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TAWC

TEXAS ALLIANCE FOR WATER CONSERVATION

TEXAS TECH UNIVERSITY
Agricultural Sciences & Natural Resources
Davis College™

Texas Water Development Board

In this issue:

The Texas Alliance for Water Conservation strives to conserve water and soil for future generations in collaboration with producers to identify agricultural production practices and technologies that, when integrated across farms and landscapes, will reduce the depletion of ground water while maintaining or improving agricultural production and economic opportunities.

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9th Annual TAWC Water College

by Samantha Borgstedt

The Texas Alliance for Water Conservation hosted its 9th Annual Water College on January 19, 2023. Over 150 producers, crop consultants, researchers, and industry leaders gathered to hear latest on agricultural issues directly impacting the Texas High and Southern Plains.

Water College was held at the Lubbock Civic and featured information booths by companies such as Texas Earth, Miller Chemical Company, Eco-Drip, SNF, Diversity D Irrigation and several others. This event is only made possible because of generous sponsors. The TAWC thanks High Plains Underground Water District for sponsoring our breakfast and Double B Crop Insurance for sponsoring lunch.

Presentations made at the event included:

- Wide Row Cotton with Covers: Proving Less Is More; Kris Verrett, TAWC cooperating producer (Lubbock County)
- Opportunities for Sorghum in Climate-Smart & Water-Smart Agriculture; John Duff, Founder of Serō Ag Strategies
- Playas Work for Texans; an overview of the Texas Playa Conservation Initiative (TXPCI); Heather Johnson, Texas Parks & Wildlife Migratory Game Bird Specialist (Region 1)
- The Long-Term Motivation of Farmers: Can They Survive in an Uncertain World?; Kevin Brinkley, Plains Cotton Cooperative Association President & CEO
- Producer Advantages of the West Texas Weather Mesonet; Wes Burgett, Operations Manager, West Texas Mesonet (Texas Tech University)
- Cattle Market Outlook: Rebuilding the Herd in 2023; Justin Benevidez, Assistant Professor – Management Economist, District 1, Texas A&M AgriLife Extension
- Weather Outlook 2023; Brian Bledsoe, Chief Meteorologist/ Climatologist & Weather 5280 Specialist

Video and audio presentations can now be watched online at All Ag All Day: https://www.allagnews.com/event-2023-tawc-water-college/

Presentations can also be found online: https://www.depts.ttu.edu/tawc/events/water-college/index.php

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Thanks to Our Sponsors

The TAWC project was made possible through a grant from the Texas Water Development Board

National Sorghum Producers: Climate Smart Agriculture and Forestry Partnership Initiative

by Samantha Borgstedt & John Duff, Founder of Serō Ag Strategies

The Texas Alliance for Water Conservation (TAWC) is pleased to announce its partnership with National Sorghum Producers on the Climate Smart Agriculture and Forestry Partnership Initiative.

Annually planted on just over 100 million acres, Sorghum, The Resource Conserving Crop™, is the world's fifth-most important cereal grain. Almost 75 percent of U.S. sorghum acres are in conservation tillage already, and this fact makes the crop's farmers the undisputed global leaders in climate stewardship.

When added to a rotation, sorghum decreases the overall carbon intensity of crop production owing to its large carbon-sequestering root system and the cover it creates aboveground, which reduces the need for tillage and helps reduce the runoff of harmful nitrates. The crop is also a water-sipper, using one-third less water than corn and requiring less energy for pumping in irrigated production systems. These advantages combined mean lower carbon intensity relative to baseline irrigated crop production, for example, up to 43 percent. Accordingly, sorghum is itself a highly impactful tool for farmers interested in driving positive climate outcomes.

Approach will focus on quantifying the climate impact of incorporating sorghum and other tools into rotations in carbon-equivalent terms. Rather than focusing on soil carbon sequestration alone, we will create a pathway for the impact of all practices to be quantified, tracked and verified with the intent to monetize these practices in ecosystems services markets.

The technical program will center specifically on enabling farmers to take advantage of added value under the California Low Carbon Fuel Standard as this market requires the most rigid measurement/quantification, monitoring, reporting and verification systems and already consumes up to one-third of the U.S. sorghum crop annually. Focusing on this existing and highly valued market gives our program a significant advantage over projects without a similar bridge between concept and reality.

