



**K-STATE**  
Research and Extension

## Extension Agronomy

# eUpdate

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*01/23/2025*

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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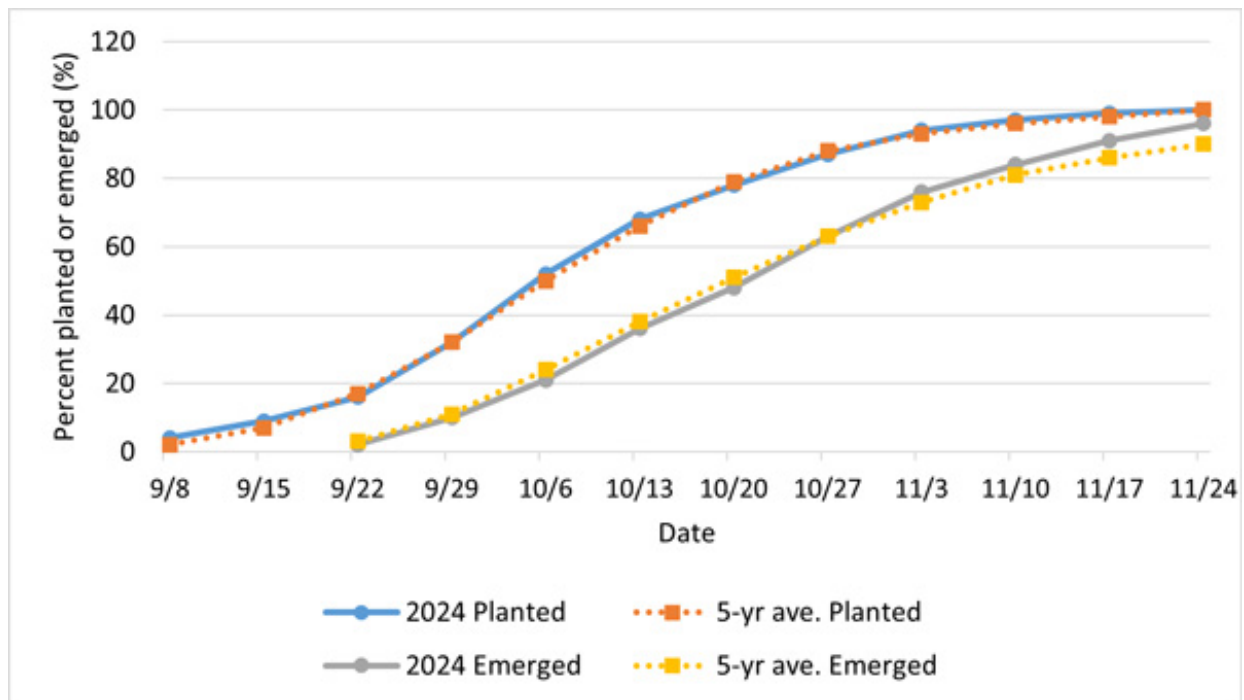
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## 1. Potential for winterkill to the Kansas wheat crop

The extremely cold temperatures observed in Kansas in mid-January 2025 have the potential to cause winterkill to the winter wheat crop. However, several factors determine whether winter wheat will survive the winter and this particular cold spell. The most important factors from the crop's perspective include proper cold hardening and root system development, as well as the overall crop status in terms of damage from pests. From an environmental perspective, important factors include air temperature, consequent soil temperatures at the crown level, snow cover, and soil moisture content.

### Crop condition by region

The condition of the 2025 Kansas wheat crop is variable depending on the region and the planting and emergence dates. Overall, some precipitation occurred in parts of the state in September, which was followed by a dry spell in late September and into October, followed by a wet late-October into November. This precipitation dynamics allowed growers to harvest summer crops on time and to move along on wheat planting, whose pace was very close to the historical average (Figure 1). However, the dry spell during October somewhat delayed the emergence of the crop that did not get planted after the early September rain events until late October (Figure 1). At this point, when precipitation occurred again across the state, the percent emerged increased and surpassed the historical average since most of the summer crops had been harvested and the wheat planted.

