Issue 784

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Extension Agronomy

eUpdate

02/07/2020

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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1. Ag-Climate Update for January 2020

The Ag-Climate Update is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

January 2020 – Wet and Mild

January was much warmer and wetter than normal. It ranked as the 16th wettest January and the 26th warmest. Two stations set records for the greatest January daily amounts: White City, 1.14 inches on the 11th, and Liberal, 1.42 inches on the 28th. Liberal also set a new snowfall record for the month of January at 12 inches.

Due to the wetter than normal pattern, drought conditions improved but were not eliminated. Severe drought continues to be a problem in the Southwest Division (Figure 1).

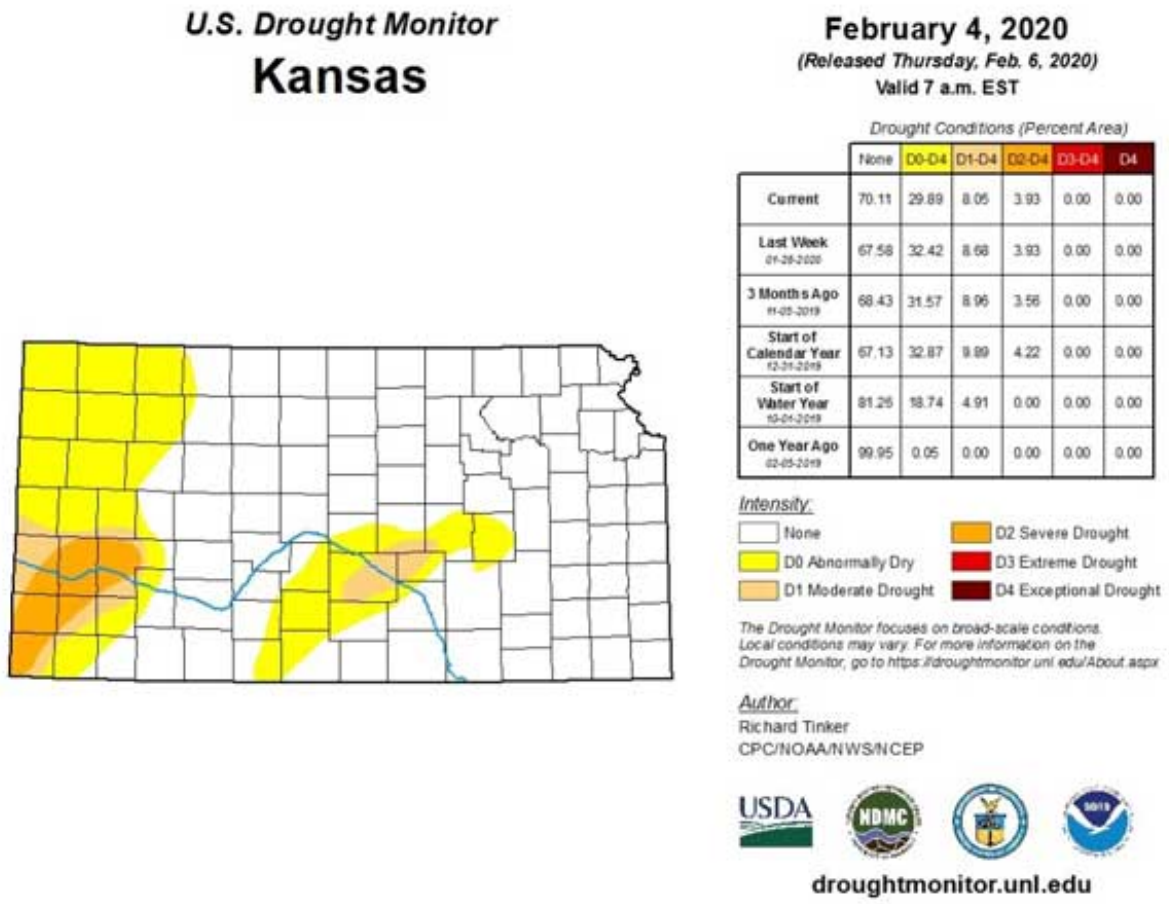

Figure 1. Drought map for Kansas as of February 4, 2020. Source: UNL Drought Monitor.

