Extension Agronomy

eUpdate

12/23/2016

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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(Note: This is an updated version of the article that was in last week's eUpdate. The most significant changes are in the table and the graph. – Steve Watson, Agronomy eUpdate Editor)

Poultry litter can provide a significant and important supply of nutrients for crop production in areas of Kansas where a supply of litter is available. Although Kansas is not a major producer of poultry, there is an abundant supply of litter from the nearby states of Arkansas, Missouri, and Oklahoma, which rank among the largest producers of poultry in the U.S. The acreage available to receive poultry litter has been declining in Arkansas, Missouri, and Oklahoma in recent years because of environmental concerns and nutrient management regulations. That trend, coupled with high fertilizer prices, has meant the availability of litter to areas such as southeast Kansas has been on the rise.

Poultry litter should serve as an excellent complement to commercial nitrogen (N) fertilizers. Phosphorus content in poultry litter is usually high, and applications rates should be based on P levels to avoid potential surface water contamination.

Types of Poultry Litter				
Source	Typical moisture content	Typical nutrient content (lbs/ton)		
		N	P_2O_5	K_2O
Layer	High	35	40	20
Pullet	Low	40	45	40
Breeder	High	40	60	40
Turkey	Low	60	60	55
Broiler	Low	60	60	55

Moisture content and nutrient concentration in poultry litter can be highly variable and depends mainly upon production conditions, storage, and handling methods. Therefore, laboratory analysis is the best way to determine the level of N and P in the material to be applied. The table above presents average values for the different types of poultry manure collected over a period of time. The graph below presents the actual laboratory analysis of 213 poultry manure samples from southeast Kansas. There is a large range in nutrient values, likely due to the source of the litter. However, a good sample average to expect would be a 56-53-46.
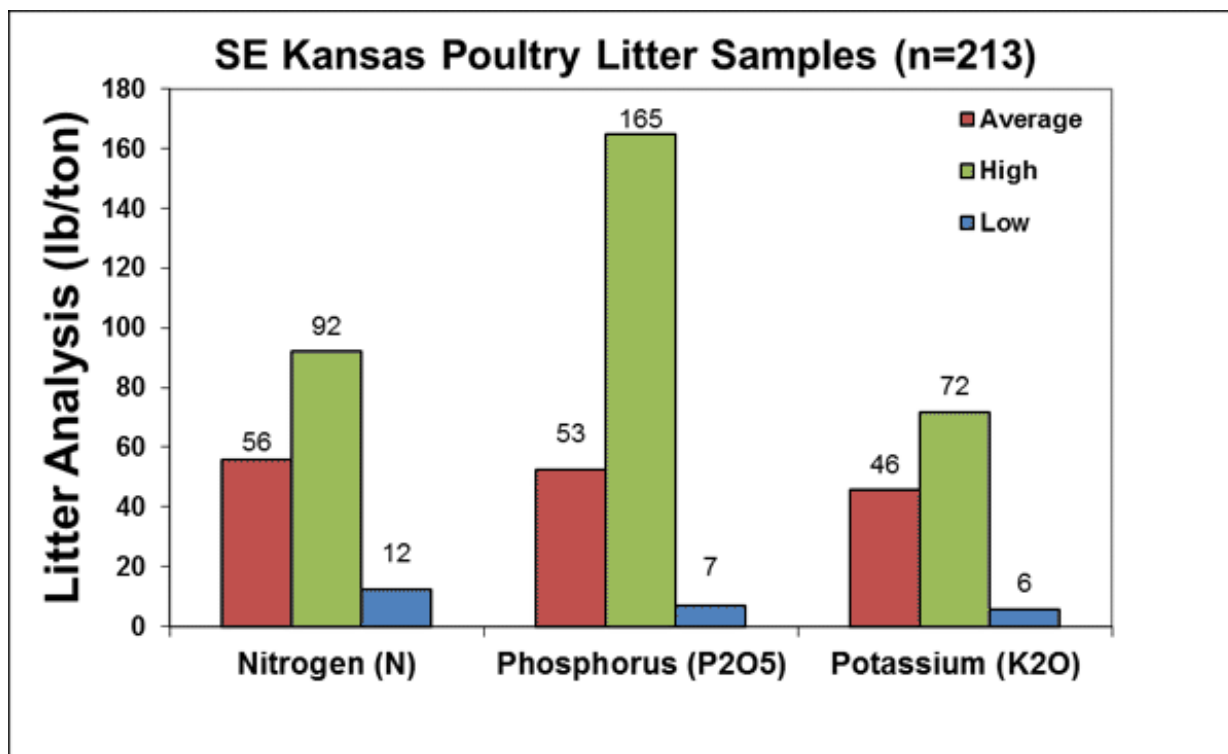
Figure 1. Results of analysis of 213 samples of poultry manure from southeast Kansas. Sources: include Keith Martin, K-State Research and Extension, Wildcat Extension District and Doug Shoup, K-State Research and Extension.

