2022 K-State Limited Irrigation Corn Management Study

Thomas County, Kansas

McIlnay Farms, Cooperator

Soil Type: Ulysses Silt Loam

Tillage: Fall Strip-Till

Fertility: Applied With Strip-Till
170 lb N/ac, 49 lb P/ac, 10 lb S/ac

Applied As Starter at Planting
2.5 lb N/ac, 9.3 lb P/ac, 1.3 lb/ac K,
applied as 1 gal/ac 10-34-0 and 2 gal/ac 6-24-6
1 qt/ac MicroMax, 1 qt Zinc, 1 qt Spectra, 0.5 oz/ac AG WSP, 2 qt/ac water

Irrigation: Preseason: 2.5" of pre-water applied in two applications, late April and May 1st

In-season: 9 passes @ 1.25" each, total applied = 11.25"

Precipitation: Total In-Season Precipitation: 1.80"

	Precipitation
6/24/2022	0.10
7/1/2022	0.35
7/24/2022	0.50
8/4/2022	0.05
8/20/2022	0.90
Total	**1.90**

Plot Planting Date: May 18th, 2022

Managing with Limited Well Capacity

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K-STATE Research and Extension

Knowledge for Life

Management options with low-capacity irrigation wells:

- Increase irrigation application efficiency
- Employ use of reduced/no-till (more residue)
- Use selective timing of limited irrigation based on water-critical growth stages
- Substitute to crop with lower water need than current crop (wholly or in part)
- Make use of crops with differently-timed water need than current crop
- Reduce irrigated area
- Increase time span of well use through pre-season irrigation

Soil type and depth sets some constraints

Management Continuum

Full Irrigation

Limited Irrigation

Dryland

Shooting for top end, but I can also hide a lot of mistakes with water

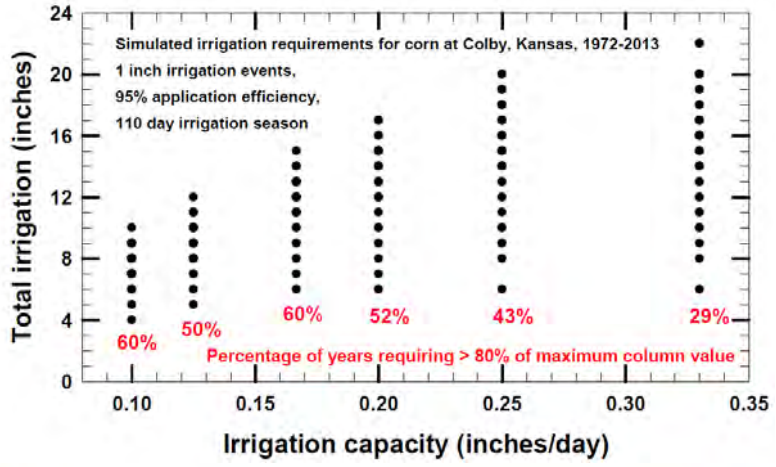
Effects on
- Yield Potential
- Inputs
- Water Management Strategy
- Economics

"If only I could time 1 good rain"

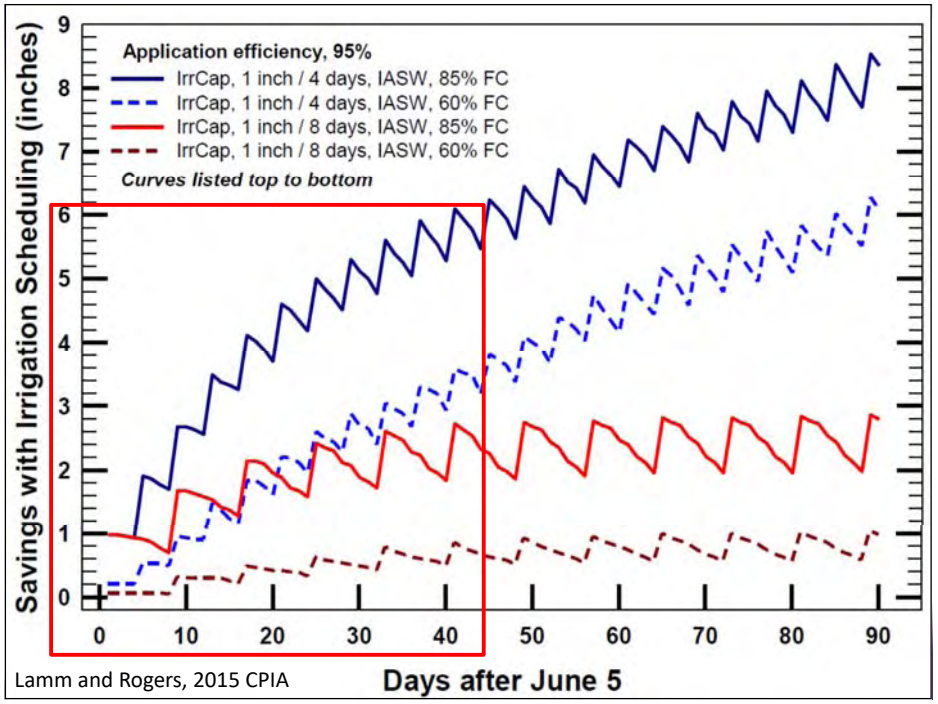
What drives how we can respond to declining well capacity

- Soil Texture and Depth
  - Margin of error
  - Efficiency of preseason
- Flexibility in moving water
  - Multiple wells tied to multiple sprinklers vs. one well one sprinkler

Irrigation Scheduling Relevant at any Well Capacity



Lamm and Rogers, 2015 CPIA



Lamm and Rogers, 2015 CPIA

Year	Date of Anthesis	Date of Maturity	Irrigation Season Termination Date For		
			80% Max Yield	90% Max Yield	MaxYield
1993	20-Jul	30-Sep	5-Aug	5-Aug	15-Aug
1994	20-Jul	15-Sep	5-Aug	15-Aug	15-Aug
1995	20-Jul	29-Sep	5-Aug	13-Aug	18-Aug
1996	20-Jul	3-Oct	17-Jul	17-Jul	29-Aug
1997	23-Jul	1-Oct	23-Jul	23-Jul	27-Aug
1998	20-Jul	28-Sep	20-Jul	20-Jul	24-Aug
1999	23-Jul	6-Oct	24-Jul	13-Aug	20-Sep
2000	12-Jul	20-Sep	14-Sep	20-Sep	20-Sep
2001	16-Jul	29-Sep	30-Jul	22-Sep	22-Sep
2002	22-Jul	30-Sep	4-Aug	30-Aug	7-Sep
2003	22-Jul	23-Sep	3-Aug	3-Aug	18-Aug
2004	19-Jul	28-Sep	8-Aug	21-Aug	27-Aug
2005	20-Jul	28-Sep	2-Aug	9-Aug	29-Aug
2006	17-Jul	25-Sep	30-Jul	13-Aug	13-Aug
2007	18-Jul	19-Sep	14-Aug	21-Aug	28-Aug
2008	24-Jul	10-Oct	31-Jul	6-Aug	27-Aug
Average	**19-Jul**	**27-Sep**	**2-Aug**	**13-Aug**	**28-Aug**
Standard Dev.	**3 days**	**6 days**	**13 days**	**19 days**	**13 days**
Earliest	**12-Jul**	**14-Sep**	**17-Jul**	**17-Jul**	**12-Aug**
Latest	**24-Jul**	**10-Oct**	**14-Sep**	**21-Sep**	**21-Sep**

* *Estimated dates are based on the individual irrigation treatment dates from each of the different studies when the specified percentage of yield was exceeded.*

Irrigation Termination

Stage of Growth	Approximate number of days to maturity	Water use to maturity (inches)
Corn		
Blister	45	10.5
Dough	34	7.5
Beginning dent	24	5
Full dent	13	2.5
Black layer	0	0
Grain Sorghum		
Mid bloom	34	9
Soft dough	23	5
Hard dough	12	2
Black layer	0	0
Dry Beans		
One pod w/fully developed seeds	35	7.0
50% pods have full developed seeds	25	4.2
One pod changed to mature color	15	2.0
80% of pods changed to mature color	0	0

Adapted from K-State MF2174, Rogers and Sothers and High Plains Dry Bean Guide

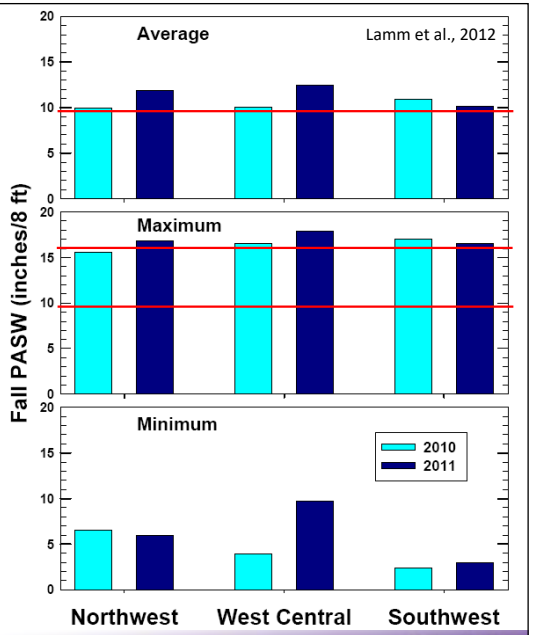
Timing of the final irrigation:

- Determine crop growth stage and anticipated remaining water use
- Determine soil water status in the field by probe or calibrated soil sensor technology
- Determine irrigation strategy necessary to meet remaining crop water use while maintaining soil water content at or above 55% (limit depletion to 45%).
- Be ready to make adjustments based on changes in ET demand, precipitation, etc.

Potential Water Loss

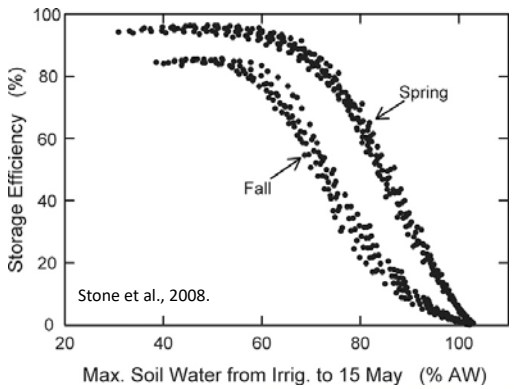
In an 8' profile, 60% available soil water would be approximately 9.6" in a Western Kansas silt-loam soil

Storage efficiency of additional water approaches zero at 100% ASW, or 16" in this case



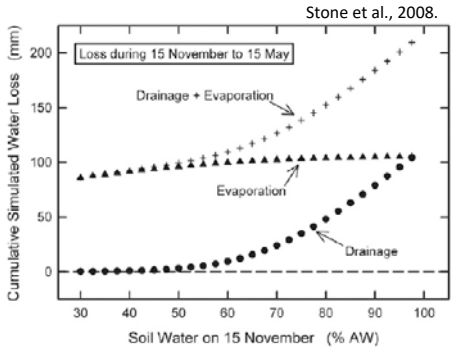
Water Loss to Drainage

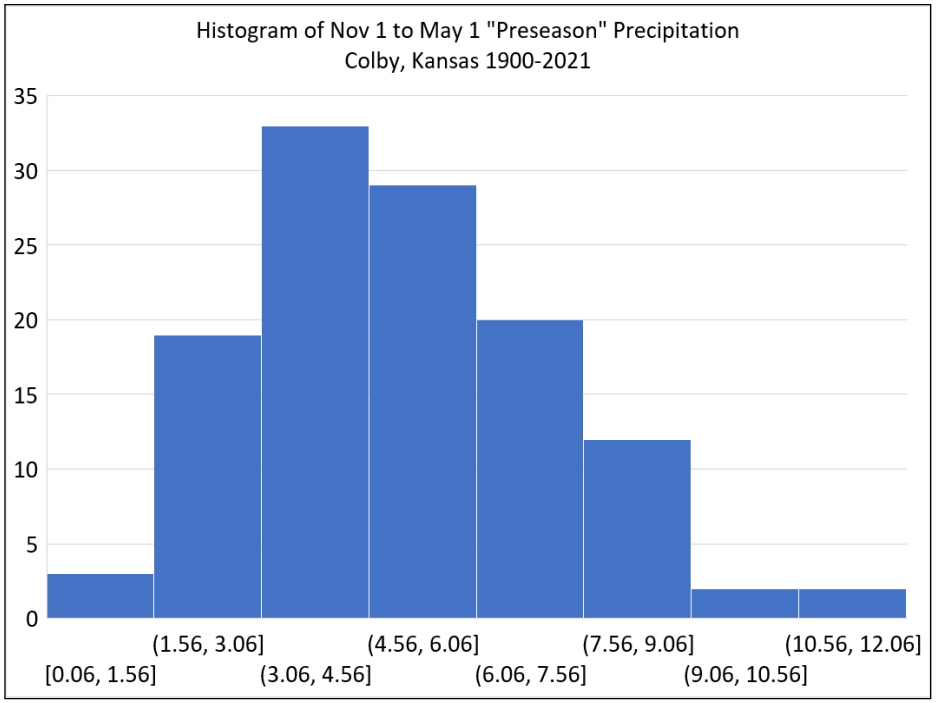
If the profile is at or above 60% full the storage efficiency of fall or spring precipitation or preseason irrigation diminishes rapidly

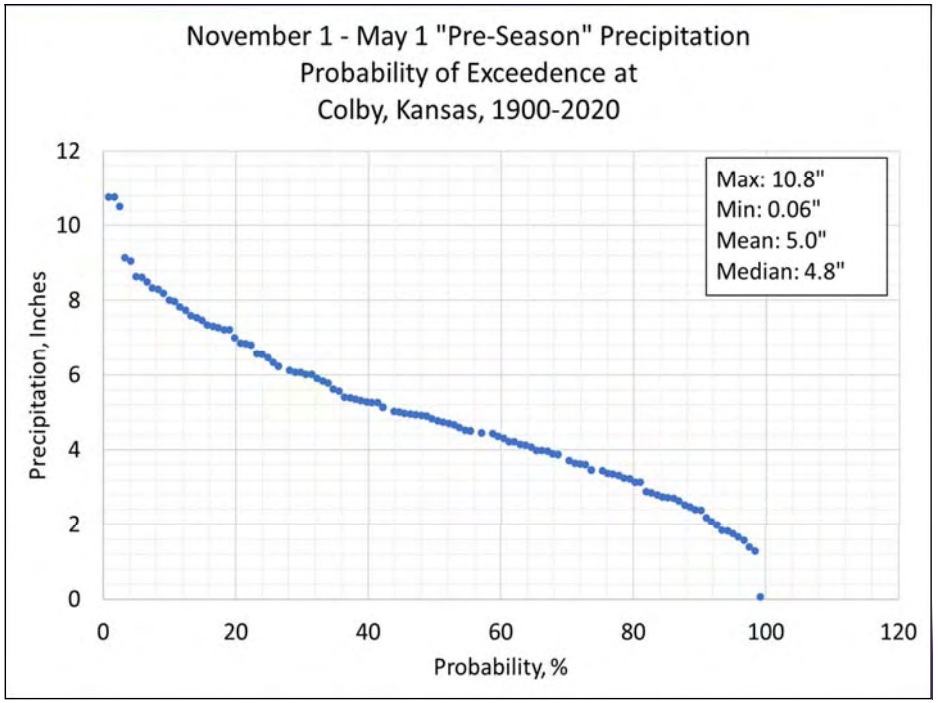


Potential Water Loss

- Proper management of irrigation at the end of the season
- Calendar not a good method
- Don't want to short the crop, but also don't want to reduce our storage efficiency for winter precipitation and pre-season irrigation







Preseason Irrigation – When?

- Tradeoffs
  - Fall preseason is less efficient, especially if you don't leave room for precipitation, lets not forfeit the FREE water
  - Spring preseason has more losses to evaporation, especially in tilled systems, but allows you to capture winter precipitation without fear of losses
  - Ultimately a mixed approach is probably best

Managing irrigated corn with limited well capacity

Alan Schlegel, Professor and Agronomist-in-Charge
Southwest Research-Extension Center, Tribune, Kans.

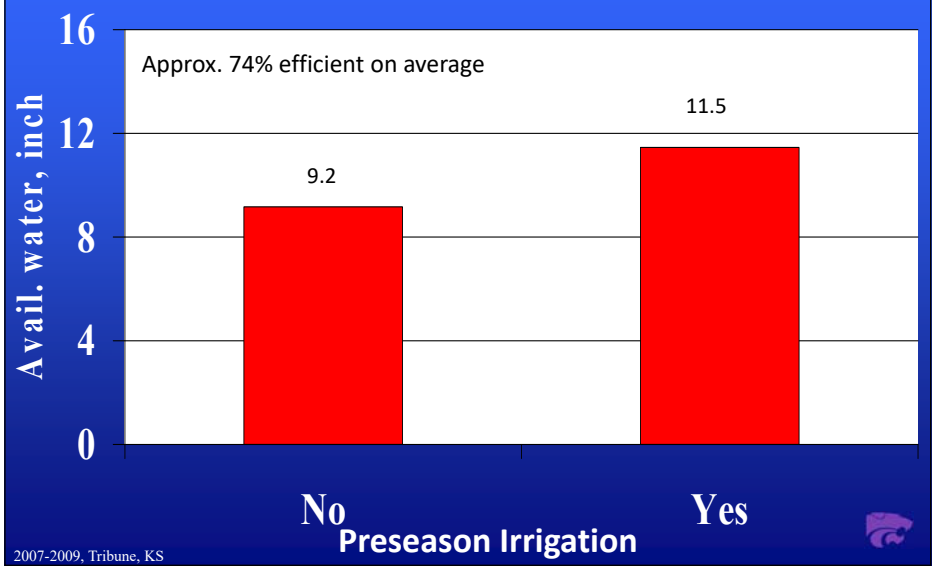
Treatments

- Preseason irrigation:
  With and without (~3 inch)
- Sprinkler irrigation capacities:
  0.10, 0.15, and 0.20 inch/day
- Seeding rates:
  22.5, 27.5, and 32.5 thousand/a

Water Inputs

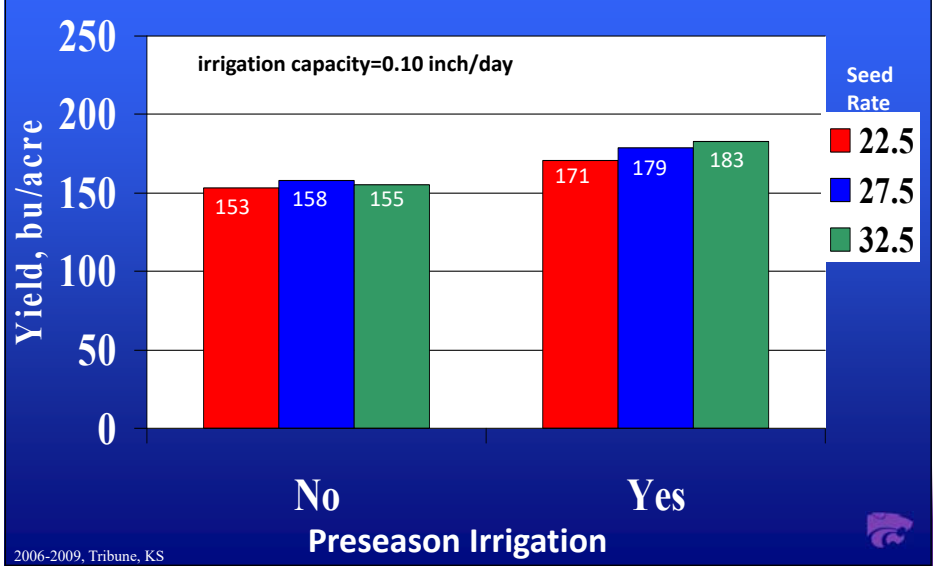
	2006	2007	2008	2009
		inch		
Precipitation				
Growing season	6.93	8.08	9.36	14.35
Preseason Irrigation	3.23	2.96	3.01	3.15
Irrigation Capacity				
1" / 5 days	9.55	7.21	8.22	8.84
1" / 7 days	12.61	10.10	10.96	11.77
1" / 10 days	19.01	15.62	14.77	17.85

