



Extension Agronomy

eUpdate

01/06/2017

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update 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 Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. New dicamba products labeled for use on Xtend soybeans and cotton

Two new low-volatile formulations of dicamba products designed specifically for use on dicamba tolerant soybeans (Roundup Ready 2 Xtend soybean varieties) and cotton (XtendFlex cotton varieties) have now been approved by the U.S. Environmental Protection Agency. This means that the traits, export approvals, and some herbicides for use on varieties with these traits have finally been approved.

Roundup Ready 2 Xtend (RR2X) soybeans are resistant to both dicamba and glyphosate, while XtendFlex cotton is resistant to dicamba, glyphosate, and glufosinate (Liberty).



Figure 1. RR2X soybean response to dicamba several hours after treatment. Photo by Dallas Peterson, K-State Research and Extension.

The two dicamba products that have been approved for use on Xtend soybeans and cotton are XtendiMax from Monsanto and Engenia from BASF. XtendiMax and Engenia have significantly lower volatility than other dicamba products such as Clarity and Banvel, which are not approved for use on Xtend crops. Use of dicamba products not specifically labeled for use on Xtend crops is an illegal treatment.

Both products have regular labels that are similar to the Clarity label, but use on Xtend crops is addressed in supplemental labels with very specific guidelines for applications to Xtend crops. In addition, there are associated websites which will allow for possible modifications and updates to the supplemental labels over time.

Below are some of the specific guidelines currently listed on the supplemental labels for XtendiMax and Engenia use on Xtend crops.

Rates

XtendiMax rates:

22 to 44 oz/acre preplant or preemergence with a maximum total of 44 oz

22 oz/acre postemergence with a maximum of two applications

Engenia rates:

12.8 oz/acre preplant or preemergence with a maximum of two applications

12.8 oz/acre postemergence with a maximum of two applications

Note: 22 oz of XtendiMax and 12.8 oz Engenia both provide 0.5 lb ae dicamba

Application timing

Application Timing to Xtend Soybeans: Preplant through R1 soybeans

Application Timing to Xtend Cotton: Preplant until 7 days prior to cotton harvest

Application Timing to Weeds: Less than 4 inches tall

Other label requirements

Do not apply with ammonium-containing additives such as ammonium sulfate. These products destabilize dicamba salts and significantly increase volatility.

Do not tank-mix with any pesticide or adjuvant unless that product is listed as an approved tank-mix partner at the associated websites below.

www.xtendimaxapplicationrequirements.com

www.engeniatankmix.com

Do not apply with any spray tip other than TTI11004 at the maximum spray pressure specified unless other approved spray tips are listed at the associated websites above.

Apply in a minimum spray volume of 10 gallons per acre.

Do not exceed 15 mph ground speed.

Do not apply during temperature inversions (most likely in the evening hours with calm conditions).

Spray only when wind speed is between 3 and 15 mph.

Do not spray if wind speed is greater than 10 mph in the direction of sensitive areas.

Do not apply this product when the wind is blowing toward adjacent commercially grown dicamba-sensitive crops, including but not limited to, commercially grown tomatoes and other fruiting vegetables (EPA crop group 8), cucurbits (EPA crop group 9), and grapes.

Protection of sensitive areas:

Maintain a 110-foot downwind buffer (when applying 22 oz/acre XtendiMax or 12.8 oz/acre Engenia) or a 220-foot downwind buffer (when applying 44 oz/acre XtendiMax) between the last treated row and the closest downwind edge (in the direction in which the wind is blowing). If any of the following areas listed below are directly adjacent to the treated field, the areas can be considered part of the buffer distance.

- Roads, paved or gravel surfaces,
- Planted agricultural fields containing: corn, dicamba-tolerant cotton, dicamba-tolerant soybean, sorghum, proso millet, small grains and sugarcane. If the applicator intends to include such crops as dicamba-tolerant cotton and/or dicamba-tolerant soybeans in the buffer distance calculation, the applicator must confirm the crops are in fact dicamba tolerant and not conventional cotton and/or soybeans.
- Agricultural fields that have been prepared for planting.
- Areas covered by the footprint of a building, silo, or other man-made structure with walls and or roof

Two additional dicamba products may be improved for use on Xtend crops in the future. DuPont is anticipating a label for FeXapan with Vapor Grip Technology, which will likely be labeled similarly to XtendiMax. Roundup Xtend is a premix of glyphosate plus dicamba with Vapor Grip technology from Monsanto that is also awaiting EPA approval.

General considerations for use of Xtend technology

The Xtend crop technologies and associated herbicides provide a new tool to help manage hard to control weeds, especially glyphosate resistant weeds, but also will require greater stewardship. Spray drift and tank contamination have long been a concern with dicamba herbicides. The new formulations and strict application guidelines are in place to help minimize the potential for off-site movement. Following the label guidelines and using good common sense will be important to help steward the new technologies and avoid potential problems and negative publicity. The illegal applications of non-labeled dicamba products on Xtend crops last summer in the southeast U.S. resulted in major crop damage issues in surrounding fields, and consequently, serious conflicts and lawsuits.

It will also be very important to communicate effectively with neighbors and commercial applicators regarding the presence of susceptible crops and which technologies have been planted in each field.

No new technology should be considered a stand-alone solution to weed management as we have learned with the development of glyphosate resistant weeds. Xtend technology should still be a part of an integrated weed management program that includes good cultural practices and a diversified herbicide program with multiple effective herbicide sites of action, residual herbicides, and timely applications.

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2. Temperature inversions: One application restriction for new dicamba products on Xtend soybeans and cotton

Producers planning to use the new Xtend soybean or cotton technologies, with either XtendiMax or Engenia low-volatile dicamba formulations, will need to take special care to avoid conditions that could result in herbicide drift onto sensitive crops. Factors affecting drift of dicamba (and 2,4-D) molecules include:

- Temperature inversions
- Wind speed
- Air temperatures (volatility increases up to 86 degrees F)
- Herbicide rate
- Surface type (volatility from plant material is higher than from bare soil)
- Humidity (dicamba is more volatile at low humidity, less than 70 percent)
- Droplet size (finer droplets of the carrier will evaporate quicker, leaving the remaining herbicide in the air susceptible to drift)

Most of these factors affecting drift are readily understood. But what about the caution on the product labels regarding temperature inversions: “Do not apply during temperature inversions (most likely in the evening hours with calm conditions).”?

What is a temperature inversion, how often does it occur, and why is it important in this situation?

Normally during the day, the sun warms the surface of the earth and coinciding air near it, while cooler air resides higher in the atmosphere above the surface. Once the sun sets, however, the reverse will happen. Upon the loss of solar heating, temperatures cool at the earth’s surface. Warm air that lifted during the day will remain in the atmosphere above this cooling layer.

This condition, called a “temperature inversion,” is a near-daily occurrence and can be amplified under clear skies and light winds. Large-scale factors such as weather fronts or cloud cover can alter this pattern. Smaller-scale influences such as elevation (river bottoms, higher terrain, etc.) can also impact the strength or presence of an inversion locally.

Upon sunrise when solar radiation begins to reach the surface again, the air above the surface gradually warms and the pattern repeats. It takes several hours for the air to become warm enough to degrade the overnight inversion, often diminishing it by late morning.

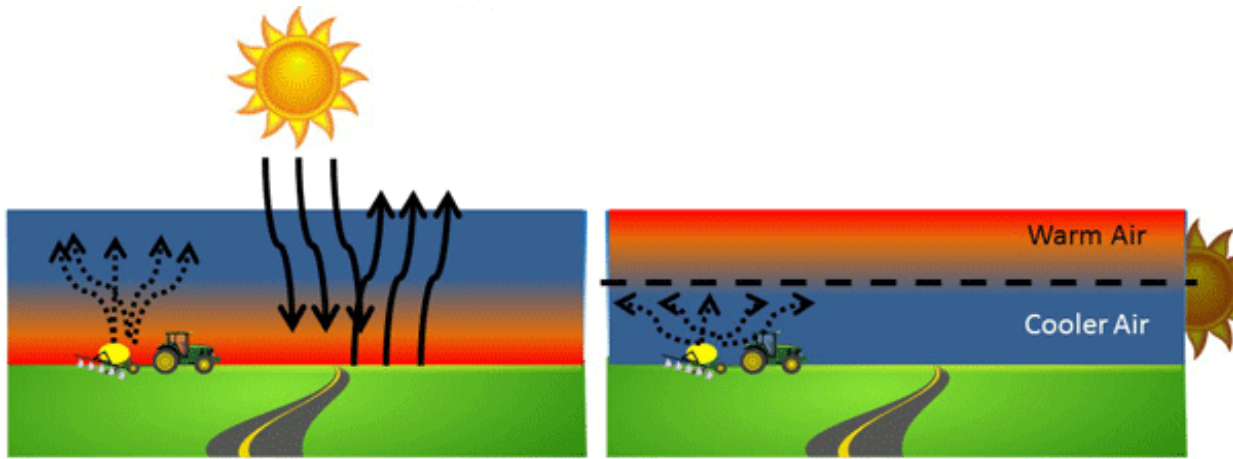


Figure 1. On a typical day, the air temperature at the surface is warmer than the temperature in the atmosphere during daylight hours after the air temperature warms up in the morning, allowing volatile compounds to dissipate into the upper air levels. In a temperature inversion (right), the air temperature at the surface is cooler than the temperature in the atmosphere. This can trap volatile compounds near the surface, increasing the likelihood that the compounds can drift onto nearby plants and structures. Graphic by Doug Shoup, K-State Research and Extension.

The labels of XtendiMax and Engenia state:

- "Temperature inversions are characterized by increasing temperatures with altitude and are common on evenings and nights with limited cloud cover and light to no wind."
- "Their presence can be indicated by ground fog; however if fog is not present, inversions can also be identified by movement of smoke from a ground source or aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing."
- "The inversion will often dissipate with increased winds (above 3 mph) or at sunrise when the surface air begins to warm (generally 3°F from morning low)."

Measurements taken by researchers at the University of Missouri indicate the time of day when inversions usually start from March to July in the Bootheel of Missouri (Bish, M. and K. Bradley, 2016. What is a temperature inversion? Proc. NCWSS. 71:204). Inversions can last for up to 10 hours or more after they begin, the authors noted.

Bootheel of Missouri	2015	2016
	Approximate time the inversion began	
March	4:00 to 5:00 p.m.	4:00 to 5:00 p.m.
April	4:00 to 5:00 p.m.	4:00 to 5:00 p.m.
May	4:00 to 6:00 p.m.	4:00 to 6:00 p.m.
June	5:00 to 6:00 p.m.	5:00 to 6:00 p.m.
July	6:00 to 7:00 p.m.	6:00 to 7:00 p.m.

In 2015, the University of Missouri researchers noted 17-23 days per month with temperature inversions. In 2016, inversions occurred on 20-27 days per month.