The target geography will include portions of six states and cover an average of 67 percent of the sorghum industry or 4.4 million acres over the last 10 years. The area includes more than 20,000 sorghum farmers and is vitally important to U.S. agriculture. Irrigated agriculture in this area is particularly important and highly threatened, and sorghum has a key role to play in prolonging irrigated agriculture in the region.

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Furthermore, the U.S. High Plains is the world's leading region for nitrogen use efficiency and mitigation of nitrate leaching, volatilization and runoff. Sorghum is a primary tool in these efforts, so incorporating the crop into rotations in this region can improve the carbon footprint of U.S. agriculture overall.

As a part of the proposed project, TAWC will aim to (i) expand the network of the grain sorghum producers to at least 15 from more than 10 counties over the next 5 years. Consistent with previous data gathering, we will obtain information on tillage type (conventional, minimum and no-till), fertilizer (type and quantity), herbicide and other inputs, and yield. In addition, participating producer records will be revised to include information on energy use for tillage, pumping and harvesting to be better positioned to determine the overall energy use and farm-level greenhouse gas benefits, when sorghum is used as a part of the producer's operation. Each participating producers' farm will be equipped with capacitance probes to determine soil moisture levels. ET tools and the irrigation calculators developed by TAWC will be revised and timing, duration and the inches of water applied during the sorghum growing season will be recorded. The overall goal is to use systematically collected data on management practices and energy use to demonstrate the "climate smart" nature of sorghum, under water-deficit conditions of the Southern High Plains.

Other partners on this climate smart initiative include seven sorghum farmer organizations, one tribal group, two land grant universities, a leading developer of plant genetics, a multinational seed and chemical manufacturer and five ethanol producers with a combined annual capacity of almost 650 million gallons of low carbon ethanol.

Preplant Irrigation

by Bob Glodt
Agri-Search, Inc. – Plainview, Texas

The time is rapidly approaching to begin applying pre-plant irrigations. For pivot irrigation systems, the normal routine of unclogging nozzles, repairing flat tires, and fixing leaking drop hoses is not something most farmers look forward to. With drip irrigation, repairing drip tape and flush valves is commonly required to get a system up and running; and it is not an easy job. It is amazing when you consider that an irrigation system that was working perfectly when it was turned off in the fall, can develop so many problems just by sitting idle over the winter and spring.

For me anyway, the most discouraging aspect of pre-plant irrigating is the thought of applying water and generating expense before a crop is even established. The costs involved in repairing irrigation systems, plus the energy costs required to pump, water are significant. As with any investment in crop production, it is helpful to give some thought and planning to the process. By this, I mean, make sure everything that can be done is being done to achieve the best possible outcome at the least possible cost.

The first question that often comes to mind is whether or not preplant irrigation is even necessary? This would essentially mean that there would be no pre-watering, just plant and start watering. Preplant irrigations may not be necessary in some years, however, adequate moisture in the soil profile at planting is necessary and makes sound agronomic sense every year. The preplant moisture should be supplied either by irrigation or rainfall or both. Most farmers do not have the irrigation capacity to adequately fill the soil profile to a reasonable depth after planting or after crop emergence, so the profile must be at least partially filled prior to planting to achieve high yields. This even applies to a crop with relatively low early season water demand such as cotton. Upon emergence, cotton is somewhat "delicate" in nature and prone to developing various seedling diseases. Applying water after crop emergence can dramatically increase the likelihood of seedling diseases, which in turn could be detrimental to plant health, as well as, maintaining adequate stands.

Every management decision that is made in a farming operation must be either agronomically or fiscally sound. And good agronomic decisions are usually always economically sound decisions as well. So, why is it important to have a reasonable soil profile of moisture prior to planting? First, regardless of the crop you grow, there must be adequate moisture in the root zone for the expansion of the root system and nutrient uptake. Roots do not grow through dry soil to reach moisture. Root expansion is surprisingly rapid and extensive early in the life of a plant. Cotton for example can easily develop a root system to a depth of 24 inches or more by the time plants are 12 inches tall. A vigorous early season root system in cotton is important in maximizing cotton yields and for plants to withstand short periods of water shortages during the growing season. A shallow root system will initiate signs of stress in cotton long before a well-developed root system. Stressed cotton plants set and hold a lower number of second position fruit at each fruiting branch. And finally, soil is a storage bank for moisture that will contribute to yield. Pullman and Olton Clay loam soils can store between 1.25 and 1.5" of available moisture per foot. Therefore, a full soil profile 24 inches in depth could easily contribute an additional 200 to 250 pounds of lint per acre assuming that a reasonable irrigation regimen could be maintained through late bloom.