Profile Water at Planting

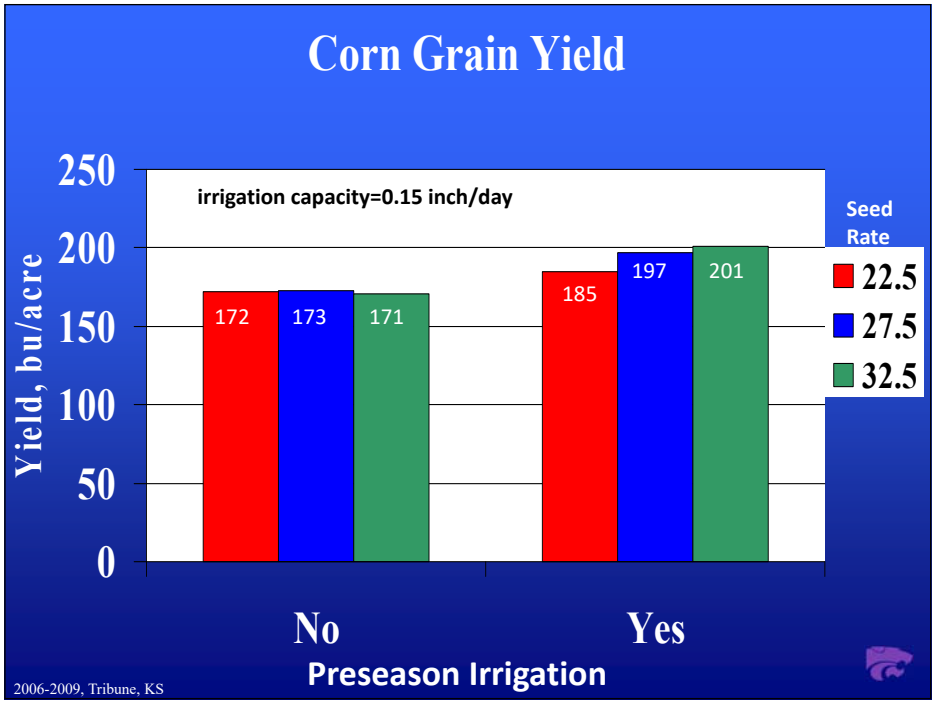


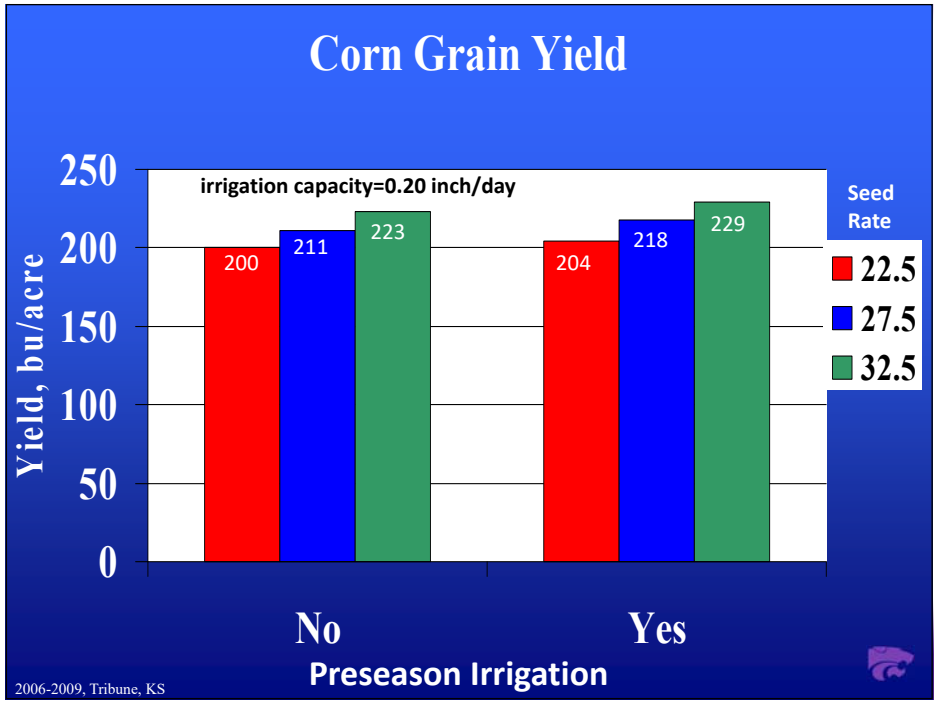
2007-2009, Tribune, KS

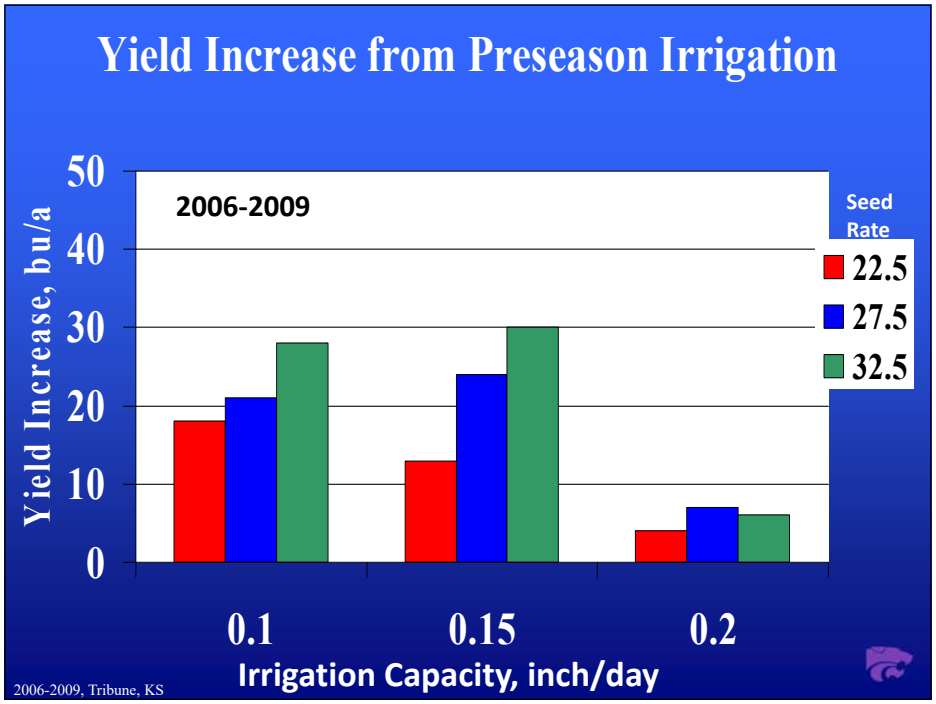
Corn Grain Yield



2006-2009, Tribune, KS

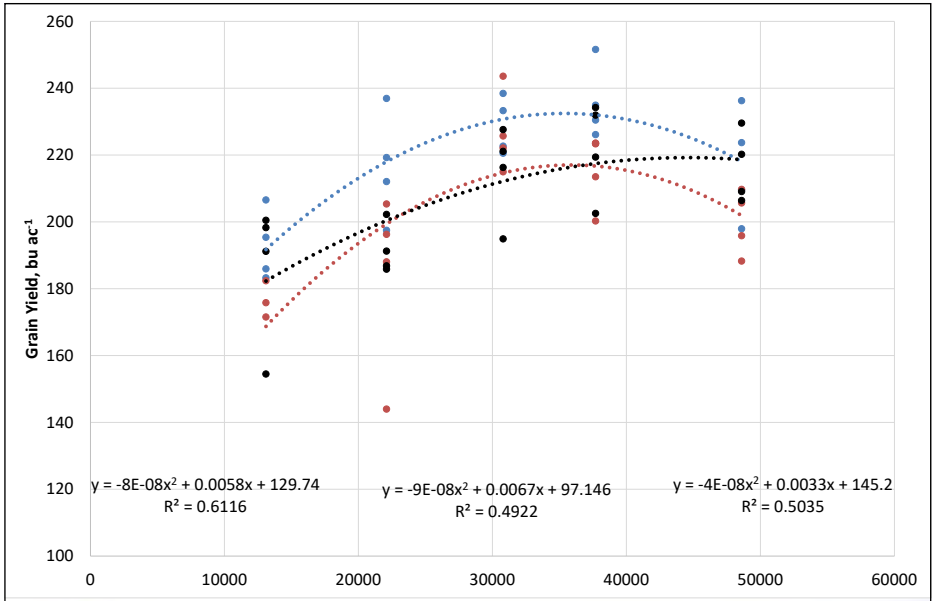






A side track on hybrids….

- The previous work was done with one commercial hybrid
- We know hybrids response to water and seeding rate can vary widely
  - E.g. Full irrigation at Colby, I seeded 4 hybrids at rates from 13k to 50k. There were some hybrids making close to 200 bu on 13k dropped
- Knowing your hybrids is going to be key to maximizing any limited irrigation/limited capacity scenario



Grain Yield with Limited Irrigation 2008 and 2001-2008

Irrigation amount	Corn	Sorghum	Soybean	Sunflower
inches	- - - - - - - bu/acre - - - - - - - - -			lb/acre
5	101 (113)	88 (94)	38 (31)	1660 (1800)
10	168 (172)	127 (111)	48 (42)	1950 (2080)
15	200 (201)	143 (123)	51 (47)	2500 (2160)

Yields in parenthesis are 2001-2008 average yields

Table 5. Penalty to crop yields for center pivot irrigated cron production at 95% application efficiency when irrigation capacity is below 0.33 inches/day (786 gpm/125 acres). Results are from simulations of irrigation scheduling and yield for the 33 years 1972-2004, Colby, Kansas.

Equivalent irrigation capacities				*Penalties to crop yield*			
Inches /day	GPM /acre	Days to apply 1 inch	GPM/125 acres	Corn Yield, bu/a	G. Sorghum Yield, bu/a	Soybean Yield, bu/a	Sunflower yield, lb/a
0.333	6.29	3	786	0	0	0	0
0.250	4.71	4	589	3	0	0	2
0.200	3.77	5	471	15	2	4	98
0.167	3.14	6	393	27	6	8	202
0.125	2.36	8	295	46	13	15	380
0.100	1.89	10	236	59	18	19	512
No Irrigation				128	54	41	1242

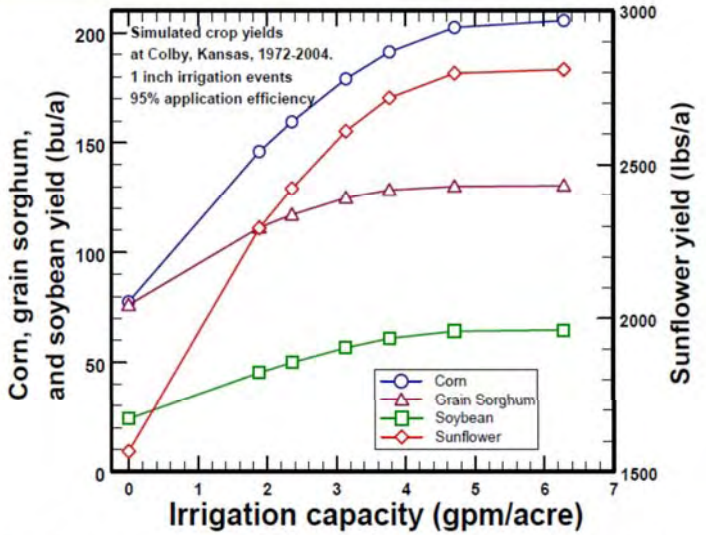
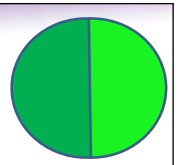


Figure 3. Simulated summer crop yields in relation to irrigation system capacity for the 33 years 1972-2004, Colby, Kansas.

Other Management Thoughts

Playing the Timing Game

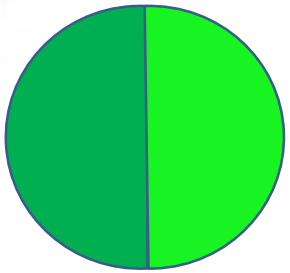


- Split the circle (or well) with multiple crops
  - corn/sorghum
  - corn/dry beans
  - wheat/dry beans
  - wheat/corn
  - dryland corn/irrigated corn?
- What about splitting the same crop in time?

Playing the Timing Game

- What about splitting the same crop in time?

Plant a short season hybrid as early as possible



Plant a full season hybrid as late as possible

Irrigation Timing and Grain Sorghum

Tribune, KS

Time of Irrigation	Yield (bu/ac)
Preplant only	65
Pre+Boot Stage	125
Pre+Half-Bloom	115
Pre+Soft-Dough	114
Full Season Irrigation	126

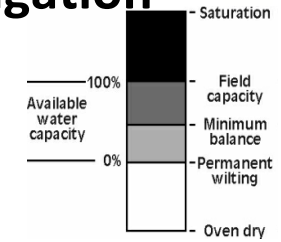
Grain Sorghum Managed Deficit Irrigation Study

- Full Irrigation (FI)
- Non-Irrigated (NI)
- Deficit Irrigation (DI)
- Managed Deficit Irrigation (MDI)

J. Bell et al., Texas AgriLife

Full and Deficit Irrigation

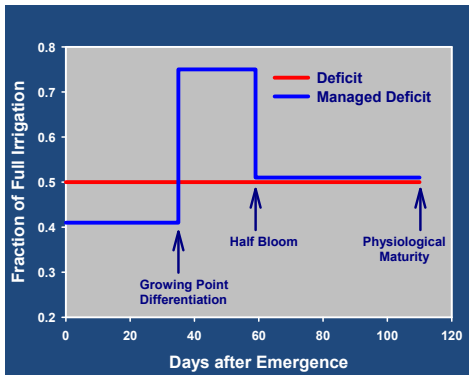
- Full Irrigation (FI)
  - 100% crop water use or based on a managed allowable depletion using soil moisture sensors



- Deficit irrigation = 50% FI
  - similar depth as FI, but longer time period between applications
    - Critical to maintaining WUE of limited irrigation

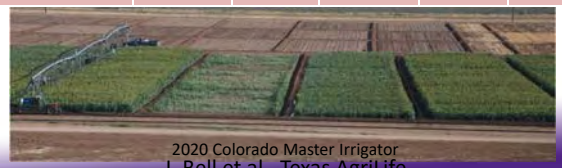
Managed Deficit Irrigation

1. Eliminate 1-2 early season irrigation events compared with DI
2. Differentiation to half bloom, irrigation scheduled at 75% FI
3. Half bloom to maturity, irrigation scheduled at 50%FI
4. Must have the well capacity to apply greater depth during critical growth periods.

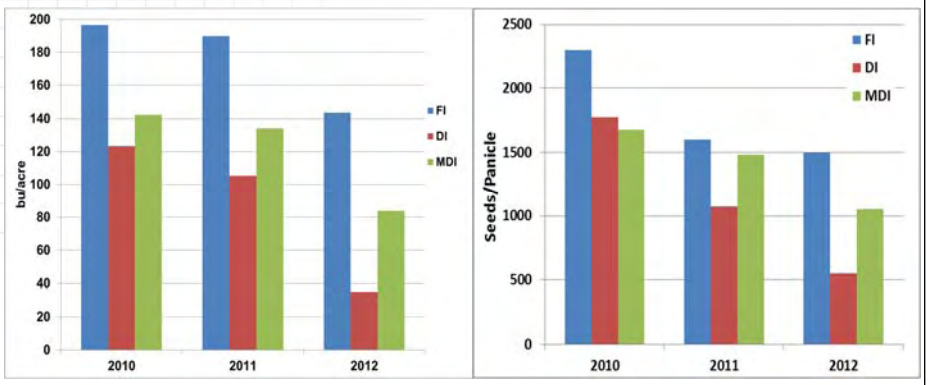


Crop water use and grain sorghum yield for an average year (2010) and an extreme year (2011) at Bushland, TX) (Bell, 2014)

Treatment	Irrigation	Rainfall	Soil water	Total Water	Yield	WUE
2010	----------Inches of water ----------				bu/acre	bu/inch
Full Irrigation	12.7	7.1	1.8	21.6	198	9.2
Managed Deficit (MDI)	6.5	7.1	3.6	17.2	142	8.3
Deficit (DI)	5.7	7.1	3.1	15.9	123	7.7
2011						
Full Irrigation	24.0	2.4	-1.1	25.3	190	7.5
Managed Deficit (MDI)	15.3	2.4	0.2	17.9	132	7.4
Deficit (DI)	13.1	2.4	0.9	16.4	106	6.5

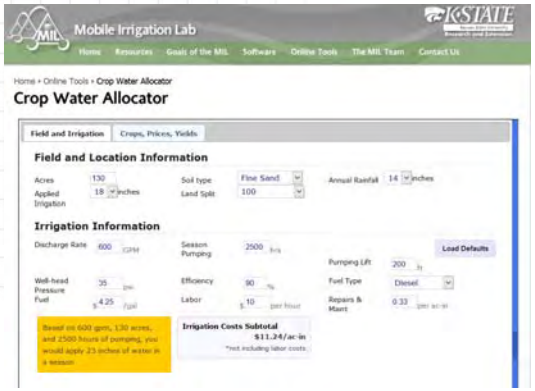


Sorghum Grain Production



Yield **Seeds/Panicle**

Crop Water Allocator



- Can include individual crop budgets
- CWA looks at multiple ways of splitting land and water to optimize net returns
- Designed for full-season strategies, not going to capture targeted strategies with cotton or sorghum

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Where do I see opportunities:

- Edges of the season
  - Technology can help with this
- Use of key timings in responsive crops
  - Sorghum, cotton, what else? There has been very little research on limited or timed irrigation of some crops, e.g. dry beans
- There is still a place for irrigation scheduling, even under limited well capacities
- Pre-season irrigation is a tool, <u>but</u> we must be smart with it

Questions?

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Limited Irrigation -Soil and Water Management

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As well capacities decrease over time, it is increasing important to manage both precipitation and irrigation appropriately to maximize the use of both. This discussion will include both impacts of residue management on soil moisture, precipitation capture and infiltration. A secondary discussion will be about water management of spreading or concentrating irrigation water for yield.

Residue Management

As most know, residue management in dryland agriculture is an important part of water management. Limited irrigation can be described as an intensively managed dryland production system at times. During tough economic times, residue can have value as it is harvested for the livestock industry. However, there is an economic cost in both water and nutrients that must be factored into the economic discussion.

Having standing residue in our environment can significantly increase the capture of snow during the winter months. Many times, snow is also accompanied by wind (blizzards) which can move the snow to areas that not desirable. Figure 1 shows the differences between having standing residue in a field vs residue that has been harvested. Standing residue increased precipitation storage efficiency by 20+% in each of the three years measured. The greatest difference was in 2019 where residue harvest resulted in storage of less than 20% of the precipitation from October to April.

The impact of storing more precipitation over the winter results in greater beginning soil moisture available to the next crop and can reduce irrigation needs. Figure 2 shows the beginning soil moisture prior to planting and tillage. On average, no-till and leaving residue showed the greatest available moisture at planting compared to the other treatments. The greatest impact is leaving standing residue over the winter. The average difference over the 3 years was 1.6” more moisture at planting with residue vs harvested residue. As you can see, the difference between residue harvest and leaving the residue increased in each of the 3 years. In year 3, the difference was nearly 2.5” more moisture where the residue remained. Depending upon precipitation, residue can significantly reduce irrigation needs.

Another factor of residue and tillage is infiltration rates. This work is done with an infiltrometer at a set application rate measuring the amount applied, amount of runoff and times. With this equipment, we can develop an infiltration curve which is important in estimating runoff potential with an intensive precipitation event or what type of sprinkler system you can utilize.

Figure 3 shows the total infiltration for 2 tillage and 2 residue management treatment with fall harvested residue or not, and tillage prior to planting or no-till management. Residue was a significant factor in increasing infiltration rates whether it was left on the surface or tilled into the soil in a conservation practice. Tillage did have a significant impact when residue was removed.

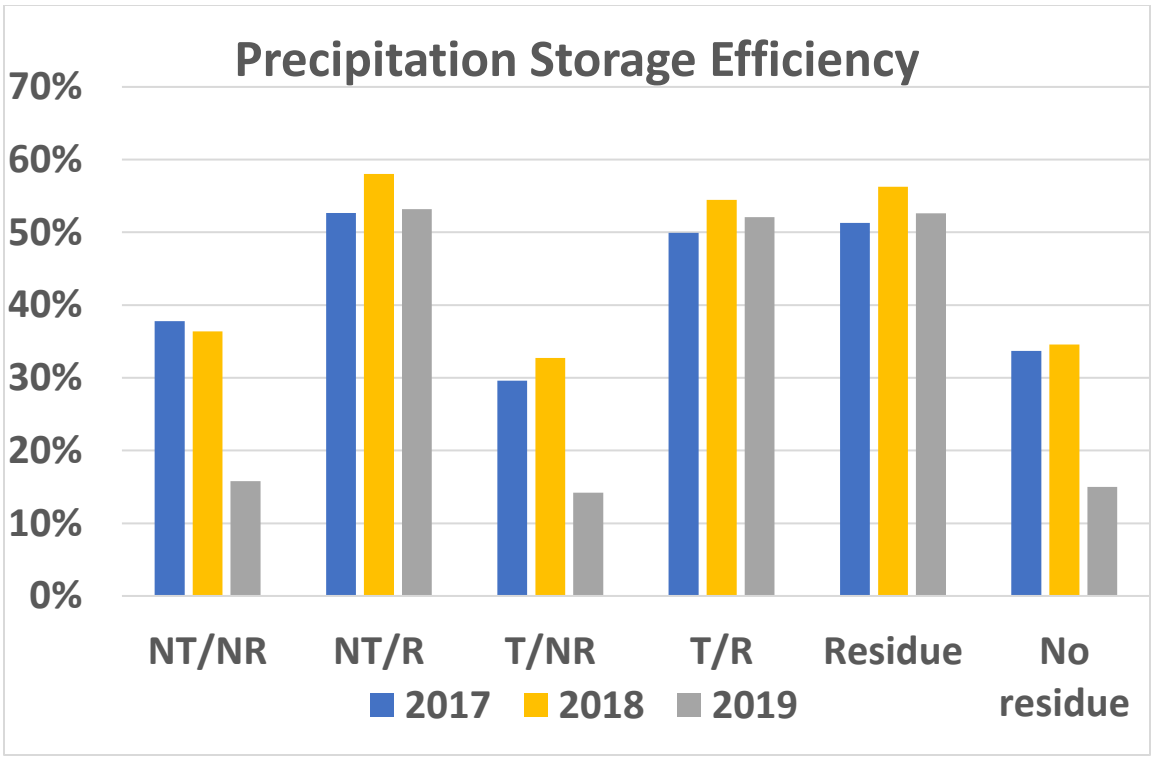


Figure 1. Precipitation storage efficiency of 4 tillage and residue management practices.

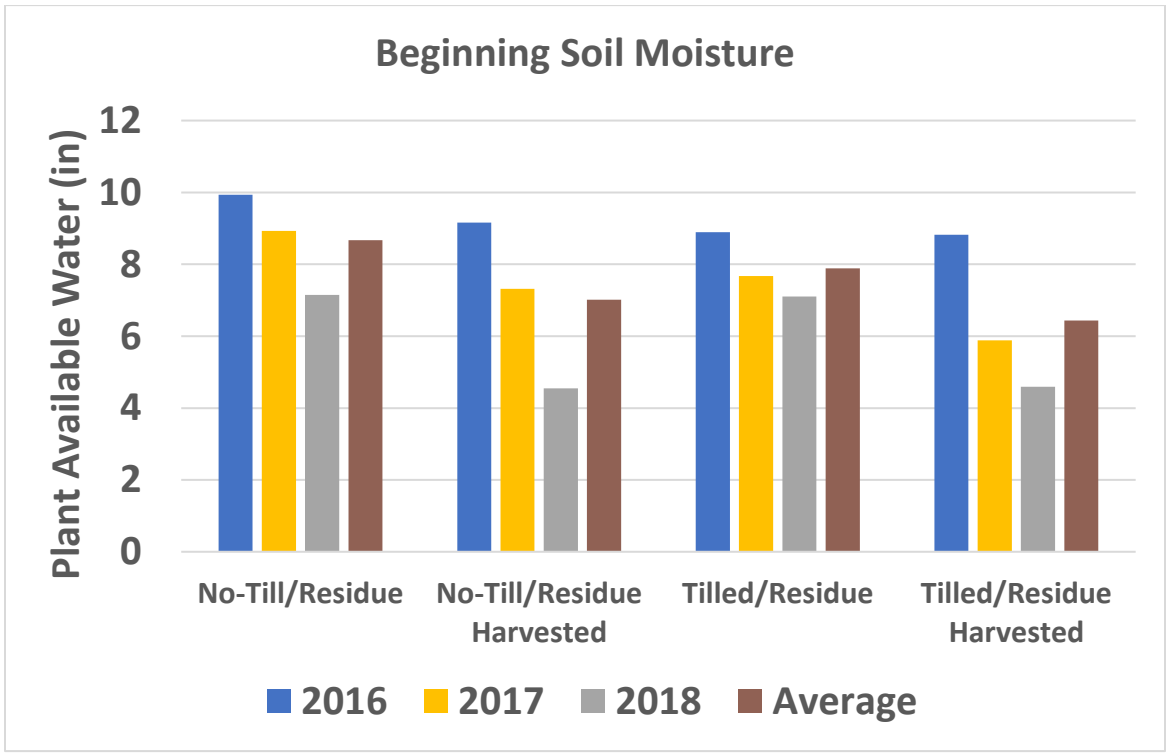


Figure 2. Beginning soil moisture contents at planting of 4 tillage and residue management practices.

Total infiltration in 30 minutes for fields where residue was not harvested average 2.9” while residue harvest decreased infiltration to 2.2”. In years 1 & 2 of this study, tilled with residue tended to be the highest infiltration. However, by year 3, no-till with residue tended to be greater infiltration. This may be due to increased soil surface aggregation at that point in time. When residue is harvested, it appears that tillage does increase the total infiltration. Over time, soil surface aggregation deteriorates which decreases infiltration.

Over time, the differences in infiltration between no-till and tilled with residue increased where early measurements favored tillage. However, as soil structure changed, the differences infiltration favored no-till. This does show that time is needed to change those structural differences.

Figure 4 shows the steady state infiltration rates which are the longer-term rates you would expect during long precipitation events. This measurement favored no-till with the residue remaining in the field. Steady state estimates showed the potential for nearly 3.5” of infiltration per hour with no-till and residue. All other treatments with tillage and residue were between 2 and 2.5” per hour of infiltration.

Utilizing the infiltrometer, we can develop an infiltration curve to look at the changes in infiltration over time. In Figure 5, this shows how quickly infiltration decreases. The majority of infiltration occurs in the first 5 minutes of time at which infiltration decreases and approaches the steady state. You can see the differences between residue and tillage management within this curve.

