutes over the Missouri border from Kansas and a five-minute drive east of downtown Kansas City. Where the tall grass grows, there once were houses, torn down long ago. On this side of the city block, just one lonely house remains, a two-story home that juts up against a long row of trees.

The students formed a grid, each square measuring two meters by two meters. Orange flags marked their progress. Once fully formed, the grid outlined an area 12 meters wide, 12 meters long.

“We are dividing the sections in this area so we can map the concentration of lead on the entire site,” said Ruwandi Kumarasinghe, a research associate in K-State’s Department of Agronomy.

A week earlier, the group took random samples in the same field, tested the soil in a university laboratory and found that the site, overall, contains a high concentration of lead. This time, they’ll test each 2 by 2 meter square to see how lead may vary spatially within the field.

The group is under the direction of Ganga Hettiarachchi, a professor of soil and environmental chemistry who recently received a three-year grant for $700,000 from the U.S. Department of Housing and Urban Development to reduce human exposure to lead in soil, especially among children under age 6.

Most of the work will be done in neighborhoods around Kansas City, including up to a dozen brownfield sites, or land previously developed that is no longer in use and has known or suspected contamination; and another dozen residential sites.

“People think soil chemistry is basic science, and most of the time it is,” Hettiarachchi said. “But in this case, it is basic science that can be applied to public health.”

The Missouri Department of Health and Senior Services reports that lead-based paint and contaminated dust are the most common sources of exposure in the United States. Soil often becomes contaminated from natural weathering of exterior paint from houses and other structures. Areas around houses built before 1978 — when lead-based paint was banned — are more susceptible to lead contamination.

Amy Roberts, the project manager for the Kansas City Health Department’s Childhood Lead Poisoning Prevention and Healthy

STORY PAT MELGARES

Homes program in Missouri, said that "there are some zip codes where the lead poisoning rate is nine times the national average."

In 2021, the CDC estimated more than 500,000 U.S. children under age 6 have blood lead levels higher than 5 micrograms per deciliter, the level at which recommended public health actions be initiated.

Even though that recommendation has since dropped to 3.5 micrograms per deciliter, public health officials agree that no amount of lead is safe for children.

Beyond identifying the presence of lead, K-State's research will include applying soil amendments to residential sites to evaluate the potential benefits of immobilizing soil lead in its original place, known as in situ stabilization.

Hettiarachchi said basic soil chemistry – for example, adding phosphorus sources to soil, or applying mulch or wood bark in home landscapes – could be key to immobilizing or reducing direct exposure to lead and other contaminants in soil. The grid that the students formed in the Washington-Wheatley neighborhood will be used to test potential remediations.

"If we can find ways to reduce bioavailability of lead in these mildly contaminated soils in situ, I think that can be really beneficial for human health, and especially for children," Hettiarachchi said.

Roberts added: "It will be really nice to identify low-cost remediations to (reduce exposure to) contamination that will be longer-lasting … and it will protect the kids and their families more."

Roberts said research on reducing the bioavailability of lead in soil has been done in community gardens in the Kansas City area — research completed by Hettiarachchi in 2015 — but "this is the first time it's ever been done in residential housing."

Hettiarachchi went even further, saying "To our knowledge, there are no studies evaluating the benefits of adding in situ stabilization methods to current state and local lead poisoning mitigation programs."

"We anticipate that the findings from this study will improve the current practices adopted by the CDC's Childhood Lead Poisoning Prevention program around the nation."

Thus, K-State's research could be a model for similar practices in cities across the country, she said, noting that the U.S. Environmental Protection Agency manages the Brownfield program, and HUD is assisting cities and states to address lead poisoning issues.

"If we are successful in Kansas City … the lessons learned can be adopted by any other city around the nation. Kansas City could be a model city."

Other public and private groups are interested in the research and results. In addition to HUD, Hettiarachchi has formed partnerships with the Kansas City, Missouri Health Department and its Brownfields program; Children's Mercy Hospital; and the EPA's National Risk Management Research Laboratory in Cincinnati.

More information on the Kansas City lead testing program is available online from the Kansas City Health Department.