Filling the soil profile after the crop emerges, can be problematic in several ways. By waiting until after the crop emerges to build the soil moisture profile means that in addition to building the profile, a portion of the water you are applying is being used by the crop. In pre-plant irrigations, no crop is present to siphon off a portion of the water being applied. Also, temperatures are generally higher and it is usually windier in May and June after crops emerge as compared to a pre-plant irrigation timing between early April and early May. Higher temperatures and more wind translates to greater evaporation rates. High evaporation rates can significantly reduce the amount of moisture that will

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ultimately end up in the soil reserve. A Pullman or Olton series clay loam soil requires about 2 inches of moisture (rainfall or irrigation) to fill each foot of soil profile. So, to fill the profile to a depth of 24", would require a minimum of 4 inches of pre-plant water. Waiting until after crop emergence to apply that much water reaches the point of diminishing returns. As an example, a pivot that could deliver 1" per week would require 4 weeks to deliver 4 inches of water to fill the profile. It is obvious that the crop demand for water increases steadily over that 4 week period of time to a point where a disproportionally high amount of water is being consumed by the crop rather than going to fill the profile. And lastly, effective herbicide programs to deal with resistant Palmer amaranth are initiated very early in the season. It goes without saying, it is nearly impossible to operate ground equipment for spraying weeds around an extensive early season irrigation program.

The best scenario for pre-plant irrigation is to rely on sound agronomic practices that would increase your odds of filling the soil profile without having to resort to irrigation, or at least not having to resort to much irrigation. First and most important would be to adopt minimum tillage practices or cover crops that blanket the soil with crop residue. Tillage or soil disturbance of any kind, depletes soil stored moisture, and a lot of it. With minimum or no till systems, there is little to no soil disturbance, therefore there is less moisture loss due to evaporation. Minimum tillage operations essentially allow for more months in which to capture moisture. So, rainfall or snowfall that was received as early as January and February could potentially still be present in the soil profile at the time of planting. No tillage prior to planting leaves soil in a condition to receive water right up to planting time. And since plowing or cultivation is not conducted or is minimized in minimum tillage operations, there will be little to no soil disturbance that would deplete moisture reserves prior to planting. The biggest advantage to a minimum till system is water conservation and/or soil moisture capture in my opinion.

For conventional tillage systems, pre-plant soil moisture will have to be supplied by irrigation or rainfall. And the amount required will depend on how dry the soil is when pre-plant irrigations are initiated. Recent 6 to 8 inches of snowfall has contributed significantly to supplying a decent soil moisture reserve. However, any tillage after the snowfall will negate the benefit.

Pre-plant irrigations in conventional tillage operations should be timed as close to planting as possible. This can be calculated based on the output of the sprinkler and the amount of time required to deliver the desired amount of water in relationship to the anticipated planting date. LEPA systems are actually very valuable in a pre-plant irrigation scenario. As an example, assuming 4 inches of water is to be applied pre-plant in 1 inch increments, a total of four irrigations would be required prior to planting. The first irrigation and the last irrigation should be applied in the broadcast spray mode and the middle applications should be applied in the LEPA mode. The LEPA irrigations will push water deeper into the soil profile.

Cotton in this area is planted on a 30 or 40 inch row spacing. The corresponding irrigation drops on the sprinkler are spaced 60 and 80 inches apart respectively. In the last couple

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of years, there has been an interest in skip row cotton, especially where irrigation resources are very limited. The economy behind every other row planted cotton is to reduce seed costs by 50 percent and take advantage of the moisture reserve in the unplanted row without sacrificing yield had the field been planted on every row.

The overall "agreed on" guidelines for insuring success with limited irrigated skip row cotton is still in being debated. However, there is definitely merit to this system. In 2022, I had two customers who planted skip row cotton and reported yields of 1 bale per acre based on land area or 2 bales per acre based on planted acre. These yields are impressive considering that last year was a very dry year. But, in 2022, we had a wet spring, and as a result we started with a near full soil profile. The moisture sensor probes that were installed in these fields indicated that we had a full soil moisture profile to a depth of nearly 36 inches to start the season. Those probes also showed that soil stored moisture in the unplanted row was being utilized by plants late in the season. I should also mention that the skip row planted fields that I personally followed in 2022 and those to which I refer to in this article, were minimum tillage fields. There was a near solid blanket of sorghum and/or millet stubble covering the soil surface between the rows.