For maximum efficiency of manure use, it is essential to know the nutrient content of the manure. Using a manure lab analysis will help in determining the actual nutrient rates applied. A laboratory analysis should be done on the poultry litter before applying it to land. A laboratory analyses provides information regarding nutrient levels, as well as the chemical forms of these nutrients. This information is necessary for an adequate estimation of nutrient availability and application rates. For more information, see K State Extension publication MF-2562, "Estimating Manure Nutrient Availability," at: http://www.ksre.ksu.edu/bookstore/pubs/MF2562.pdf

Nitrogen availability

Nitrogen and P crop availability shortly after application is a common question. In the case of N, it is important to consider that this nutrient is primarily in the organic form in poultry litter (up to 75-80% organic N). Organic N needs to mineralize before becoming available to crops. A fraction of this organic N may become part of the soil organic matter pool and unavailable to crops in the short term.

Field and laboratory studies suggest the fraction of total nitrogen that becomes plant available the first year of application is approximately 45-55%, which includes both the inorganic N in the manure and a percentage of the organic N. This value varies depending upon components in the litter, and the method of handling and application. For example, poultry litter that contains a large fraction of bedding material will tend to have lower N availability the year of application. Reduction in N availability may also occur when litter is aged, and has undergone some level of composting. Nitrogen lost from the volatile ammonium fraction at the time of application to the soil surface can also reduce plant available N. Ammonium volatilization is typically higher during windy and warm days. Incorporation of litter immediately after application will reduce volatilization and potential nutrient loss by water runoff in case of a rainfall event, in addition to reducing the odor of the litter.

If the manure is applied to pastures, the percentage of nitrogen utilized by the forage the first year will depend on whether the pasture consists of cool-season or warm-season grasses. For cool-season grasses, such as fescue pasture, nitrogen utilization will likely be less than 50% the first year. Most of the growth in cool-season pasture occurs early in the year. The microbial community will not mineralize as much N early in the spring as they will later in the summer. Fall applications may result in better N utilization for fescue than winter or spring applications. For warm-season grasses, such as bermudagrass pasture, nitrogen utilization from manure will likely be close to 50%. In both cases, producers should base application rates on the P and K needs of the grass, and supplement additional N fertilizer to meet the N needs of the grass.

Phosphorus and potassium availability

When manure is applied to the soil, what percentage of this phosphorus and potassium is available to the crop during the first year?

A large fraction of the phosphorus in manure is considered to be plant available immediately after application. The fraction that is not plant available shortly after application will become available over time.

Estimated values of phosphorus availability are from 50 to 100%. This range accounts for variation in sampling and analysis, and for phosphorus requirements with different soil test levels. Use the lower end of the range of phosphorus availability values (50%) for soils testing "Very Low" and "Low" (below 20 ppm) in phosphorus. In these situations, large yield loss could occur if insufficient phosphorus is applied and soil phosphorus buildup is desirable.

On the other hand use 100% availability when manure is applied to maintain soil test phosphorus in the Optimum soil test category, and when the probability of a yield response is small.

Several studies have shown that manure P is a valuable resource, comparable to inorganic fertilizer P for crop production. These two P sources are similarly effective when the manure P concentration is known and the manure is applied properly.

Nevertheless, excessive application of manure phosphorus (for example, applying manure at rates sufficient to meet the crop's nitrogen needs) often results in excessive soil phosphorus buildup over time, resulting in higher risk of surface water contamination. This problem of excessive phosphorus buildup in the long-term can be minimized by:

- Applying manure to meet the phosphorus needs of the crop and using inorganic sources of

fertilizer to complement nitrogen needs,
- Constantly monitoring soil test phosphorus levels, and
- Using the P-index to assess potential impact of phosphorus buildup on water quality.

Producers should think in terms of actual phosphorus application rates and not just tons per acre of manure being applied. Uniform application of manure at precise rates can also be difficult. Careful calibration of manure applicators is needed. If these aspects are not considered, the efficiency of manure P compared with inorganic fertilizer P may be reduced. Careful management pays off.

Availability of potassium (K) is usually near 100% with proper application, poultry litter can also provide significant amounts of secondary and micronutrients.