Inversions typically persist overnight and can last late into the morning depending on the weather conditions (as late as 10 a.m. to noon). Inversions don't just develop instantly, but take time to develop over several hours. Inversions are very typical in all seasons, not just the months involved in the Missouri study. Inversions are largely influenced by terrain. Therefore, they will be extremely localized in some places, and the strength and impact of these will differ widely.

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3. K-State Corn Management Schools scheduled for January 2017

A series of three K-State Corn Production Management Schools will be offered in early January of 2017 to provide in-depth training targeted for corn producers. The schools are primarily sponsored by Kansas Corn Commission and Pioneer.

The one-day schools will cover up-to-date and specific corn topics: on-farm research, high-yielding corn production practices, weed control, soil fertility, and price and market perspectives. The focus of the Corn Production Schools will be in northwest, central, and eastern Kansas. Schools will be followed by a tour.

Jan. 9 – Wichita – Drury Plaza Hotel Broadview Wichita, 400 West Douglas Ave.

Jan. 11 – Oakley – Buffalo Bill Cultural Center, 3083 US 83

Jan. 13 – Olathe – John Deere Ag Marketing Center, 10789 South Ridgeway Rd.

Jan. 9 – Wichita

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Randy Hein, Sumner County Extension, rvhein@ksu.edu, 620-326-7477
David Kehler, Butler County Extension, dkeehler@ksu.edu, 316-321-9660

Jan. 11 – Oakley

Contact Information:

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Alicia Boor, Barton County Extension, aboore@ksu.edu, 620-793-1910
Sandra Wick, Post Rock Extension District, swick@ksu.edu, 785-282-6823
Jenifer Sexson, Hamilton County Extension, jsexson@ksu.edu, 620-384-5225

Jan 13 – Olathe (John Deere facility) – Registration is needed

Contact Information:

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Karol Lohman, Leavenworth County Extension, klohman@ksu.edu, 913-364-5700

Roberta Wyckoff, Douglas County Extension, rwyckoff@ksu.edu, 785-843-7058
Leroy Russell, Shawnee County Extension, lrussell@ksu.edu, 785-232-0062

Lunch will be provided courtesy of the sponsors. There is no cost to attend, but participants are asked to pre-register before or by January 6.

Online registration is available at K-State Corn Schools: <http://bit.ly/KSCORNSchools>

You can also preregister by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

For more information, contact:

Greg Krissek, CEO Kansas Corn; gkrissek@ksgrains.com

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Primarily supported by:



4. Cover Your Acres Conference, January 17-18 in Oberlin

K-State Research and Extension is teaming up with the Northwest Kansas Crop Residue Alliance to host the 14th annual Cover Your Acres Winter Conference for crop producers and consultants Jan. 17-18 at the Gateway Center in Oberlin, Kansas. The same program will be offered both days of the conference.



Cover Your Acres

Winter Conference

January 17 and 18, 2017
The Gateway in Oberlin, KS

Presented by Kansas State University and Northwest Kansas Crop Residue Alliance



Like to Attend?
Early-Bird Registrations
Due January 11.
Online:
www.northwest.ksu.edu/CoverYourAcres
Mail in:
Circle when you would like to attend.
Tuesday, Jan 17 **Wednesday, Jan 18**
Cost \$40.00 Cost \$35.00
Both days - Jan 17 & 18
Cost \$50.00

Name: _____
Address: _____
City, State Zip: _____
Phone: _____
Email: _____
Please include information for all attending.

After January 11
\$50.00 per day
Mail registrations to:
Kansas State University
NW Area Extension Office
PO Box 786
Colby, KS 67701
For questions, call (785) 462-6281.
Program will be held regardless of weather. No refunds will be given.
Kansas State University is an equal opportunity employer and provider.

	Room 1	Room 2	Room 3	Room 4
7:45 - 8:15	Registration			
8:15 - 8:20	Welcome			
8:30 - 9:20	Profitability in NWKS Operations ¹ (M. Wood)	Current State of Weed Resistance ^{1,2} (P. Stahlman)	Forage Sorghum and Cover Crops ¹ (J. Holman)	Sunflower Update (Nat'l. Sunflower Assoc.) (I)
9:30 - 10:20	Marketing Grain and Storage Economics ¹ (D. O'Brien)	Managing Bin Stored Grain ¹ (K. Moore)	Learning from Long-Term Tillage/Rotation Studies ¹ (A. Schlegel & L. Haag)	Industry Session (Dupont Pioneer) (I)
10:20 - 10:50	View Exhibits			
10:50 - 11:40	Weed Management Strategies ^{1,2} (C. Thompson)	Soil Biology: Who and What is Living In Our Soil (P. Tomlinson) ¹	Building Strong Business Dynamics in Tough Times ¹ (C. Griffin)	Plant Nutrition (CPS) (I)
11:50 - 12:40	Economics of Soil Fertility ¹ (D. Ruiz-Diaz)	Forage Sorghum Cover Crops ¹ (J. Holman)	Lunch	
12:50 - 1:40	Current State of Weed Resistance ^{1,2} (P. Stahlman)	Marketing Grain and Storage Economics ¹ (D. O'Brien)		
1:50 - 2:40	Learning from Long-Term Tillage/Rotation Studies ¹ (A. Schlegel & L. Haag)	Weed Management Strategies ^{1,2} (C. Thompson)	Economics of Soil Fertility ¹ (D. Ruiz-Diaz)	High Resolution Imagery (CHS) (I)
2:40 - 3:10	View Exhibits			
3:10 - 4:00	Producer Discussion Panel	Building Strong Business Dynamics in Tough Times ¹ (C. Griffin)	Soil Biology: Who and What is Living In Our Soil (P. Tomlinson) ¹	Improve Your Bottom Line (Sims Fertilizer) (I)
4:10 - 5:00	Managing Bin Stored Grain ¹ (K. Moore)	Profitability in NWKS Operations ¹ (M. Wood)	Industry Session (Green Cover Seed) (I)	Industry Session (EGE Products) (I)

Platinum Sponsors:

CHS

Crop Production Services

DuPont Pioneer

Hoxie Implement Co.

SureFire Ag Systems

Lang Diesel

Natl. Sunflower Assoc.

PacLeader Technology

Plains Equipment Group

Tuesday: Bull session with hors d'oeuvres begins at 5:00
¹ CCA CEUs applied for.
² Commercial Applicator CEUs applied for.
(I) indicate industry sessions.

www.northwest.ksu.edu/CoverYourAcres

Cover Your Acres is a producer-driven meeting focused on new ideas and research-based updates in crop production in northwest Kansas and the central High Plains region.

The conference, which typically draws more than 600 attendees from Kansas and other states, highlights the latest technology, methods and conservation practices to improve crop production in the region. This year it will feature university specialists and industry representatives discussing the following topics:

Building Strong Business Dynamics in Tough Economic Times: What Does it Take to Succeed?
 Current State of Weed Resistance
 Economics of Soil Fertility Management
 Forage Sorghum and Cover Crop Management
 Learning from Long-Term Rotation and Tillage Studies
 Managing Bin-Stored Grain

Marketing Grain and Storage Economics
Profitability in Northwest Kansas Operations
Soil Biology
Weed Management Strategies
Producer Panel Discussion

The same programs will be offered both days of the conference. Registration will begin at 7:45 a.m., with educational sessions ending at 5:00 p.m. followed by a “bull session” on Tuesday evening, where attendees can visit with industry and university specialists.

Early registration is due by Jan.11. The fee is \$40 for Jan. 17, \$35 for Jan. 18 or both days for \$50. After Jan. 11, the cost is \$50 per day. The conference fee includes lunch and educational materials. Continuing education unit credits are available for commercial applicators and certified crop advisors.

Mail your registration, with a check payable to KSU, to the Northwest Area Office, ATTN: Cover Your Acres, P.O. Box 786, Colby, KS 67701. To view the conference details and for online registration, visit www.northwest.ksu.edu/coveryouracres. For questions, call 785-462-6281.

Major sponsors of the conference include CHS, Crop Production Services, Decatur Coop Association, DuPont Pioneer, Hoxie Implement Co., Lang Diesel, National Sunflower Association, PacLeader Technology, Plains Equipment Group, and SureFire Ag Systems. CCA and Commercial Applicator CEU's have been applied for.

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5. Canola College 2017 in Enid, January 19, 2017



Once again, the Great Plains Canola Association, Oklahoma State University, Kansas State University, USDA-RMA, and partners from the canola industry are teaming up to conduct Canola College.

Canola College 2017 will be held January 19, 2017 at the Chisholm Trail EXPO Center, 111 W. Purdue, Enid, OK.

This will be the premier canola education/training event in the region in 2017. Canola College 2017 is for anyone with an interest in the canola industry including: experienced and first time growers, crop insurance agents, members of agricultural governmental agencies, and canola industry service and product providers. Attendees will hear from canola experts on a variety of key topics and will have the opportunity to visit with industry members who provide the goods and services needed to produce, handle, and market the crop.

Canola College 2017 topics will include:

- **Canola Basics** – Mike Stamm, K-State Canola Breeder and Heath Sanders, OSU SW Area Extension Agronomy Specialist
- **Canola Planting Technology** – Josh Bushong, OSU NW Area Extension Agronomy Specialist and Kraig Roozeboom, K-State Cropping Systems Agronomist
- **Advanced Production Practices** – Bob Schrock, Grower, Kiowa, KS and Jeff Scott, Grower, Pond Creek, OK
- **Risk Management** – Francie Tolle, Director, USDA-RMA, Oklahoma City
- **Canola Economics** – Trent Milacek, OSU Extension Area Economist, NW District
- **Weed Control** – Misha Manuchehri, OSU Extension Weed Scientist
- **Insect Management** – Kris Giles, OSU Regents Prof of Entomology
- **Canola Plant Health Management** – John Damicone, OSU Extension Plant Pathologist and Paul De Laune, Assoc Prof, Texas A&M
- **Canola Learning Lab** – Coordinated by Josh Lofton, OSU Cropping Systems Specialist

The very popular **Canola Learning Laboratory** will be continued in 2017. Attendees will see demonstrations and gain experience with: canola biology, canola production equipment, and the latest in spray technology. Participants will have the opportunity to learn to identify common canola

production pests.

Individuals can register for *Canola College 2017* at www.canola.okstate.edu. For more information on Canola College, contact Ron Sholar, Executive Director, GPCA, at Jrsholar@aol.com or Josh Lofton, Extension Cropping Systems Specialist, OSU, at josh.lofton@okstate.edu.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

6. Kansas Agricultural Technologies Conference, January 19-20 in Junction City

The 20th Annual Kansas Agricultural Technologies (KARTA) Conference will be held January 19-20, 2017 in Junction City at the Courtyard by Marriott & Geary County Convention Center, 310 Hammons Dr.

This annual event brings hundreds of agricultural producers and industry leaders together for a two-day interactive workshop on the ever-changing precision agriculture industry. There will be presentations on a wide variety of topics dealing with precision agriculture. The two-day event also includes vendor displays, the KARTA Annual Meeting, research presentations from grant recipients, and an interactive evening discussion that is always an attendee favorite.