Based on 2022 observations, I believe it is necessary to start with a full soil moisture profile and have adequate previous crop residue covering the soil surface for skip row cotton to be successful.

Could La Niña Finally be Ending?

by Samantha Borgstedt

When you get a group of people involved in agriculture together, the topic of weather is bound to come up. While it is often the first topic of many conversations, we held it to the final presentation at the 9th Annual Water College, and fortunately Brian Bledsoe, chief meteorologist at KKTV 11 in Colorado Springs, had some hopeful news for the audience to leave with.

After three years of La-Niña-driven weather, models are beginning to indicate the cold water along the equatorial Pacific is showing signs of warming. It will take a period of a few months for the pattern to completely break down, but it looks like the persistent below-normal-precipitation patterns are coming to an end.

The US National Oceanic and Atmospheric Administration (NOAA) has reported that the equatorial Pacific Ocean will return to its neutral state between March and May of 2023, and it is likely that El Niño conditions will develop during the northern hemisphere's autumn and winter.

"El Niño development later this year is not a certainty, but seems likely," Bledsoe said. "That, however, doesn't necessarily imply immediate drought relief."

Bledsoe said a factor he heavily watches is the Pacific Decadal Oscillation (PDO). According to the NOAA, the PDO is often described as a long-lived El Niño-like pattern of Pacific climate variability. As seen with the better-known El Niño/Southern Oscillation (ENSO), extremes in the PDO pattern are marked by widespread variations in the Pacific Basin and the North American climate.

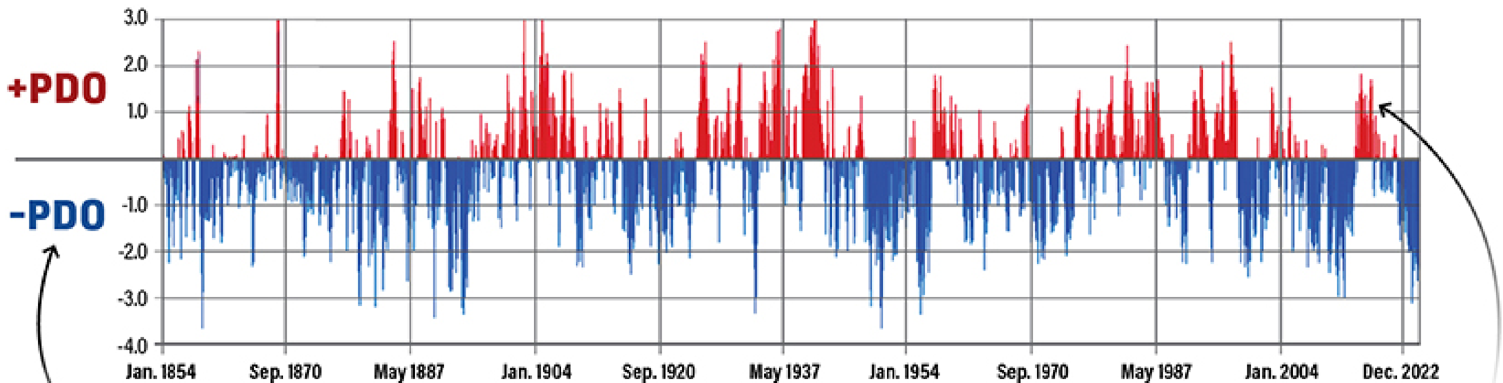
"The PDO operates on a 25-to-30-year cycle. Since the late 90s it's been in a cold and negative phase," Bledsoe said. "The PDO needs to flip to at least a short-term warm phase to really capitalize on the moisture." said Bledsoe.

Bledsoe said the PDO is negative right now, but it does show some evidence to possibly flip to a less negative or even neutral phase by later 2023. This possible phase shift is important in facilitating long term pattern change (key words there being 'long term').

Bledsoe, who grew up on a ranch in southeast Colorado, emphasized to Water College attendees the importance of capitalizing on moisture once this dry pattern does break.

"Once we do see a pattern change," Bledsoe said, "It is important to have everything you can ready to make the most of the moisture it brings."

You can follow Bledsoe at : weather5280.com



A negative Pacific Decadal Oscillation (PDO) is associated with warm northern Pacific Ocean temperatures and cool temperatures along the West Coast. This pattern means a higher drought chance in the West, Southwest and western Plains.

From **July 2014 to July 2016** there was a positive PDO, which created consistent rains.

SOURCE: NOAA

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