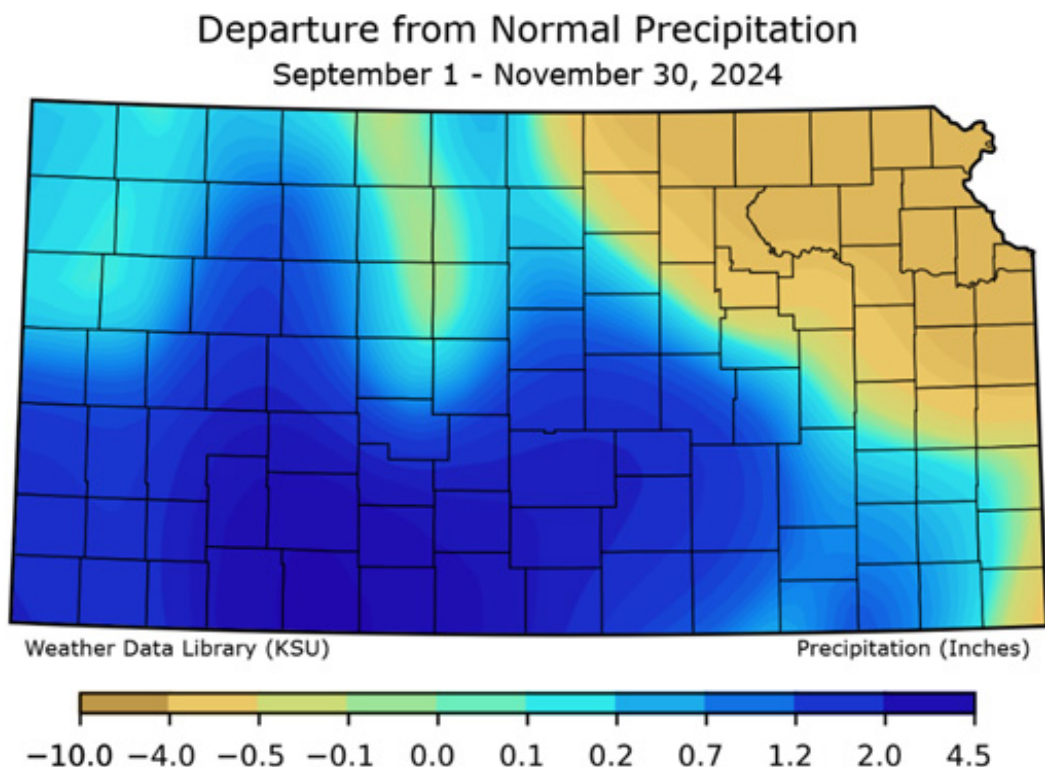


**Figure 1. Winter wheat planting and emergence progress in 2024 (smooth lines) as compared to the 5-yr average (dotted lines) for the state of Kansas. Data source: USDA-NASS.**

The good amount of late fall precipitation, coupled with above-average fall temperatures (Figure 2),

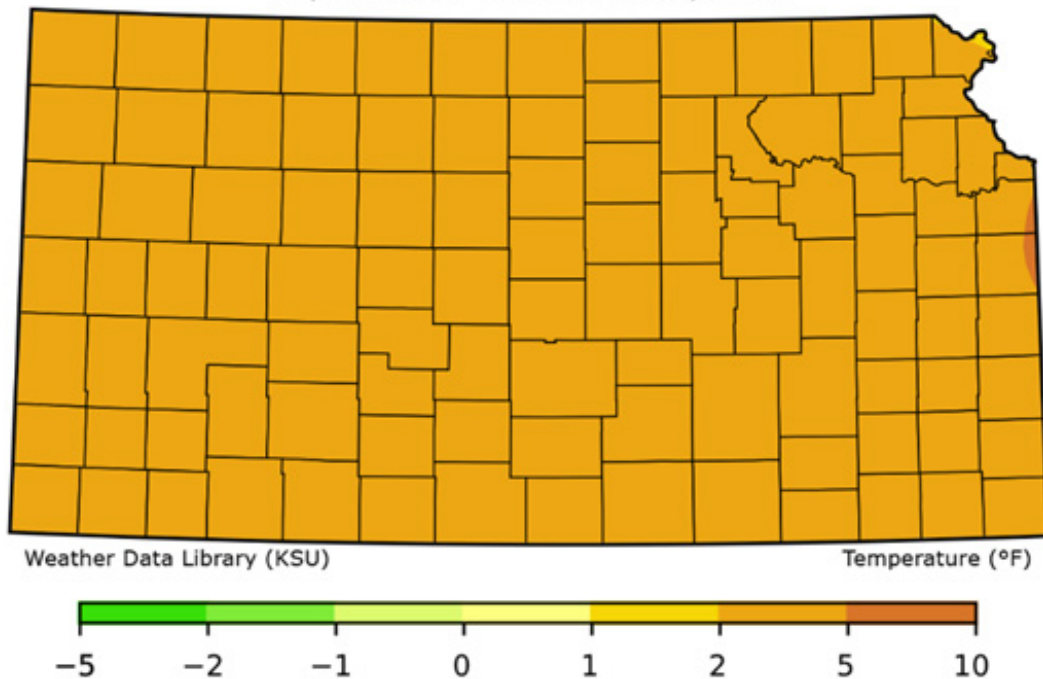
were positive in allowing the crop to establish and tiller during the fall. In fact, some reports from growers in south central Kansas suggest that the early planted crop produced a large amount of biomass during the fall, perhaps being considered “too big”. The large number of tillers and consequent good root development may have allowed for good winterhardiness development, although excessive tillering can increase moisture consumption and worsen the crop’s potential to survive through the winter due to a dryer subsoil. Some fields planted after the harvest of a summer crop could be exceptions, perhaps emerging late and having much more limited development in the fall both in terms of tillers and root development, thus being more exposed to potential consequences of the cold temperatures. However, for the most part, the Kansas wheat crop was off to a good start in the 2025 growing season.