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2. Calculating the value and proper storage of poultry litter

Value

The use of poultry litter can contribute to reducing the cost of fertilizer inputs for many operations, depending on the price and transportation cost of the litter. For many farmers the use of poultry litter may represent significant savings. However, for many producers there is a "hassle factor" with using poultry litter. Reliable delivery, storage site location, uniform application, access to application equipment, and odor can all be additional challenges to producers unfamiliar with its use, and should be a consideration.

How valuable is poultry manure? This may not be a straightforward answer and depends on several factors, including the nutrient(s) required for a specific field, but here's one example using the average nutrient analysis values from southeast Kansas of 56-53-46 (N-P_2O_5-K_2O lbs/ton):

• Year 1:

• 35% of N is inorganic (all available) = 19.6 lbs/ton

• 65% of N is organic (1/4th available in year 1) = 9.1 lbs/ton

• Total N available in year 1 = 28.7 lbs/ton

• Total value of N available in year 1 (@ $0.40/lb) = $11.48

• P is 50% available in year 1 = 26.5 lbs/ton

• Total value of P in year 1 (@ $0.40/lb) = $10.60

• K is 100% available in year 1 = 47.0 lbs/ton

• Total value of K in year 1 (@ $0.40/lb) = $18.80

Total in year 1 = $40.88/ton

Residual N and P = $21.52/ton

In addition to the value of the N, P and K poultry litter also contains sulfur, micronutrients and organic matter which adds additional value to the poultry litter.

Storage

Proper storage of manure is important to prevent runoff contamination of water and odor problems. The following practices should be utilized:

- Avoid stockpiling litter near homes, public roadways, and drainage ditches.
- Stockpile litter at least 200 feet away from "Waters of the State."

- Use tarps on litter piles to keep litter dry, reduce odor, and reduce N losses from volatilization.
- Create an earthen berm around piles to allow time for water and nutrients to infiltrate.

Additional considerations when selecting a suitable storage site

- Locate stockpiles in areas with minimal slope.
- Avoid sites that slope toward waterways and receive extraneous drainage.
- Locate sites in areas surrounded by grass that can serve as a buffer.
- Avoid sensitive groundwater areas and sites in close proximity to wells.

Figure 1. Stockpiling poultry litter. Photo by Doug Shoup, K-State Research and Extension.

If poultry litter is a regular part of an operation's fertility program consider constructing improved poultry litter storage sites that include a storage pad built out of lime screenings, all-weather truck access, and a grass or cropland buffer to trap nutrients leaving the storage site. K-State Research and Extension Watershed Specialists may be able to provide assistance in identifying suitable storage locations and/or designing improved temporary storage sites that poses the least possible environmental risk from runoff for the area.

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3. Benefits of timber stand improvement on Kansas farmsteads

(Note: The following is an excerpt from *Forest Management for Wildlife*, KSRE publication MF2899, available at: http://www.bookstore.ksre.ksu.edu/pubs/MF2899.pdf -- Steve Watson, Agronomy eUpdate Editor)

Many producers and landowners in Kansas have wooded areas on their property that can provide beneficial habitat for wildlife. These forests offer protection from wind and snow, refuge from predators, and a variety of foods not found in other landscapes. While these areas might be taken for granted, they can often be enhanced with little or no loss to timber production.

Properly managed forests provide habitat for wildlife such as squirrels, deer, turkey, and songbirds. Other wildlife species such as rabbits, quail, and raptors use the forest edge (the border where two different cover types come together) and benefit from the management of these areas. For the landowner, wooded areas offer aesthetic beauty, improve water and air quality, provide valuable wildlife habitat, and offer income opportunities.

Timber stand improvement (TSI) is one option for enhancing the wildlife value of a wooded area. TSI removes inferior trees to improve the growth rate and/or quality of the best, high-valued (crop) trees. Use this practice to thin a forest by removing trees that are restricting the growth of the more valuable trees.

By incorporating some of the following suggestions, wildlife and forest health will benefit from TSI.

Various game and non-game species benefit from forested habitat.

Figure 1. Various game and non-game species benefit from a wooded habitat. Photos from: Forest Management for Wildlife, K-State publication MF-2899.

1. Leave around seven den trees (trees with a cavity or hollow pocket) of various sizes per acre.

2. Do not remove standing dead trees.

3. Kill poor quality, low-valued trees that inhibit the growth of crop trees or those that are suppressing natural regeneration of favorable species. Deaden the undesirables and allow them to remain standing, a process called girdling. To do this, make a continuous encircling cut 1 to 2 inches deep with a chain saw; application of an approved herbicide prevents resprouting.