**Twentieth Annual
Kansas Agricultural
Technologies Conference**

Courtyard by Marriott &
Geary County Convention Center
310 Hammons Dr.
Junction City, Kansas
January 19-20, 2017

The following schedule of events is subject to
change. Visit www.KARTAonline.org for updates.

THURSDAY JANUARY 19th

8:00 Registration/Coffee & Rolls
8:45 Welcome & Announcements
Matt Walters, KARTA President
9:00 20 Years of KARTA
A Look Back and a Charge Forward
Randy Taylor & Lee Scheffler
10:00 Vendor Presentations
10:30 Break
10:45 Project SENSE - On Farm Trials to
Evaluate Sensor Based Nitrogen Mgt.
Joel Crowther & John Parrish
11:45 Vendor Presentation
12:00 Lunch
1:00 Vendor Presentation
1:15 Collecting Data that Matters
Brent Myers with DuPont Pioneer
2:15 Break
2:45 Vendor Presentations
4:15 Break
4:30 2017 Research Planning Session

2017 Research Reports | Journals | Kansas State

4:30 KARTA Annual Business Meeting
5:45 Dinner & Social
7:00 Big Data Implications for Precision Ag
Jointly Presented by Dr. Terry Griffin, KSU
and Dr. Shannon Ferrell, OSU

FRIDAY JANUARY 20th

8:00 Coffee & Rolls
8:30 Ag UAV's - Where Are We At?
John Nowatzki, NDSSJ
9:30 Vendor Presentations
10:00 Break
10:15 K-State Precision Ag Rapid Fire Session
Several KSU Faculty
11:30 KARTA Research Presentations
2016 Grant Recipients
12:15 Lunch
1:15 Vendor Presentation
1:30 Fully Autonomous Electric Tractors -
Has the Future Arrived?
Kraig Schult, Autonomous Tractor Corp.
2:30 Break
2:45 KARTA Research Presentations
2016 Grant Recipients
4:00 Conference Wrap-Up & End Statement

2016 RESEARCH PROJECTS

Possible Research Presentation Topics

- Ascend in Winter Wheat
- Ascend in Irrigated Corn
- Grain Sorghum Seeding Rates
- Honey Soil Test Fertilizer Rates
- Gypsum as a Soil Amendment
- Cover Crops in Irrigated Corn in East KS
- Long Term Impact of Canola in Crop Rotation
- Grain Sorghum Seeding Rates in NE OK
- AgBoost NutriPlant in Irrigated Corn
- Comparison of Soil Sampling Methods
- Row Spacing in Grain Sorghum
- Row Spacing in Corn
- Vegetable Production Tunnel Comparison
- Using Yield History to Predict Soil P

BOARD NOMINATIONS

If you would like to nominate yourself or
another KARTA member to serve as a
volunteer member of our Board of Directors
in 2017, please email kartaonline@yahoo.com
with their name, phone number, email address,
and mailing address if possible. Board members
meet virtually a few times per year, and conduct
most business by email. Get involved, and make a
difference in the future of agriculture!

CONNECT WITH US

We exist to help ensure a bright future for
the agricultural industry, and we need YOU
to join the conversation.

kartaonline@yahoo.com
www.KARTAonline.org

CCA CREDITS

CCA credits will be applied for:

REGISTRATION FORM

Name: _____
Organization: _____
Address: _____
City, St, Zip: _____
Phone: _____
Email: _____

Please make the appropriate registration selection.
Fees include lunch both days, dinner on Thursday,
and refreshments during the breaks for one person.
No refunds after January 10, 2017.

\$225 \$225 Conference Registration
Make payable to Kansas Ag Research
& Technology Association (KARTA)

**\$50 Discount if Postmarked before
January 10, 2017**

If you would like to obtain or renew a KARTA
Membership, please mark the following:

+ \$100 2017 KARTA Membership
+ \$50 Discount for KARTA Members

Total Enclosed

KARTA Complete and return by mail
KARTA
6009 K Road
Ness City, KS 67560

OR use our **ONLINE REGISTRATION** at
www.KARTAonline.org

The conference is co-sponsored by K-State Research and Extension and the Kansas Agricultural Research and Technology Association, whose members are producers, university researchers, and industry professionals focused on learning about agricultural production and technological and informational changes on today's farms.

There is a fee for this conference, and you must register. More information, including online registration is available at www.KARTA-online.org

Information is also available by contacting Lucas Haag, K-State Research and Extension Northwest Area Crops and Soil Specialist, at 785-462-6281 or lhaag@ksu.edu.

7. K-State Soybean Schools scheduled for late January 2017



A series of three K-State Soybean Production Schools will be offered in late January 2017 to provide in-depth training targeted for soybean producers and key stakeholders. The schools will be held at three locations around the state.

The one-day schools will cover a number of issues facing soybean growers: weed control strategies; production practices; nutrient fertility; and insect and disease management.

The dates and locations of the K-State Soybean Production Schools are:

Jan. 24th – Parsons, 25092 Ness Road

Contact information:

Josh Coltrain, Wildcat Extension District, jcoltrain@ksu.edu, 620-724-8233

Jeri Geren, Wildcat Extension District, jlsigle@ksu.edu, 620-331-2690

Jan. 26th – Hesston, Dyck's Arboretum of the Plains, 177 W Hickory St.

Contact information:

Ryan Flaming, Harvey County Extension, flaming@ksu.edu, 316-284-6930

Jan. 27th – Highland, Highland Community Building, 501 West Av

Contact information:

David Hallauer, Meadowlark Extension District, dhallaue@ksu.edu, 785-863-2212

Matthew Young, Brown County Extension, mayoung@ksu.edu, 785-742-7871

More information on the final program for each Soybean School will be provided in future issues of the Agronomy eUpdate.

Lunch will be provided courtesy of Kansas Soybean Commission. There is no cost to attend, but participants are asked to pre-register by Jan. 19.

Online registration is available at: [K-State Soybean Schools](#)

You can also preregister by emailing or calling the nearest local Research and Extension office for the

location you plan to attend.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
duncan@ksu.edu

8. K-State Sorghum Schools scheduled for late January and early February 2017



A series of four K-State Sorghum Production Schools will be offered in late January and early February 2017 to provide in-depth training targeted for sorghum producers and key stakeholders. The schools will be held at four locations around the state. The one-day schools will cover a number of issues facing sorghum growers: weed control strategies; production practices; nutrient fertility; and insect and disease management.

The dates and locations of the K-State Sorghum Production Schools are:

Jan. 31st – Colby: City Limits Convention Center, 2227 S Range Ave
Kurt Sexton, Thomas Co. Extension, kurtsexton@ksu.edu, 785-460-4582

Feb. 1st – Wichita: Sedgwick Co. Extension Center, 7001 W 21st St N
Zach Simon, Sedgwick Co. Extension, zsimon@ksu.edu, 316-660-0100

Feb. 2nd – Concordia: Cloud County Community College, 2221 Campus Drive
Kim Kohls, River Valley Extension District, kclarson@ksu.edu, 785-243-8185

Feb. 3rd – Iola Riverside Park New Community Building, 600 S. State St
Carla Nemecek, Southwind Extension District, cnemecek@ksu.edu, 620-365-2242

More information on the final program for each Sorghum School will be provided in future issues of the Agronomy eUpdate.

Lunch will be provided courtesy of Kansas Grain Sorghum Commission. There is no cost to attend, but participants are asked to pre-register by Jan. 27. Online registration is available at: [K-State Sorghum Schools](#)

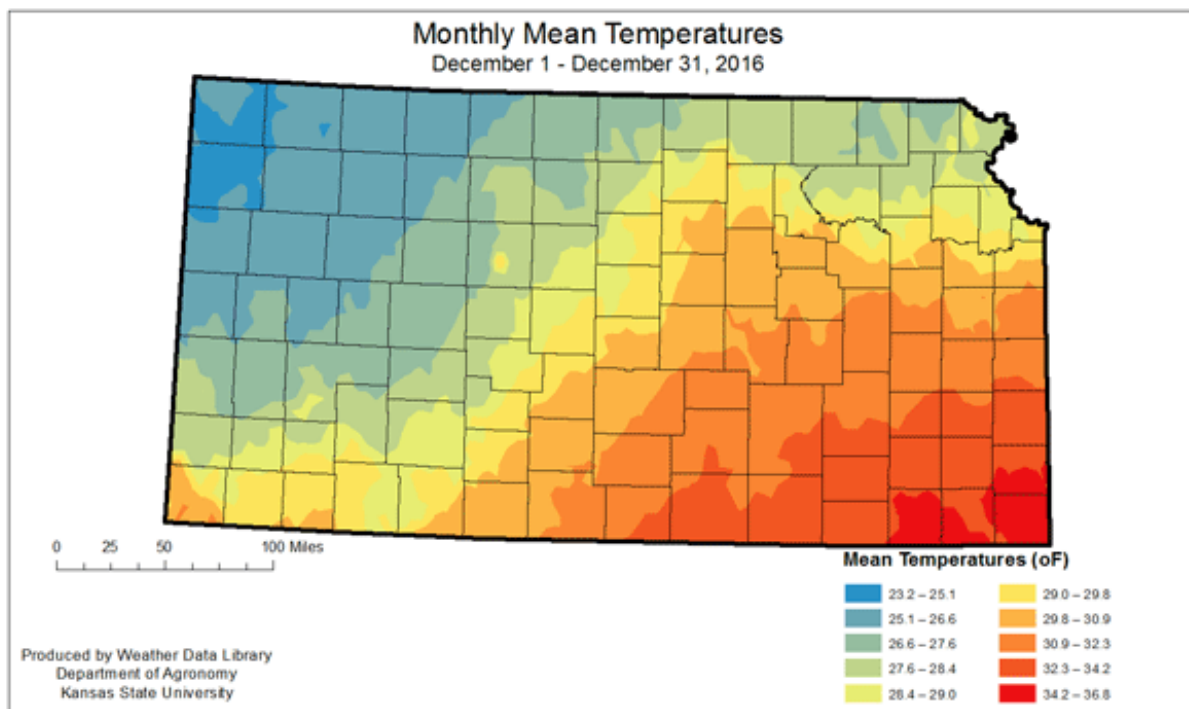
You can also preregister by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