These reading show the potential infiltration capacity of the soil. However, under normal circumstances, infiltration deteriorates quickly with small amounts of water applied. In Figure 5, a typical application curve shows the application time of an irrigation system with a 15 ft wetted diameter and a capacity of 600 gpm. The areas of this curve above the infiltration curves show the potential runoff that must be managed. Residue management decreases the potential runoff but still does not eliminate it. Soil surface storage is an important factor but decreases with slope which will increase runoff.

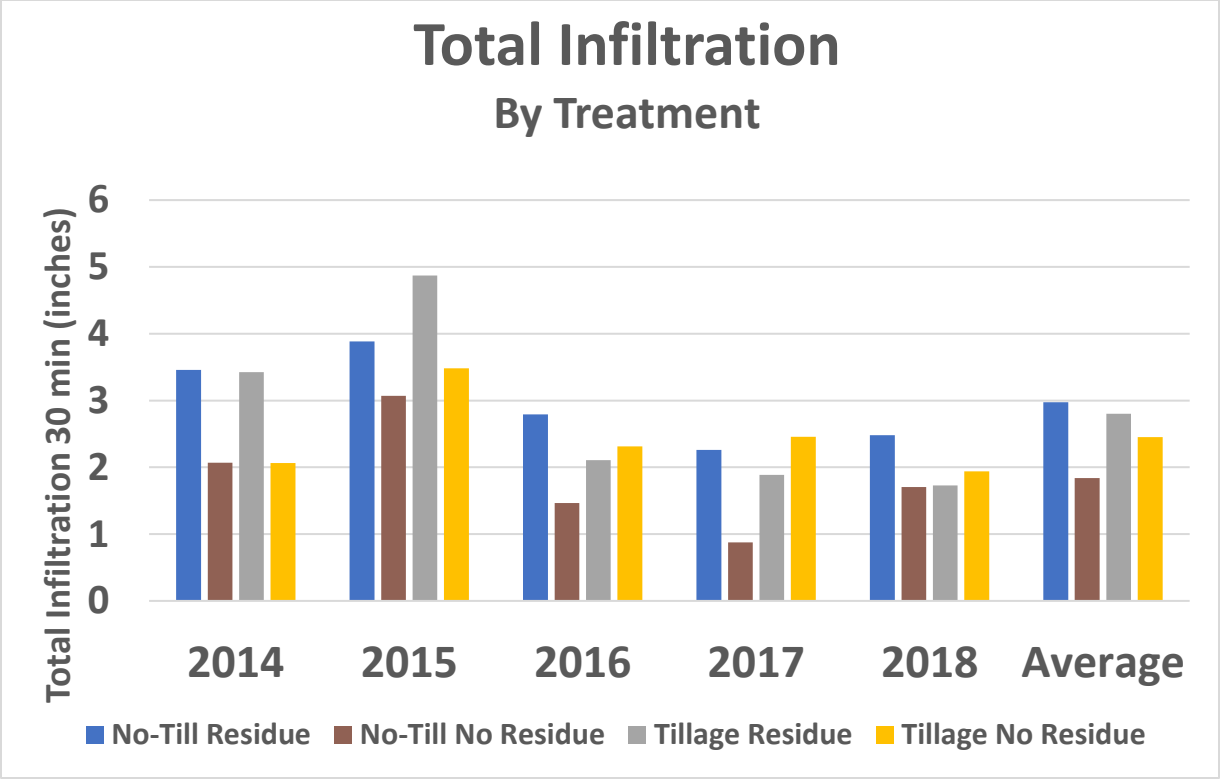


Figure 3. Total infiltration over a 30 minute period.

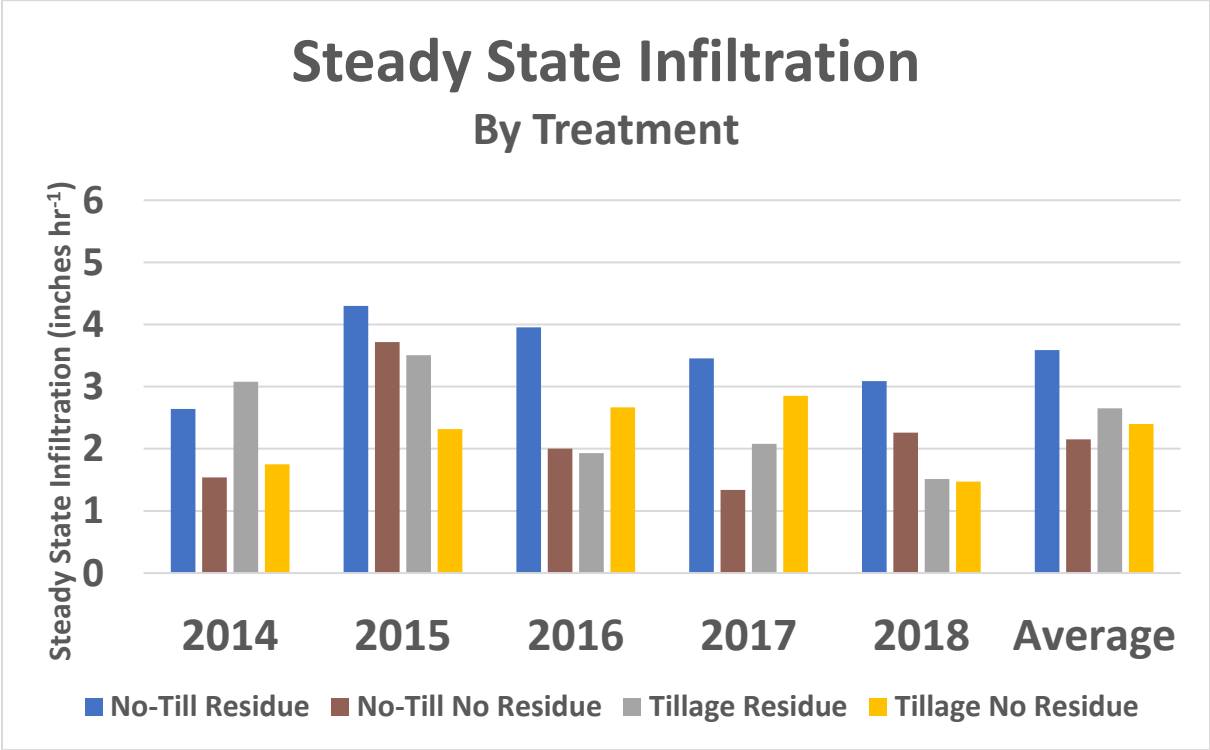


Figure 4. Steady state estimates for tillage and residue management.

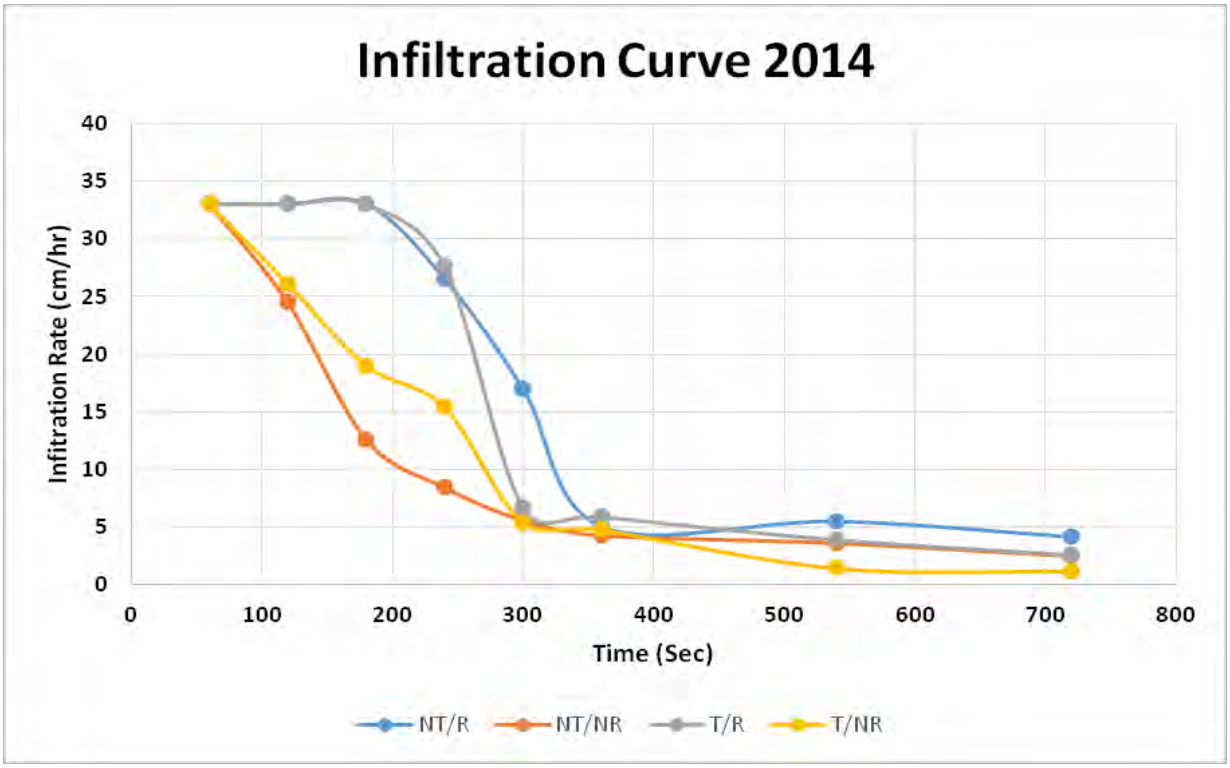


Figure 5. Infiltration curves for tillage and residue management practices.

Irrigation Management Decisions

Another factor in limited irrigation management is based upon either capacity, quantity, or both. Each has a set of unique decision. This will be a discussion of over 30 years of experience in limited irrigation strategies and management.

Plant Populations

There always has been discussions of the impact of too high of populations with limited water management. However, I have rarely seen a decrease in yield with too great of a population. Lowering populations should be done accordingly to the expected grain yield of the field with the conditions that you see. This is generally, a purely economic decision. Planting more seeds than necessary is a cost that will not be recovered unless weather patterns change substantially with above average precipitation. Seed corn prices historically cost between $3 and $4 per thousand. However, remember that a yield increase of 0.5 bu/ac at todays price of corn can pay for that seed cost. A significant reduction in population can decrease costs but can also limit the upper yield potential if conditions improve.

Water Management Strategies

Water management strategies with a limited capacity well are very much a personal decision. You can irrigate the entire acres with an increased time between irrigations. You can reduce acres which will appear as an increased capacity per acre and irrigation frequency decreases. Many times, if quantity is not severely limiting, the management strategy is to turn on irrigation and only shut off for a significant

precipitation event. One of the major issues is that if below average precipitation occurs during the growing season, water stress will increase during the season and typically will be the greatest during the most critical time-period, reproductive. Figure 6 shows the yield impact of water stress during the reproductive growth stages of a 50% capacity system compared to full irrigation or a growth stage management strategy. Full irrigation or growth stage management must reduce irrigated acres to increase capacity per irrigated acre of corn.

In years such as 2009 where adequate precipitation occurred during the reproductive growth stage, a 50% capacity appeared to be the correct management practice because little impact to yield was observed. However, in years such as 2010 and 2011, you can observe that yields of the 50% irrigation capacity were less than 70% of an adequate capacity and in 2011, yields were less than 60% of full irrigation.

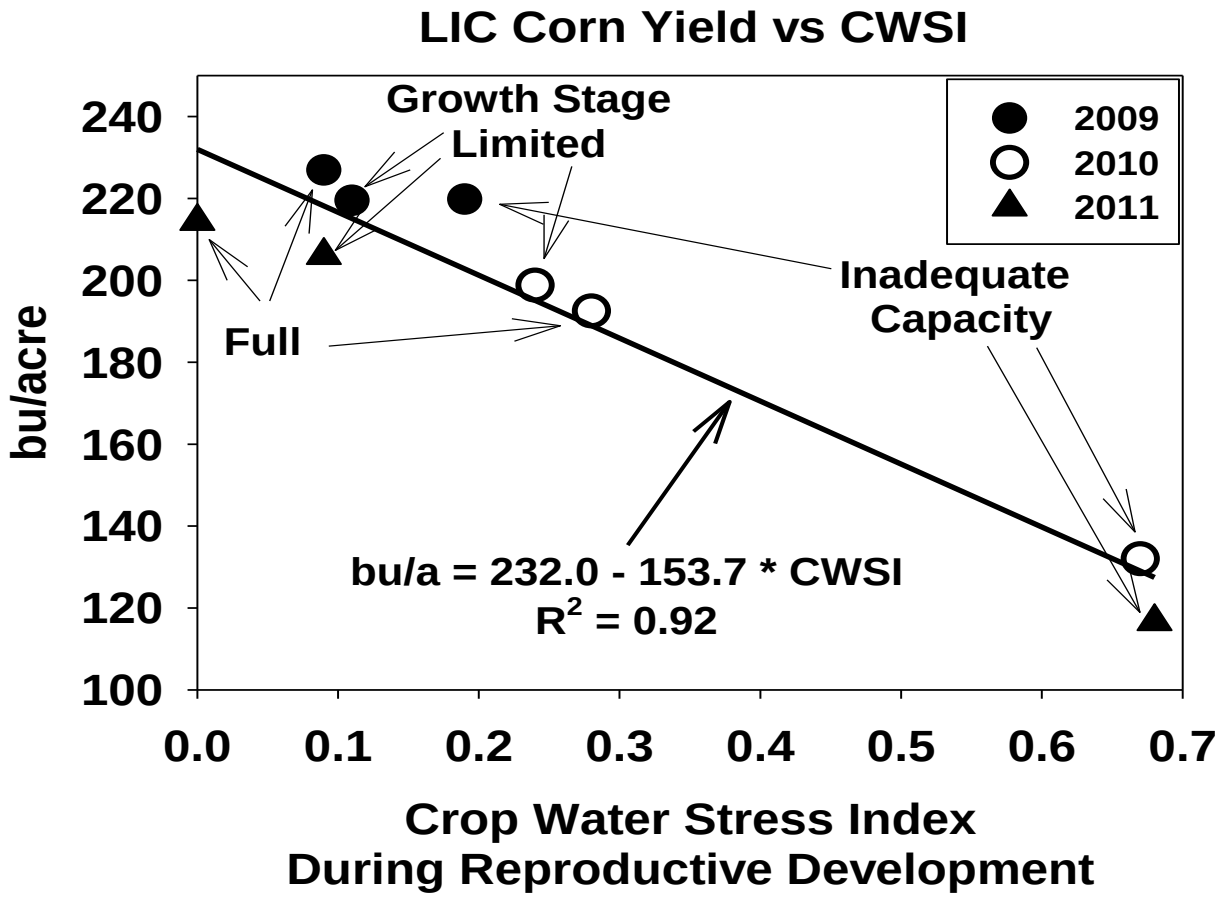


Figure 6. Impact of crop water stress at the reproductive growth stage on grain yield.

Over the years, we have conducted 2 large scale irrigation management on-farm demonstrations. These demonstrations are costly to conduct as you must pay for anticipated yield reductions to the producers. However, these demonstrations can be valuable to producers as they show what the potential yields are for different management strategies in a real-world situation in several locations. To researchers, these demonstrations can show that the research conducted in one location can be taken to other locations with minor changes.

In the late 1990's, a multi-farm demonstration was conducted in SW Nebraska with producers at 4 locations: Arapahoe, Benkelman, Elsie and Dickens. Yield results over the 6 year demonstration are shown in Figure 7. Four irrigation management strategies were observed over years: Farmer management, Best Management Practices, Growth Stage and an Allocation. The major comparison would show the differences between farmer/consultant management and following BMP management practices. The other comparisons were to show the impact of water stress utilizing 2 irrigation strategies to limit irrigation during the vegetative growth stage and a strict allocation.

The allocation was chosen due to the declines in the Ogallala Aquifer and research in that region showing that pumping of 6 inches or less was required to maintain aquifer levels.

Overall, improving irrigation management strategies did not decrease yields between farmer management and BMP but did decrease the amount of water applied by over 1.5" per year or close to 10%. However, this can be deceiving as farmer management generally became closer to BMP management as the years progressed. A second concern of producers showing that stress during the vegetative growth stage really has minor to no major yield impact in many years with average precipitation but can reduce irrigation applied. Grain yields overall decreased by 5% with a 20% decrease in irrigation applied.

The allocation strategy was to show producers that even with strict restrictions, there was significant yield potential. Grain yields were reduced on average by 13% with a reduction in irrigation by 45% when irrigation could be applied to the reproductive stages in adequate amounts. The worst of the years for precipitation was 2000 at 2 locations. In that year, a reduction in irrigation of 49% resulted in a yield of 70% of full irrigation. Precipitation at both locations was under 6 inches for the growing season.

A similar irrigation demonstration was conducted in Burlington, CO in the mid 2000's. Results of that demonstration were similar to that of the previous demonstration over the 3 years of that demonstration.

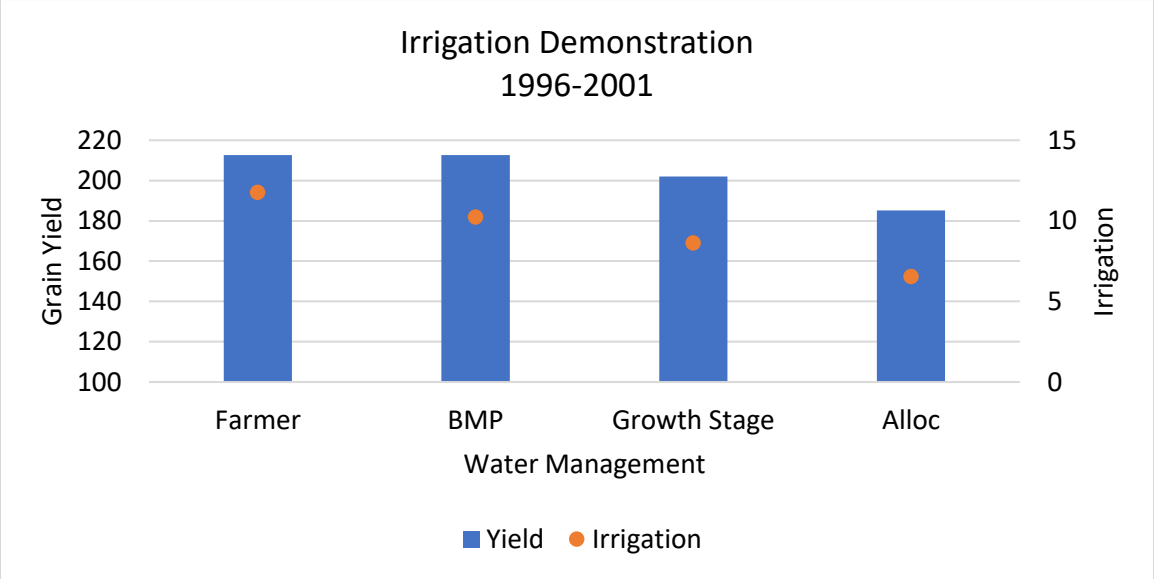


Figure 7. Grain yields and irrigation amounts for different irrigation management strategies for an on-farm demonstration in the late 1990's in Nebraska.

A similar research study was conducted for furrow irrigation at the same time. This study utilized all management strategies that would improve irrigation efficiency for furrow irrigation. They included ridge-till, furrow packing, surge irrigation and shortening furrow length to 1,100 feet. With improved management, irrigation efficiencies can be very high with furrow irrigation but at the cost of time for management which would typically reduce the number of acres a producer could farm.

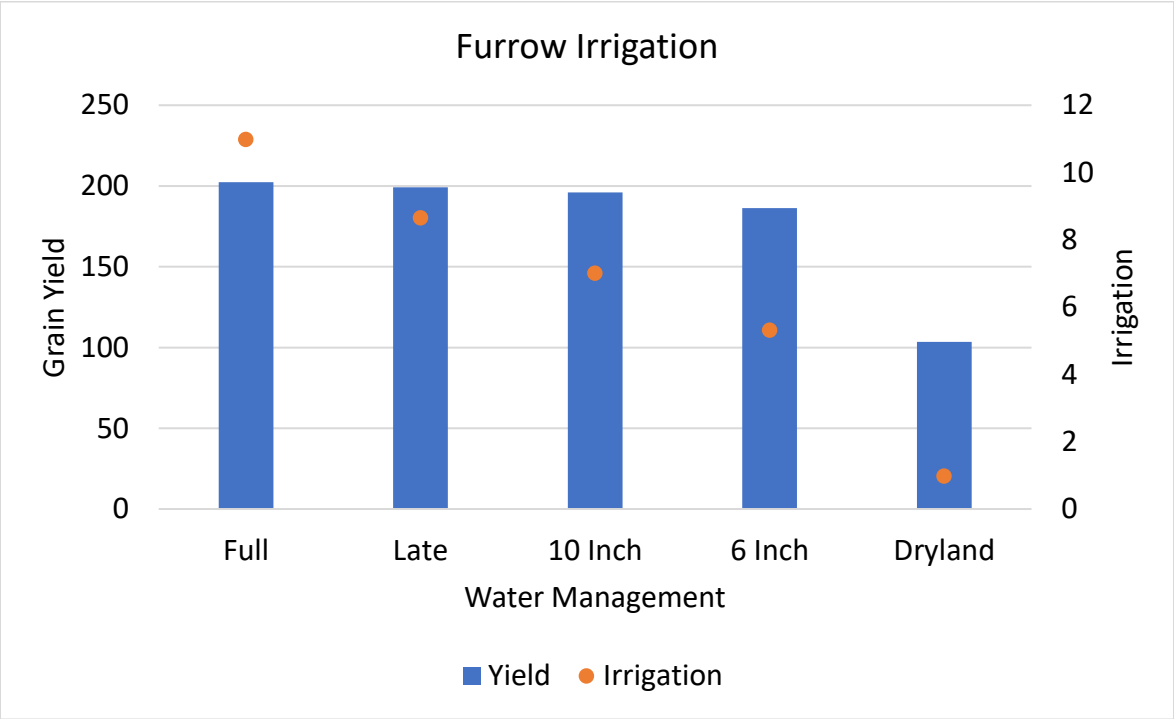


Figure 8. Grain yields and irrigation amounts for a furrow irrigation study.

These are just a few observations I have seen over 30+ years of limited irrigation management in the High Plains. There is no one correct answer to these management decisions as every producer and field can be different. However, some of the information observed over the years and locations has shown that with improved management, there are potential positive impacts that can happen with small changes over time.

One of the major factors that can't be discussed is the differences in risk that occur with strategies or tolerance to risk between farmers. Risk is always present must be managed.