View the entire January 2020 Ag-Climate Summary, including the accompanying maps and graphics (not shown in this summary), at http://climate.k-state.edu/ag/updates/

2. Topdressing wheat with nitrogen: Timing, application methods, sources, and rates

With the recent precipitation and snowfall, and a few warm days during the week of January 27 - 31, some wheat fields in central and southern Kansas have started to show initial levels of spring greenup, and might be starting to develop spring tillers. Thus, now is a good time to start planning for topdressing nitrogen (N), especially for those wheat fields that emerged last fall. However, it might be early to topdress N for fields in central Kansas or southwest Kansas in which the crop is still extremely small (just now emerging or with less than one tiller due to lack of fall moisture; see eUpdate article "Learn what to expect from a spring-emerged winter wheat crop", in Issue 782, January 24). In either circumstance, some key elements that need to be considered when deciding on the exact program you plan to use include: timing, N source, application method and N rate.

Ideally, the N in topdress applications will be moved into the root zone with precipitation well before jointing begins in order to be most efficiently utilized by wheat. With some of the small wheat out there with limited fall tillers, having adequate N available to support spring tillering when it breaks dormancy will be important. Also, the potential number of meshes per head is determined right after spring green-up and prior to jointing; thus, having available N in the root zone can help ensure a good yield potential. Some combination of fall pre-plant or at-seeding N, and/or early topdressed N, is also normally needed to supply adequate N to support head differentiation. The following will discuss some of the issues to consider when making topdressing decisions.

Timing

The most important factor in getting a good return on topdress N is usually timing. It is critical to get the N on early enough to have the maximum potential impact on yield, especially in a year with limited fall tillering. While waiting until spring just prior to jointing can be done with success, this can be too late in some years, especially when little or no N was applied in the fall. For the well-drained, medium- to fine-textured soils that dominate our wheat acres, the odds of losing much of the N that is topdress-applied in the winter is low. For these soils, topdressing can begin anytime now, and usually the earlier the better. For wheat grown on sandier soils, earlier is not necessarily better for N applications. On these soils, there is a greater chance that N applied in the fall or early winter could leach completely out of the root zone if precipitation is unusually heavy. Waiting until closer to spring green-up to make topdress N applications on sandier soils will help manage this risk.

On poorly drained and/or shallow claypan soils, especially in south central or southeast Kansas, N applied in the fall or early winter would have a significant risk of denitrification N loss. Waiting until closer to spring green-up to make topdress N applications on these soils will help minimize the potential for this N loss.

Keep in mind that N should not be applied to the soil surface when the ground is deeply frozen and especially when snow covered. This will help prevent runoff losses with snow melt or heavy precipitation. Additionally, once the soils start to melt, they will likely be too wet for any field work. Therefore, every field should be considered for characteristics such as slope, N source, tillage system, and the short-term forecast for temperature and precipitation.

On both sandy soils subject to leaching and poorly-drained soils prone to denitrification, split

applications may be a strategy to consider. This would involve applying enough N in the fall at or prior to planting to give good support for fall growth and tillering -- generally 20-30 pounds of N. Then follow up with an additional application of about 20-30 pounds of N in late winter or early spring to support spring tillering, possibly applied with herbicides. This late-winter/early-spring application becomes especially important when stands are thin due to poor emergence, as many fields are this year. Finally, come back around jointing or a few days later with a final application to support heading and grain fill. This strategy can also provide flexibility in a year like this with poor fall growth, allowing to hold back part of the N for later in the spring as we have a better idea of soil moisture and weather conditions for the season.

Application method

Most topdressing is broadcast applied. In high-residue situations, this can result in some immobilization of N, especially where liquid UAN is used. If no herbicides are applied with the N, producers can get some benefit from applying the N in a dribble band on 15- to 18-inch centers. This can minimize immobilization and may provide for a more consistent crop response.

Nitrogen source

The typical sources of N used for topdressing wheat are UAN solution and dry urea. Numerous trials by K-State over the years have shown that both are equally effective. In no-till situations, there may be some slight advantage to applying dry urea since some of it will fall to the soil surface (Figure 1) and be less affected by immobilization than broadcast liquid UAN, which tends to get hung up on surface residues.