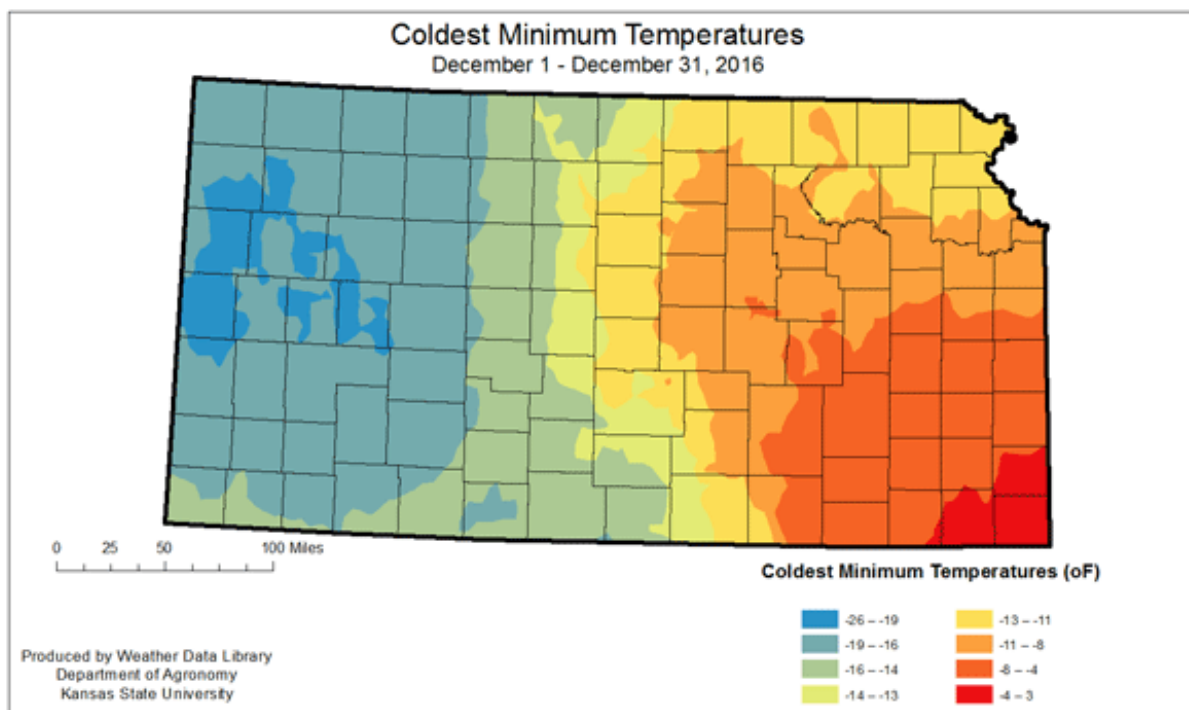
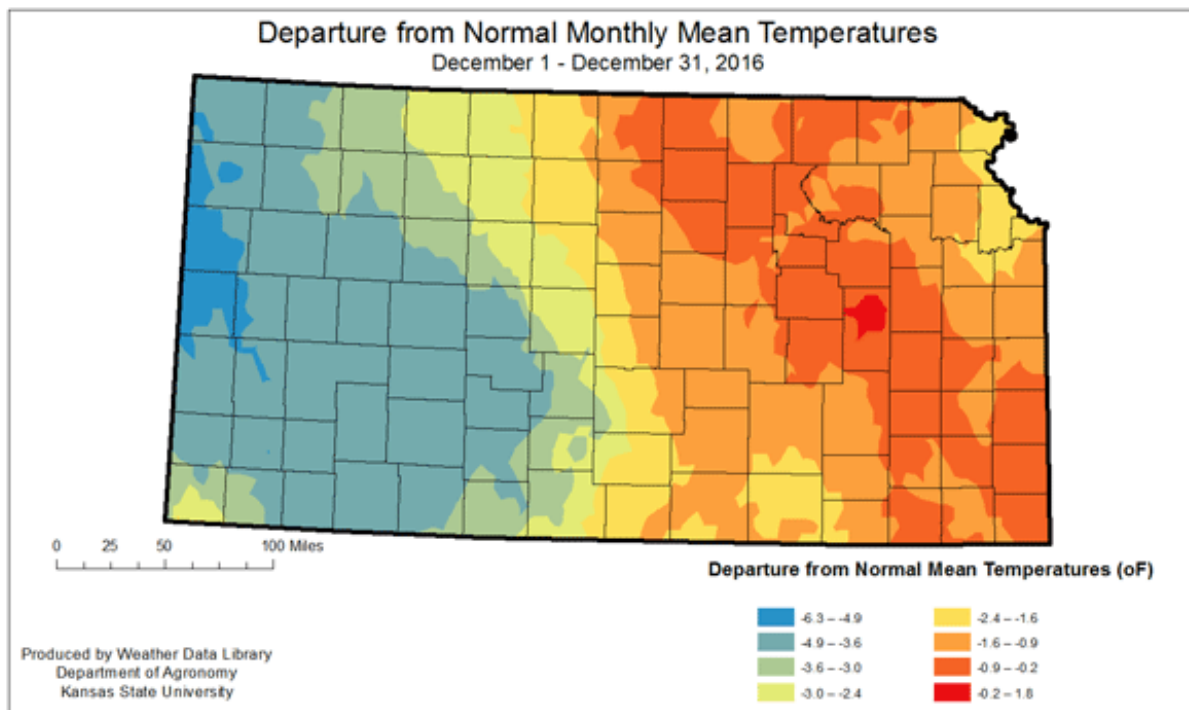
Ignacio Ciampitti, Cropping Systems Specialist
ciampitti@ksu.edu

Pat Damman, Kansas Grain Sorghum Commission
pat@ksgrainsorghum.org

9. December weather summary for Kansas: A cold end to the year

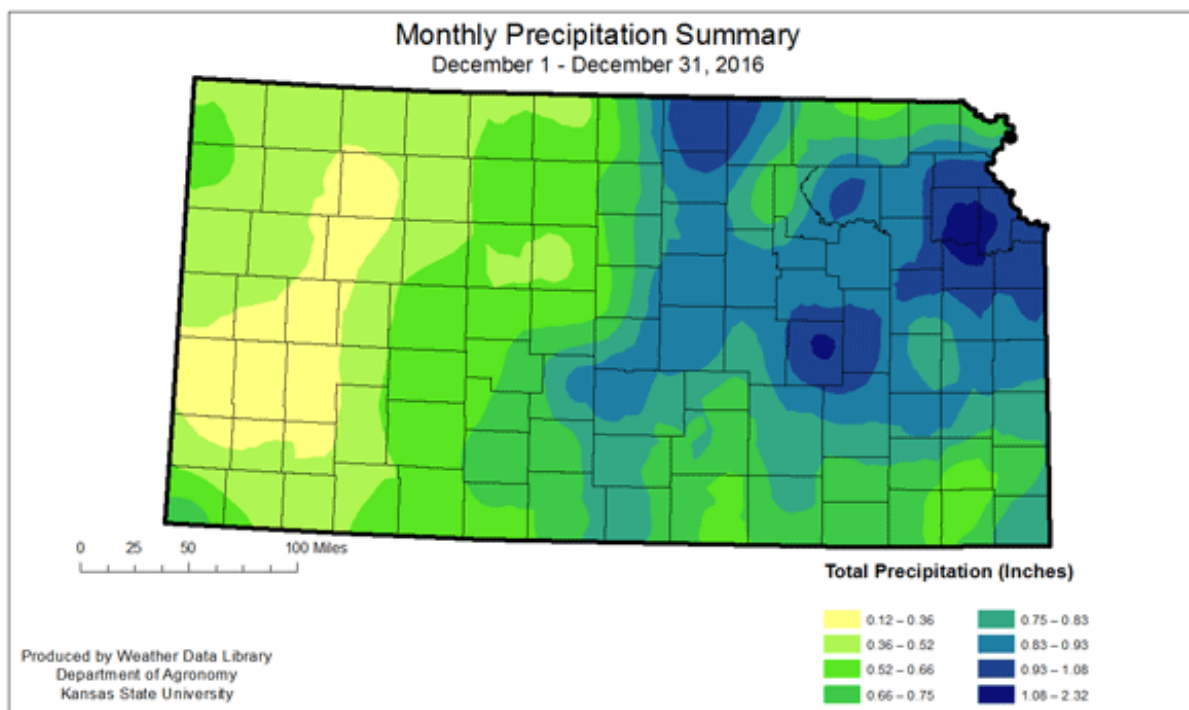
December marked a shift in the warm pattern that dominated much of the fall in Kansas. The statewide average temperature was 29.0 degrees F, or -2.3 degrees colder than normal. This was the 25th coldest since 1896. The Southeast Division was closest to normal for the month. Its average temperature was 33.4 degrees F, or -0.4 degrees colder than normal. The greatest departure was in the West Central Division where the average temperature was 26.7 degrees F, or -3.7 degrees colder than normal. Even with the cold, there were 28 new daily record high temperatures set in the month, although none of those set monthly records. There were also 12 new daily record high minimum temperatures set. On the cold side, there were 17 new record daily low maximum temperatures and 93 new record daily low minimum temperatures reported. Of those record low minimum temperatures, 11 set new record lows for December. The coldest minimum temperature reported was -24 degrees F reported at Oakley 19 SSW, Logan County, on the 20th. The highest temperature reported was 74 degrees F reported at Elkhart, Morton County, on the 17th.