CORN

G09Y24

RM: 109

Silk	Black Layer
RM: **112**	RM: **109**
GDU: **1420**	GDU: **2570**

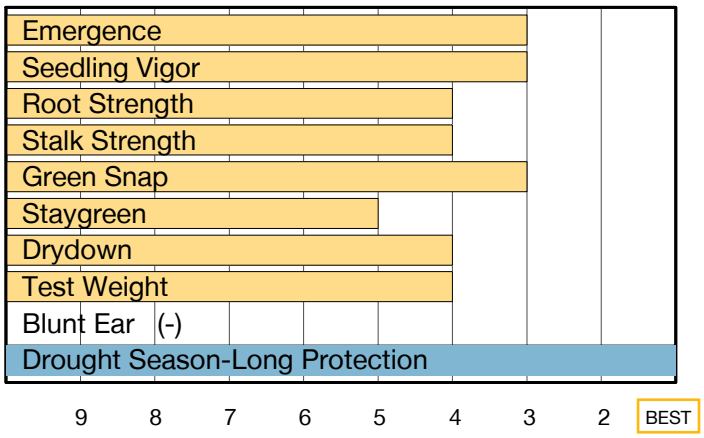
Brands Available: G09Y24-DV
G09Y24-V
E109Y2-D

Duracade Viptera
Duracade
Viptera
Artesian

Exciting Genetics with Artesian Technology

- Maximizes yield when it rains; increases yield potential when it doesn't
- Population flexibility across all environments
- Top-end yield potential with stability when conditions are tough

Agronomic Characteristics



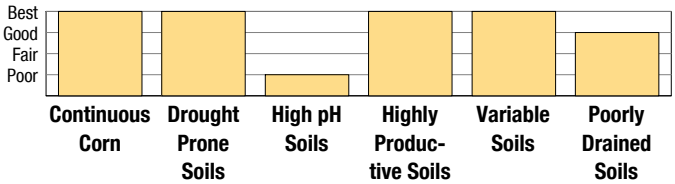
Disease Tolerance

Gray Leaf Spot	**5**
Northern Corn Leaf Blight	**2**
Goss's Wilt	**4**
Bacterial Leaf Streak	**4**
Southern Corn Leaf Blight	**4**
Eyespot	**3**
Anthracnose Stalk Rot	**-**
Tar Spot	**4**
Fusarium Crown Rot	**5**
Common Rust	**-**
Southern Rust	**5**

Plant & Ear Characteristics

Plant Height	Ear Height	Ear Flex	Cob Color	Husk Cover	Leaf Type	Root Type
5	**3**	**Semi-Flex**	**Red**	**Medium**	**Semi-Upright**	**Modified**

Performance In...



Seeding Rates

Yield Environment	Target Seeds/Ac
280 bu/Ac	**34,000**
240 bu/Ac	**31,000**
200 bu/Ac	**28,500**
160 bu/Ac	**26,000**
120 bu/Ac	**23,500**

More info:

For more info or to view product performance data: goldenharvestseeds.com (800) 944-7333

1-9 Scale: 1 = Best, Tallest or Highest; 9 = Worst, Shortest or Lowest; (-) = Not Available.

Seed products with the LibertyLink® (LL) trait are resistant to the herbicide glufosinate ammonium, an alternative to glyphosate in corn and soybeans, and combine high-yielding genetics with the powerful, non-selective, postemergent weed control of Liberty® herbicide for optimum yield and excellent weed control.

Ratings are based on interpretation of data gathered by Syngenta and/or observations across areas of adaptation and may change as additional data are gathered. Product performance assumes disease presence.

Published April 29, 2022. For use until April 30, 2023.

CORN

G10L16

RM: 110

Silk	Black Layer
RM: **109**	RM: **113**
GDU: **1395**	GDU: **2620**

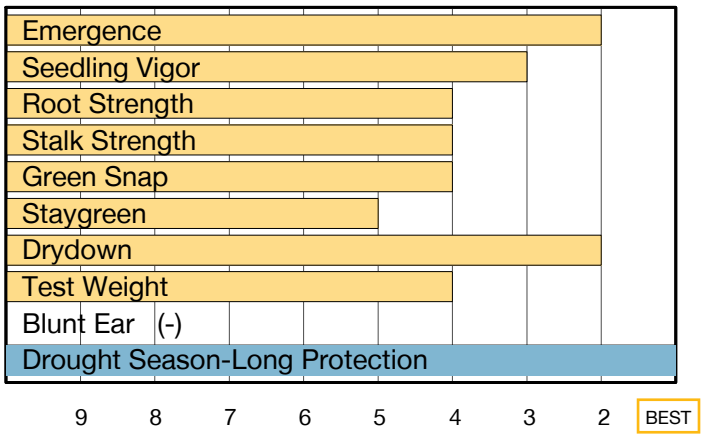
Brands Available: G10L16-DV
G10L16-V
G10L16A (Conv.)

Duracade Viptera
Viptera
Artesian

Industry-leading Yield Potential Across All Acres

- Leading drought tolerance powered by Artesian technology
- Moderate plant structure for residue management
- Excellent drydown for an early harvest option

Agronomic Characteristics



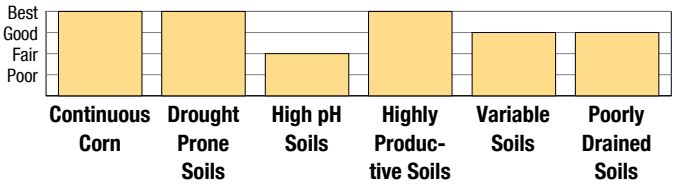
Disease Tolerance

Gray Leaf Spot	**4**
Northern Corn Leaf Blight	**6**
Goss's Wilt	**3**
Bacterial Leaf Streak	**3**
Southern Corn Leaf Blight	**4**
Eyespot	**3**
Anthracnose Stalk Rot	**-**
Tar Spot	**4**
Fusarium Crown Rot	**4**
Common Rust	**7**
Southern Rust	**4**

Plant & Ear Characteristics

Plant Height	Ear Height	Ear Flex	Cob Color	Husk Cover	Leaf Type	Root Type
5	**6**	**Semi-Flex**	**Red**	**Medium**	**Semi-Upright**	**Modified**

Performance In...



Seeding Rates

Yield Environment	Target Seeds/Ac
280 bu/Ac	**34,500**
240 bu/Ac	**33,000**
200 bu/Ac	**32,000**
160 bu/Ac	**30,500**
120 bu/Ac	**25,500**

More info:

For more info or to view product performance data: goldenharvestseeds.com (800) 944-7333

1-9 Scale: 1 = Best, Tallest or Highest; 9 = Worst, Shortest or Lowest; (-) = Not Available.

Seed products with the LibertyLink® (LL) trait are resistant to the herbicide glufosinate ammonium, an alternative to glyphosate in corn and soybeans, and combine high-yielding genetics with the powerful, non-selective, postemergent weed control of Liberty® herbicide for optimum yield and excellent weed control.

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CORN

G13N18

RM: 113

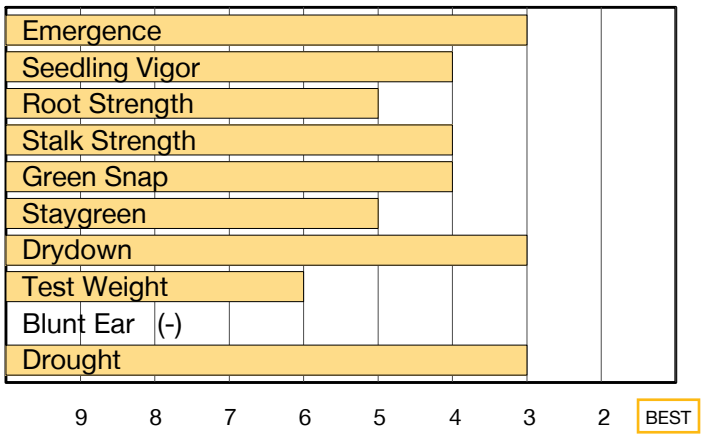
Silk	Black Layer
RM: **112**	RM: **113**
GDU: **1415**	GDU: **2630**

Brands Available: G13N18-3111
E113N8-3000GT

Excellent Tolerance to Heat and Moisture Stress with Western Adaptation

- Excels in high-management acres of the Western Corn Belt
- Solid performance in drought-prone and variable soil types
- Rapid drydown contributes to ease of harvest

Agronomic Characteristics



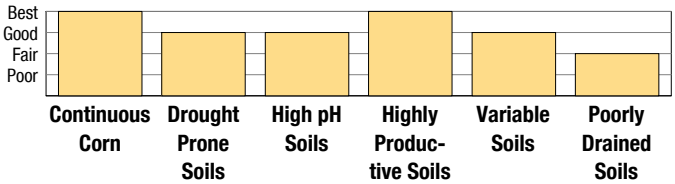
Disease Tolerance

Gray Leaf Spot	**6**
Northern Corn Leaf Blight	**4**
Goss's Wilt	**4**
Bacterial Leaf Streak	**5**
Southern Corn Leaf Blight	**2**
Eyespot	**6**
Anthracnose Stalk Rot	**4**
Tar Spot	**-**
Fusarium Crown Rot	**4**
Common Rust	**3**
Southern Rust	**6**

Plant & Ear Characteristics

Plant Height	Ear Height	Ear Flex	Cob Color	Husk Cover	Leaf Type	Root Type
4	**5**	**Flex**	**White**	**Medium**	**Semi-Upright**	**Fibrous**

Performance In...



Seeding Rates

Yield Environment	Target Seeds/Ac
280 bu/Ac	**32,000**
240 bu/Ac	**31,000**
200 bu/Ac	**29,500**
160 bu/Ac	**28,500**
120 bu/Ac	**26,000**

More info:

For more info or to view product performance data: goldenharvestseeds.com (800) 944-7333

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Ratings are based on interpretation of data gathered by Syngenta and/or observations across areas of adaptation and may change as additional data are gathered. Product performance assumes disease presence.

Published April 29, 2022. For use until April 30, 2023.

B01Z88AM™

101 RM

Optimum AcreMax ABOVE

Top yield potential with wide adaptability across the Corn Belt.

BREVANT seeds

Trait versions with same base
B01Z88Q™

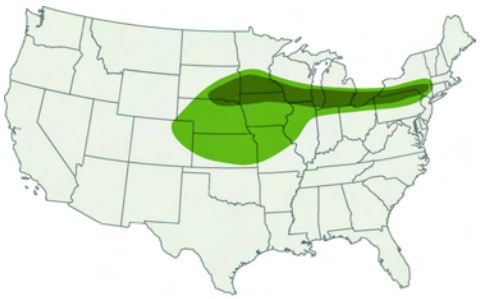
Good stress emergence for cool, wet soil conditions.

Best performance observed in moderate to high yield environments.

Strong tolerance to Goss`s wilt for areas of high risk.

Solid choice where green snap is a concern.

A fungicide is recommended in areas with heavy gray leaf spot or northern corn leaf blight.



YIELD ENVIRONMENTS

- ★ Highly Productive
- ★ Moderate
- ◎ Low

CROP MANAGEMENT

- ★ Early Planting
- ★ Late Planting
- ✓ Delayed Harvest

POPULATION

Very Low — Very High

(Consult a Brevant seeds representative for specific recommendations on planting populations.)

SOIL ADAPTABILITY

- ✓ Poorly Drained Soils
- ✓ Sandy Soils
- ✓ Clay Soils

CROP ROTATION

- ◎ Continuous Corn
- ★ Corn / Soybean

FUNGICIDE RESPONSE

Low — High

AGRONOMICS

- ★ Stress Emergence
- ✓ Stalks
- ✓ Roots
- ✓ Green Snap
- ✓ Stay Green
- ✓ Drought Tolerance
- ★ High pH Soil Tolerance
- ✓ Test Weight
- ✓ Husk Cover

DISEASE TOLERANCE

- ✓ Gray Leaf Spot
- ◎ NCLB
- ★ Tar Spot
- ✓ Goss's Wilt
- NA SCLB
- NA S. Corn Rust
- ◎ Anthracnose Stalk Rot
- ✗ Fusarium Ear Rot
- ✓ Diplodia Ear Rot
- ◎ Giberella Ear Rot

CHARACTERISTICS

Relative Maturity Range	100-104
GDUs to Mid-Silk	1260
GDUs to Black Layer	2450
Plant Height	Medium
Ear Height	Moderately Low
Ear Flex	Semi-Flex
Cob Color	Red

HERBICIDE TOLERANCES

LIBERTY LINK®

Roundup Ready® CORN 2

KEY

- ★ **Highly Suitable - Key Strength**
- ✓ **Suitable - Meets Standards**
- ◎ **Manage Appropriately**
- ✗ **Strong Caution - Limitation**
- NA **Rating Not Available**

IMPORTANT: Characteristic scores provide key information useful in selecting and managing products in your area. Information and ratings are based on comparisons with other products sold by Brevant seeds. Ratings denoted with an asterisk (*) reflect preliminary data subject to change when additional data becomes available.

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CORTEVA™ agriscience

B04Z92Q™

104 RM

QROME

Optimum AQUAmax

BREVANT seeds

Trait versions with same base
B04Z92AM™

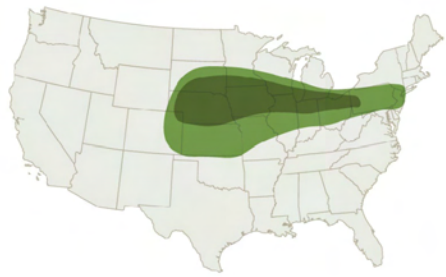
Leader hybrid with great combination of yield potential, agronomics and broad adaptability.

Broadly adapted across most soil types and yield environments.

Optimum® AQUAmax® hybrid for drought-prone geographies.

Strong Goss`s wilt and green snap for the West.

A fungicide is recommended in areas high risk to gray leaf spot.



YIELD ENVIRONMENTS

- ✓ Highly Productive
- ★ Moderate
- ★ Low

CROP MANAGEMENT

- ✓ Early Planting
- ✓ Late Planting
- ✓ Delayed Harvest

POPULATION

Very Low — Very High

(Consult a Brevant seeds representative for specific recommendations on planting populations.)

SOIL ADAPTABILITY

- ✓ Poorly Drained Soils
- ✓ Sandy Soils
- ✓ Clay Soils

CROP ROTATION

- ✓ Continuous Corn
- ★ Corn / Soybean

FUNGICIDE RESPONSE

Low — High

AGRONOMICS

- ✓ Stress Emergence
- ✓ Stalks
- ✓ Roots
- ★ Green Snap
- ✓ Stay Green
- ★ Drought Tolerance
- ★ High pH Soil Tolerance
- ★ Test Weight
- ◎ Husk Cover

DISEASE TOLERANCE

- ◎ Gray Leaf Spot
- ✓ NCLB
- ★ Tar Spot
- ★ Goss's Wilt
- NA SCLB
- NA S. Corn Rust
- ✗ Anthracnose Stalk Rot
- ◎ Fusarium Ear Rot
- ✓ Diplodia Ear Rot
- ✓ Giberella Ear Rot

CHARACTERISTICS

Relative Maturity Range	102-106
GDUs to Mid-Silk	1280
GDUs to Black Layer	2530
Plant Height	Medium-Short
Ear Height	Medium
Ear Flex	Semi-Flex
Cob Color	Pink

HERBICIDE TOLERANCES

LIBERTY LINK®

Roundup Ready® CORN 2

KEY

- ★ **Highly Suitable - Key Strength**
- ✓ **Suitable - Meets Standards**
- ◎ **Manage Appropriately**
- ✗ **Strong Caution - Limitation**
- NA **Rating Not Available**

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CORTEVA™ agriscience

B04V12AML™

104 RM

Optimum® AcreMax® ABOVE Leptra®

Optimum® AQUAmax®

BREVANT seeds

Trait versions with same base
B04V12Q™

Exciting new Optimum® AcreMax® Leptra® + AQUAmax® hybrid for the central and western Corn Belt.

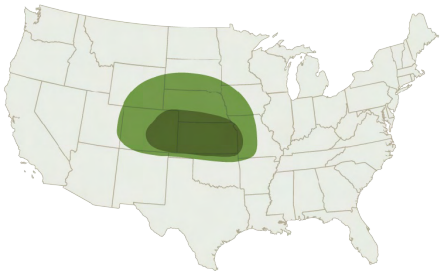
Optimum® AQUAmax® hybrid that provides very strong drought tolerance.

Excellent western traits including drought, green snap and Goss`s wilt tolerances.

Leptra® technology provides improved protection against earworm and cutworms for the shorter season maturity.

For optimal early season performance, avoid planting into very cold, wet soils.

A fungicide may be necessary for yield enviornments where gray leaf spot pressure is high.



YIELD ENVIRONMENTS

- ✓ Highly Productive
- ★ Moderate
- ★ Low

CROP MANAGEMENT

- ◎ Early Planting
- ✓ Late Planting
- ✓ Delayed Harvest

POPULATION

Very Low — Very High

(Consult a Brevant seeds representative for specific recommendations on planting populations.)

SOIL ADAPTABILITY

- ✓ Poorly Drained Soils
- ★ Sandy Soils
- ✓ Clay Soils

CROP ROTATION

- ◎ Continuous Corn
- ★ Corn / Soybean

FUNGICIDE RESPONSE

Low — High

AGRONOMICS

- ◎ Stress Emergence
- ✓ Stalks
- ★ Roots
- ★ Green Snap
- ◎ Stay Green
- ★ Drought Tolerance
- ✓ High pH Soil Tolerance
- ✓ Test Weight
- ✓ Husk Cover

DISEASE TOLERANCE

- ◎ Gray Leaf Spot
- ★ NCLB
- NA Tar Spot
- ★ Goss's Wilt
- NA SCLB
- NA S. Corn Rust
- ✓ Anthracnose Stalk Rot
- ◎ Fusarium Ear Rot
- ★ Diplodia Ear Rot
- NA Giberella Ear Rot

CHARACTERISTICS

Relative Maturity Range	102-106
GDUs to Mid-Silk	1280
GDUs to Black Layer	2530
Plant Height	Medium
Ear Height	Moderately High
Ear Flex	Semi-Det.
Cob Color	Pink

HERBICIDE TOLERANCES

LIBERTY LINK®

Roundup Ready® CORN 2

KEY

- ★ **Highly Suitable - Key Strength**
- ✓ **Suitable - Meets Standards**
- ◎ **Manage Appropriately**
- ✕ **Strong Caution - Limitation**
- NA **Rating Not Available**

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CORTEVA™ agriscience

B12C01Q™

112 RM

QROME

VFQ Optimum AQUAmax

BREVANT seeds

Trait versions with same base
B12C01AM™
B12C01™

Exciting combination of high yield potential, strong agronomics and versatility to perform on a wide variety of acres.

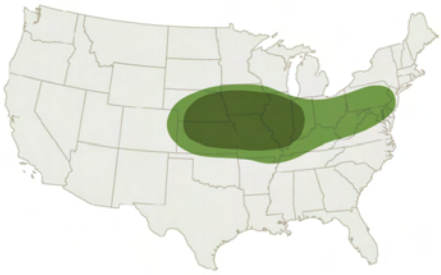
Broadly adapted across most soil types, and yield environments.

Good ear flex allows adaptability across planting populations.

Optimum® AQUAmax® hybrid for drought-prone geographies.

Excellent stalks and roots combined with strong green snap and Goss`s wilt tolerance.

May require fungicide application in high-risk northern corn leaf blight or gray leaf spot environments.



YIELD ENVIRONMENTS

- ★ Highly Productive
- ★ Moderate
- ✓ Low

CROP MANAGEMENT

- ✓ Early Planting
- ✓ Late Planting
- ✓ Delayed Harvest

POPULATION

Very Low — Very High

(Consult a Brevant seeds representative for specific recommendations on planting populations.)

SOIL ADAPTABILITY

- ✓ Poorly Drained Soils
- ★ Sandy Soils
- ✓ Clay Soils

CROP ROTATION

- ✓ Continuous Corn
- ★ Corn / Soybean

FUNGICIDE RESPONSE

Low — High

AGRONOMICS

- ✓ Stress Emergence
- ★ Stalks
- ★ Roots
- ★ Green Snap
- ✓ Stay Green
- ★ Drought Tolerance
- ★ High pH Soil Tolerance
- ★ Test Weight
- ✓ Husk Cover

DISEASE TOLERANCE

- ◎ Gray Leaf Spot
- ✓ NCLB
- ✓ Tar Spot
- ✓ Goss's Wilt
- ✗ SCLB
- ◎ S. Corn Rust
- ✓ Anthracnose Stalk Rot
- ◎ Fusarium Ear Rot
- ◎ Diplodia Ear Rot
- NA Giberella Ear Rot

CHARACTERISTICS

Relative Maturity Range	110-114
GDUs to Mid-Silk	1340
GDUs to Black Layer	2630
Plant Height	Medium
Ear Height	Moderately High
Ear Flex	Semi-Flex
Cob Color	Pink

HERBICIDE TOLERANCES

LIBERTY LINK®

Roundup Ready® CORN 2

KEY

- ★ **Highly Suitable - Key Strength**
- ✓ **Suitable - Meets Standards**
- ◎ **Manage Appropriately**
- ✗ **Strong Caution - Limitation**
- NA **Rating Not Available**

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CORTEVA™ agriscience

B12M18Q™

QROME

112 RM

Widely adapted, stable product that competes well in most yield environments and stands out for overall agronomics.

BREVANT seeds

Trait versions with same base
B12M18AM™

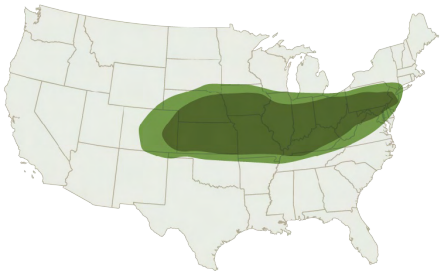
An early silker with heavy test weight, solid agronomics and stability in both AM and Q versions.

Standability is a strength with above average stalks, roots and green snap.

Good gray leaf spot and northern corn leaf blight tolerance make it a good choice for fields with a history of these foliar diseases.

Excellent Goss`s wilt, drought tolerance and green snap scores for the western corn belt.

Top choice for continuous corn acres due to strong stalks, roots and gray leaf spot tolerance.



YIELD ENVIRONMENTS

- ★ Highly Productive
- ★ Moderate
- ✓ Low

CROP MANAGEMENT

- ✓ Early Planting
- ★ Late Planting
- ★ Delayed Harvest

POPULATION

(Consult a Brevant seeds representative for specific recommendations on planting populations.)

SOIL ADAPTABILITY

- ★ Poorly Drained Soils
- ✓ Sandy Soils
- ★ Clay Soils

CROP ROTATION

- ★ Continuous Corn
- ★ Corn / Soybean

FUNGICIDE RESPONSE

AGRONOMICS

- ✓ Stress Emergence
- ✓ Stalks
- ★ Roots
- ★ Green Snap
- ◎ Stay Green
- ✓ Drought Tolerance
- NA High pH Soil Tolerance
- ★ Test Weight
- ✓ Husk Cover

DISEASE TOLERANCE

- ★ Gray Leaf Spot
- ✓ NCLB
- ✓* Tar Spot
- ★ Goss's Wilt
- ◎ SCLB
- ◎ S. Corn Rust
- ✓ Anthracnose Stalk Rot
- ◎ Fusarium Ear Rot
- ✓ Diplodia Ear Rot
- NA Giberella Ear Rot

CHARACTERISTICS

Relative Maturity Range	110-114
GDUs to Mid-Silk	1380
GDUs to Black Layer	2680
Plant Height	Medium
Ear Height	Medium
Ear Flex	Semi-Flex
Cob Color	Pink

HERBICIDE TOLERANCES

LIBERTY LINK®

Roundup Ready® CORN 2

KEY

- ★ **Highly Suitable - Key Strength**
- ✓ **Suitable - Meets Standards**
- ◎ **Manage Appropriately**
- ✕ **Strong Caution - Limitation**
- NA **Rating Not Available**

IMPORTANT: Characteristic scores provide key information useful in selecting and managing products in your area. Information and ratings are based on comparisons with other products sold by Brevant seeds. Ratings denoted with an asterisk (*) reflect preliminary data subject to change when additional data becomes available.

Information and scores are assigned by Brevant Seeds and are based on period-of-years testing through 2021 harvest and were the latest available at time of printing. Some scores may change after 2022 harvest. Scores represent an average of performance data across areas of adaptation, multiple growing conditions, and a wide range of both climate and soil types, and may not predict future results. Individual product responses are variable and subject to a variety of environmental, disease and pest pressures. Please use this information as only one component of your product positioning decision.