4. When deadening undesirable trees, chemically treat stumps of species such as honeylocust and Osage-orange. Sprouts from untreated stumps (such as mulberry, elm, oak, and walnut) provide beneficial browse and low-level cover.

5. Thin around food trees such as mulberry, oaks, persimmon, walnut, hickories, dogwood, and pawpaw.

Food value of 20 common forest trees, shrubs, and vines for wildlife					
Species	Songbirds	Upland game birds	Big game	Small game	Furbearers
Blackberry	Excellent	Excellent	Good	Excellent	Excellent
Coralberry	Fair	Fair	Fair	Poor	Poor
Dogwood	Excellent	Excellent	Excellent	Fair	Fair
Elderberry	Excellent	Excellent	Excellent	Excellent	Excellent
Elm	Poor	Fair	Good	Fair	Poor
Grape	Excellent	Excellent	Excellent	Excellent	Excellent
Green ash	Fair	Fair	Fair	Fair	Poor
Greenbriar	Excellent	Excellent	Excellent	Excellent	Excellent
Hackberry	Excellent	Fair	Good	Good	Good
Haw	Excellent	Excellent	Fair	Excellent	Excellent
Mulberry	Excellent	Good	Excellent	Excellent	Excellent
Oaks	Excellent	Excellent	Excellent	Excellent	Excellent
Osage-orange	Poor	Poor	Poor	Good	Poor
Pecan, Hickory	Fair	Fair	Fair	Good	Fair
Persimmon	Excellent	Good	Fair	Excellent	Excellent
Plum	Excellent	Excellent	Excellent	Excellent	Excellent
Redcedar	Good	Fair	Poor	Poor	Poor
Sumac	Fair	Fair	Fair	Poor	Poor
Virginia creeper	Excellent	Excellent	Excellent	Excellent	Excellent
Walnut	Poor	Poor	Fair	Good	Poor

6. Kill vines that are growing into future crop trees, but leave vines that are growing in low-value trees. Wildlife benefit from vines left in poor quality or low-valued trees, as well as those along forest edges.

7. Place thinning material into brush piles near the woodland edge or in the woods to decompose and provide habitat for invertebrates, as this may be important food for other wildlife species.

8. Remember to retain wooded buffer strips along creek channels. The Kansas Forest Service recommends leaving a strip of trees and shrubs at least 66 feet wide to protect the stream bank from erosion, enhance fisheries, and to reduce sediment and chemicals from entering the creek. Generally, wider buffers are necessary to maximize wildlife benefits.

When performing TSI work, do not aim for a park-like setting where all of the understory vegetation is removed. These ground-level plants are an important source of food and cover to wildlife.

For complete information, see *Forest Management for Wildlife*, K-State publication MF-2899, at:
http://www.bookstore.ksre.ksu.edu/pubs/MF2899.pdf

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4. 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 Ridgeview Rd.

Jan. 9 – Wichita

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

Jan. 11 – Oakley

Contact Information:
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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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Abbie Powell, Marais des Cygnes Extension District, abbie2@ksu.edu, 913-795-2829
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Leroy Russell, Shawnee Count Extension y, 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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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.

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

(Note: There has been a change of location at the Hesston school. The new location is included in the information below. – Steve Watson, Agronomy eUpdate Editor)

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.

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7. 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.