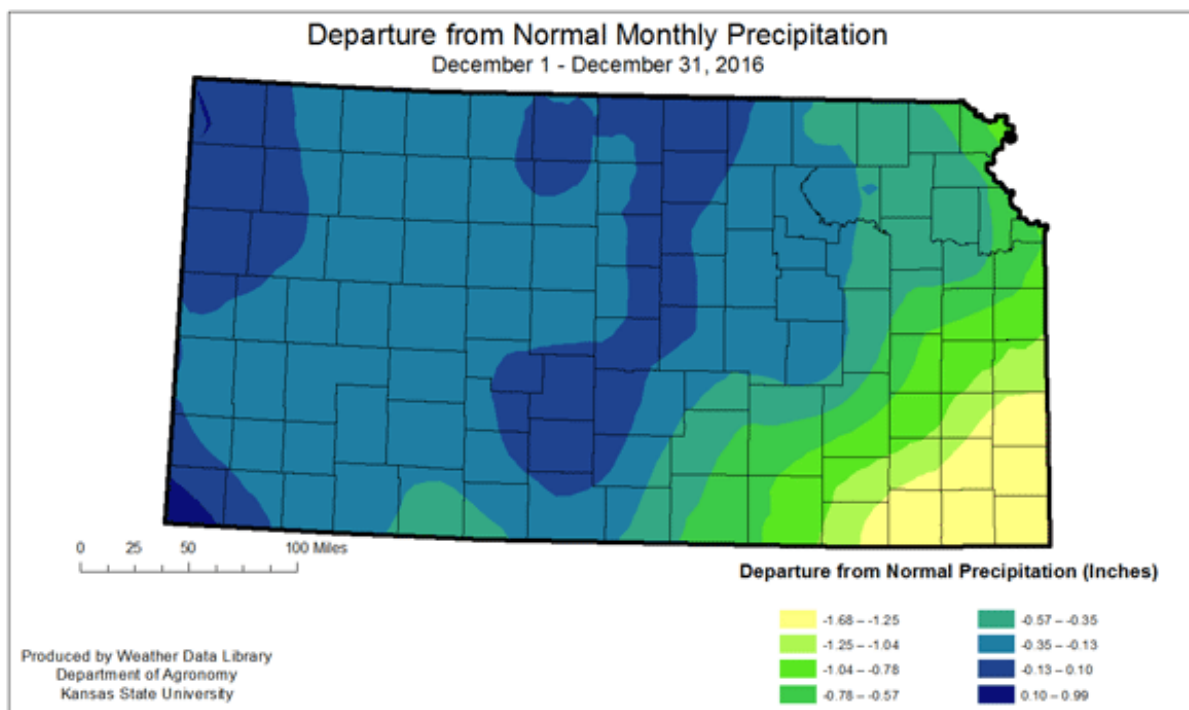
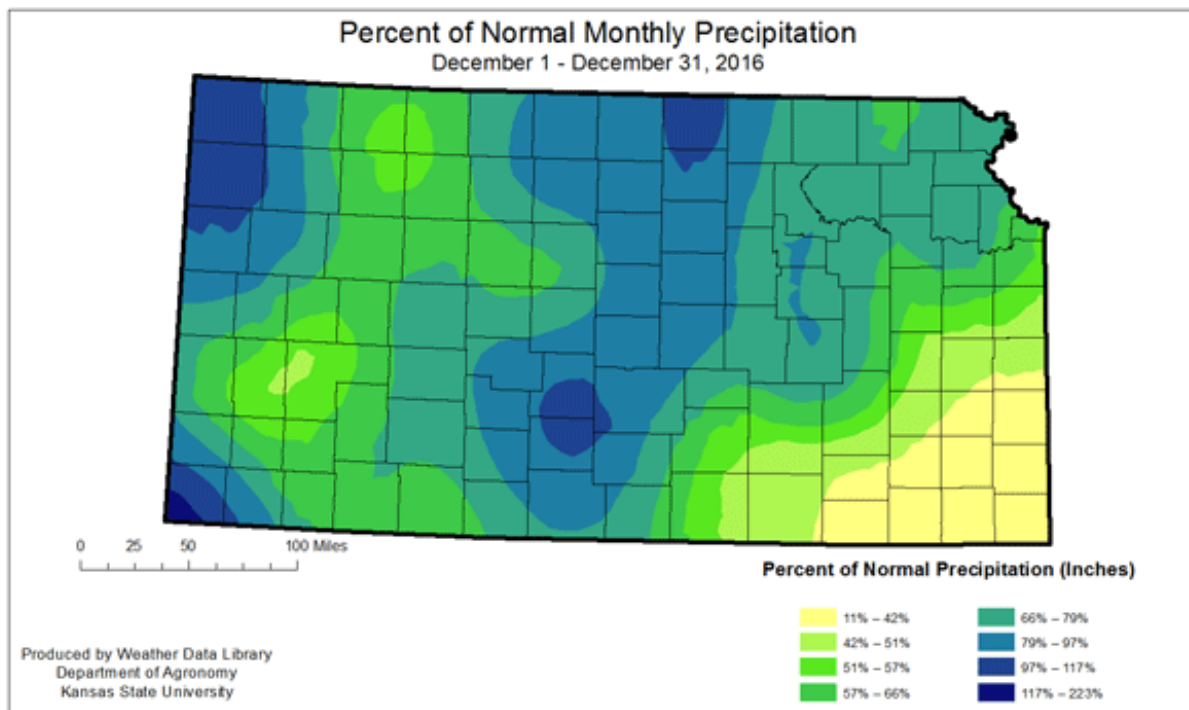


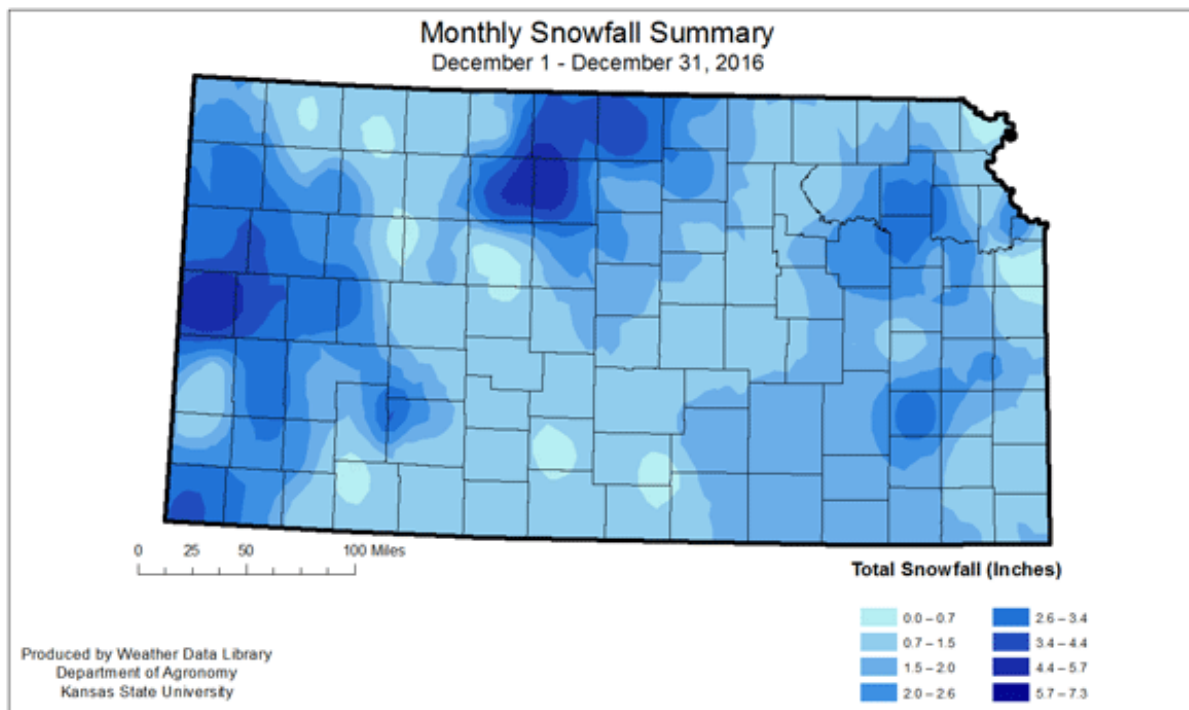


Statewide average rainfall for December continued the trend of the dry fall and was well below normal. The statewide average was 0.56 inches, or 57 percent of normal. The Northwest Division fared the worst with an average of 0.18 inches, or 34 percent of normal. The North Central Division came closest to normal with an average of 0.70 inches, or 82 percent of normal. This December ranks as the 50th driest in the 122 years of record. The wettest December on record occurred in 1913, when the statewide average total was 3.15 inches. The driest December occurred in 1976 when the

statewide average was 0.05 inches. Despite the dry pattern, there were 43 new record daily precipitation totals. The greatest 24-hour total recorded at a CoCoRaHS station was 0.94 inches at St. Francis 8.6 NNE, Cheyenne County, on the 26th. The greatest 24-hour report for a National Weather Service station was 1.15 inches at Eskridge, Wabaunsee County, on the 25th. The greatest monthly totals: 1.88 inches at Lawrence, Douglas County (NWS) and 1.58 inches at Olathe 3.3 ENE, Johnson County (CoCoRaHS).





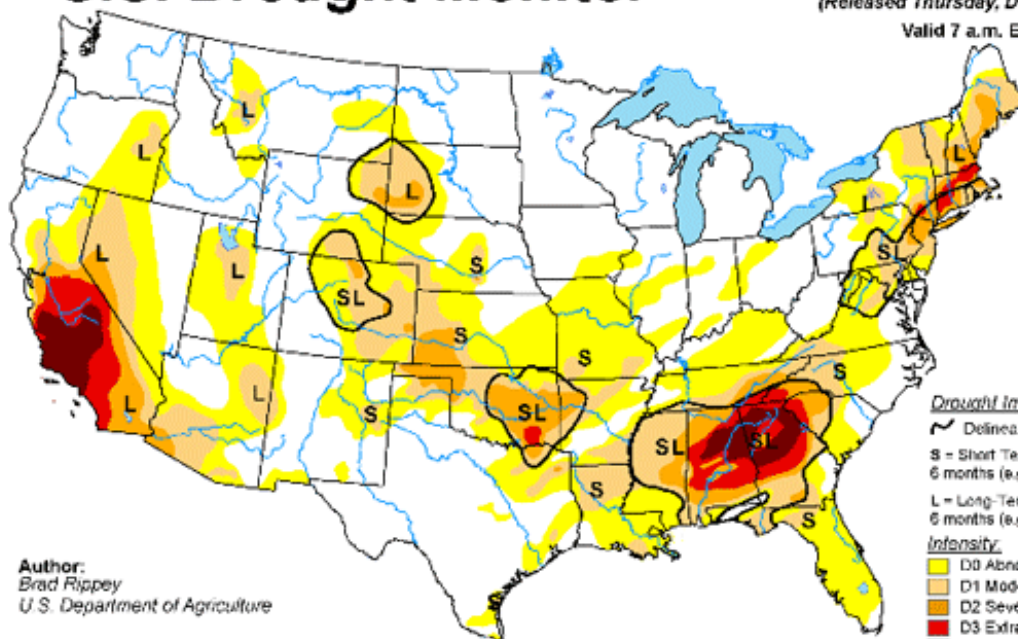


The cold air mass of the 18th through the 20th was displaced by a warm front. The clashing systems triggered a rare Christmas tornado outbreak in southwest Kansas. Brief touchdowns were reported in Ford, Kiowa, and Rush counties. There were reports of damage to a cattle building and a horse shed in Kiowa County, but no reports of deaths or injuries. In addition to the tornadoes, there were 11 reports of wind damage during the month.

The lack of precipitation has taken its toll, and abnormal dry conditions expanded during the month. As we move into the drier part of the year, even above-normal precipitation is not likely to result in significant improvement. By the same token, the rate of deterioration is likely to slow, especially in the western half of the state.