CORTEVA™ agriscience

LG54C76

104 RM

CORN

SmartStax® RIB COMPLETE® | VTDoublePRO® RIB COMPLETE®

Silage Proven

PRODUCT INFORMATION

LG54C76 is a high yielding semi-flex product that moves east to west very well. Solid agronomics with a great disease and health profile. Very versatile in placement and adaptation. Approved as HEC or food grade corn in some markets.

- Medium-tall plant with medium ear insertion, a longer ear with a dark red cob and open husk.
- Excellent emergence and early vigor. Superior roots. Above average Test Weight. Good fall intactness.
- Above average on stalk diseases. Very good on Goss's Wilt and Gray Leaf Spot. Average scores for NCLB.
- Scout for disease and apply fungicide if needed. Will respond to fungicide.

PLANT CHARACTERISTICS

Early Vigor	9
Stalk Strength	7
Root Strength	9
Greensnap	9
Drydown	7
Staygreen	8
Drought Tolerance	8
Test Weight	8
Harvest Appearance	8
Hard Endosperm	Yes
GDD - Pollen	1280
GDD - Silk	1311
GDD - Black Layer	2590
Plant Height	MT
Ear Height	M
Ear Type	SF
Flowering for Maturity	MID

MANAGEMENT TIPS

Handles early planting and no-till/reduced till situations well. Recommend fungicide use when planted in continuous corn situations. Adapts well in zone, and both north and south of its adapted zone.

MANAGEMENT PRACTICES

Low Populations	8
Medium Populations	9
High Populations	6
Marginal Soil	8
Productive Soil	9
Continuous Corn	8
Adapt To No Till	9
Planting Rate	27-36,000

DISEASE RATINGS

Northern Leaf Blight	6
Southern Leaf Blight	N/A
Gray Leaf Spot	8
Goss's Bacterial Wilt	8
Anthracnose	8
Tar Spot	Moderately Susceptible
Common Rust	N/A
Southern Rust	7
Fungicide Response	High

HERBICIDE INTERACTION

None noted

NOTES

9 = Excellent 1 = Poor N/A = Not Available NR = Not Recommended

LG58C77

108 RM

CORN

Agrisure Duracade® 5222 E-Z Refuge®

CONVENTIONAL

Silage Proven

PRODUCT INFORMATION

LG58C77 produces high yields from consistent, large, semi-flex ears with deep kernels that have good test weight grain. Shows very good stalk and root strength, staygreen and late season intactness. Silage Proven.

- High yielding product that is widely adapted east to west and can perform well in variable environments.
- Open husk allows for faster drydown in the fall and can lead to an earlier harvest.
- Excellent to very good ratings for most major leaf diseases; a good rating for Goss's Wilt.
- Superior early vigor and disease package allow flexibility at planting time.

PLANT CHARACTERISTICS

Early Vigor	8
Stalk Strength	8
Root Strength	8
Greensnap	8
Drydown	7
Staygreen	8
Drought Tolerance	8
Test Weight	7
Harvest Appearance	8
Hard Endosperm	No
GDD - Pollen	1371
GDD - Silk	1352
GDD - Black Layer	2743
Plant Height	MT
Ear Height	M
Ear Type	SF
Flowering for Maturity	LATE

MANAGEMENT TIPS

The Agrisure Duracade® 5222 E-Z Refuge® trait stack combines the above-ground insect control of the Agrisure Viptera® trait and the unique corn rootworm control of the Agrisure Duracade® trait. Best performance is on well-drained soils east to west across the Corn Belt. Late flowering with very good heat stress tolerance allows movement south of its maturity zone. Adapts well to corn-on-corn situations. The E-Z Refuge® component is glyphosate and glufosinate tolerant.

MANAGEMENT PRACTICES

Low Populations	8
Medium Populations	9
High Populations	8
Marginal Soil	8
Productive Soil	9
Continuous Corn	9
Adapt To No Till	8
Planting Rate	30-38,000

DISEASE RATINGS

Northern Leaf Blight	9
Southern Leaf Blight	N/A
Gray Leaf Spot	8
Goss's Bacterial Wilt	7
Anthracnose	7
Tar Spot	Tolerant
Common Rust	8
Southern Rust	7
Fungicide Response	Moderate

HERBICIDE INTERACTION

None noted

NOTES

9 = Excellent 1 = Poor N/A = Not Available NR = Not Recommended

LG60C12

110 RM

CORN

Agrisure Duracade® 5222A E-Z Refuge®

Agrisure Viptera® 3330A E-Z Refuge®

Silage Proven

PRODUCT INFORMATION

LG60C12 is a full flex ear hybrid with excellent western, southern, and low population adaptation. Very good ear girth with excellent ear flex associated with this product. Has dual purpose possibilities for both grain and silage.

- Exceptional yield for maturity, even at lower plant populations.
- Larger plant style with good heat tolerance and very good husk cover.
- Above average Goss's Wilt, average GLS and NCLB.
- A fungicide application will likely provide benefit for disease protection and late season stalk intactness.

PLANT CHARACTERISTICS

Early Vigor	7
Stalk Strength	7
Root Strength	6
Greensnap	8
Drydown	7
Staygreen	8
Drought Tolerance	8
Test Weight	7
Harvest Appearance	8
Hard Endosperm	No
GDD - Pollen	1365
GDD - Silk	1370
GDD - Black Layer	2760
Plant Height	T
Ear Height	H
Ear Type	F
Flowering for Maturity	MID

MANAGEMENT TIPS

The Agrisure Duracade® 5222A E-Z Refuge® trait stack and Agrisure Viptera® 3330A E-Z Refuge® trait stack options provide outstanding insect control for growers. Well adapted for planting in the high plains dryland environments. Manage fertility for high yields at low to moderate populations. Place on adequately drained soils at moderate populations. Use as an early hybrid south or in lower population environments. Fungicides recommended when planted corn-on-corn. The E-Z Refuge® component will be glyphosate and glufosinate tolerant.

MANAGEMENT PRACTICES

Low Populations	9
Medium Populations	9
High Populations	6
Marginal Soil	8
Productive Soil	8
Continuous Corn	8
Adapt To No Till	8
Planting Rate	22-32,000

DISEASE RATINGS

Northern Leaf Blight	6
Southern Leaf Blight	N/A
Gray Leaf Spot	7
Goss's Bacterial Wilt	7
Anthracnose	7
Tar Spot	Tolerant
Common Rust	N/A
Southern Rust	4
Fungicide Response	High

HERBICIDE INTERACTION

None noted

NOTES

9 = Excellent 1 = Poor N/A = Not Available NR = Not Recommended

LG62C35

112 RM

CORN

SmartStax RIB COMPLETE | SmartStax | VT DoublePRO RIB COMPLETE | VT DoublePRO

Silage Proven

PRODUCT INFORMATION

LG62C35 has very high yield potential with healthy plants and a standout season-long great look. This product is a first choice for maximum yield and stable performance over a wide range of environments.

- Really nice look with plants that stays green late-season and have prominent, showy ears.
- Strong emergence and plant vigor allow for early planting.
- Very high levels of both stalk and leaf disease tolerance, including Anthracnose, GLS, Goss's Wilt, and Southern Rust.
- Conveys very good tolerance to ASR.

PLANT CHARACTERISTICS

Early Vigor	8
Stalk Strength	7
Root Strength	7
Greensnap	8
Drydown	8
Staygreen	8
Drought Tolerance	8
Test Weight	7
Harvest Appearance	8
Hard Endosperm	No
GDD - Pollen	1400
GDD - Silk	1390
GDD - Black Layer	2836
Plant Height	MT
Ear Height	M
Ear Type	SF
Flowering for Maturity	MID

MANAGEMENT TIPS

Longer, semi-flex ears will tolerate a wide range of populations. Responds favorably to irrigation. Healthy plants will benefit from in-season sidedress nitrogen applications. Fungicide applications should be infrequent and in combination with a field scouting program.

MANAGEMENT PRACTICES

Low Populations	8
Medium Populations	9
High Populations	8
Marginal Soil	7
Productive Soil	9
Continuous Corn	9
Adapt To No Till	8
Planting Rate	28-36,000

DISEASE RATINGS

Northern Leaf Blight	7
Southern Leaf Blight	7
Gray Leaf Spot	8
Goss's Bacterial Wilt	8
Anthracnose	7
Tar Spot	Moderately Tolerant
Common Rust	7
Southern Rust	8
Fungicide Response	High

HERBICIDE INTERACTION

Manage growth regulators

NOTES

9 = Excellent 1 = Poor N/A = Not Available NR = Not Recommended

Corn Grain:

P0075Q (Q,LL,RR2)

Additional Products in this Family: P0075AM (AM,LL,RR2) | P0075Q (Q,LL,RR2) | P0075

CRM:100
Silk CRM: 103
GDUs to Silk: 1280
GDUs to Phy. Mat.: 2500

Positioning For:

MANAGEMENT COMMENTS

- Exceptional Goss's Wilt tolerance.
- Very good drought tolerance; works well on fully irrigated to tough dryland applications.
- Good stress emergence allows planting into cool soils.
- Good brittle stalk tolerance and strong roots.
- Moderate plant stature reduces residue.

REFUGE

Integrated Refuge

- 95% (RW, YGCB, HXX, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Highly Suitable

SUITABILITY

Late Harvest	Suitable
Corn After Corn	Suitable

SOILS

Early Planting/Cold Soils	Highly Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Highly Suitable
High pH Soils	Highly Suitable

CHARACTERISTIC SCORES

Drought Tol.	8
Root Strength	6
Stalk Strength	6
Mid-Season Brittle Stalk	6
Ear Ht.	5
Plant Ht.	5
Stress Emergence	6
Hybrid Family	P0075

DISEASE SCORES

Goss`s Wilt	8
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P0487Q (Q,LL,RR2)

CRM:104
Silk CRM: 103
GDUs to Silk: 1280
GDUs to Phy. Mat.: 2530

Positioning For:

MANAGEMENT COMMENTS

- Early season Optimum® AQUAmax® hybrid.
- Excellent Goss's wilt tolerance for corn on corn acres.
- Good brittle stalk tolerance.
- Above average plant stature with moderate ear height for tough acres & hills.
- Solid leaf disease package.

REFUGE

Integrated Refuge

- 95% (RW, YGCB, HXX, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Highly Suitable

SUITABILITY

Late Harvest	Highly Suitable
Corn After Corn	Highly Suitable

SOILS

Early Planting/Cold Soils	Highly Suitable
Coarse Textured Soils	Highly Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Highly Suitable
High pH Soils	Highly Suitable

CHARACTERISTIC SCORES

Drought Tol.	9
Root Strength	5
Stalk Strength	5
Mid-Season Brittle Stalk	6
Ear Ht.	6
Plant Ht.	7
Stress Emergence	6
Hybrid Family	P0487

DISEASE SCORES

Goss`s Wilt	7
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P0404Q (Q,LL,RR2)

Additional Products in this Family: P0404Q (Q,LL,RR2) | P0404AM (AM,LL,RR2)

CRM:104
Silk CRM: 100
GDUs to Silk: 1250
GDUs to Phy. Mat.: 2450

Positioning For:

MANAGEMENT COMMENTS

- Strong drought tolerance allows placement on dryland and irrigated acres.
- Exceptional Goss's wilt tolerance and a good leaf disease package.
- Strong roots with good brittle stalk tolerance.
- Average staygreen improves grain drydown.
- Avoid soil pH levels above 7.9 for best positioning and performance.

REFUGE

Integrated Refuge

- 95% (RW, YGCB, HXX, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Highly Suitable

SUITABILITY

Late Harvest	Suitable
Corn After Corn	Suitable

SOILS

Early Planting/Cold Soils	Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Manage Appropriately

CHARACTERISTIC SCORES

Drought Tol.	8
Root Strength	7
Stalk Strength	5
Mid-Season Brittle Stalk	6
Ear Ht.	5
Plant Ht.	5
Stress Emergence	5
Hybrid Family	P0404

DISEASE SCORES

Goss`s Wilt	6
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P0622Q (Q,LL,RR2)

Additional Products in this Family: P0622Q (Q,LL,RR2) | P0622AML (AML,LL,RR2)

CRM:106
Silk CRM: 102
GDUs to Silk: 1270
GDUs to Phy. Mat.: 2550

Positioning For:

MANAGEMENT COMMENTS

- Optimum AQUAmax product offering exceptional drought tolerance and good stability.
- Good mid-season brittle stalk tolerance.
- Moderate plant stature with strong roots.
- Consider fungicide applications in fields with a known history of severe Grey Leaf Spot pressure.

REFUGE

Integrated Refuge

- 95% (RW, YGCB, HXX, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Suitable

SUITABILITY

Late Harvest	Manage Appropriately
Corn After Corn	Suitable

SOILS

Early Planting/Cold Soils	Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Insufficient Data

CHARACTERISTIC SCORES

Drought Tol.	9
Root Strength	7
Stalk Strength	5
Mid-Season Brittle Stalk	6
Ear Ht.	5
Plant Ht.	4
Stress Emergence	5
Hybrid Family	P0622

DISEASE SCORES

Goss`s Wilt	6
Gray Leaf Spot	3

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P0995AM

CRM:109
Silk CRM: 109
GDUs to Silk: 1360
GDUs to Phy. Mat.: 2580

Positioning For:

MANAGEMENT COMMENTS

- Exciting Optimum® AQUAmax® hybrid for dryland and irrigated environments.
- Strong leaf disease package.
- Excellent Goss's wilt tolerance.
- Good brittle stalk tolerance and strong late-season plant health.
- Consider placement on freshly strip-tilled or conventional tilled fields due to average roots.
- Below average Fusarium ear rot; higher likelihood in years favorable to this pathogen should be considered.

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Highly Suitable

SUITABILITY

Late Harvest	Highly Suitable
Corn After Corn	Highly Suitable

SOILS

Early Planting/Cold Soils	Suitable
Coarse Textured Soils	Highly Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Suitable

CHARACTERISTIC SCORES	
Drought Tol.	9
Root Strength	5
Stalk Strength	5
Mid-Season Brittle Stalk	5
Ear Ht.	7
Plant Ht.	6
Stress Emergence	5
Hybrid Family	P0995

DISEASE SCORES	
Goss`s Wilt	7
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P1089AMXT (AMXT,LL,RR2)

CRM:110
Silk CRM: 109
GDUs to Silk: 1360
GDUs to Phy. Mat.: 2630

Positioning For:

MANAGEMENT COMMENTS

- Optimum AQUAmax product offering exceptional drought tolerance and good stability.
- Excellent disease package reduces the likelihood of a foliar fungicide response.
- Impressive grain quality.
- Strong brittle stalk tolerance and very good late-season stalks.

REFUGE

Integrated Refuge

- 95% (RW, YGCB, HXX, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Suitable

SUITABILITY

Late Harvest	Highly Suitable
Corn After Corn	Highly Suitable

SOILS

Early Planting/Cold Soils	Highly Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Suitable

CHARACTERISTIC SCORES	
Drought Tol.	9
Root Strength	4
Stalk Strength	6
Mid-Season Brittle Stalk	6
Ear Ht.	6
Plant Ht.	6
Stress Emergence	6
Hybrid Family	P1089

DISEASE SCORES	
Goss`s Wilt	6
Gray Leaf Spot	6

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P1122AML* (AML,LL,RR2)

CRM:111
Silk CRM: 110
GDUs to Silk: 1370
GDUs to Phy. Mat.: 2680

Positioning For:

MANAGEMENT COMMENTS

- Early silking 111 CRM AQUAmax offering that includes Leptra insect protection technology for control of difficult above ground ear feeding insects.
- Exceptional stress tolerance for the toughest dryland acres and minimal water applications but also performs well under higher yield environments.
- Excellent late health coupled with good mid-season brittle stalk resistance.
- Strong disease package including very good Gosss wilt and Northern leaf blight tolerance.

REFUGE

Integrated Refuge

- 95% (AVBL, YGCB, HX1, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Highly Suitable

SUITABILITY

Late Harvest	Highly Suitable
Corn After Corn	Highly Suitable

SOILS

Early Planting/Cold Soils	Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Insufficient Data

CHARACTERISTIC SCORES

Drought Tol.	9
Root Strength	5
Stalk Strength	5
Mid-Season Brittle Stalk	6
Ear Ht.	7
Plant Ht.	6
Stress Emergence	5
Hybrid Family	P1122

DISEASE SCORES

Goss`s Wilt	7
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

Corn Grain:

P1548AM (AM,LL,RR2)

CRM:115
Silk CRM: 112
GDUs to Silk: 1390
GDUs to Phy. Mat.: 2650

Positioning For:

MANAGEMENT COMMENTS

- Full season Optimum® AQUAmax® best suited for tough to moderate yield levels.
- Excellent Goss's wilt tolerance with respectable gray leaf spot tolerance.
- Moderate plant stature with good ear placement.
- Slightly below average for FUSER.

REFUGE

Integrated Refuge

- 95% (YGCB, HX1, LL, RR2)
- 5% (LL, RR2)

SUITABILITY RATINGS

KEY ENVIRONMENTS

Goss's Prone Fields	Suitable

SUITABILITY

Late Harvest	Suitable
Corn After Corn	Highly Suitable

SOILS

Early Planting/Cold Soils	Suitable
Coarse Textured Soils	Suitable
Drought Prone Soils	Highly Suitable
Poorly Drained Soils	Suitable
High pH Soils	Suitable

CHARACTERISTIC SCORES

Drought Tol.	9
Root Strength	6
Stalk Strength	5
Mid-Season Brittle Stalk	6
Ear Ht.	6
Plant Ht.	6
Stress Emergence	5
Hybrid Family	P1548

DISEASE SCORES

Goss`s Wilt	7
Gray Leaf Spot	5

TRAIT SCORE RATINGS: 9 = Excellent; 1 = Poor; Blank = Insufficient Data.

DKC56-65RIB
BRAND BLEND

Relative Maturity

106

Trait

SmartStax RIB COMPLETE

Key Strengths

- Product can provide very good emergence and seedling vigor for early planting
- Can provide utilization in field with known physoderma history
- Hybrid has shown food grade potential
- Has shown an attractive shorter plant profile with excellent root and stalk strength
- Has show good utilization in corn following corn rotations
- May benefit from a fungicide in heavy Gray Leaf Spot fields
- Position on medium to higher productivity soils for best performance

Notes

AGRONOMIC CHARACTERISTICS

GDUS TO BLACK LAYER	2650
EMERGENCE	2
ROOT STRENGTH	2
STALK STRENGTH	2
DROUGHT TOLERANCE	3
GREEN SNAP	3
PLANT HEIGHT	MED SHORT
EAR PLACEMENT	MED LOW
STAYGREEN	2
DRY DOWN	3
TEST WEIGHT	4
GRAY LEAF SPOT	5
GOSS'S WILT	⊕
SEEDLING GROWTH	2
LATE HARVEST	★
COARSE TEXTURE SOILS	◇
EARLY PLANTING	★
DRYLAND	⊘

LOCAL RECOMMENDED PLANTING RATE

160 - 200 BU/A	⊕
220 - 240 BU/A	★
240 - 280 BU/A	★

Give Feedback

LOCAL KEY RATINGS

Highly Recommended

Recommended with Management

Use with Management

Not Recommended

New Product

LEGEND

These ratings are approximate and should not be considered as absolute. Based on Monsanto conducted trials realtive to other DEKALB® brand corn.

Rating Scale: 1 = Excellent; 9 = Poor; - = None

Codes: L = Low; S = Short; M-S = Medium - Short; M = Medium; M-MH = Medium - Medium High; M-H = Medium High; M-L = Medium-Low; M-T = Medium Tall; MH-H = Medium High - High; T = Tall; H = High

Herbicide Tolerance
Ratings are based on observations and research using herbicides at labeled and above labeled rates to simulate extreme environmental conditions, misapplication and adverse soil pH or organic content.

A = Acceptable

Either no adverse effects from the corn product/herbicide combination were noted on any traits or only slight damage could be noted under adverse conditions or herbicide application at higher than label rates.

C = Caution
The corn product/herbicide combination is usually not a problem if sprayed according to label directions, but can result in plant height reduct stand loss and suspected yield loss under very adverse environmental conditions, high rates or extreme soil pH levels or organic content. Use drop nozzle spraying for postemergence herbicides to avoid interactions.

W = Warning
Not advised–this corn product/herbicide combination should not be used under any circumstances.

GDU (Growing Degree Unit)
Although maturity of one corn product relative to another remains reasonably constant, the actual number of calendar days from planting to any given point of plant development varies with temperature, day length, rate and date of planting, soil fertility and other environmental factors. All GDU values calculated are from the time of planting.