A well-developed crop with 3-5 tillers can handle air temperatures during the winter in the single digits fairly well. Over 60% of the Kansas wheat crop emerged by mid-October and likely fall in this category. However, soil temperatures in the single digits can cause significant damage and winterkill, especially to less developed crops, such as the fields that emerged after November (about 25% of the Kansas crop), which will be more sensitive to winterkill with higher temperature thresholds for damage.



## Departure from Normal Temperatures

September 1 - November 30, 2024



**Figure 2. Departure from normal precipitation (upper panel) and departure from normal temperature (lower panel) between September 1 and November 30, 2024. Source: Kansas Mesonet.**

### **Weather conditions: Air and soil temperatures**

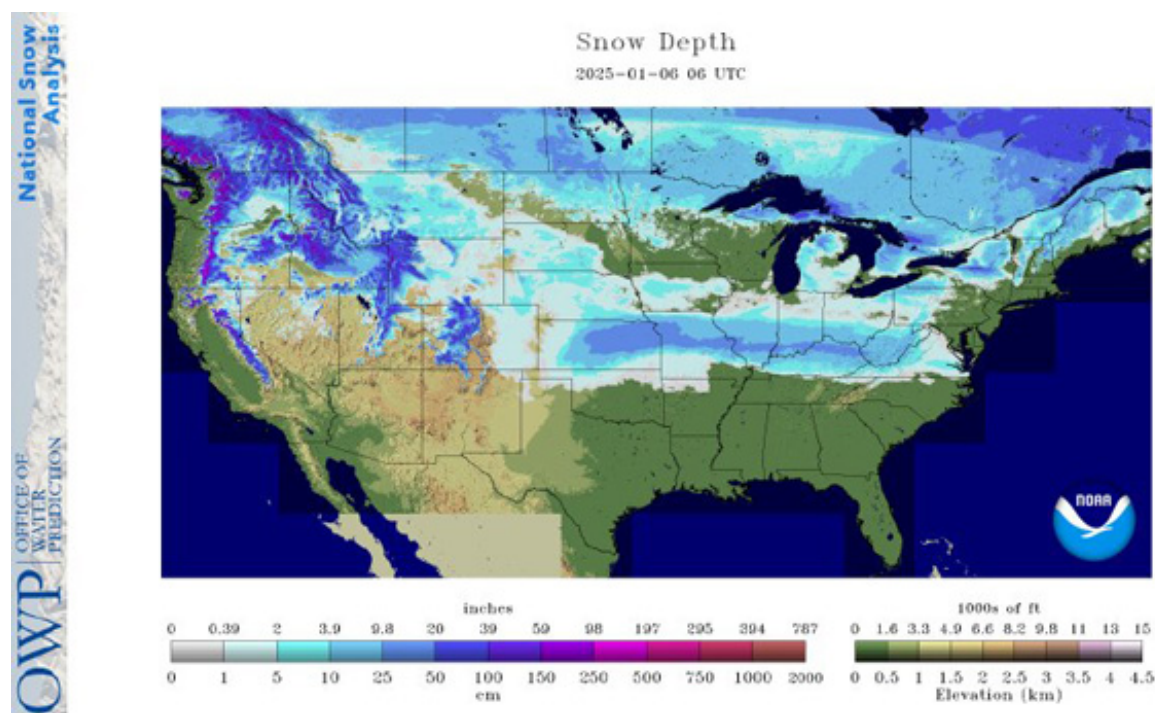
During the current cold stretch that began on January 18 and lasted through the 21st, air temperatures have dropped as low as  $-15^{\circ}\text{F}$  in lower valleys of the state (Figure 3). These temperatures were cold enough to cause leaf burn and, if soil temperatures reached these levels, could potentially cause winterkill. However, some areas of the state, central and northeast, were still snow-covered from the January 6<sup>th</sup> snowfall event. Despite the west remaining mostly snow-free, soil temperatures at the 2" depth never dropped below  $20^{\circ}\text{F}$  across the state (Figure 3). Soil temperatures at these levels are likely not cold enough to cause winterkill to a well winter-hardened wheat crop.