Figure 1. Urea broadcast to tillering wheat in a topdress application. Photo by Romulo Lollato, K-State Research and Extension.

Dribble (surface band) UAN applications would also avoid some of this tie-up on surface crop residues. However, if producers plan to tank-mix with an herbicide, they will have to use liquid UAN and broadcast it.

Controlled-release products such as polyurethane coated urea (ESN) might be considered on very sandy soils prone to leaching, or poorly-drained soils prone to denitrification. Generally, a 50:50 blend of standard urea and coated urea will provide some N immediately to support tillering and head development, and also continue to release some N in later stages of development. This would work best in settings with high loss potential.

Nitrogen rate

Producers should have started the season with a certain N recommendation in hand, ideally based on a profile N soil test done before the crop is planted and before any N has been applied. If a soil sample was taken at sowing, profile nitrate-N can help determine the rate to be applied based on the yield goal. However, it is not too late to use the profile N soil test if taken in late winter/very early spring before green-up. While it will not be as accurate as when sampled in the fall, it can still identify fields or areas in fields with high levels of available nitrate N. Unfortunately, it is not reliable in measuring recently applied N. So if a high rate of N has already been applied, a late winter profile sample probably shouldn't be taken. Remember that topdressing should complement or

supplement the N applied in the fall and the residual soil N present in the soil. The total N application, planting and topdressing, should equal the target recommended rate.

If the wheat was grazed this fall and winter, producers should add an additional 30-40 lbs N/acre for every 100 lbs of beef weight gain removed from the field. If conditions are favorable for heavy fall and/or spring grazing, additional N maybe necessary, especially for a grain crop.

Low grain prices this year may also play a role for N rate decisions this spring. However, is important to keep in mind that N is the most limiting nutrient for wheat, and the optimum agronomic N application rate will likely result in economic returns. In general, producers may consider a later topdress application (around jointing) with a better idea of the overall crop condition and expectations for the rest of the season; rather than cutting back on N rates now and potentially limiting yields.

Some fields may also benefit from an application of sulfur and chloride. Like N, these nutrients are mobile in the soil, and a topdress application before jointing is considered an effective application time. Sulfur and chloride topdress applications should be made based on soil test and history of response. For more information on sulfur fertility, please see the recent eUpdate article, "Sulfur deficiency in wheat", in Issue 776, December 6, 2019.

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3. Soil Health Spotlight: Soil structure and aggregation

Soil structure is a way to describe how mineral and organic particles are arranged in the soil. Structure is an important characteristic because it influences how stable and resilient the soil is to disturbance and erosion. It also plays an important role in water infiltration, aeration, root penetration, carbon storage, and nutrient cycling. Measuring soil aggregates is one way to determine the structural status of the soil. Aggregates are the small-scale clumps of bound soil particles and organic matter ranging from a half inch in diameter to microscopic in size. In general, the bigger and more numerous the aggregates, the better structure your soil has. Stable soil aggregates can hold soil particles together against wind, rain, and traffic more effectively than unbound free agents because they are literally stuck together.

Aggregates are often divided into two groups: macroaggregates (pea gravel size) and microaggregates (smaller than a grain of sand). Each group serves a different role in carbon cycling. Macroaggregates can be an important source of easily available carbon for soil microbial activity but breakdown relatively quickly in response to disturbance in the soil. Microaggregates act as more long-term carbon storage where they protect small amounts of organic matter from microbial breakdown. These aggregates are far more stable and resistant to destructive forces. Microaggregates can be formed inside of macroaggregates, which highlights the importance of macroaggregate formation. If macroaggregates are broken before microaggregates can be formed, the long-term storage of organic matter in soil can be compromised.

Aggregates are formed by attractive forces between particles, held together by sticky “organic glues” exuded by microorganisms, and physically molded together by plant roots and soil animals (Figure 1). Preventing aggregate breakdown and enhancing the activity of plants and microbes are the primary ways agricultural management can improve soil aggregation.

Figure 1. Earthworms exude sticky glues which help to build soil structure. Photo from K-State Research and Extension.