NEW

DKC107-33RIB

BRAND BLEND

Relative Maturity

107

Trait

Genuity® SmartStax® PRO® RIB Complete® corn blend

Key Strengths

Has displayed strong yield potential across most yield levels

- Product has shown excellent yield to moisture ratio with ability to perform south of zone
- Excellent agronomic package combines solid root strength, stalk strength and greensnap tolerance
- Semi-fixed ear type; product has shown a positive response to increasing planting densities
- Product has demonstrated a positive response to in crop use of foliar fungicides
- Has shown very good emergence and seedling vigor for an early planting option
- Average staygreen and harvest appearance has been exhibited by this product
- Caution on Southern Rust tolerance when used

MANAGEMENT

VALUE ADDED TRAIT	SSPRIB
RELATIVE MATURITY	107
GDUS TO MID-POLLINATION	1315
GDUS TO BLACK LAYER	2695
PLANTING RATE	MED HIGH
DEKALB® DISEASE SHIELD®	-
NEW PRODUCT	YES

HARVEST

STAYGREEN	4
HARVEST APPEARANCE	4
DRYDOWN	2
TEST WEIGHT	5

DISEASE RATINGS

ANTHRACNOSE LEAF BLIGHT	-
GRAY LEAF SPOT	4
SOUTHERN RUST	6
ANTHRACNOSE STALK ROT	3
GOSS'S WILT	4
EYE SPOT	-
NORTHERN CORN LEAF BLIGHT - RACE 1	4
SOUTHERN CORN LEAF BLIGHT	-

PLANT DESCRIPTION

COB COLOR	RED
KERNEL CAP COLOR	YELLOW
KERNEL ROW	16

GROWTH

EMERGENCE	2
SEEDLING GROWTH	3
ROOT STRENGTH	2
STALK STRENGTH	3
DROUGHT TOLERANCE	
GREENSNAP TOLERANCE	
PLANT HEIGHT	M
EAR PLACEMENT	M

HERBICIDE

GROWTH REGULATORS SENSITIVITY	A
SULFONYLUREAS SENSITIVITY	A
ISOXAZOLES SENSITIVITY - PREEMERGENCE	A

Give Feedback

- Caution on Southern Rust tolerance when used in impacted geographies

SOUTHERN CORN LEAF BLIGHT	
STEWART'S LEAF BLIGHT	-
CORN LETHAL NECROSIS	-
COMMON RUST	3

DKC59-81RIB
BRAND BLEND

Relative Maturity

109

Trait

SmartStax RIB COMPLETE

Key Strengths

- Has shown very consistent ear development even under stress
- Can provide a good foliar disease tolerance package
- Very good greensnap and Goss's Wilt tolerance ratings
- Push plant populations to maximize yield potential
- Adapted to both dryland and irrigated environments
- Has shown stability across soil types

Notes

AGRONOMIC CHARACTERISTICS

GDUS TO BLACK LAYER	2725
EMERGENCE	3
ROOT STRENGTH	3
STALK STRENGTH	3
DROUGHT TOLERANCE	2
GREEN SNAP	2
PLANT HEIGHT	MED
EAR PLACEMENT	MED
STAYGREEN	3
DRY DOWN	3
TEST WEIGHT	4
GRAY LEAF SPOT	5
GOSS'S WILT	★
SEEDLING GROWTH	2
LATE HARVEST	★
COARSE TEXTURE SOILS	★
EARLY PLANTING	★
DRYLAND	⊕

LOCAL RECOMMENDED PLANTING RATE

160 - 200 BU/A	⊕
220 - 240 BU/A	★
240 - 280 BU/A	★

Give Feedback

DKC61-40RIB
BRAND BLEND

Relative Maturity

111

Trait

SmartStax RIB COMPLETE

Key Strengths

- Has shown outstanding high yield potential across environments
- Very good Goss's Wilt tolerance for Western Corn Belt adaptation
- Appears to perform well, even in high pH soils
- Use caution when applying growth regulator herbicides
- Can provide excellent heat and drought stress performance
- Plant at moderate populations to capitilize on ear flex

Notes

AGRONOMIC CHARACTERISTICS

GDUS TO BLACK LAYER	2775
EMERGENCE	1
ROOT STRENGTH	4
STALK STRENGTH	3
DROUGHT TOLERANCE	2
GREEN SNAP	3
PLANT HEIGHT	MED
EAR PLACEMENT	MED
STAYGREEN	5
DRY DOWN	2
TEST WEIGHT	6
GRAY LEAF SPOT	5
GOSS'S WILT	⊕
SEEDLING GROWTH	2
LATE HARVEST	◇
COARSE TEXTURE SOILS	★
EARLY PLANTING	★
DRYLAND	★

LOCAL RECOMMENDED PLANTING RATE

160 - 200 BU/A	★
220 - 240 BU/A	★
240 - 280 BU/A	★

Give Feedback

NEW

DKC111-33RIB

BRAND BLEND

Relative Maturity

111

Trait

Genuity® SmartStax® PRO® RIB Complete® corn blend

Key Strengths

Broadly adapted product that has shown high yield potential with movement north and south of zone

- Attractive, medium-tall statured plant features a semi-flex ear type with excellent test weight and good tip fill
- Medium-high plant populations are recommended for best results
- Impressive agronomic package with solid root strength, stalk strength, and greensnap tolerance
- Very strong Southern Rust tolerance

MANAGEMENT

VALUE ADDED TRAIT	SSPRIB
RELATIVE MATURITY	111
GDUS TO MID-POLLINATION	1335
GDUS TO BLACK LAYER	2800
PLANTING RATE	MED HIGH
DEKALB® DISEASE SHIELD®	-
NEW PRODUCT	YES

HARVEST

STAYGREEN	3
HARVEST APPEARANCE	3
DRYDOWN	3
TEST WEIGHT	1

DISEASE RATINGS

ANTHRACNOSE LEAF BLIGHT	-
GRAY LEAF SPOT	4
SOUTHERN RUST	2
ANTHRACNOSE STALK ROT	5
GOSS'S WILT	5
EYE SPOT	-
NORTHERN CORN LEAF BLIGHT - RACE 1	5
SOUTHERN CORN LEAF BLIGHT	3

PLANT DESCRIPTION

COB COLOR	RED
KERNEL CAP COLOR	YELLOW
KERNEL ROW	16

GROWTH

EMERGENCE	3
SEEDLING GROWTH	3
ROOT STRENGTH	1
STALK STRENGTH	2
DROUGHT TOLERANCE	
GREENSNAP TOLERANCE	
PLANT HEIGHT	ME
EAR PLACEMENT	M

HERBICIDE

GROWTH REGULATORS SENSITIVITY	A
SULFONYLUREAS SENSITIVITY	A
ISOXAZOLES SENSITIVITY - PREEMERGENCE	A

SOUTHERN CORN LEAF BLIGHT	-
STEWART'S LEAF BLIGHT	-
CORN LETHAL NECROSIS	-
COMMON RUST	3

DKC62-69RIB
BRAND BLEND

Relative Maturity

112

Trait

SmartStax RIB COMPLETE

Key Strengths

- Attractive product with outstanding high yield potential across yield zones
- Very strong root and stalk strength
- Has shown a good overall disease tolerance package highlighted with very good Southern Rust and Southern Corn Leaf Blight tolerance
- Hybrid has shown good drought stress for tough conditions
- Excellent fall intactness and harvest appearance
- Hybrid has exhibited excellent grain quality and test weight; high food grade potential
- Has shown very good Anthracnose Stalk Rot tolerance
- Can provide very good husk on a semi-flex ear type
- Has shown to be a slower drydown product

AGRONOMIC CHARACTERISTICS	
GDUS TO BLACK LAYER	2835
EMERGENCE	3
ROOT STRENGTH	1
STALK STRENGTH	2
DROUGHT TOLERANCE	2
GREEN SNAP	3
PLANT HEIGHT	MED TALL
EAR PLACEMENT	MED
STAYGREEN	2
DRY DOWN	5
TEST WEIGHT	2
GRAY LEAF SPOT	5
GOSS'S WILT	5
SEEDLING GROWTH	2
LATE HARVEST	5
COARSE TEXTURE SOILS	5
EARLY PLANTING	5
DRYLAND	5

LOCAL RECOMMENDED PLANTING RATE	
160 - 200 BU/A	26-28
220 - 240 BU/A	30-32
240 - 280 BU/A	32-34

DKC63-90RIB
BRAND BLEND

Relative Maturity

113

Trait

SmartStax RIB COMPLETE

Key Strengths

Has shown stable performance across environments

- Can stand well late into the season due to strong stalks and roots
- Has exhibited very good greensnap tolerance
- May benefit from a foliar fungicide in areas where Southern Rust is a concern
- Adaptable to both dryland and irrigated environments
- Can be planted across a range of populations

MANAGEMENT

VALUE ADDED TRAIT	SSRIB
RELATIVE MATURITY	113
GDUS TO MID-POLLINATION	1325
GDUS TO BLACK LAYER	2825
PLANTING RATE	MED HIGH
DEKALB® DISEASE SHIELD®	-
NEW PRODUCT	NO

HARVEST

STAYGREEN	3
HARVEST APPEARANCE	4
DRYDOWN	3
TEST WEIGHT	5

DISEASE RATINGS

ANTHRACNOSE LEAF BLIGHT	-
GRAY LEAF SPOT	5
SOUTHERN RUST	6
ANTHRACNOSE STALK ROT	4
GOSS'S WILT	4
EYE SPOT	-
NORTHERN CORN LEAF BLIGHT - RACE 1	3
SOUTHERN CORN LEAF BLIGHT	2

PLANT DESCRIPTION

COB COLOR	RED
KERNEL CAP COLOR	YELLOW
KERNEL ROW	18

GROWTH

EMERGENCE	3
SEEDLING GROWTH	2
ROOT STRENGTH	4
STALK STRENGTH	4
DROUGHT TOLERANCE	
GREENSNAP TOLERANCE	
PLANT HEIGHT	M
EAR PLACEMENT	M

HERBICIDE

GROWTH REGULATORS SENSITIVITY	A
SULFONYLUREAS SENSITIVITY	A
ISOXAZOLES SENSITIVITY - PREEMERGENCE	A

DKC64-64RIB
BRAND BLEND

Relative Maturity

114

Trait

SmartStax RIB COMPLETE

Key Strengths

- Broadly adapted through the 110 and 115 RM zone
- Has shown very good emergence and early season vigor
- Best positioned on medium to high yield environments
- Can provide very good greensnap tolerance and Goss's Wilt tolerance for western geographies
- Has shown very good stalk and root strength
- Has shown strong performance in corn following corn rotations
- A fungicide application may benefit performance in fields where Southern Rust is prominent

Notes

AGRONOMIC CHARACTERISTICS

GDUS TO BLACK LAYER	2835
EMERGENCE	3
ROOT STRENGTH	2
STALK STRENGTH	2
DROUGHT TOLERANCE	3
GREEN SNAP	3
PLANT HEIGHT	MED
EAR PLACEMENT	MED
STAYGREEN	3
DRY DOWN	3
TEST WEIGHT	4
GRAY LEAF SPOT	4
GOSS'S WILT	⊕
SEEDLING GROWTH	3
LATE HARVEST	⊕
COARSE TEXTURE SOILS	⊕
EARLY PLANTING	★
DRYLAND	◇

LOCAL RECOMMENDED PLANTING RATE

160 - 200 BU/A	⊕
220 - 240 BU/A	★
240 - 280 BU/A	★

Give Feedback

Corn & Grain Sorghum Markets – Basis Issues KSU Ag Economics

Daniel O'Brien, Extension Agricultural Economist KSU, Limit Irrigation Field Day, Tuesday, September 13, 2022

I. Grain Futures Closes, Changes & Market Carry on Tuesday, September 13, 2022 (10:00 a.m. CDT)

Corn Futures				Soybean Futures				Kansas HRW Wheat Futures			
Month	Close	Change	Carry /mo	Month	Close	Change	Carry /mo	Month	Close	Change	Carry /mo
Sept^{D} 22	**$7.14 ¾**	⇧ **$0.02 ½**	---	**Sep^{D} 22**	**$15.50 ¾**	⇧ **$0.01**	---	**Sept^{D} 22**	**$9.37 ¼**	⇧ **$0.08**	---
Dec^{LH} 22	**$6.94 ¼**	⇩ **$0.01 ¾**	*-$0.06^{833}*	**Nov^{LH} 22**	**$14.92**	⇧ **$0.03 ¾**	*-$0.29^{375}*	**Dec^{L} 22**	**$9.37 ¼**	⇧ **$0.10 ¼**	*No Carry*
Mar 23	$6.98 ¼	⇩ **$0.01 ¼**	*+$0.01^{333}*	Jan 23	$14.96 ¼	⇧ **$0.04**	*+$0.02^{125}*	Mar 23	$9.38	⇧ **$0.10 ½**	*+$0.00^{25}*
May 23	$6.97 ½	⇩ **$0.01 ½**	*-$0.00^{375}*	Mar 23	$14.92 ¾	⇧ **$0.02 ¾**	*-$0.01^{75}*	May 23	$9.41 ¾	⇧ **$0.13 ¾**	*+$0.01^{875}*
July 23	$6.91 ½	⇩ **$0.01**	*-$0.03*	May 23	$14.90 ¾	⇧ **$0.02 ¾**	*-$0.01*	**July^{H} 23**	**$9.23 ¾**	⇧ **$0.06**	*-$0.09*
Sept 23	$6.45 ¾	⇩ **$0.01 ¾**	*-$0.22^{875}*	July 23	$14.86	⇧ **$0.03**	*-$0.02^{375}*	Sept 23	$9.26	⇧ **$0.10 ¾**	*-$0.01^{125}*
Dec^{H} 23	**$6.30 ¾**	⇩ **$0.01 ½**	*-$0.05*	Aug 23	$14.59	**No Change**	*-$0.27*	Dec 23	$9.24	⇧ **$0.04 ¾**	*-$0.00^{667}*
Mar 24	$6.38 ¼	⇩ **$0.00 ¾**	*+$0.02^{50}*	**Nov^{H} 23**	**$13.94 ¼**	⇧ **$0.03 ¼**	*n.a.*	Mar 24	$9.15	⇧ **$0.03**	*-$0.03*

USDA National Daily Ethanol Report

Agricultural Marketing Service
Livestock, Poultry, and Grain Market News

September 13, 2022

US #2 Yellow Corn -Bulk

Ethanol Plant

State/Province/Region	Sale Type	Basis (¢/bu)	Basis Change	Price ($/Bu)	Price Change	Average
Iowa East	Bid	-10.00Z to 90.00Z	UNCH-DN 45	6.8600-7.8600	UP 0.1100-DN 0.3400	7.4000
Iowa West	Bid	-10.00Z to 115.00Z	UNCH-DN 10	6.8600-8.1100	UP 0.1100-UP 0.0100	7.6935
Kansas	Bid	45.00Z to 120.00Z	UP 15-UNCH	7.4100-8.1600	UP 0.2600-UP 0.1100	7.7350
Michigan	Bid	-38.00Z to 15.00Z	UNCH	6.5800-7.1100	UP 0.1100	6.9167
Minnesota	Bid	-20.00Z to 80.00U		6.7600-7.9225	UP 0.1100-UP 0.1225	7.5392
Missouri	Bid	5.00Z to 60.00Z	UNCH	7.0100-7.5600	UP 0.1100	7.3075
Nebraska	Bid	45.00Z to 125.00Z	UNCH	7.4100-8.2100	UP 0.1100	7.6985

Kansas Cash & Futures Prices

Date
9/13/2022 (10:00 a.m. CDT)

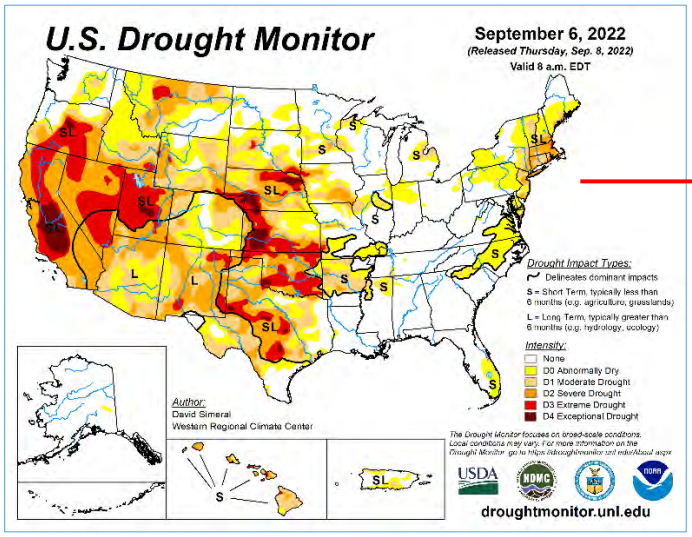
Grain Futures Contracts	Closing $
DEC 2022 Corn (2022 Harvest contract)	$6.9350
DEC 2023 Corn (2023 Harvest Contract)	$6.3025
NOV 2022 Soybeans (Lead Contract)	$14.9100
NOV 2023 Soybeans (2023 Harvest Contract)	$13.9575
DEC 2022 KC HRW Wheat (Lead Contract)	$9.3825
JULY 2023 KC HRW Wheat (2023 Harvest Contract)	$9.2525

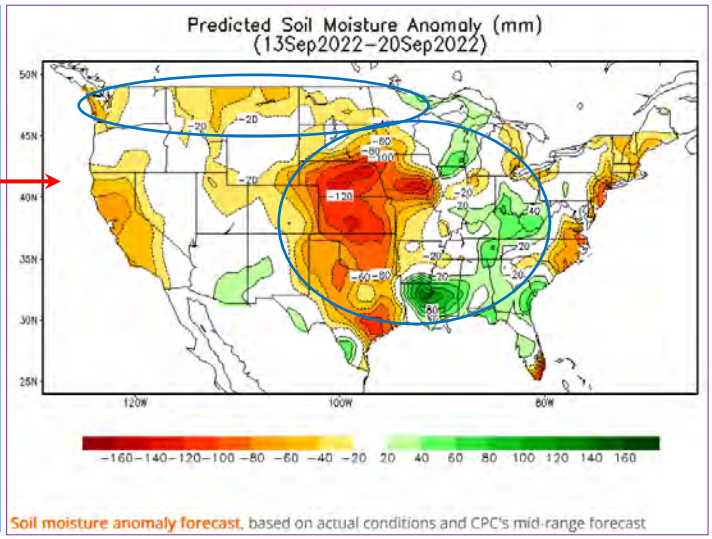
9/13/2022 (10:00 a.m. CDT) — Cash Grain & Harvest Contract Prices @ Kansas Grain Elevators

Representing the highest bids available at each location

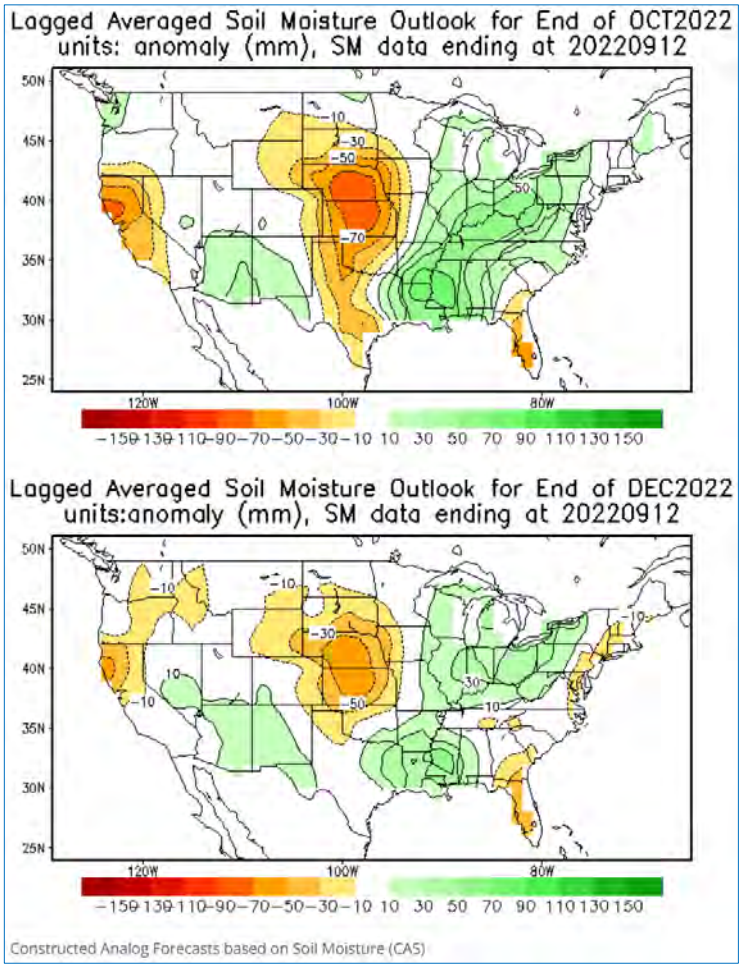
Cash Market Spot & FC Bids	Colby NW KS	Salina NC KS	Topeka EC-NE KS	Garden City SW KS	Hutchinson SC KS	Columbus Area SE KS
Corn Spot Cash$	**$7.83**	**$7.83**	**$7.38**	**$8.13**	**$7.93**	**$7.73**
Corn Spot Cash Basis	*$0.90*	*$0.90*	*$0.45*	*$1.20*	*$1.00*	*$0.80*
Corn Harvest FC$: Fall 2022	**$6.06**		**$6.00**	**$6.06**	**$6.40**	**$6.00**
Corn Harvest FC$ Basis	*($0.24)*		*($0.30)*	*($0.24)*	*$0.10*	*($0.30)*
Grain Sorghum Spot Cash$	**$7.33**	**$7.18**	**$7.03**	**$7.28**	**$7.19**	**$6.53**
Sorghum Spot Cash Basis	*$0.40*	*$0.25*	*$0.10*	*$0.35*	*$0.26*	*($0.40)*
Grain Sorghum Harvest FC$: Fall 2022	**$5.90**		**$5.85**	**$5.91**		
Sorghum Harvest FC$ Basis	*($0.40)*		*($0.45)*	*($0.39)*		
Soybean Spot Cash$	**$14.31**	**$14.45**	**$14.43**	**$13.99**	**$15.23**	**$15.63**
Soybean Spot Cash Basis	*($0.60)*	*($0.46)*	*($0.48)*	*($0.92)*	*$0.32*	*$0.72*
Soybean Harvest FC$: Fall 2022	**$13.16**		**$13.30**			**$13.46**
Soybean Harvest FC$ Basis	*($0.80)*		*($0.66)*			*($0.50)*
KC HRW Wheat Harvest Spot Cash$	**$8.88**	**$9.23**	**$9.13**	**$9.01**	**$8.95**	**$8.62**
HRW Wheat Harvest Spot Cash Basis	*($0.50)*	*($0.15)*	*($0.25)*	*($0.37)*	*($0.43)*	*($0.76)*
KC HRW Wheat FC$ - Harvest 2023	**$8.61**	**$8.65**	**$9.11**	**$8.90**	**$8.76**	**$8.56**
HRW Wheat Harvest FC$ Basis	*($0.64)*	*($0.60)*	*($0.14)*	*($0.35)*	*($0.49)*	*($0.69)*

II. Key U.S. Weather Patterns Affecting U.S. Agriculture

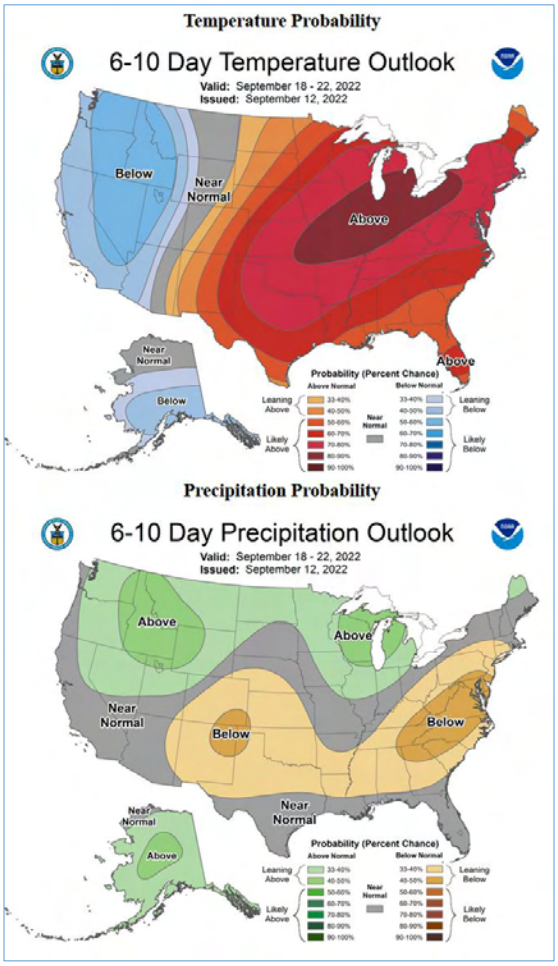


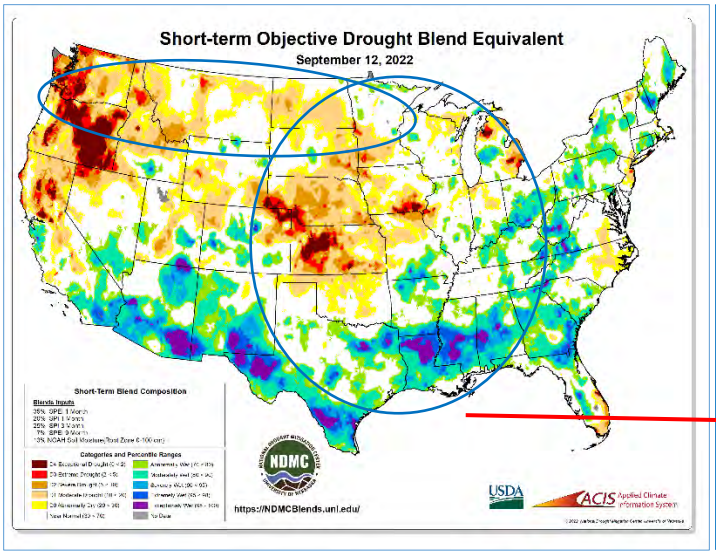


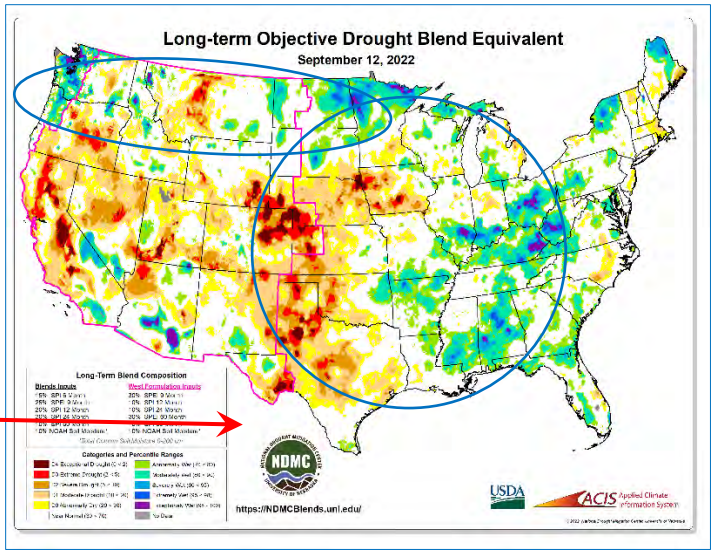
Soil moisture anomaly forecast, based on actual conditions and CPC's mid-range forecast