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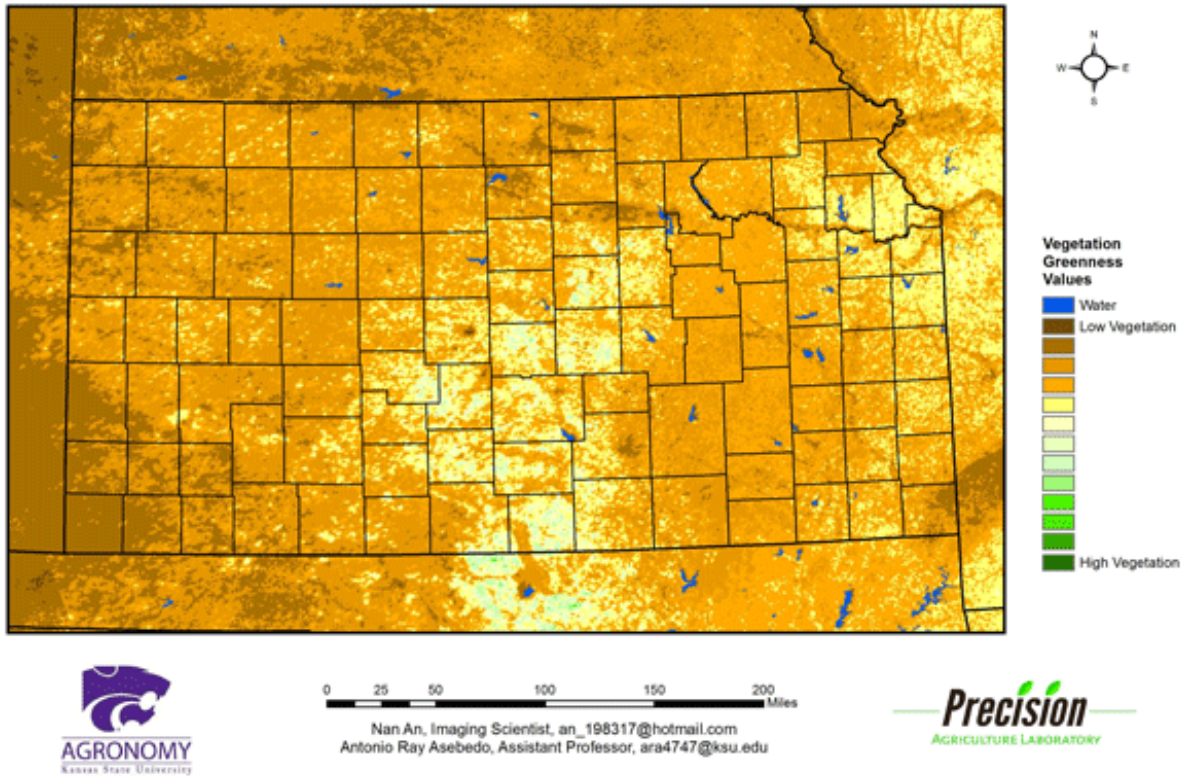
The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography, and his pioneering work in this area is gratefully acknowledged.