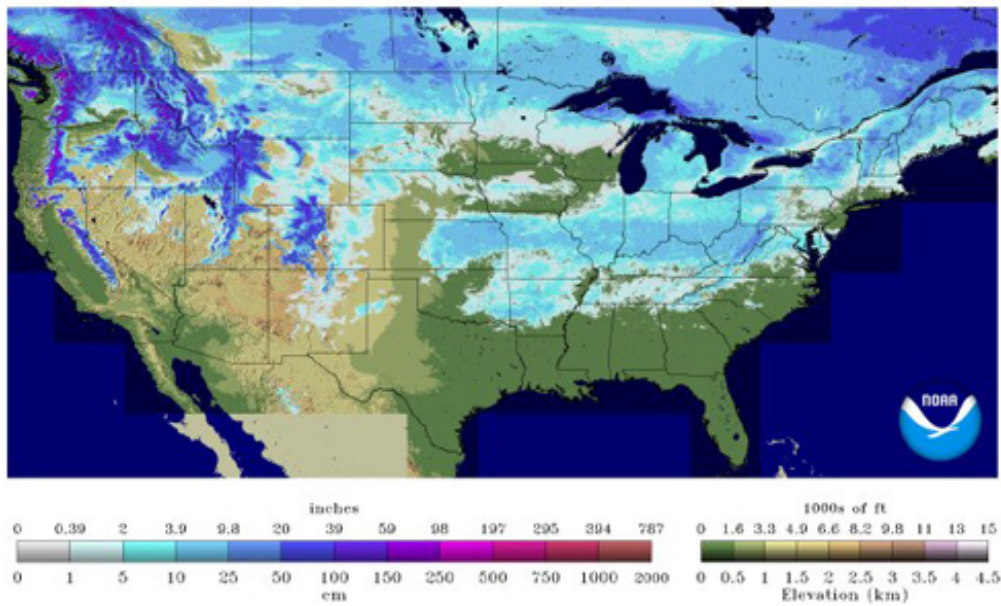
## Weather conditions: Soil moisture and snow cover

Two environmental factors that affect the crop's response to cold temperatures due to their potential of buffering of low air temperatures are soil moisture content and snow cover. The relatively moist fall led to high percent saturation of soil water at the majority of the state (while 5- and 10-cm measures are mostly unavailable due to frozen soils, the 20- and 50-cm maps of the Kansas Mesonet Soil Moisture suggest that most stations are currently above 70-80% saturation, <https://mesonet.k-state.edu/agriculture/soilmoist/#mtIndex=2>). Wetter soils help in buffering changes in soil temperature as a function of the low air temperatures observed.

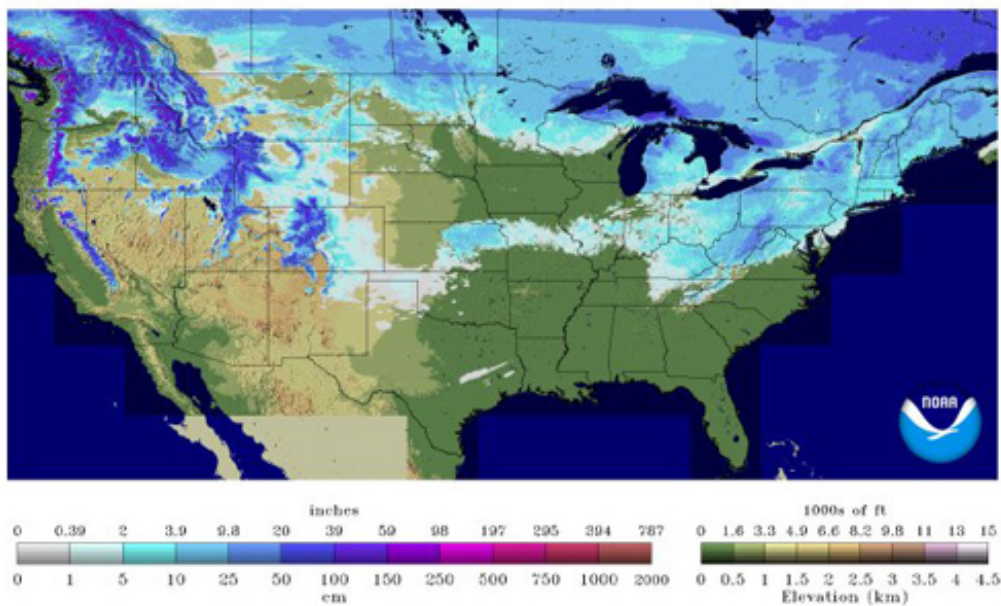
Regarding snow cover, most of Kansas's wheat-growing region had good snow cover levels from January 6 until about January 14, and parts of central and north central Kansas had decent snow cover until January 21 (Figure 4). The western portion of the state had only limited and shallow snow during the cold temperatures experienced on January 18-21. Where the crop had at least 2-3 inches of snow cover, this snow should have been sufficient to insulate the wheat crop from the coldest temperatures. However, the combination of extremely cold air temperatures and lack of snow coverage, particularly in western Kansas, could leave the crop exposed and result in some winterkill, particularly in terrace tops, late-planted fields, and other more exposed areas.