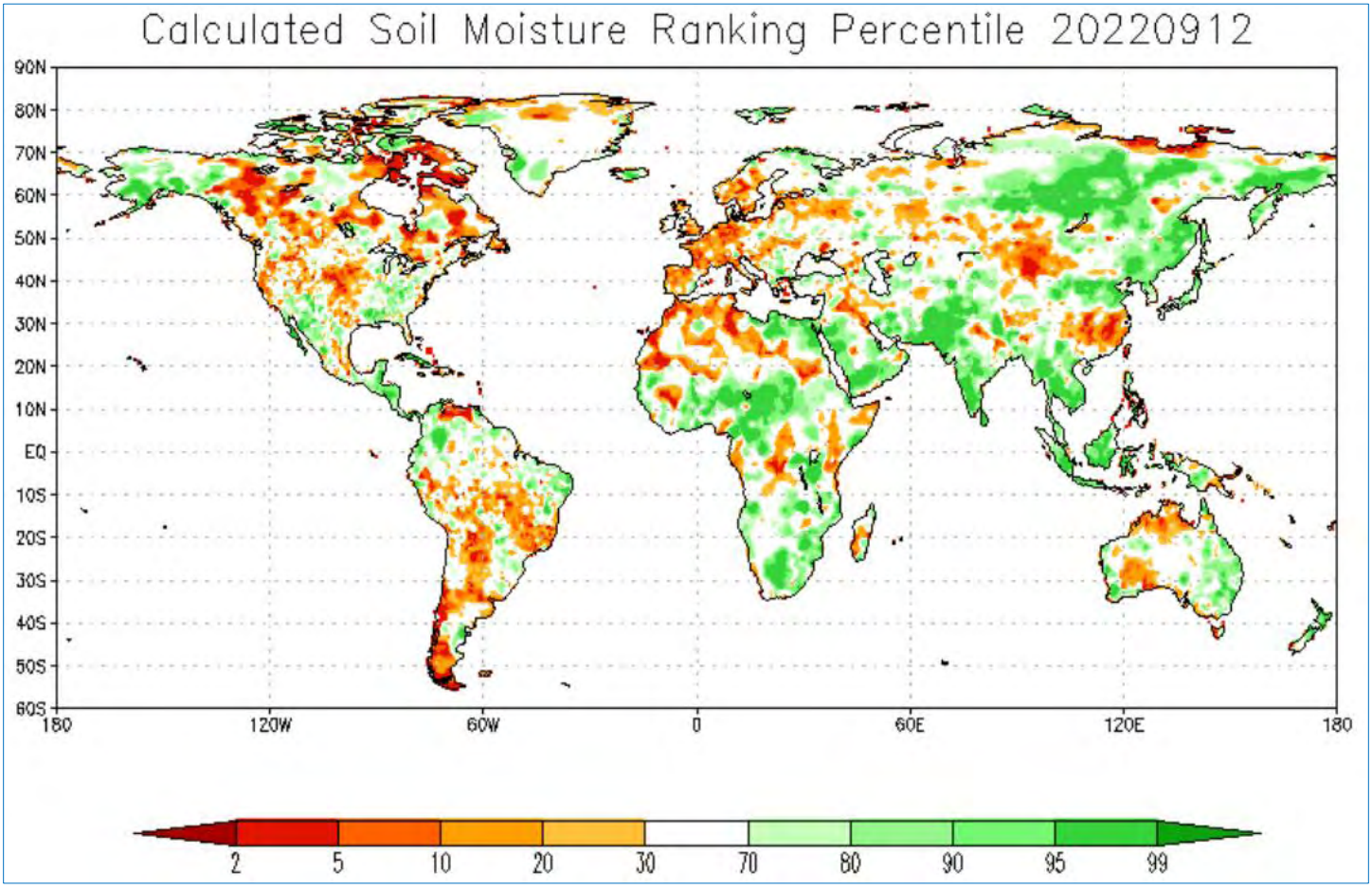


Constructed Analog Forecasts based on Soil Moisture (CAS)




Short-term Objective Drought Blend Equivalent
September 12, 2022
Short-Term Blend Composition
Categories and Percentile Ranges
https://NDMCBlends.unl.edu/


Long-term Objective Drought Blend Equivalent
September 12, 2022
Long-Term Blend Composition
Categories and Percentile Ranges
https://NDMCBlends.unl.edu/

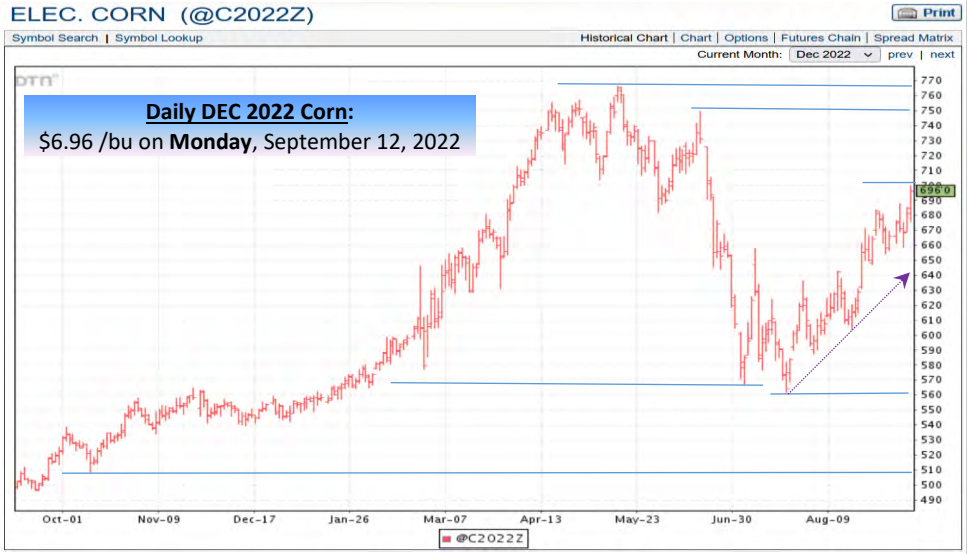

Calculated Soil Moisture Ranking Percentile 20220912
90N
80N
70N
60N
50N
40N
30N
20N
10N
EQ
10S
20S
30S
40S
50S
60S
180
120W
60W
0
60E
120E
180
2
5
10
20
30
70
80
90
95
99

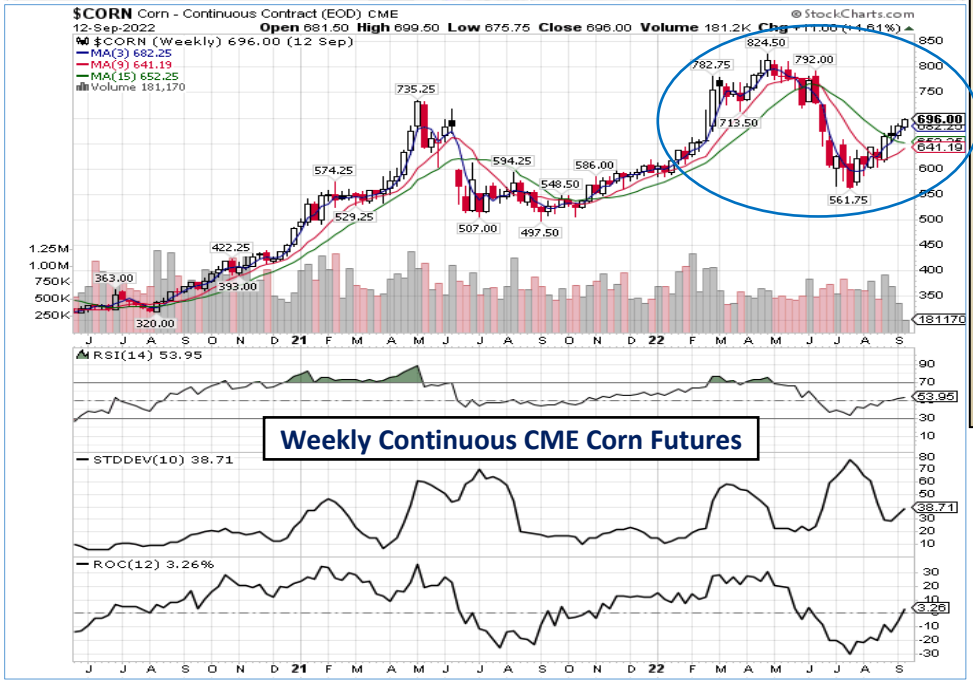
International

- **Europe** – Much-Needed Showers In France, Heavy Rain In The Balkans
  - Much-needed rain eased drought and improved soil moisture for winter crop planting over **France**.
  - Widespread heavy rainfall across the **Balkans** curtailed fieldwork but boosted moisture reserves for winter crop planting and establishment.
  - Dry weather in **England** and **Germany** promoted winter grain and oilseed sowing but kept soils unfavorably dry in the latter.
- **Western FSU** –Mostly Warm And Dry
  - Mostly dry and warm weather favored summer crop drydown and harvesting in **Moldova**, **Ukraine**, and **Russia**. However, soil moisture remained limited in **eastern portions of the region**.
- **Middle East** – Seasonably Dry In Turkey, But Some Showers In The Northwest
  - Dry weather over most of **Turkey** favored summer crop drydown and harvesting, though lingering showers in the **northwest** (**Marmara**) slowed fieldwork locally.
- **South Asia** – Beneficially Drier In Pakistan
  - Drier weather prevailed across **Pakistan**, easing historic flooding but not before irreversible damage was done to cotton and other crops.
- **East Asia** – Beneficially Cool, Wet Weather In Southern China
  - Showers and cooler weather in **portions of southern China** eased extreme drought, but likely came too late to improve yield prospects for late-crop rice.
- **Southeast Asia** – Tropical Cyclone Rainfall
  - Typhoon Hinnamnor produced drenching rainfall in the **northwestern Philippines**, while somewhat drier weather prevailed in **northern Thailand and the surrounding areas**.
- **Australia** – Conditions Remained Favorable For Winter Crops
  - In the **east**, widespread showers maintained abundant moisture supplies for reproductive winter grains and oilseeds, but likely interrupted fieldwork in preparation for summer crop planting.
  - In the **south** and **west**, sunny skies promoted wheat, barley, and canola development.
- **South America** – Showers Returned To Southern Brazil
  - Rain benefited wheat in **southern Brazil** and neighboring locations in **northeastern Argentina**.
  - Cool, dry weather continued for winter grains in **central and northwestern Argentina**.
- **Mexico** – Beneficial Rain Overspread Northern Mexico
  - Showers intensified from **northwestern watersheds to the Rio Grande Valley**.
- **Canada** – Warm, Mostly Dry Weather Supported Prairie Harvesting
  - **Prairie** spring grain and oilseed harvesting advanced, although the pace lagged the long-term average in many locations.
  - Warm, showery weather benefited immature corn and soybeans in **Ontario and Quebec**.

III. Corn & Grain Sorghum Market Information

Daily CME DEC 2022 Corn Futures





U.S. Corn Exports: "*Bearish*" **short-term corn shipments for *"New Crop"* MY 2022/23**

- Export Shipments for week of 9/8/2022[USDA AMS] for MY 2022/23 = 17.6 mb *(Bearish)* vs 44.3 mb/wk needed to meet USDA's September 12th projn of **2.275 bb exports**
- Total shipments through 9/8/2022[USDA AMS] for "New" MY 2022/23 = 22.0 mb i.e., 1.0% of **2.275 bb** USDA projn with 2.20% of MY complete (1.143/52 weeks)

World & U.S. Corn Supply-Demand Fundamentals

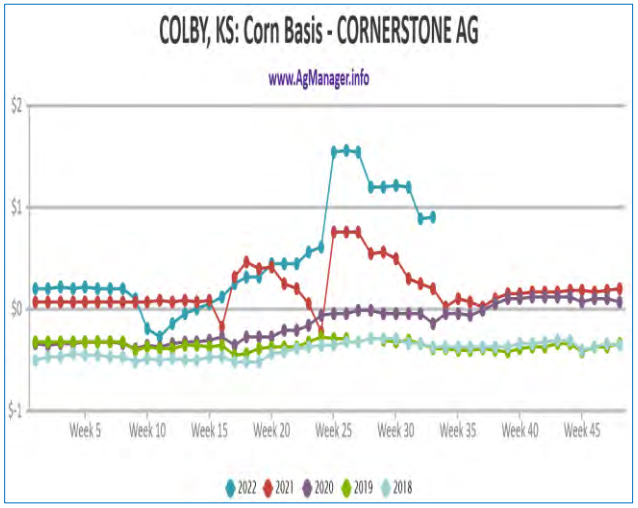
Mktg Yr	World S/U	Wld-China S/U	U.S. % S/U	U.S. $/bu	U.S. Crop
2017/18	31.2% S/U	14.3% S/U	14.5% S/U	$3.36 /bu	14.609 bln bu
2018/19	28.1% S/U	12.7% S/U	15.5% S/U	$3.61 /bu	14.340 bln bu
2019/20	27.0% S/U	12.3% S/U	13.7% S/U	$3.56 /bu	13.620 bln bu
2020/21[USDA]	**25.6% S/U**	**10.1% S/U**	**8.3% S/U**	**$4.53 /bu**	**14.111 bln bu**
2021/22[USDA]	**26.0% S/U**	**11.2% S/U**	**10.3% S/U**	**$5.95 /bu**	**15.115 bln bu**
2022/23[USDA]	**25.8% S/U**	**11.0% S/U**	**8.5% S/U**	**$6.75 /bu**	**13.944 bln bu**

U.S. Grain Sorghum Exports: "*Bearish*" **short-term shipments for *"New Crop"* MY 2022/23**

- Weekly Export Shipments week of 9/8/2022[USDA AMS] for MY 2021/22 = 1.831 mb *(Bearish)* vs 3.800 mb/wk needed to meet USDA's September 12th projn of **195 mb exports**
- Total shipments through 9/8/2022[USDA AMS] for "New" MY 2022/23 = 1.882 mb i.e., 1.0% of **195 mb** USDA projn with 0.003% of MY complete (0.143/52 weeks)

World Coarse Grain & U.S. Sorghum Supply-Demand Fundamentals

Mktg Yr	World S/U	Wld-China S/U	U.S. % S/U	U.S. $/bu	U.S. Exports
2019/20	23.5% S/U	12.0% S/U	8.0% S/U	$3.34 /bu	203 mln bu
2020/21	**22.2% S/U**	**10.1% S/U**	**5.2% S/U**	**$5.04 /bu**	**279mln bu**
2021/22[USDA]	**22.7% S/U**	**10.9% S/U**	**12.8% S/U**	**$5.90 /bu**	**290 mln bu**
2022/23[USDA]	**22.4% S/U**	**10.6% S/U**	**7.0% S/U**	**$6.65 /bu**	**195 mln bu**