U.S. Drought Monitor

December 27, 2016
(Released Thursday, Dec. 29, 2016)
Valid 7 a.m. EST



Author:
Brad Rippey
U.S. Department of Agriculture

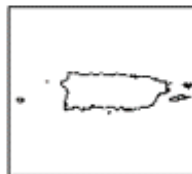
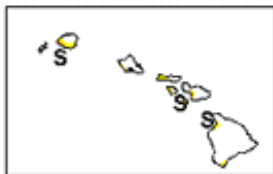
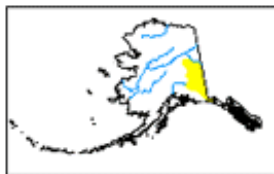
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

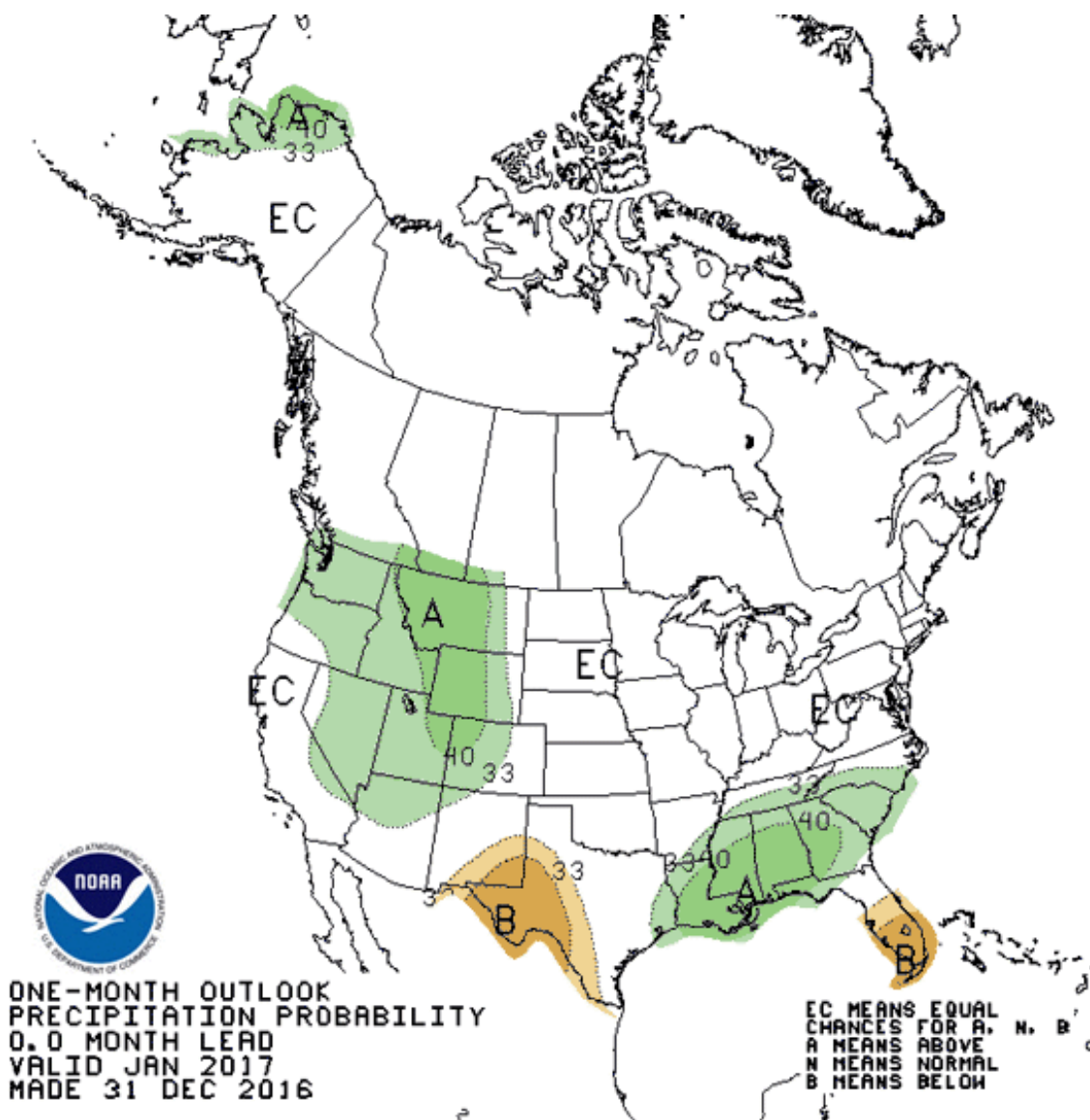


<http://droughtmonitor.unl.edu/>

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron



Dec 2016

Kansas Climate Division Summary

Precipitation (inches)			Temperature (°F)						
Dec 2016			2016 Jan through Dec				Monthly Extremes		
Division Total	Dep. ¹	% Normal	Total	Dep. ¹	% Normal	Ave	Dep. ¹	Max	Min

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Northwest	0.18	-0.37	34	19.73	-1.63	92	26.0	-2.9	72	-21
West Central	0.32	-0.29	54	19.12	-1.65	91	26.7	-3.7	71	-20
Southwest	0.37	-0.28	57	20.50	0.60	102	29.4	-3.2	74	-21
North Central	0.70	-0.15	82	31.25	3.24	111	27.9	-1.3	66	-18
Central	0.72	-0.17	78	31.44	2.15	107	29.1	-2.1	68	-16
South Central	0.64	-0.43	59	35.31	3.99	111	30.6	-2.5	67	-15
Northeast	0.70	-0.47	61	35.53	0.53	101	28.1	-1.5	66	-12
East Central	0.72	-0.62	54	36.03	-1.89	94	30.1	-1.3	69	-11
Southeast	0.68	-1.07	40	42.94	1.45	104	33.4	-0.4	71	-12
STATE	0.56	-0.43	57	30.31	0.93	102	29.0	-2.1	74	-21

1. Departure from 1981-2010 normal value

2. State Highest temperature: 74 oF at Elkhart, Morton County, on the 17th.

3. State Lowest temperature: -24 oF at Oakley 19SSW, Logan County, on the 20th.

4. Greatest 24hr: 1.15 inches at Eskridge, Wabaunsee County, on the 25th (NWS); 0.94 inches at St. Francis 8.6 NNE, Cheyenne County, on the 26th (CoCoRaHS).

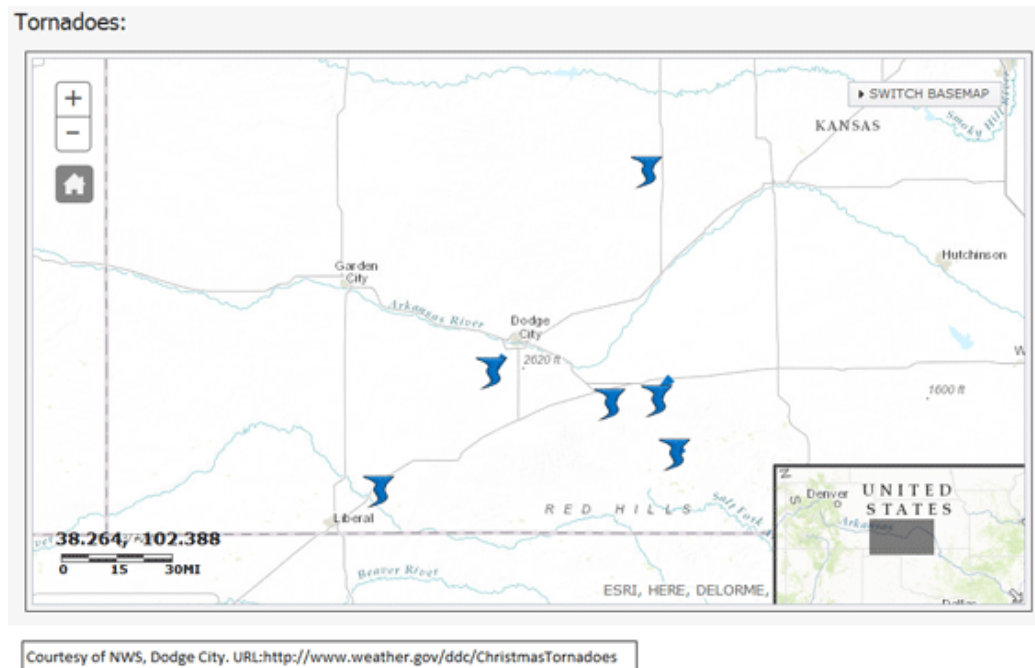
Source: KSU Weather Data Library

Mary Knapp, Weather Data Library

mknapp@ksu.edu

10. Christmas tornadoes in Kansas

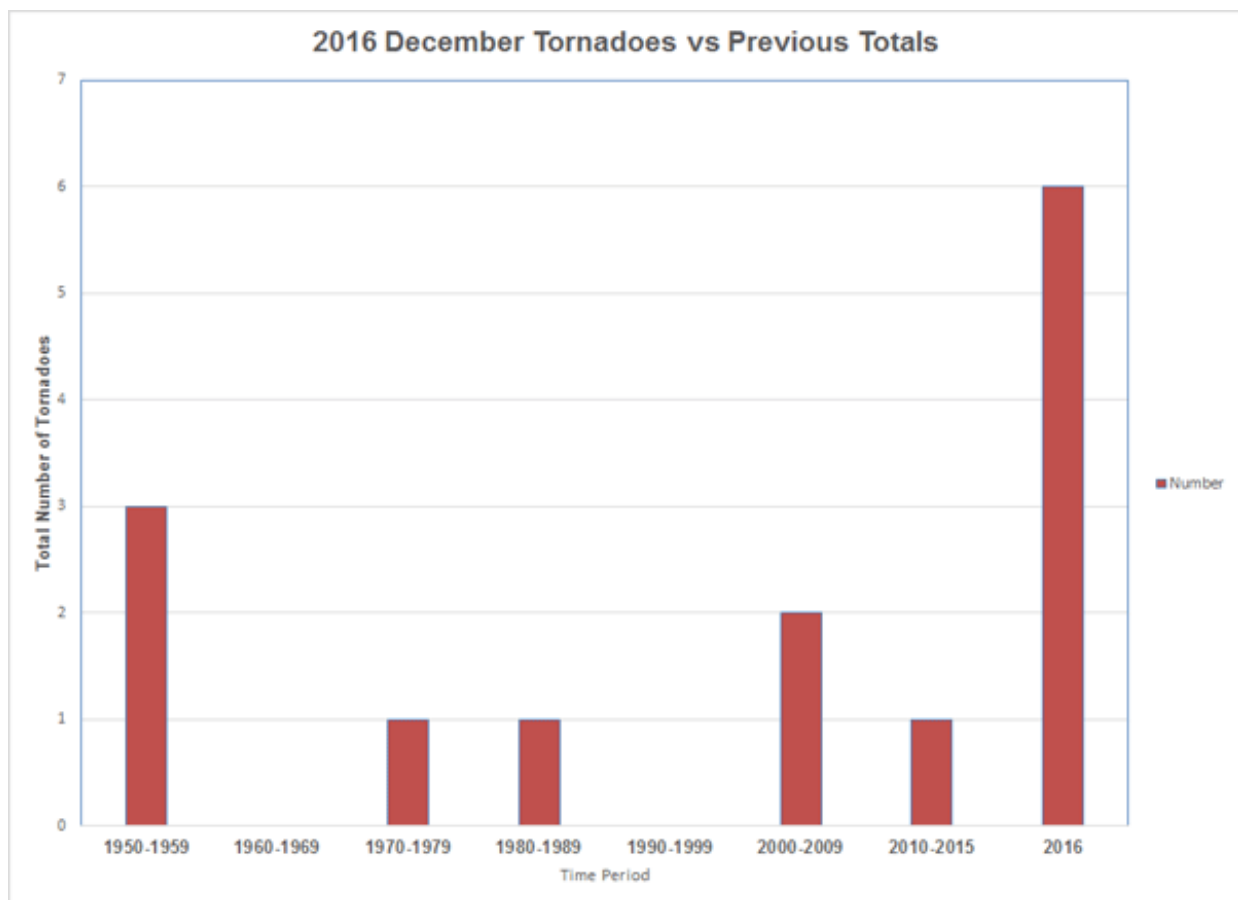
An outbreak of severe weather occurred on Christmas 2016 in Kansas. In southwest Kansas, a squall line triggered several small brief tornadoes. According to the Dodge City National Weather Service office, there were 6 tornadoes that touched down. All tornadoes were rated as EF0, and tracks ranged from less than a mile near Kismet to almost seven miles southeast of Greensburg.