Snow Depth  
2025-01-14 06 UTC



Snow Depth  
2025-01-21 06 UTC



**Figure 4. Snow depth as of January 6, 14, and 21, 2025, as reported by the National Oceanic and Atmospheric Administration.**

**What is the potential for damage, and what should we look for?**

The biggest potential for winterkill is in fields that either emerged too early and had a very lush top growth, consequently drying the soil, or those fields that emerged very late and thus had limited tiller and root development. In particular, fields with very limited snow cover (less than 2-3 inches) in more exposed areas of the terrain (e.g., terrace tops) are more prone to winterkill.



We will not know the extent of winterkill in the state until temperatures start to warm up and the wheat starts to green up later in the spring, so there is nothing growers can do at the moment. This will likely occur in mid- to late-March, so at least another 50-60 days. As wheat green-up progresses later in the year, any winter injury will become more apparent. Injured wheat may initially green up, then go backward.

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## 2. Looking back: Kansas 2024 weather in review

### Temperature

2024 was a warm year across Kansas. The average temperature for the year was 57.5° or 3.4° above normal. This ranked 2024 as the 2<sup>nd</sup> warmest of the last 130 years (tied with 1935) according to NCEI, the National Centers for Environmental Information, whose monthly climate averages date back to 1895 (<https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/mapping>). Kansas was not alone in being above normal; a total of 17 states recorded their warmest year on record. Kansas was one of 13 states to finish at 2<sup>nd</sup> warmest. Nationally, it was the warmest year on record, about one-quarter degree ahead of 2012's mark.

Ten of the twelve months averaged above normal in Kansas; only January and July were below normal (Table 1). Of the 366 days in the year, 237, or 64.8%, were above normal, based on data from the Kansas Mesonet. The most below-normal month was January (statewide average departure of -5.2°), largely due to a bitterly cold air mass that brought sub-zero temperatures to the state. There was a 13-day period of below-normal temperatures from January 9-21, the year's longest stretch. The year's coldest temperature was recorded during this period: -22° on the 15<sup>th</sup> at the Wallace County Mesonet site and in Herington on the 16<sup>th</sup>. Interestingly, this cold spell was followed by the year's longest stretch of above-normal days, 19, that began on January 22 and lasted through February 9. This helped February finish as the most above-normal month of the year (+8.8°). Ten counties recorded their warmest February on record, including Brown County, where the departure of +11.7° was the highest in the state.

All three months of meteorological spring (March, April, and May) averaged above normal in all divisions, and when combined, it was the 2<sup>nd</sup> warmest spring on record in southeast Kansas, the 3<sup>rd</sup> warmest in east central, and the 6<sup>th</sup> warmest in northeast Kansas. The average temperature in the summer months of June, July, and August was slightly less than one degree above normal in the state, thanks in part to a colder-than-normal July. The summer was still hot, and most locations exceeded their average number of 90-degree days, including Dodge City (78/normal 71), Wichita (77/65), Goodland (75/52), and Topeka (57/50). But the counts of the hottest days, when highs were at or above 100, were close to or fewer than normal at many locations, such as Dodge City (10/normal 14), Topeka (4/6), Manhattan (2/10), and Pittsburg (0/5). Medicine Lodge won the "triple crown" by having the most 90-degree days (113), the most 100-degree days (37), and the hottest reading recorded anywhere in the state: a sizzling 115° on August 24<sup>th</sup>.

Autumn was very warm, and the combined months of September, October, and November ranked as the 4<sup>th</sup> warmest meteorological fall in the state. In northwest Kansas, the average temperature of 57.4° tied 1963 for the warmest fall on record, a departure from normal of +4.1°. The remaining divisions in the state all ranked between 4<sup>th</sup> and 6<sup>th</sup> warmest fall out of the past 130 years. December continued the above-normal trend; it was the fifth consecutive above-normal month in the state and helped to boost the year-end ranking from 4<sup>th</sup> warmest for the first 11 months of the year to tied 2<sup>nd</sup> warmest. Northwest Kansas led the way again, setting a new record for their warmest December. The average December temperature of 37.2° exceeded the old record of 37.0° in 2021.