LEARN MORE AT
kcmo.gov/city-hall/departments/health/lead-poisoning-testing-children-and-homes-for-lead

FLINCHBAUGH FELLOWS PREP FOR CAREERS IN ADVOCACY

This year, five College of Agriculture students were named Flinchbaugh Food and Agricultural Policy Fellows. The program was recently named for the late Barry Flinchbaugh, a renowned agricultural economist and K-State professor. It offers students experience at both the state and federal level working with lawmakers, lobbyists and agricultural advocacy groups.

The fellowship program was the brainchild of a group of Kansas agriculture leaders and advocates, including Michael Torrey, K-State College of Agriculture alumnus, and principal and CEO of a Washington, D.C. lobbyist group.

“Government policies have a significant impact on the food and ag industry and strong leadership is needed,” said Torrey. “Our hope is K-State students can fill that role. As for success, we have watched students go through the program and then find jobs which utilize that experience. We hope to continue to grow participation and engagement.”

Since the program began in 2016, 23 students have gone through the program, according to Susan Metzger, Ph.D., administrator of the program and associate director for the K-State College of Agriculture and K-State Research and Extension.

“The students selected are incredibly bright,” said Metzger, “And they are paired with host partners who can provide them with valuable experiences and opportunities of interest to each particular student,” said Metzger. “The partners also benefit from having access and opportunities to recruit some of the best students in the country.”

Parker Vulgamore, one of this year’s policy fellows and a K-State Agricultural Economics major, is a fifth-generation wheat, corn and sorghum farmer from Western Kansas. He spent spring 2022 working for both the Kansas Grain Sorghum Producers Association and the National Grain Sorghum Producers Association. In the summer, Vulgamore shifted to his federal assignment, working in the Washington offices of U.S. Representative Tracey Mann and U.S. Senator Roger Marshall.

“I’ve learned a lot sitting in on committee meetings and talking with other state lobbyists and agricultural advocacy groups about food and ag policy. I feel immersed in the topic,” said Vulgamore. “The program has given me great mentors and a network of people to talk with and learn from.

“It’s become clear to me that the people making (agriculture) policy decisions must have experience and a background and passion for agriculture. I love farming. I know the producers I grew up with. I am passionate about it. I’ve found my purpose.”

Vulgamore returned to K-State this fall and is putting his new leadership skills to work as K-State’s student body president.

STORY FAYE SMITH AND SUSAN SCHIFF
PHOTO DAN DONNERT
IN THE PHOTO PARKER VULGAMORE
LOCATION WATERS HALL

GARDEN HOUR: COVID-ERA SEED CONTINUES TO ROOT AND BLOOM

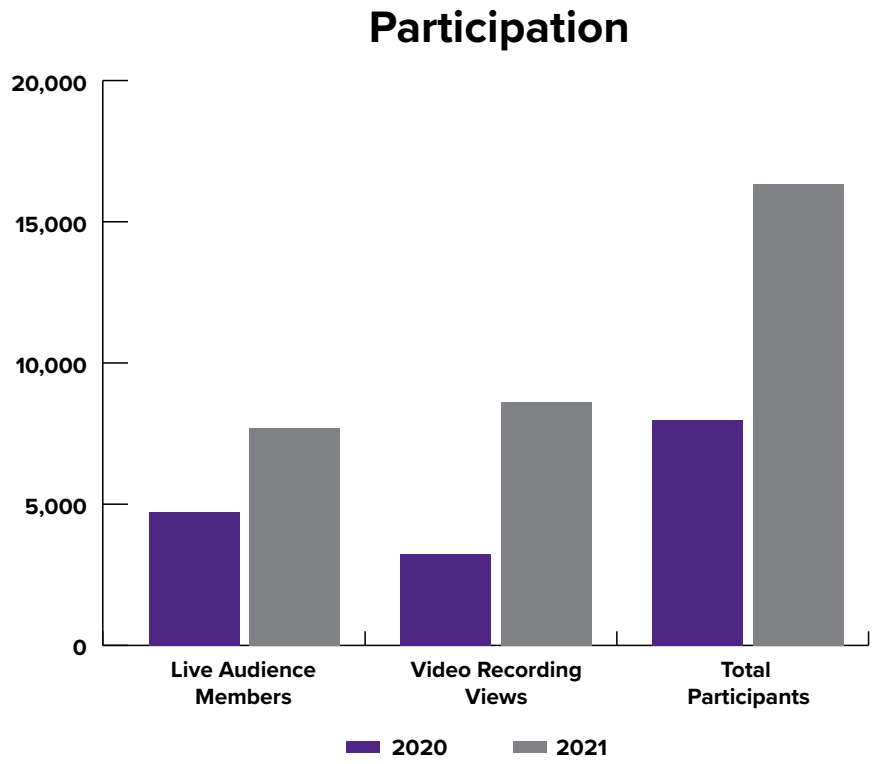
Pivoting to meet the needs of gardening enthusiasts confined to home, K-State Research and Extension Horticulture specialists created the K-State Garden Hour webinar series at the beginning of the COVID-19 pandemic. The popularity of the program grew quickly, with the number of participants more than doubling between 2020 and 2021. The program reached people in all 105 Kansas counties, 39 states and five countries.