Damage was limited, with the most severe occurring to a hog containment facility near Kismet.



Historical records show December tornadoes are relatively rare, with only two or three per decade. In fact, there are several decades without any December tornadoes, as shown by the graph below:



With the total of six tornadoes on Dec. 25, 2016 had more than a decade's worth of December tornadoes, and nearly double the previous high point of 3 between 1950 and 1959, all occurring in 1956. It is important to note that detection methods were less reliable in the early part of the record, and weak tornadoes were often not recorded.

Dramatic as they were, tornadoes weren't the only feature of the front. Strong and damaging winds were also a problem. The Storm Prediction Center storm reports show 14 damaging wind events in Kansas that day. Damage include downed trees, car windows blown out, porches destroyed, and a barn roof torn off. Gusts reported in the storm reports were as high as 64 miles per hour.

Kansas Mesonet recorded wind gusts as high as 52 mph at 6 feet above ground (2 meters), and 61 mph at 30 feet (10 meters). The recorded maximum gusts on the station network are plotted below.



24 Hour Max 10m Windspeed (mph) - Kansas Mesonet 12/25 12:55

You can view the latest 24-hour wind gusts (and maximum/minimum temperatures) on the Kansas Mesonet webpage at: www.mesonet.ksu.edu/weather/maxmin/

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Christopher Redmond, Assistant Scientist KSU Weather Data Library/Mesonet
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11. Comparative Vegetation Condition Report: December 27 - January 2

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography, and his pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 01: 12/27/2016 - 01/02/2017

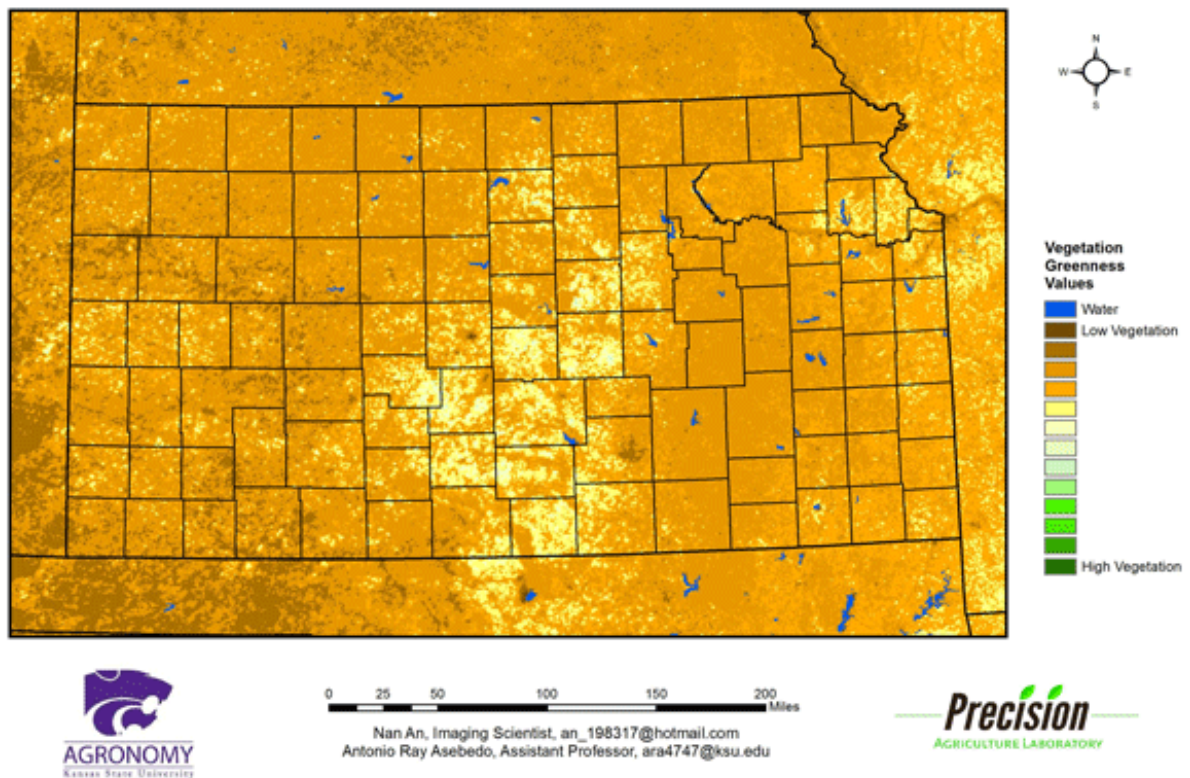


Figure 1. The Vegetation Condition Report for Kansas for December 27, 2016 – January 2, 2017 from K-State’s Precision Agriculture Laboratory shows almost no photosynthetic activity. The little production is mainly in south central Kansas. This is not unexpected given the very cold pattern for the last week.

Kansas Vegetation Condition Comparison
Early-January 2017 compared to the Early-January 2016

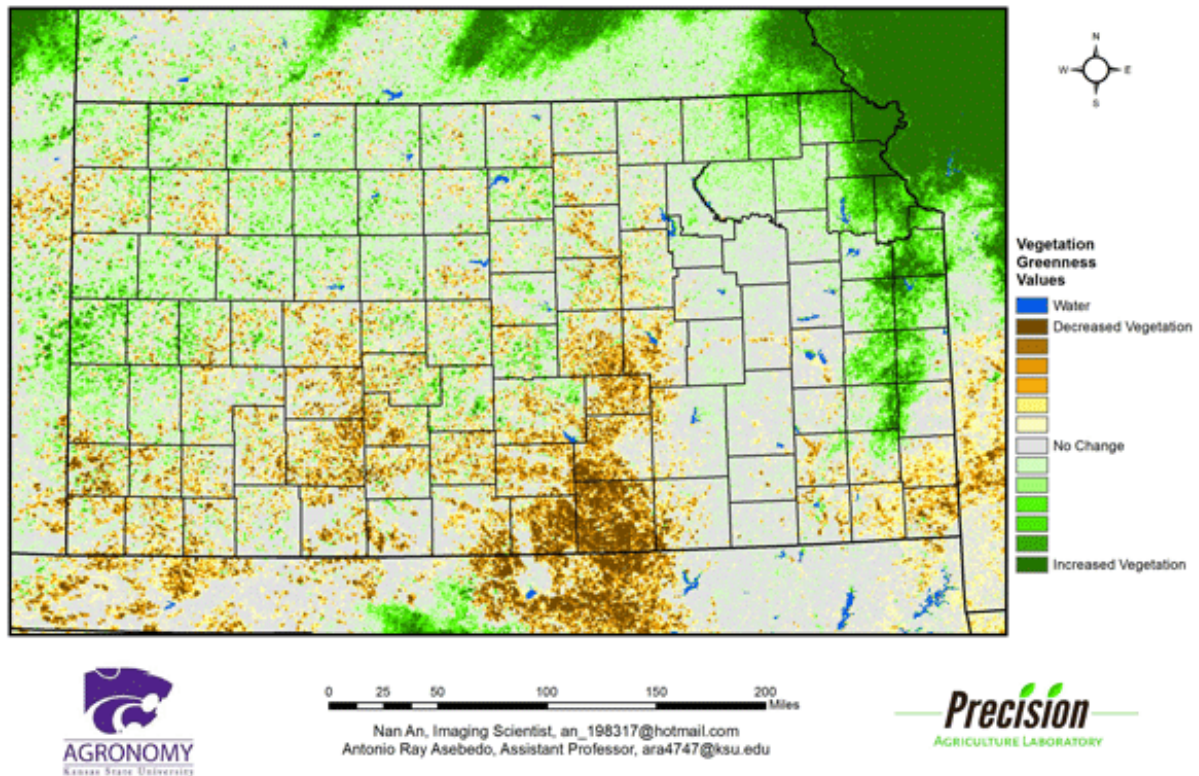


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for December 27, 2016 – January 2, 2017 from K-State’s Precision Agriculture Laboratory shows only a slight increase in NDVI values across parts of the state. Lower values are most evident in the southern divisions. Expanding drought conditions and the slow establishment of winter wheat in the Southwest into the South Central Divisions have resulted in reduced NDVI values there. Dry conditions are also showing in extreme southeast Kansas.

Kansas Vegetation Condition Comparison

Early-January 2017 compared to the 28-Year Average for Early-January

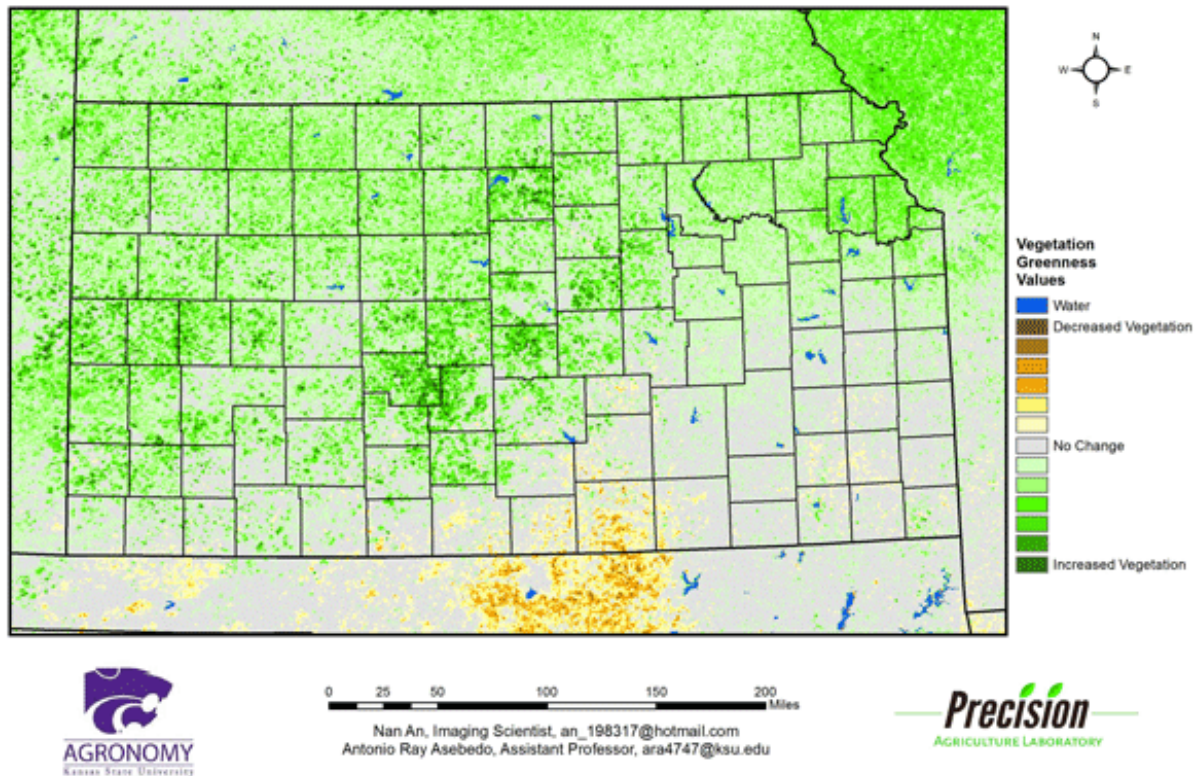


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for December 27, 2016 – January 2, 2017 from K-State's Precision Agriculture Laboratory shows much of the state has slightly above-average vegetative activity. Despite the recent cold weather, temperatures have been slightly warmer than average for the period.