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:
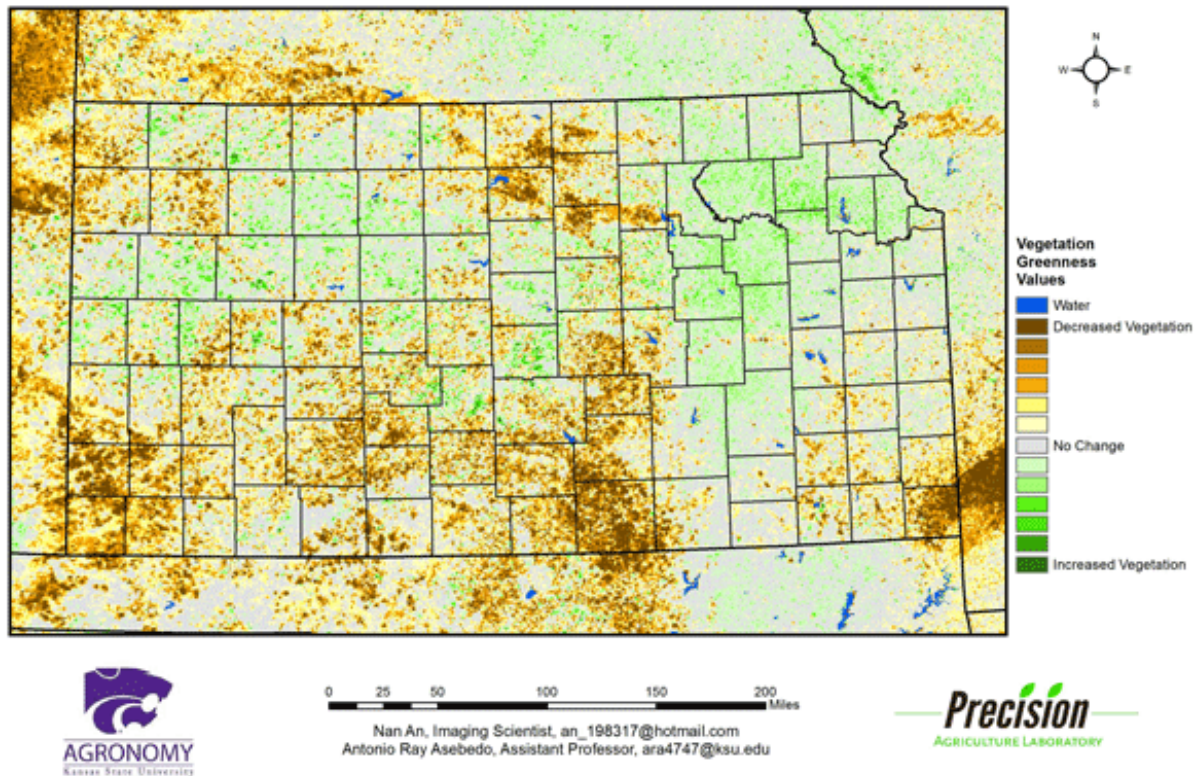
Figure 1. The Vegetation Condition Report for Kansas for December 13 – December 19, 2016 from K-State's Precision Agriculture Laboratory shows almost no photosynthetic activity. The little production is mainly in south central Kansas. Cold temperatures have moved most vegetation into dormancy.
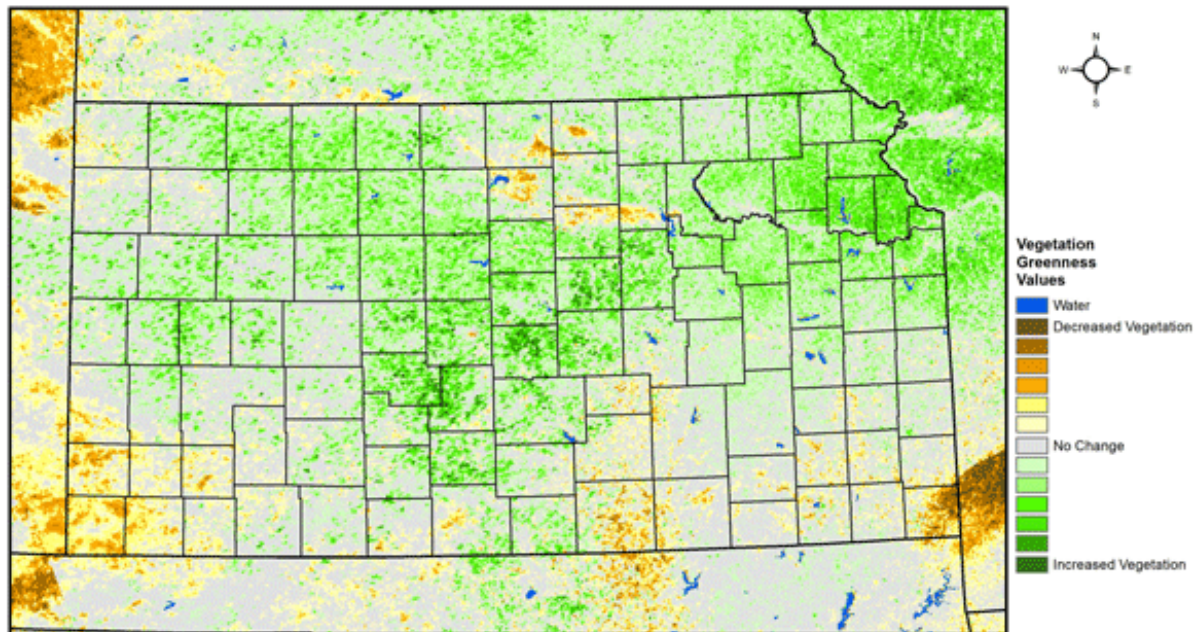
Kansas Vegetation Condition Comparison
Mid-December 2016 compared to the Mid-December 2015

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for December 13 – December 19, 2016 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 is visible as reduced NDVI values there. The much lower NDVI values in southeast Kansas is due mainly to persistent cloud cover.

Kansas Vegetation Condition Comparison
Mid-December 2016 compared to the 27-Year Average for Mid-December

Vegetation Greenness Values
- Water
- Decreased Vegetation
- No Change
- Increased Vegetation

0 25 50 100 150 200 Miles

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Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for December 13 – December 19, 2016 from K-State's Precision Agriculture Laboratory shows much of the state has slightly above average NDVI values. Cold weather has finally arrived and vegetative activity has slowed, as normal. The very low values in the southeastern part of the state are due to persistent cloud cover.