Participants who completed surveys following the series reported:

- 73% made efforts to improve water quality
- 77% implemented five strategies to improve pollinator habitat
- 56% reported improved physical and emotional health
- 80% implemented science-based practices like reading and understanding fertilizer and pesticide labels, identifying plant problems and selecting proper plants for their local environments

"The K-State Garden Hour Webinar Series has given our statewide Horticulture Program Focus team a platform to showcase the deep talent in our horticulture, agriculture, natural resources, family and consumer sciences and youth development staff," said Cheryl Boyer, associate professor, Horticulture, Forestry and Recreation Resources and creator of the K-State Garden Hour. "Collaborating from border to border and throughout our system has elevated our effort to serve the public of Kansas (and beyond) in ways we never imagined. Delivering this program and gathering impact data (both personal and community) from knowledge gain, to intention to change, through achieved behavior change is deeply rewarding."

STORY MEG DRAKE
PHOTO DAN DONNERT
IN THE PHOTO CHERYL BOYER
LOCATION KANSAS STATE UNIVERSITY GARDENS



AN EYE ON THE TAP

For farmers and ranchers in Kansas, drought concerns are always looming, so community conversations about conservation and water use are ongoing and vital. Concerns are ever present about ponds dwindling to muddy puddles, and recently irrigators learned that the Ogallala Aquifer – a main water source for the state – declined last year by an astounding two feet in parts of Kansas.

The urgent work on water conservation forms part of the foundation for the Kansas Center for Agricultural Resources and the Environment (KCARE). Established by Kansas State University, KCARE works to coordinate water and natural resource research, including multiple projects addressing aquifer declines.

But that's only the tip of the iceberg: think "quality," in addition to "quantity."

Consider oil, trash, pet waste or chemicals seeping into storm drains after a downpour, or pesticides and fertilizer leaching off a farmer's fields. Maybe sediment washes away from construction sites or erodes from streambanks.

All are examples of "non point source pollution," and over time it negatively impacts the water from your faucet, the pond on your farm, or the rivers and reservoirs you visit. In fact, many states have named non-point source pollution as the leading cause of water-quality problems.

For more than 20 years, KCARE has been helping reverse those harmful effects by empowering a team of watershed specialists who actively partner with producers, municipalities and other important water users to identify and implement science-based solutions to improve water quality.

"We must conserve Kansas water while also safeguarding the quality of the waters we enjoy here," said Associate Director for the College of Agriculture and K-State Research and Extension Susan Metzger. She said KCARE watershed specialists actively partner with water users to implement on-the-ground practices that assist both producers and municipalities to limit the amount of sediment and nutrients entering Kansas waters.

This grassroots approach works. Metzger said the program has prevented tens of thousands of tons of sediment from entering rivers and reservoirs.

"The desire of clean water is a constant in our communities," said KCARE watershed specialist Ron Graber. "Our job is to listen to producers and other stakeholders, and help folks work toward common goals. I think we're all making a difference."

Graber said that the work has evolved over the years, from identifying water quality concerns, to implementing solutions, or best management practices that match a community's needs. Best management practices can range from planning alternative livestock watering facilities, to reducing atrazine use on cropland, to stabilizing streambanks. Watershed specialists provide technical assistance to producers to explain which solutions are right for their specific situation and assist farmers to identify financial programs to offset costs.