Continental U.S. Vegetation Condition

Period 01: 12/27/2016 - 01/02/2017

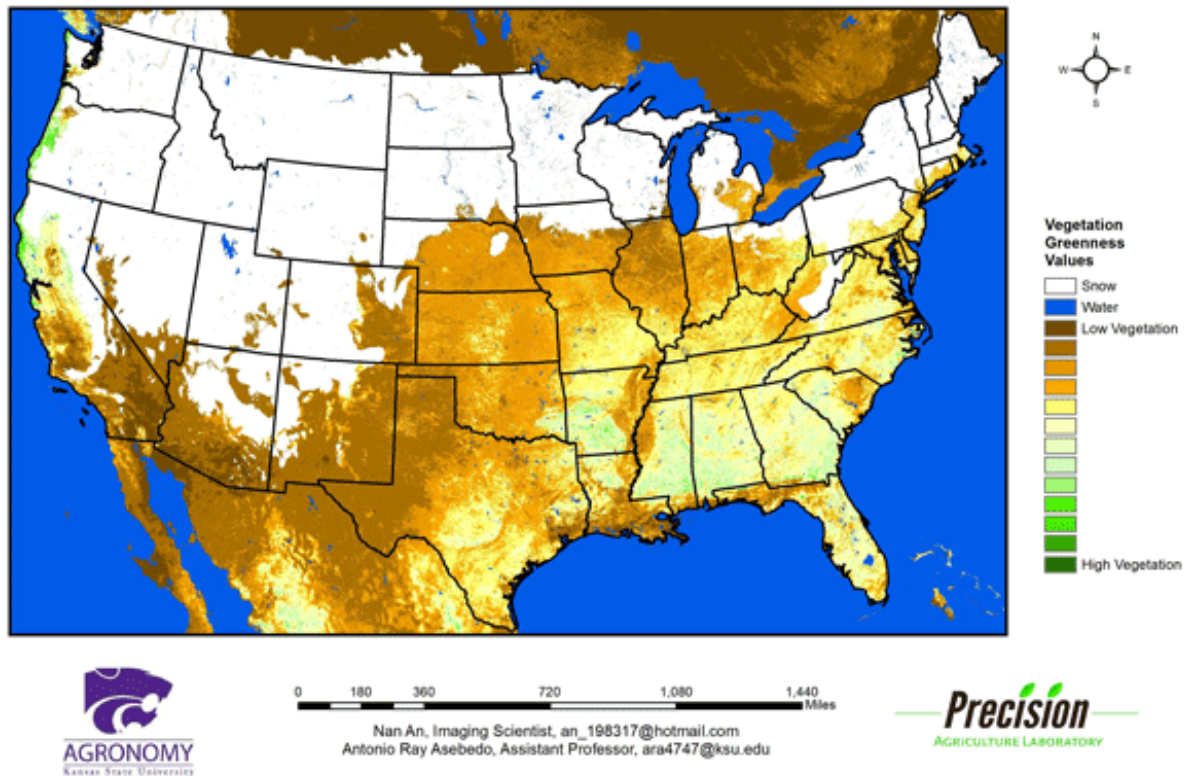


Figure 4. The Vegetation Condition Report for the U.S for December 27, 2016 – January 2, 2017 from K-State’s Precision Agriculture Laboratory shows the highest NDVI readings are confined to the South, as the growing season has ended for much of the country. Snowfall has been concentrated in the Intermountain West and the Northern Plains.

Continental U.S. Vegetation Condition Comparison Early-January 2017 Compared to Early-January 2016

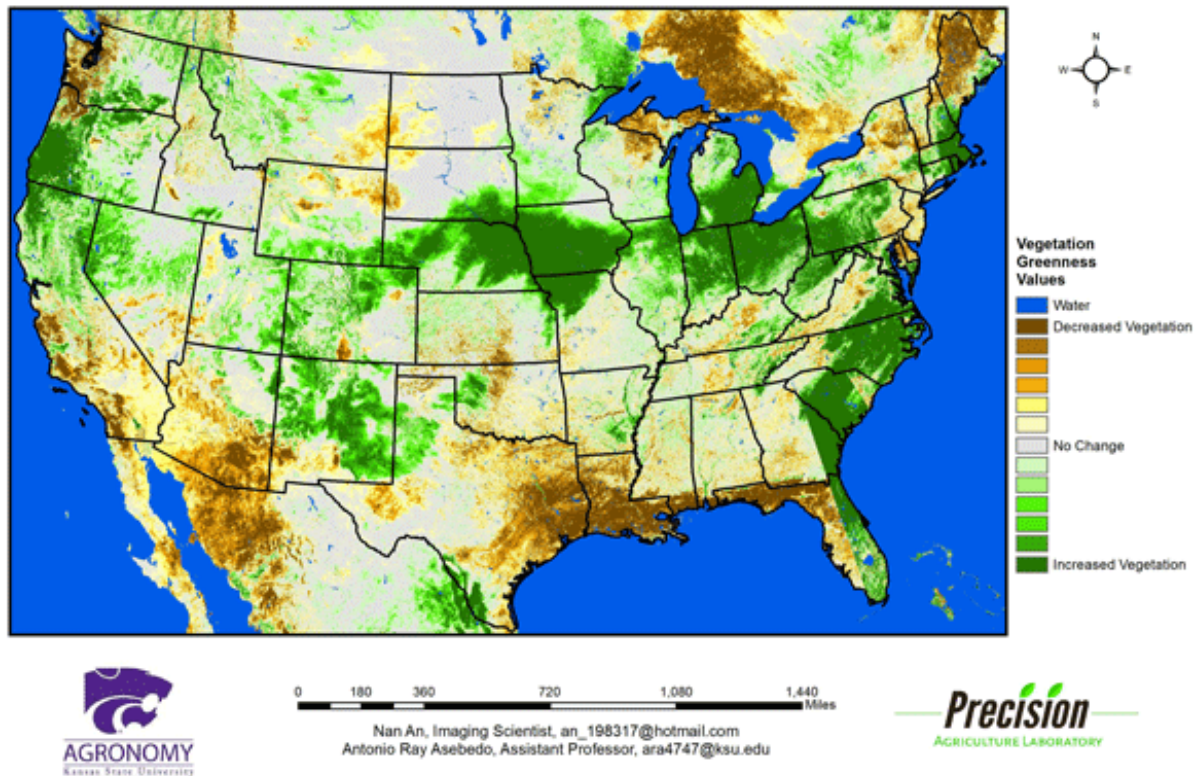


Figure 5. The U.S. comparison to last year at this time for December 27, 2016 – January 2, 2017 from K-State’s Precision Agriculture Laboratory shows that higher NDVI values are greatest in the Southwest and across parts of the central Corn Belt from eastern Nebraska to western Pennsylvania. Rainfall has been much more plentiful this year, and snowfall has been limited. Along the Gulf Coast, clouds have been more prevalent than last year.

Continental U.S. Vegetation Condition Comparison
Early-January 2017 Compared to 28-year Average for Early-January

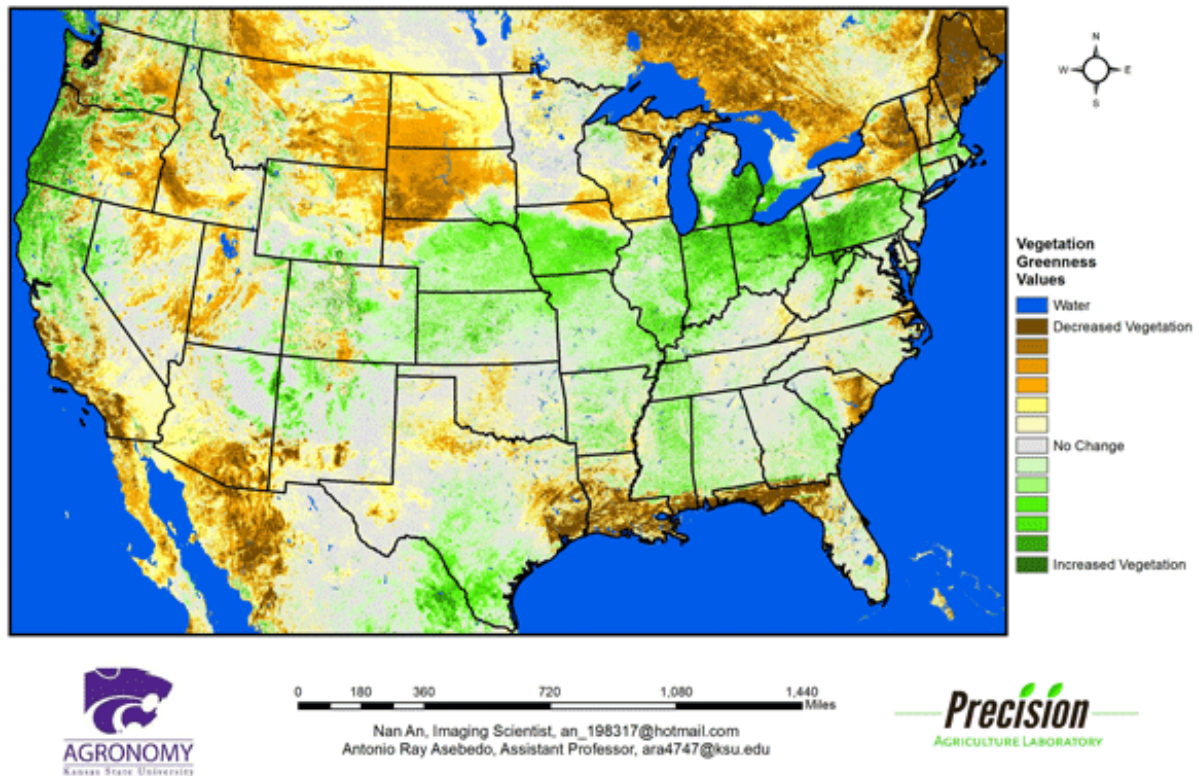


Figure 6. The U.S. comparison to the 27-year average for the period December 27, 2016 – January 2, 2017 from K-State’s Precision Agriculture Laboratory shows an area of below-average photosynthetic activity along the Gulf Coast, where persistent cloud cover has masked vegetative activity. NDVI values have dropped along the northern areas of the U.S. as snow cover has begun to develop.

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Nan An, Imaging Scientist
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