**Table 1. Monthly average temperatures and precipitation for Kansas, along with departures from normal. Source: National Centers for Environmental Information.**

Month	Temperature		Precipitation	
	Average (°F)	Departure	Average (in.)	Departure
January	25.9	-5.2	1.30	+0.58
February	43.8	+8.8	0.94	-0.03
March	47.1	+2.3	0.93	-0.86
April	57.3	+3.4	2.31	-0.37
May	65.3	+1.4	4.04	-0.17
June	77.2	+3.0	4.47	+0.42
July	78.0	-1.0	2.88	-0.97
August	77.6	+0.5	3.47	-0.04
September	71.1	+2.3	1.62	-0.90
October	62.5	+6.3	0.91	-1.41
November	46.4	+3.1	4.33	+3.03
December	38.0	+4.8	0.18	-0.89
<b>YEAR</b>	<b>57.5</b>	<b>+2.5</b>	<b>27.38</b>	<b>-1.62</b>

## Precipitation

While annual precipitation averaged below normal in 2024, it was Kansas' wettest year since 2019. 2024 was the 5<sup>th</sup> consecutive year with below-normal precipitation, but the total was closer to normal than in the previous four years. The state's average precipitation for 2024 was 27.38", or 1.62" below the normal amount of 29.00" (Table 1). Only two divisions were above normal for the year: southwest (departure +0.90") and west central (+0.20") Kansas. Northeast Kansas was close to normal, finishing 2024 less than one-quarter inch below normal (-0.21"). North central was the most below normal division for the year, with a departure from normal of -3.56". Only three months had above normal average precipitation: January, June, and November.

This past November was the second wettest on record, averaging 4.33" across the state. The normal amount for November is just 1.30". 2024's total was 0.35" shy of the record holder, 4.68" in 1909. It was the wettest November on record in both northwest and west central Kansas and the second-wettest November in south central as well as in southwest Kansas, where the average of 3.26" was over five times the monthly normal and finished just 0.05" behind the wettest November on record in 1909. At least 30 observing sites in the state recorded their wettest November on record, including at Wichita (6.99"), Dodge City (6.38") and Goodland (3.35"). The wettest location in the state was in Montgomery County at Havana 4.2 N (CoCoRaHS observer), with 10.55". The last time any location in the state had 10 inches or more of precipitation in November was back in 1998. Of the nine months with below-normal precipitation, October had the lowest percentage of normal (39%), and when combined with September, the two-month period was the 10<sup>th</sup> driest September and October on record.

Approximately 63% of the state had below-normal precipitation for the year, based on data from the most complete data records in 2024, which number about 400. Goodland's total of 14.46" was 4.63" below normal, while Wichita, which had about twice as much precipitation (28.97"), was 5.34" below normal. One county south, Wellington in Sumner County, had one of the largest deficits in the state; their total for 2024 was 25.84", or 10.30" below normal. Other locations more than 6 inches below normal for 2024 include Independence (-9.52") and Salina (-7.58").

Despite the majority of below-normal totals, there were some high precipitation totals for the year. Humboldt in Allen County had the most in the state in 2024 with 50.70", or 8.40" above normal. Greensburg (+9.15"), Dodge City (+8.45"), and Cimarron (+7.28") were also at least 6 inches above normal for the year.

Snowfall totals across Kansas for the calendar year were generally a few inches below normal. The highest amount in the state for the year, 25.6" at Goodland, was 4.4" below the normal annual amount of 30.0". Dodge City's 16.3" was 2.8" below average, while Topeka's total of 12.6" was 4.5" below normal. Wichita's 6.3" for the year was just under half the normal amount of 12.7". While it is normal for southeast Kansas to have the least snowfall on average, 2024's totals were well below normal. Erie, in Neosho County, had just 2.4" of snow for the year. Other low totals include 2.5" in Columbus, 3.4" in Arkansas City, and 4.6" in El Dorado.

December was a dry month, so there was a lack of snow across the state. Goodland recorded no snow during the month for only the fifth time on record. The last time no snow fell in Goodland during December was in 2002. Wichita was snow-free in December, and Dodge City and Topeka measured only a trace.

## **Drought**

Drought conditions in Kansas at the end of 2024 were better than at the start of the year at most locations. A measure of the collective improvement during the year is the Drought Severity and Coverage Index (DSCI), a single numerical value that describes the average drought condition across Kansas. It is based on the percentages of each state within each drought category and can range from 0 (the entire state is drought-free) to 500 (the entire state is in D4, the worst drought category). At the start of 2024, the DSCI was 155. The highest value during the year was 211 on October 29 and was lowest on July 9 at 69. The DSCI at year's end was 94. A total of 35% of the state was drought-free in the final drought update on December 31. The state's drought-free percentage was as high as 49% in February and fell to a low of 1.5% on November 5. There was no D2 or worse drought anywhere in the state at the end of the year; the last remaining D2 was removed on November 19. The last time Kansas had no areas in D2 or worse status prior to this year was back in July 2021.