The following management practices have been shown to improve soil aggregation:

- Reduced tillage or no-till – Reduces disturbance and increases plant residue return to soil
- Crop rotation – Enhances plant-microbe-soil interactions
- Cover crops – Enhances plant-microbe-soil interactions, increases plant residue return to the soil

- Adjusting soil pH or cation availability with amendments such as lime or gypsum (in case of sodic soils) – Can increase soil particle binding from calcium input and/or improve soil pH to facilitate plant and microorganism growth

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4. Cover crop termination considerations

Now is the time to begin considering how to terminate winter cover crops in preparation for summer crops. Some cover crop species, such as oilseed radish or fall-planted oats, are likely to be killed by freezing over the winter. But, many cover crops will need to be terminated by mechanical or chemical methods in the spring. Once the cover crop has been planted, there are two factors you can control in cover crop termination: method and timing, and choices related to these factors interact. It's also important to remember that NRCS guidelines for termination timing have implications for program compliance (Figure 1).

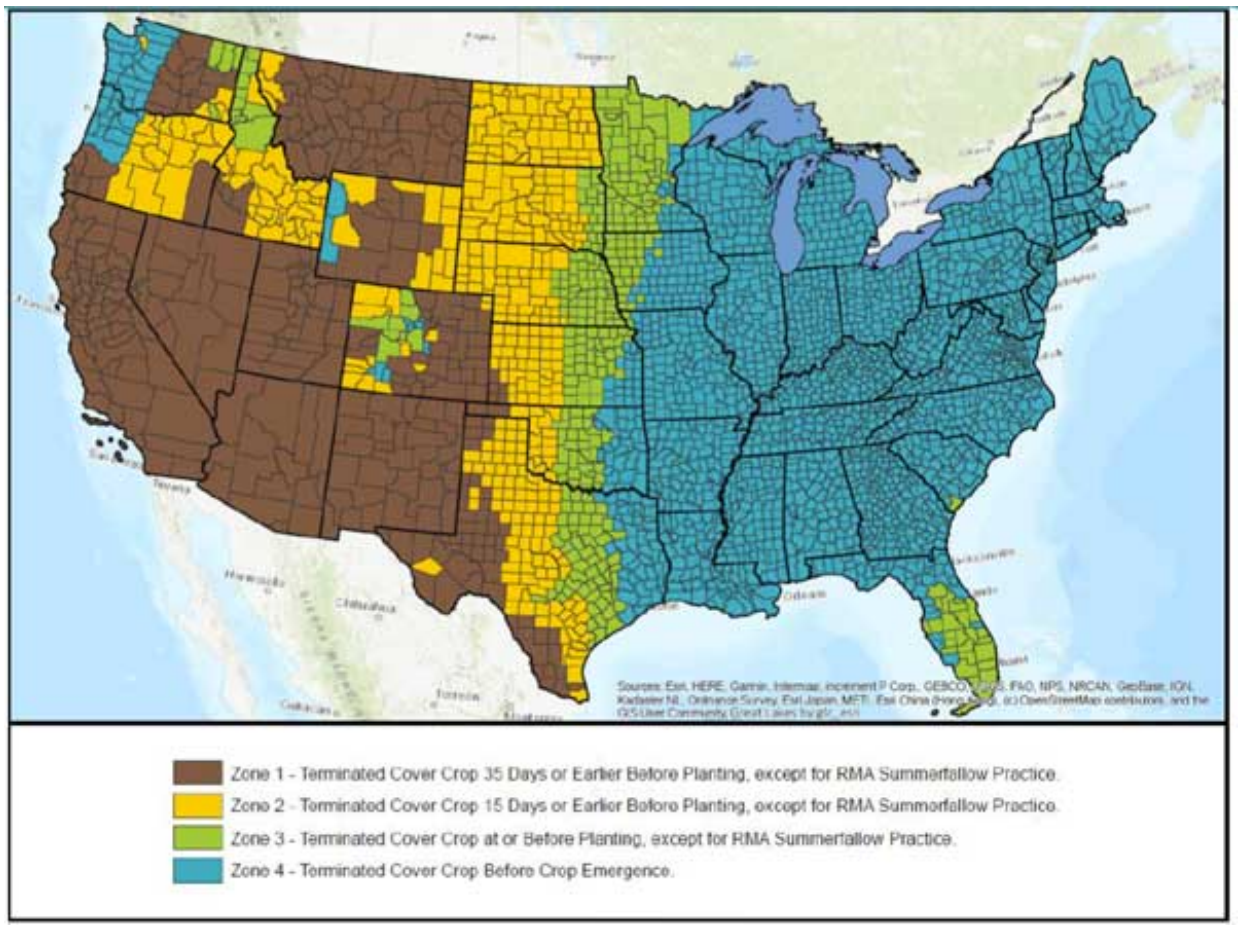

Figure 1. USDA's map depicting termination timing guidelines.