Continental U.S. Vegetation Condition
Period 51: 12/13/2016 - 12/19/2016
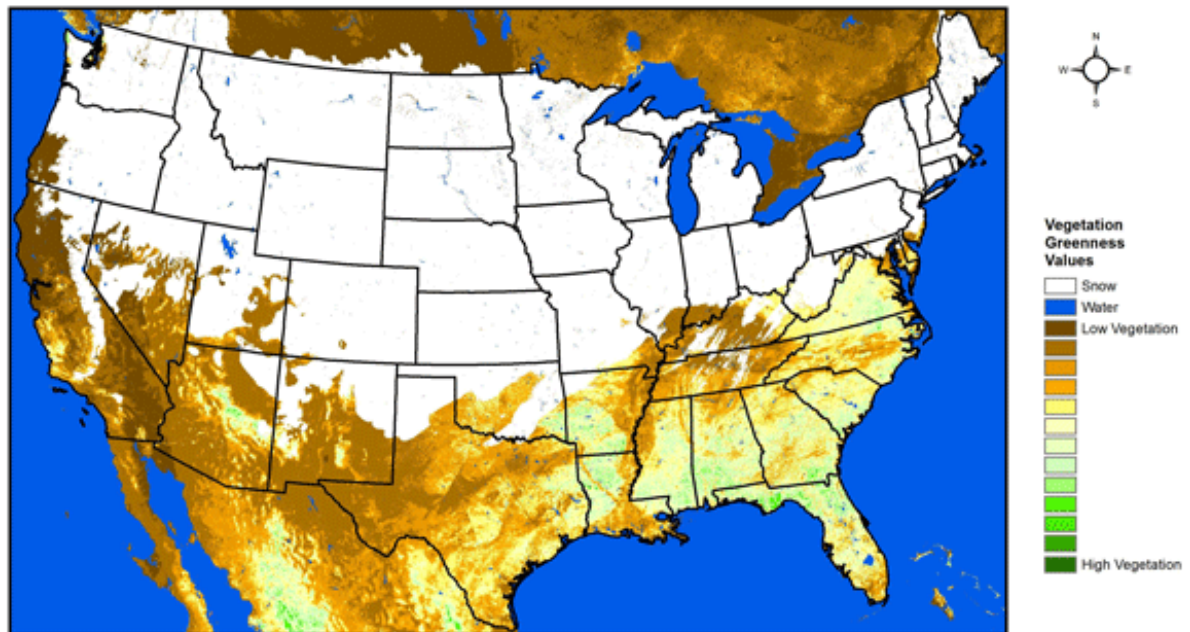
Vegetation Greenness Values
Snow
Water
Low Vegetation
High Vegetation

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Figure 4. The Vegetation Condition Report for the U.S for December 13 – December 19, 2016 from K-State's Precision Agriculture Laboratory shows the highest NDVI values are confined to the South, as the growing season has ended for much of the county. Snowfall intruded on much of the country, with snow as far south as parts of Oklahoma and the Texas Panhandle.

Continental U.S. Vegetation Condition Comparison
Mid-December 2016 Compared to Mid-December 2015
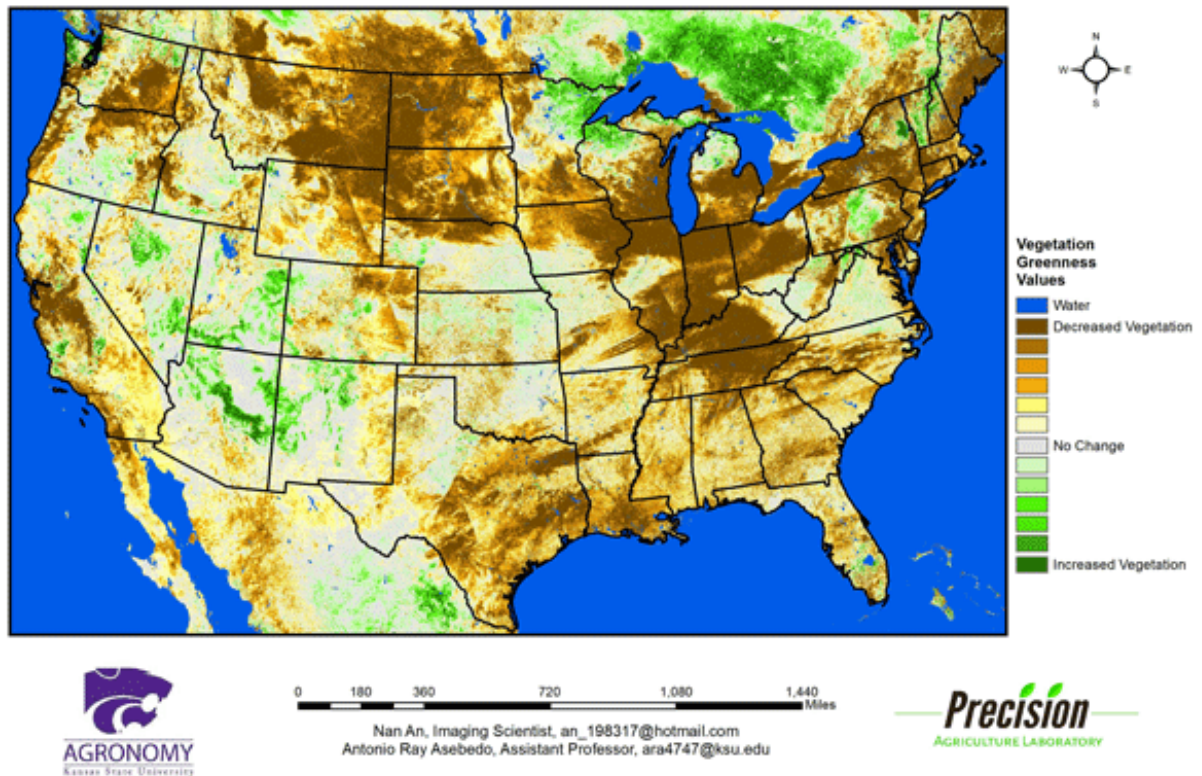
Figure 5. The U.S. comparison to last year at this time for December 13 – December 19, 2016 from K-State's Precision Agriculture Laboratory shows that higher NDVI values in the Southwest. Rainfall has been much more plentiful this year, and snowfall has been limited. Along the Gulf Coast, cloud cover has been more prevalent than last year.