## **Severe Weather**

Kansas averages 85 tornadoes a year (Source: Storm Prediction Center). The preliminary count of tornadoes in 2024 in Kansas is 89. Despite the above-normal count, there was only one strong (rated EF2 or higher) tornado in the state this year. It was an EF3 that struck Westmoreland in Pottawatomie County on April 30. Sadly, there was one fatality associated with this tornado, but this was the only tornado death in the state this year. There were nearly 500 reports of severe hail of 1" or greater in diameter during the year (495). May had the most reports in a calendar month with 137. There were 86 reports of hail at least 2" in diameter during the year. Of these, the largest report was 4.5" diameter hail in Gove County on May 1<sup>st</sup>. Wabaunsee, Dickinson, and Phillips Counties had 4" diameter hail reports. The Manhattan area had 3.5" diameter hail on June 13.

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### 3. Updated - Wheat Rx seminar on February 12 in Salina

A prescription for producing high-yielding and high-quality wheat is just what the doctor ordered for Kansas wheat producers. [Kansas Wheat Rx](#) combines suggested management practices for the economical and sustainable production of high-quality winter wheat in Kansas.

Mark the calendar now for an upcoming seminar on February 12 at the Great Plains Corporate Office in Salina, KS. Speakers will discuss variety selection, weed control, disease management, soil fertility, and more. Attendees will also learn more about Great Plains Ag, tour its Salina facility, and about a new project between K-State and the Kansas Wheat Commission to help growers benefit from ongoing government and private conservation programs.

#### **Program agenda:**

8:30 AM – Coffee and registration  
8:50 – Welcome by Aaron Harries, Kansas Wheat Commission  
9:00 – Dr. Allan Fritz, K-State wheat breeder  
9:45 – Dr. Sarah Lancaster, K-State weed science specialist  
10:30 – Break  
10:45 – Dr. Kelsey Andersen Onofre, K-State wheat pathologist  
11:30 – Dr. Dorivar Ruiz Diaz, K-State soil fertility specialist  
12:15 – Lunch  
1:00 – Dr. Romulo Lollato, K-State wheat and forage specialist  
1:45 – Great Plains facility tour

This event is free for members of the Kansas Association of Wheat Growers (KAWG). It costs \$110 for non-members; however, the event fee includes KAWG membership.

Online registration will open soon at [kswheat.com/wheatrx](http://kswheat.com/wheatrx)

These programs are part of Wheat Rx, a partnership between Kansas Wheat and K-State Research and Extension, to disseminate the latest research recommendations for high-yielding and high-quality wheat to Kansas wheat farmers. This effort includes a series of extension publications at [kswheat.com/wheatrx](http://kswheat.com/wheatrx) and educational outreach like the upcoming seminars.

FREE FOR KAWG MEMBERS  
\$110 FOR NON KAWG MEMBERS  
(PRICE INCLUDES KAWG MEMBERSHIP AND FREE EVENT ATTENDANCE)

# KANSAS WHEAT Rx

A combination of suggested management practices  
for economical and sustainable production  
of high-quality winter wheat in Kansas



**FEBRUARY 12, 2025**

**8:30AM - 3PM**

LUNCH AND FACILITY TOUR INCLUDED

**SALINA**

Great Plains Manufacturing  
(1525 E. North St. - Salina, KS)

Romulo Lollato, Wheat and Forages Specialist  
[lolato@ksu.edu](mailto:lolato@ksu.edu)

#### 4. Winter Agronomy Series on corn and sorghum in southwest Kansas

K-State Research and Extension is hosting a series of winter schools in southwest Kansas focusing on corn and sorghum. Program topics include dryland crop rotations, soil fertility, and pest management (weeds, insects, and disease). The corn leaf hopper, a new pest for corn producers in Kansas, will be discussed. A free meal will be provided at all locations.