Mechanical cover crop termination methods, such as rolling or roller-crimping (Figure 2), tillage, and mowing have the potential advantage of reducing selection pressure on herbicide resistant weeds by deferring herbicide use to in-crop applications. Termination with a roller or roller-crimper may be more effective for single-species plantings, because cover crop growth stage is a key factor in achieving a successful kill. For example, cereal rye and other winter cereal grains are most consistently killed when a roller-crimper is used at milk or dough stage, while legumes are best controlled at full bloom. Tillage is also a mechanical termination option in some cropping systems. Some species, especially clovers, may not be effectively killed by tillage. Multiple tillage passes may be required, which may cancel out soil health and conservation benefits of the practice. Mowing as a

termination method is best suited to smaller acreages.

Figure 2. Roller crimper being used to terminate a sorghum-sudan grass summer cover crop. Photo by Peter Tomlinson, K-State Research and Extension.

Herbicides are an effective cover crop termination method that can be used in a variety of cropping systems. Selection of the most effective herbicide varies with cover crop species and growth stage. In general, more mature cover crops are more difficult to control with herbicides, especially once plants have begun reproductive development. Selective herbicides, such as Select for grasses or 2,4-D for broadleaves can be used to control single-species plantings, but non-selective herbicides such as glyphosate, glufosinate, or paraquat are recommended for control of mixed-species plantings. Combinations of glyphosate and 2,4-D can increase kill of broadleaf crops.

Residual herbicides such as Prefix or Authority Maxx can also be used in cover crop termination sprays. Research by Whalen et al. in Missouri suggests that including a residual herbicide controls waterhemp and protects soybean yields better than chemical termination without residual herbicides. In this research, the mid-season waterhemp control was greater when the cover crop was terminated 21 days before planting than when the cover crop was terminated 7 days before planting, but termination timing did not affect soybean yield. If you choose to include an herbicide with residual activity, it is especially important to consider the potential for injury to the crop that will be planted afterward. When selecting an herbicide program to terminate your cover crop, it is important to consider the termination effectiveness and possible restrictions (Table 1).

Table 1. Herbicide considerations for chemical cover crop termination.

Herbicide	Termination effectiveness[2]		Potential rotation restriction[3]
	Cereal rye	Austrian winter pea	
Roundup PowerMax	G/E	F/E	none
Roundup PowerMax + Aatrex	G	G/E	corn
Roundup PowerMax + Clarity	G/E	G/E	soybean
Roundup PowerMax + Canopy	F/G	G/E	corn
Roundup PowerMax + Sharpen	G/E	G	soybean
Roundup PowerMax + Lo-Vol 4	G/E	G/E	soybean
Gramoxone Inteon	F/P	F/G	none
Gramoxone Inteon + Aatrex	F	E	corn
Gramoxone Inteon + Lo-Vol 4	F/P	E	soybean

[1]Use of trade names does not indicate an endorsement of any product.
[2]E=excellent, G=good, F=fair, P=poor; Cover crop growth stage and environmental conditions will influence effectiveness. Based on Cornelius et al., 2017. Herbicide labels supersede this information.
[3]Rotation restrictions are influenced by application rate and herbicide resistance in crop. Herbicide labels supersede this information.

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5. 2020 Great Plains Cotton Conference, Feb. 25-26 in Wichita

The inaugural Great Plains Cotton Conference is scheduled for February 25-26 at the Red Roof Inn & Conference Center in Wichita, KS. Presentations will be focused on all things cotton, including pest and nutrient management, varieties, harvest-aids, post-harvest management, economics, and cotton industry updates related to the Great Plains. Nationally recognized speakers from OK, KS, TX, TN, and AR will be presenting. Seed companies will be presenting on their latest varieties and traits as well. Prior to the conference starting, an Auxin Applicator training will be offered for KS and OK applicators.