Continental U.S. Vegetation Condition Comparison
Mid-December 2016 Compared to 27-year Average for Mid-December
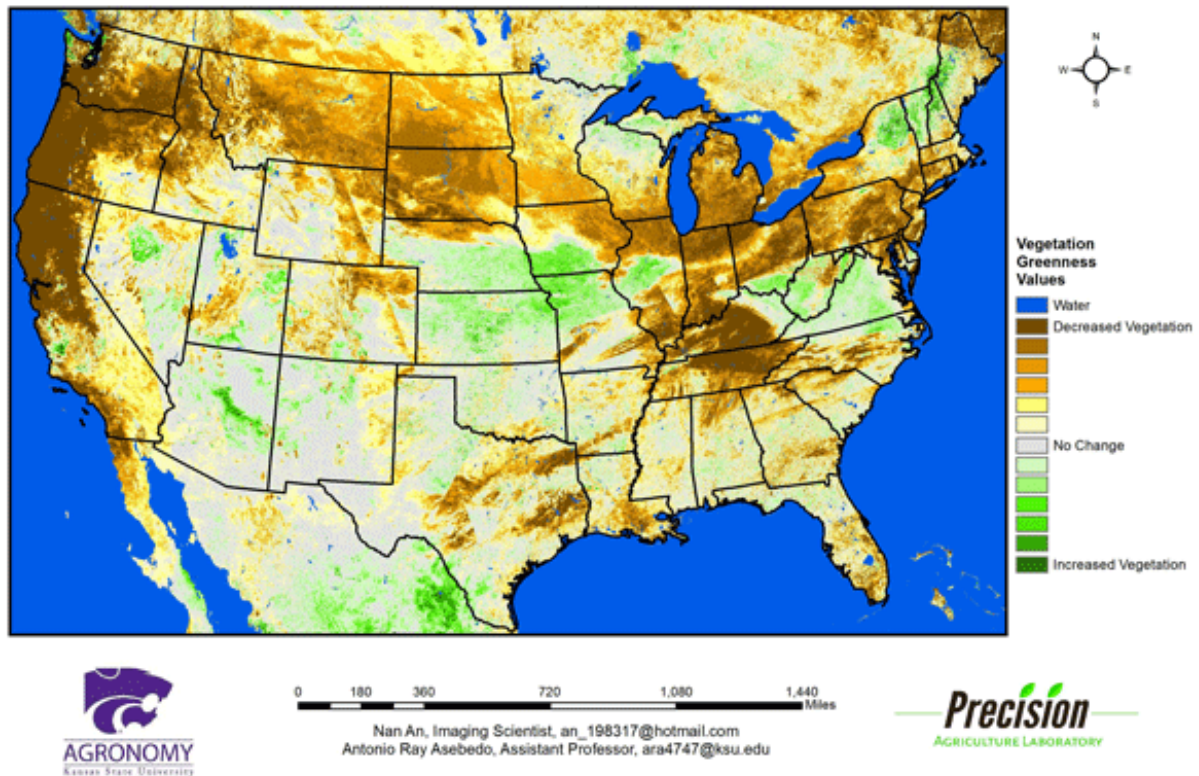
Figure 6. The U.S. comparison to the 27-year average for the period December 13 – December 19, 2016 from K-State's Precision Agriculture Laboratory shows an area of below-average photosynthetic activity along the Pacific Northwest and the Northern Plains. NDVI values have dropped along the northern areas of the U.S. as snow cover has begun to develop. The much lower NDVI values from east Texas through the Ohio River Valley is mainly due to persistent cloud cover.

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