Locations and dates:

- **Greeley County: February 3**

9:00 AM MT to noon MT

Greeley County 4-H Building, 1001 Ingalls Ave, Tribune, KS 67879

Contact Todd Schmidt to RSVP

[tschmidt@ksu.edu](mailto:tschmidt@ksu.edu) or 620-376-4284

- **Stevens County: February 4**

9:00 AM CT to noon

Stevens County 4-H Building, 1130 S. Trindle St., Hugoton, KS 67951

RSVP at 620-376-4284 or online at [https://k-state.qualtrics.com/jfe/form/SV\\_ahZVcCRjIhwXye2](https://k-state.qualtrics.com/jfe/form/SV_ahZVcCRjIhwXye2)

- **Pratt County: February 5**

9:00 AM CT to noon

Pratt Area 4-H Center, 81 Lake Road, Pratt, KS 67124

Contact Jenna Fitzsimmons by Jan. 31 to RSVP

[jbfitzsimmons@ksu.edu](mailto:jbfitzsimmons@ksu.edu) or 620-672-6121

- **Pawnee County: February 5**

6:00 PM CT to 9:00 PM

J.A. Haas Building, 403 E. 18<sup>th</sup> St., Larned, KS 67750

Contact Kyle Grant by January 31 to RSVP

[kkgrant@ksu.edu](mailto:kkgrant@ksu.edu) or 620-285-6901

The speakers and topics for each event will be the same across all locations.

- Dryland crop rotations for corn and sorghum – Logan Simon
- Soil fertility for corn and sorghum – Dorivar Ruiz Diaz
- Weed management in corn and sorghum – Jeremie Kouame
- Insect pest management in corn and sorghum – Anthony Zukoff
- Disease management in corn and sorghum – Rodrigo Onofre

Logan Simon, Southwest Area Agronomist

Kansas State University Department of Agronomy

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## 5. Winter Agronomy Series features alternative crops for southwest and south central Kansas

K-State Research and Extension is hosting a series of winter schools in southwest and south central focusing on three alternative crops – winter canola, camelina, and cowpea. Program topics will address production considerations and marketing opportunities for these crops. Speakers include Logan Simon and Mike Stamm from K-State and Jeff Frazier from Scoular.

Locations and times:

### **January 28 – 6:00 PM**

Grant County Civic Center – Lawson Room  
1000 W Patterson Ave  
Ulysses, KS 67880

### **January 29 – 12:00 PM**

Gray County Extension Office – 4-H Building  
17002 W Hwy 50  
Cimarron, KS 67835

### **January 30 – 12:00 PM**

Stafford County Extension Office  
210 E 3<sup>rd</sup> St.  
St. John, KS 67576



# ALTERNATIVE CROPS

## KSRE SW & SC Winter Agronomy Series

### LOCATIONS AND TIMES:

- **January 28, 6:00 PM - Grant County Civic Center**
  - Lawson Room, 1000 W Patterson Ave, Ulysses, KS 67880
- **January 29, 12:00PM - Gray County Extension Office**
  - 4-H Building, 17002 W. Hwy 50, Cimarron, KS 67835
- **January 30, 12:00PM - Stafford Co. Extension Office**
  - 210 E 3rd St., St. John, KS 67576

### PROGRAM TOPICS:

- Canola and camelina production considerations
- Marketing opportunities for canola and camelina
- Cowpea (black-eyed pea) production considerations

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Mike Stamm, Canola Breeder  
[mjstamm@ksu.edu](mailto:mjstamm@ksu.edu)

## 6. Save the Date: Kansas Agricultural Technology Conference - March 7

This year, the Kansas Agricultural Research and Technology Association (KARTA) and the KSRE River Valley District are collaborating to put on a "Wild" KATCON in Clay Center, KS, on Friday, March 7. This will be an all-day event from 9 AM - 7 PM. There will be numerous presentations, divided between K-State Extension Specialists and farmer/industry researchers, with an evening presentation delivered by Dr. Wes Lowe of Mississippi State University on the use of "See & Till" technology. There will also be several hours of structured time for trade show participation and a catered lunch and supper.

Registration for the conference is \$75. Agribusinesses or organizations that would like a table at the trade show have a \$375 vendor fee that includes two conference registrations and a five-minute promo spotlight during the program.

The agenda is still being finalized. For more information and to register, please visit the KARTA website at <https://www.karta-online.org/>.

The Kansas Agricultural Research & Technology Association is a grassroots organization of farmer citizen scientists who conduct on-farm research and technology trials on farm-wide scales and share actionable results among their peers.

**26<sup>th</sup> KANSAS  
TECHNOLOGIES**

**AGRICULTURAL  
CONFERENCE**



**WILD**

**FRIDAY,  
MARCH 7<sup>th</sup>,  
2025**

**KATCON  
2025**

**CLAY  
CENTER,  
KS**

*Kansas Agricultural Technologies Conference*

**KARTA**  
Kansas Ag Research & Technology Association

Presented by



**K-STATE**  
Research and Extension

River Valley  
District



**SAVE THE DATE!**

Kansas State University is committed to making its services, activities and programs accessible to all participants. If you have special requirements due to a physical, vision, or hearing disability, contact Luke Byers, 785-632-5335.

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