Presentations will begin at 1:00 pm on February 25 and conclude at 12:30 pm on February 26. For those planning to attend the Auxin Applicator Training, this will be offered at 12:00-12:30 pm on the 25th, just prior to the start of the conference.

CCA credits will be provided and CEUs for OK and KS have been requested.

Please RSVP to: Penny Adams at the NE Regional Extension Office, 785-532-5833, padams@ksu.ed

The location of the conference is the Red Roof Inn & Conference Center, 6815 W Kellogg (US 54), Wichita, KS; 844-758-0639

Agenda

February 25

Noon	Auxin Training Opportunity (30 minutes) – Todd Baughman (OSU)
1:00	Welcome to the Great Plains Cotton Conference
1:05	Understanding Crop Growth to Optimize Inputs - Seth Byrd (OSU) and Stu Duncan (KSU)
2:00	Cotton Disease Identification & Management –Heather Kelly, Univ of Tennessee
2:40	Prioritizing Nutrient Inputs – Brian Arnal, OSU
3:20	Break
3:40	Weed Management – Todd Baughman, OSU
4:20	Insect Management Decisions – Gus Lorenz, Univ of Arkansas; Rex Friesen
5:00	Q & A Panel on Pest Management
5:30	Concluding remarks
6: 30	Dinner for all attendees

February 26

6:00-7:30am	Continental Hotel Breakfast – on your own
7:45	Policy Updates – Craig Brown, National Cotton Council
8:20	Market Outlook – John Robinson, Texas A&M University
8:50	Harvest-aid Management – Seth Byrd, OSU

9:30	Break
10:00	Fiber Quality and Minimizing Plastic contamination – John Wanjura – USDA Gin Lab
10:40	Your Check-off Funds at Work – Shelley Heinrich, Cotton Board; Gaylon Morgan, Cotton Incorporated
11:10	Boll Weevil Monitoring program update – Rex Friesen
11:15	Variety updates from Seed Companies
12:30	Concluding remarks and feedback

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6. Dryland Soil Health Network meeting - February 18 in Hays

K-State Research and Extension, in collaboration with the USDA, is hosting a Dryland Soil Health Network meeting on February 18 for dryland producers and researchers. The meeting will be held at the K-State Agricultural Research Center in Hays. Opening remarks will begin at 10:00 am, a lunch will be provided, and the meeting will conclude at 2:00 pm.

The goal of the Dryland Soil Health Network is to advance soil management strategies including conservation, cover crops, and no-tillage to improve soil health and productivity of dryland cropping systems through participatory research and learning.

The overall objectives of this meeting include:

1. Provide farmers and researchers a platform to share information on soil management through structured research and education.
2. Conduct on-farm research trials to investigate new and proven soil management strategies to improve soil health.
3. Facilitate farmer-researcher feedback to identify soil health challenges and refine soil management recommendations/guidelines for dryland systems.

Interested individuals are encouraged to RSVP to Dr. Augustine Obour at aobour@ksu.edu or Joe Kimzey at jgk5335@ksu.edu. You can also RSVP by phone at 785-625-3425.

Dryland Soil Health Network

K-STATE Research and Extension

February 18, 2020
KSU Agricultural Research Center – Hays
1232 240th Ave, Hays, KS 67601

USDA United States Department of Agriculture

The goal of the *Dryland Soil Health Network* is to advance soil management strategies including conservation, cover crops, and no-tillage to improve soil health and productivity of dryland cropping systems through participatory research and learning.

Meeting Agenda

10:00 AM – Introductions led by Dr. Augustine Obour
10:45 AM – Open discussion for participants
12:00 PM – Lunch
12:45 PM – Overview of CIG On-Farm Soil Health Demonstration Program
1:30 PM – Future plans for the network
2:00 PM – Close

Tentative Objectives

1. Provide farmers and researchers a platform to share information on soil management through structured research and education,
2. Conduct on-farm research trials to investigate new and proven soil management strategies to improve soil health;
3. Facilitate farmer-researcher feedback to identify soil health challenges and refine soil management recommendations/guidelines for dryland systems.

RSVP by contacting Dr. Augustine Obour at aobour@ksu.edu or Mr. Joe Kimzey at jgk5335@ksu.edu. Phone: 785 625 3425