"This important work goes beyond providing the public with facts and figures. It remains successful because

STORY MELISSA HARVEY AND KCARE

each team member combines scientific expertise with a focus on relationships and people," Metzger said.

"If you get to know someone and then explain how we can create a solution together, it's more effective than just telling them to fix a problem," said Graber. "When we work together, then it's a win for Kansas water."

LEARN MORE BY FOLLOWING KCARE'S WORK ON FACEBOOK AND TWITTER **@KStateKCARE**

ON CALL: KANSAS FOREST SERVICE AIDS IN FIREFIGHTING

Prairie fires are a concern for all who call the Great Plains home. They are beautiful, but terrifying and destructive. Those that fight them must be both courageous and dedicated to taming them.

In December of 2021, central and western Kansas counties were ravaged by several large wildfires. Two people died, 42 structures were destroyed, and 200,000 acres burned. Yet in the midst of this tragedy, Kansans banded together to stop the spread and eventually extinguish the fires.

"The level of support at all stages of this crisis was phenomenal," said Gregg Hadley, director of K-State Research and Extension. "People were going above and beyond to help wherever they could. We had 4-H agents doing what they do best, coordinating volunteers, as well as community members donating time and resources.

"Extension professionals provided these communities education on everything from stress and resiliency to pasture restoration and setting up emergency feeding programs," added Hadley.

Jason Hartman, state forester for the Kansas Forest Service, said "The first line of defense for almost all Kansas wildfires is the local fire departments. The majority of wildfires can be extinguished within a couple of hours, but sometimes the fire fighters need more help. That's when local departments call on neighboring counties under mutual aid agreements. If it takes more than three or four counties' fire departments, that's often when a request is made by the local departments for the Kansas Forest Service, Kansas Emergency Management and the Fire Marshall to get involved, which is what happened in December."

When Kansas fire departments are nearing their capacity, help can also be called from other six other states through the Great Plains Interstate Fire Compact, whose member states include Kansas, Colorado, Nebraska, New Mexico, North Dakota, South Dakota and Wyoming. While this aid won't arrive as quickly as that from neighboring counties, the help can still provide great relief to exhausted local fire departments.

"Most of the fire fighters who respond to Kansas wildfires are volunteers," said Hartman. "When that out-of-state help arrives, our local volunteers have been working tirelessly and could use a well-deserved rest. They need to go home, back to work, and those resources can provide relief. This is all a fairly new concept, so I think people will get used to it and start asking for help sooner, which will hopefully keep fires smaller when they do get out of control, and reduce the damage to property."

Ryan Melin, state fire management officer for the North Dakota Forest Service, recalled, "In spring of 2021, North Dakota burned 100,000 acres more than in previous years. We were still waiting for some of our seasonal help to arrive and we were severely shorthanded, so we ended up getting help from other states in the Compact. Within an hour of getting here, that team of volunteers from other states was out responding to a call and they were fighting fires every day for the 21 days they were here. Because of their help, there was no loss of life and no primary residences were destroyed. One group from Colorado even came across a car accident when they were enroute between calls and were able to perform life-saving maneuvers while waiting for the ambulance to arrive.

LEARN MORE ON WILDFIRES AND PREVENTING FIRES AT **kansasforests.org**

STORY ANNIKA WEIBERS
PHOTO DAN DONNERT
IN THE PHOTO JASON HARTMAN
LOCATION KANSAS FOREST SERVICE

The Great Plains Interstate Fire Compact was started to make resources available to states when the federal government has shortages," Melin said. "When a call does go out, everyone steps up. It's like asking for help from your neighbor."

Over his years as state forester, Jason Hartman has seen an uptick in the number of more severe wildfires, but there are ways for Kansans to prepare. The Kansas Forest service has several tips for preventing wildfires, including cutting your lawn short after the first frost of the year, maintaining prescribed burning practices, and keeping your property clear of dead vegetation.

"I think people need to be aware that wildfires are a possibility, just like tornadoes, and that they play a role in preventing them to keep themselves safe and to protect their crops and livestock," said Hartman. "The best way to keep Kansans safe is Kansans themselves."

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