COLBY, KS: Corn Basis - CORNERSTONE AG
www.AgManager.info
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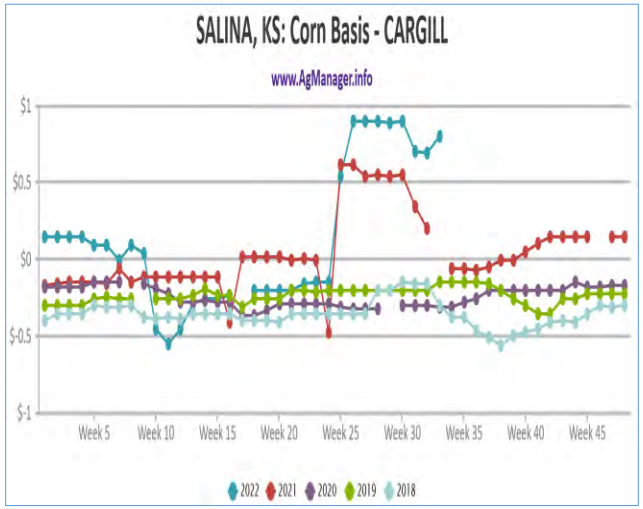
SALINA, KS: Corn Basis - CARGILL
www.AgManager.info
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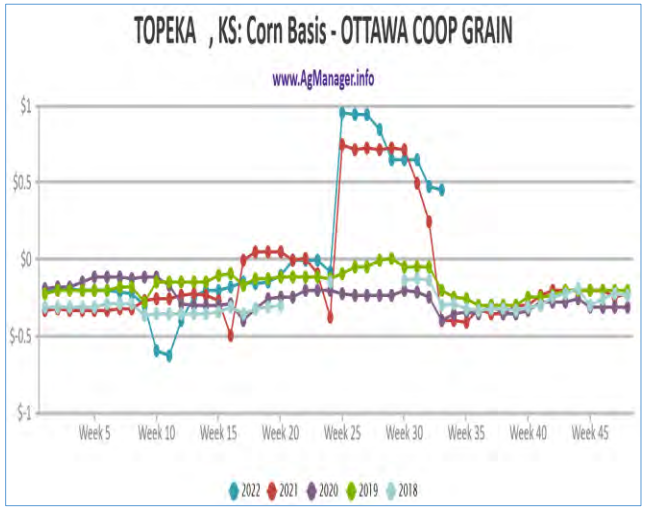
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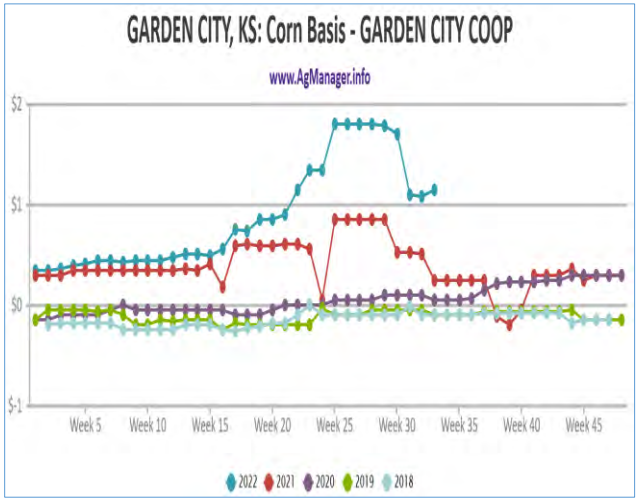
GARDEN CITY, KS: Corn Basis - GARDEN CITY COOP
www.AgManager.info
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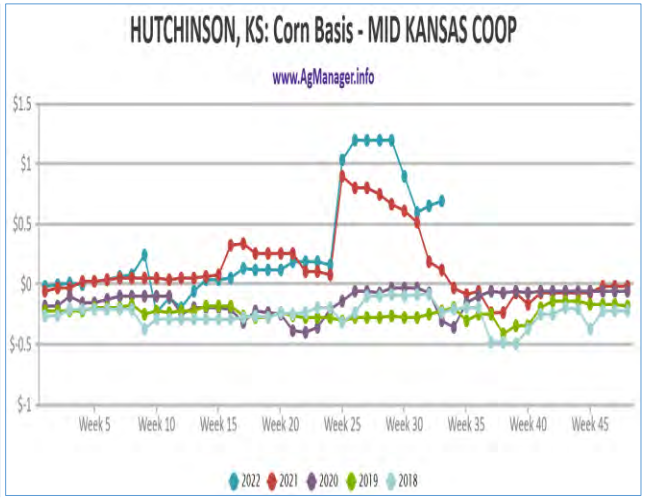
HUTCHINSON, KS: Corn Basis - MID KANSAS COOP
www.AgManager.info
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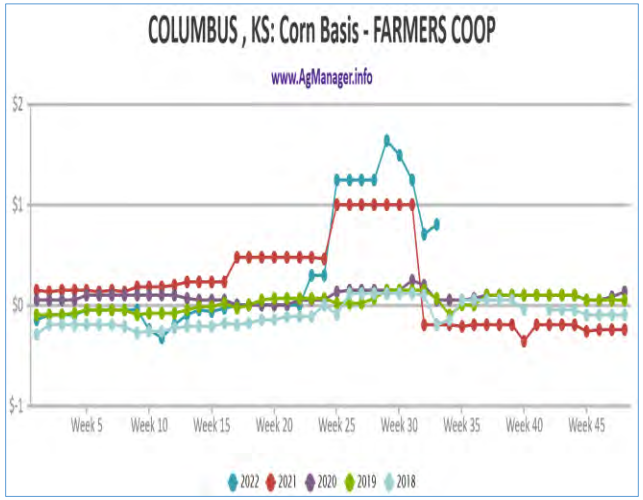
COLUMBUS , KS: Corn Basis - FARMERS COOP
www.AgManager.info
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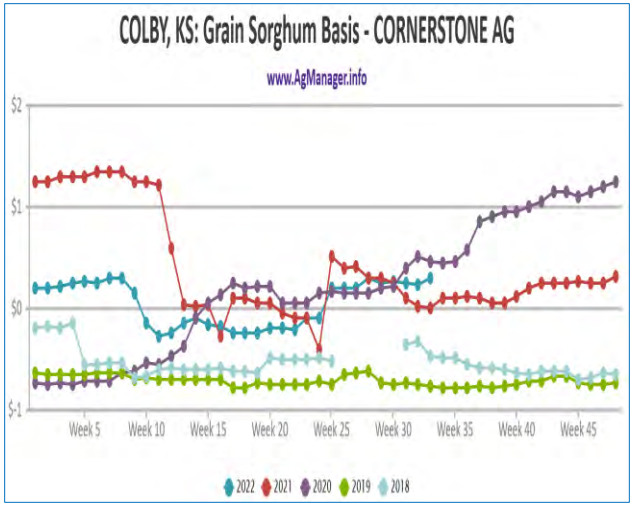
COLBY, KS: Grain Sorghum Basis - CORNERSTONE AG
www.AgManager.info
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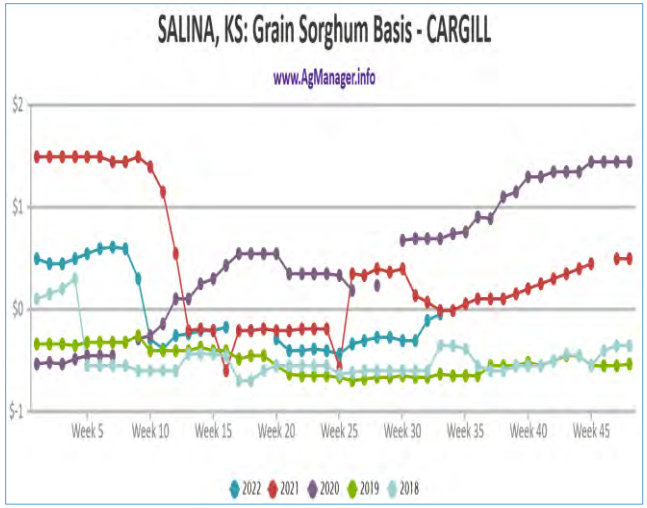
SALINA, KS: Grain Sorghum Basis - CARGILL
www.AgManager.info
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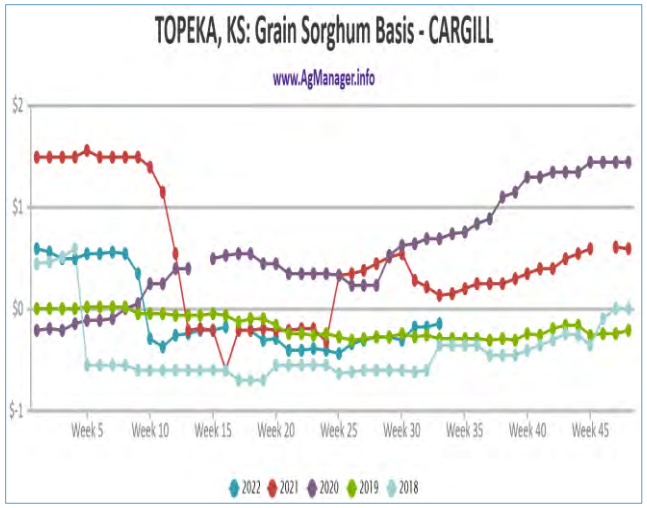
TOPEKA, KS: Grain Sorghum Basis - CARGILL
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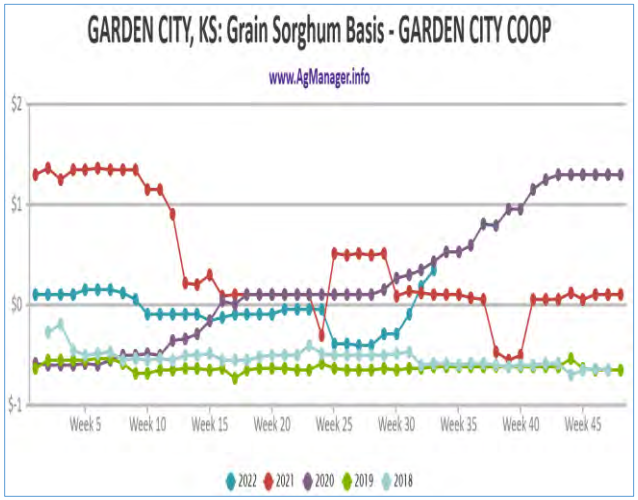
GARDEN CITY, KS: Grain Sorghum Basis - GARDEN CITY COOP
www.AgManager.info
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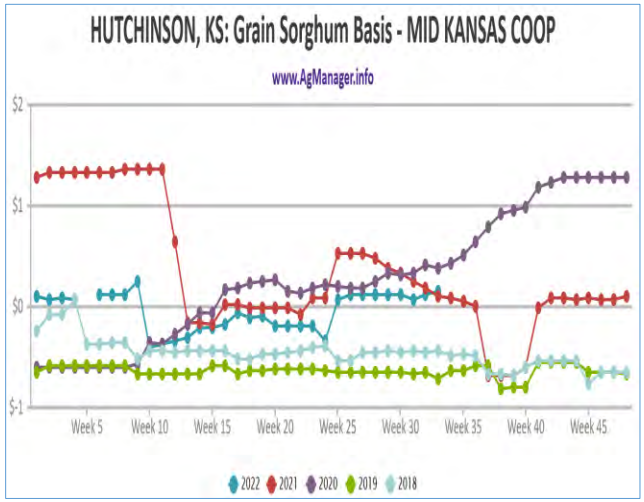
HUTCHINSON, KS: Grain Sorghum Basis - MID KANSAS COOP
www.AgManager.info
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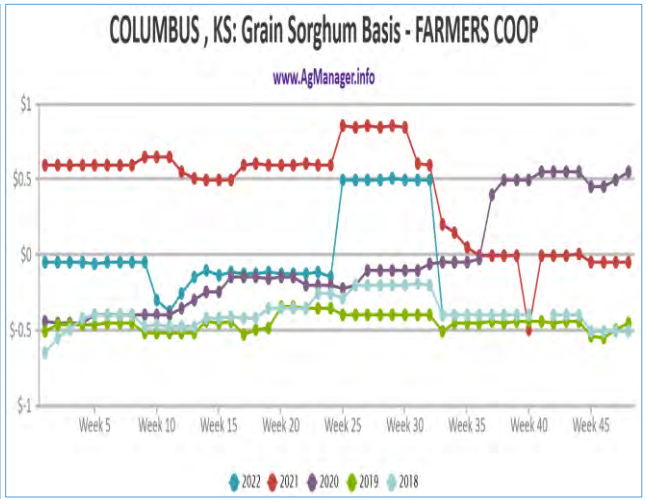
COLUMBUS , KS: Grain Sorghum Basis - FARMERS COOP
www.AgManager.info
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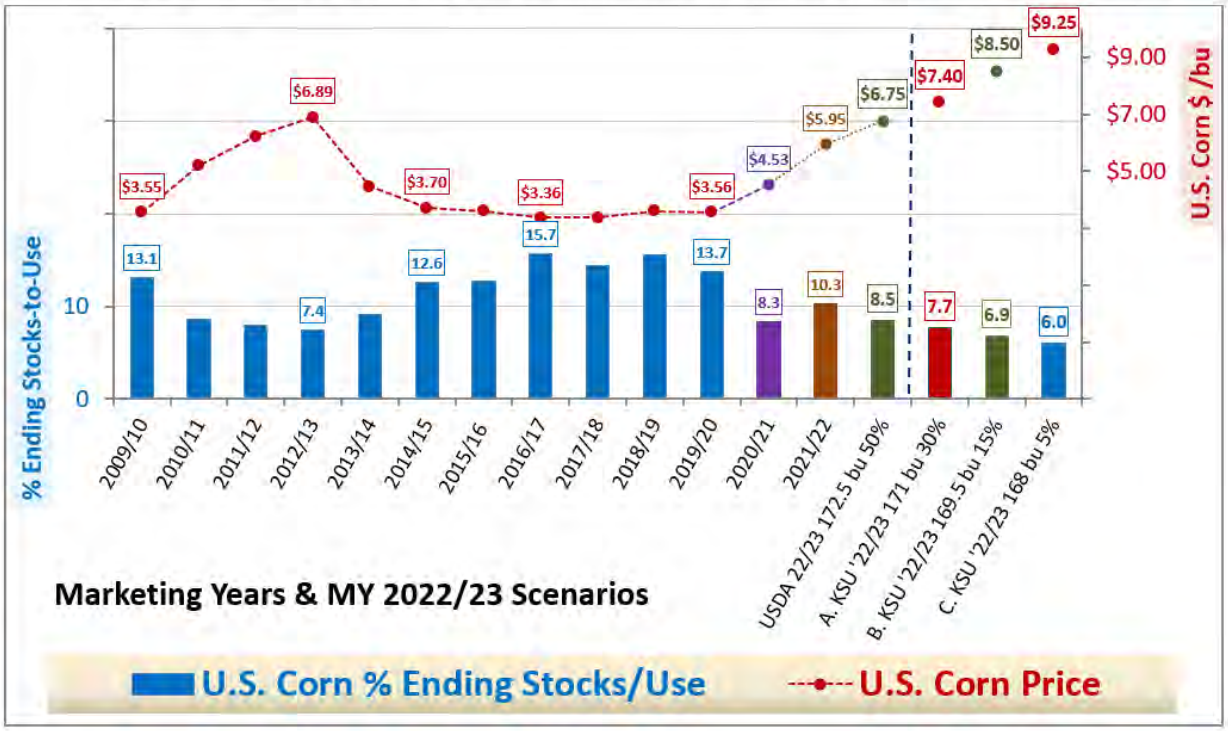
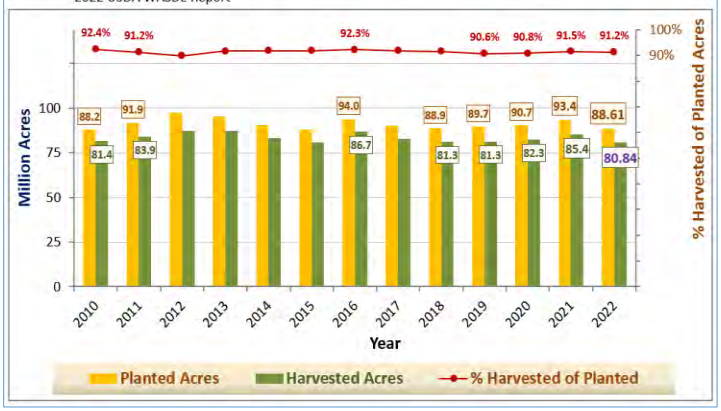
U.S. Corn Supply-Demand Balance Sheet: Projected "New Crop" MY 2022/23 as of the September 12, 2022 USDA WASDE report, with Alternative KSU "New Crop" 2022/23 Marketing Year Scenarios

Item	USDA 2022/23 9/12/2022 WASDE 172.5 bu/ac 13.994 bb crop	A. KSU "New Crop" MY 2022/23 Scenario #1 "Lower Yields" = 171.0 bu/ac 13.824 bb crop	B. KSU "New Crop" MY 2022/23 Scenario #2 "Much Lower Yields" = 169.5 bu/ac 13.703 bb crop	C. KSU "New Crop" MY 2022/23 Scenario #3 "Major Drought Yields" = 168.0 bu/ac 13.582 bb crop
% Probability of Occurring (KSU)	*50% KSUest*	*30% KSUest*	*15% KSUest*	*5% KSUest*
Planted Area (million acres)	**88.608**	**88.608**	**88.608**	**88.608**
Harvested Area (million acres)	80.844	80.844	80.844	80.844
% Harvested/Planted Area	91.24%	91.24%	91.24%	91.24%
Yield / harvested acre (bu/ac)	172.5	171.0	169.5	168.0
	Million Bushels			
Beginning Stocks (million bushels)	1,525	1,525	1,525	1,525
Production (million bu.)	**13,944**	**13,824**	**13,703**	**13,582**
Imports (million bu.)	25.0	25	25	25
Total Supply (million bu.)	**15,494**	**15,374**	**15,253**	**15,135**
Ethanol for fuel Use (million bu.)	5,325	5,325	5,375	5,375
Food & Industrial Use (mln bu.)	1,419.4	1,419.4	1,419.4	1,419.4
Seed Use (million bu.)	30.6	30.6	30.6	30.6
Exports (million bu.)	2,275	2,275	2,275	2,275
Feed & Residual Use (million bu.)	5,225	5,225	5,225	5,225
Total Use (million bu.)	**14,275**	**14,275**	**14,275**	**14,275**
Ending Stocks (million bu.)	1,219	1,099	978	860
% Ending Stocks-to-Use	**8.54%**	**7.70%**	**6.85%**	**6.02%**
Days of Supply (% S/U x 365 days)	*31.2 days*	*28.1 days*	*25.0 days*	*22.0 days*
U.S. Corn Average Farm Price ($/bushel)	**$6.75** USDA *Vs $7.14 KSU Futures*	**$7.40** /bu *vs $7.14 KSU Futures*	**$8.50** /bu *vs $7.14 KSU Futures*	**$9.25** /bu *vs $7.14 KSU Futures*

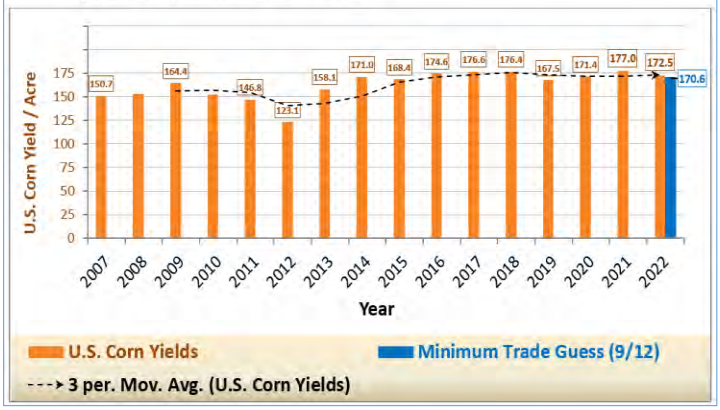
U.S. Corn % End Stocks vs U.S. Corn $'s: MY 2009/10 – "New Crop" MY 2022/23 as of the September 12, 2022 USDA WASDE report + KSU Scenarios



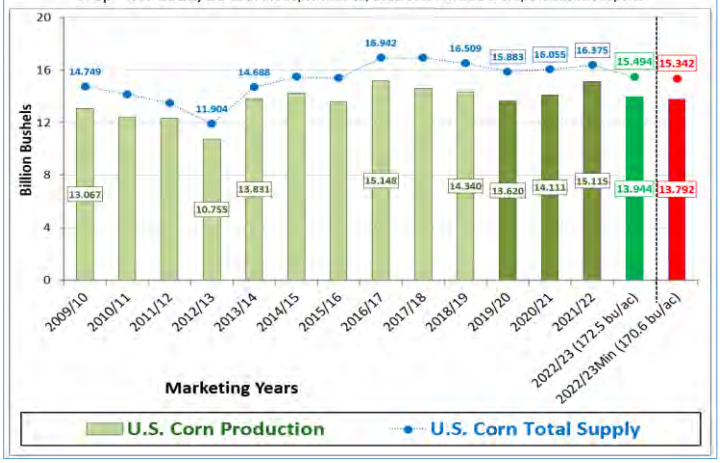
U.S. Corn Acreage for Years 2010-2022 as of the September 12, 2022 USDA WASDE Report



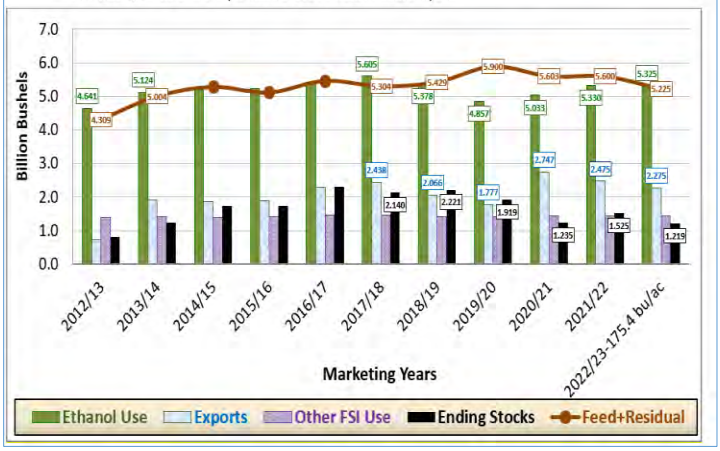
U.S. Corn Yields for 2007-2022 as of the September 12, 2022 USDA World Agricultural Supply and Demand Estimates Report



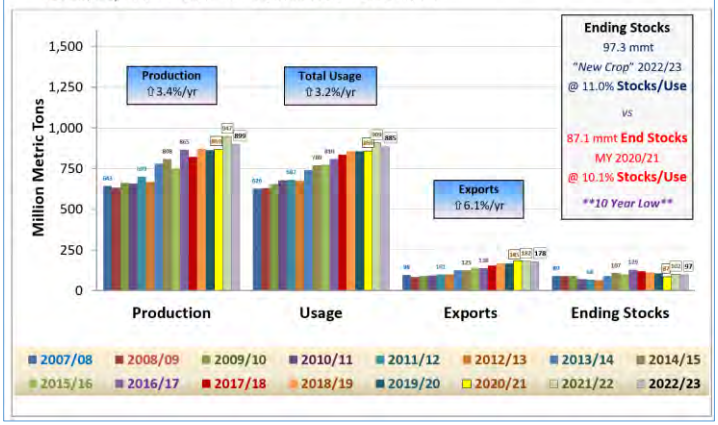
U.S. Corn Production & Total Supplies: MY 2009/10 - "New Crop" MY 2022/23 as of the September 12, 2022 USDA WASDE & Crop Production Reports



U.S. Corn Use & Ending Stocks: MY 2012/13 through Projected "New Crop" MY 2022/23 as of the September 12, 2022 USDA WASDE report



"World Less-China" Corn Supply-Demand: MY 2007/08 – "New Crop" MY 2022/23, as of the September 12, 2022 USDA WASDE Report



World vs "World Less-China" % Corn Stocks-to-Use:

MY 2007/08 through "New" MY 2022/23, as of the September 12, 2022 USDA WASDE report.

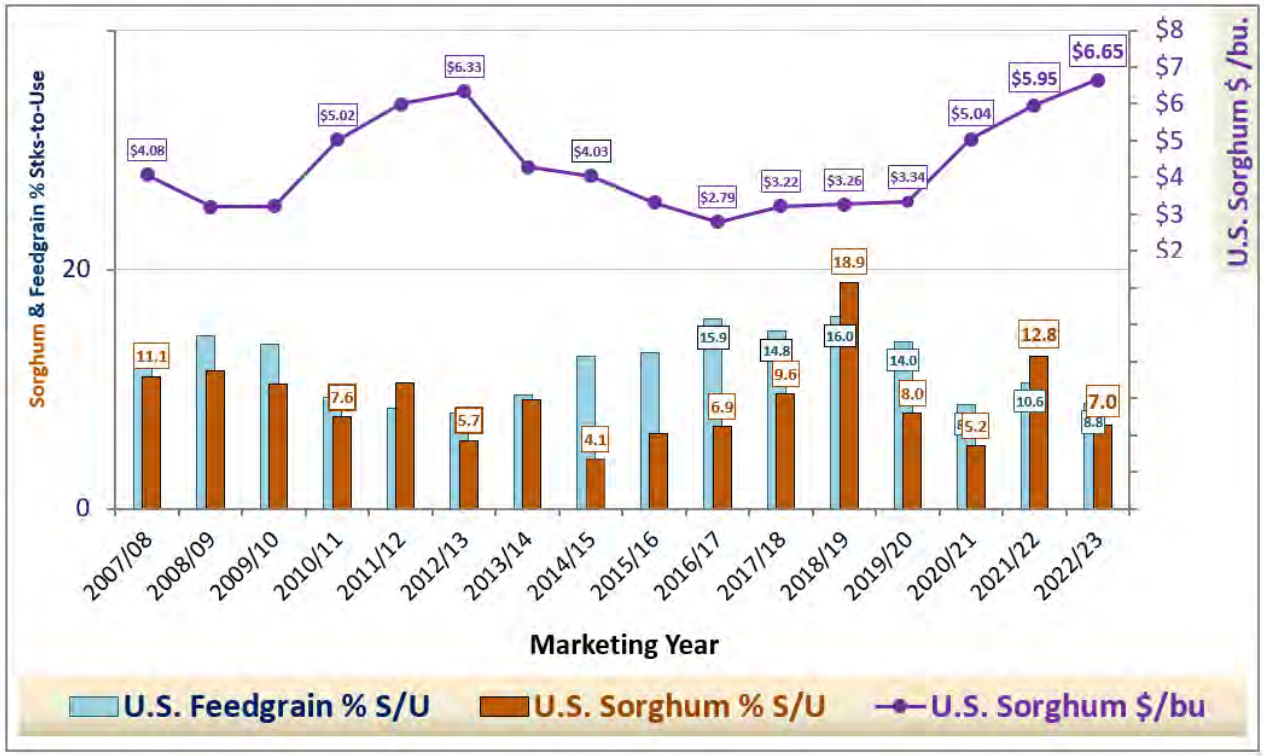
Projected U.S. Grain Sorghum Supply-Demand for MY 2022/23

"New Crop" MY 2022/23 as of the September 12, 2022 USDA WASDE report, with Alternative KSU "New Crop" 2021/22 Marketing Year Scenarios

Item	A. USDA "New Crop" MY 2022/23 August 12, 2022 WASDE	B. KSU Adjusted USDA "New Crop" MY 2022/23 + 20 mb Exports to 215 mb
% Probability of Occurring (KSU)	*65%KSUest*	*15%KSUest*
Planted Area (million acres)	6.365	6.365
Harvested Area (million acres)	5.480	5.480
% Harvested/Planted Area	86.1%	86.1%
Yield / harvested acre (bu/ac)	46.0	46.0
	Million Bushels	
Beginning Stocks (million bushels)	53	53
Production (million bu.)	252	**252**
Imports (million bu.)	0.05	0.05
Total Supply (million bu.)	305	**305**
Food & Industrial Use (mln bu.)	24.14	24.14
Seed Use (million bu.)	0.86	0.86
Exports (million bu.)	195	**215**
Feed & Residual Use (million bu.)	65	55
Total Use (million bu.)	285	**295**
Ending Stocks	20	**10**
% Ending Stocks-to-Use	7.02%	*3.39%*
Days of Supply (% S/U x 365 days)	25.6 days	*12.4 days*
U.S. Grain Sorghum Avg. Farm Price ($ / bushel)	**$6.65 USDA**	**$7.50 KSU**

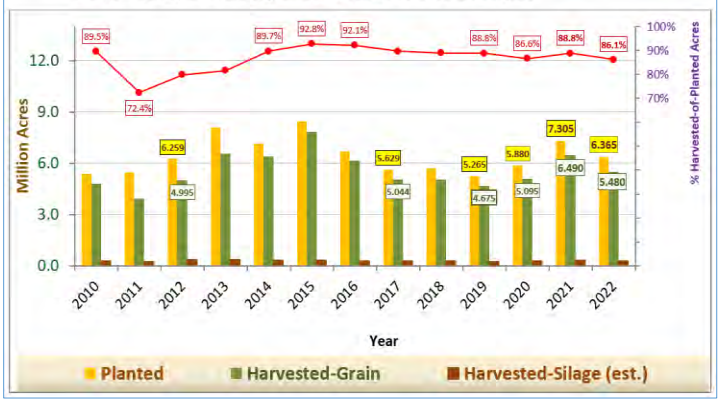
U.S. Sorghum % End Stocks/Use vs U.S. Avg. Cash $s:

MY 2004/05 - "New Crop" MY 2021/22 as of the August 12, 2022 USDA WASDE



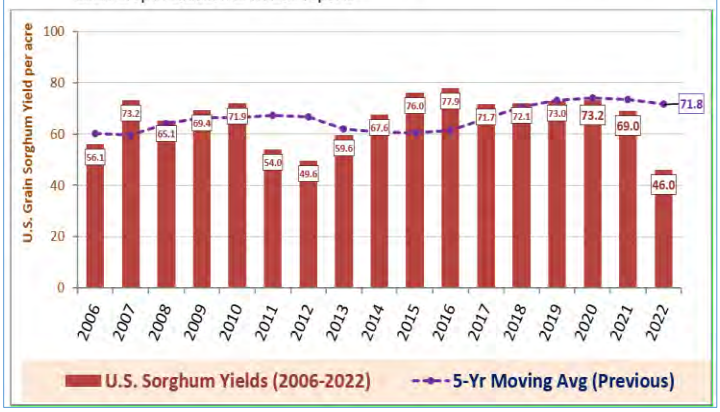
U.S. Grain Sorghum Planted & Harvested Acreage

(2010 – 2022) as of the September 12, 2022 USDA WASDE report



U.S. Grain Sorghum Yields for 2006-2022 as of the September 12, 2022

USDA Crop Production & WASDE reports



U.S. Grain Sorghum Total Supplies: MY 2006/07 - "New Crop"

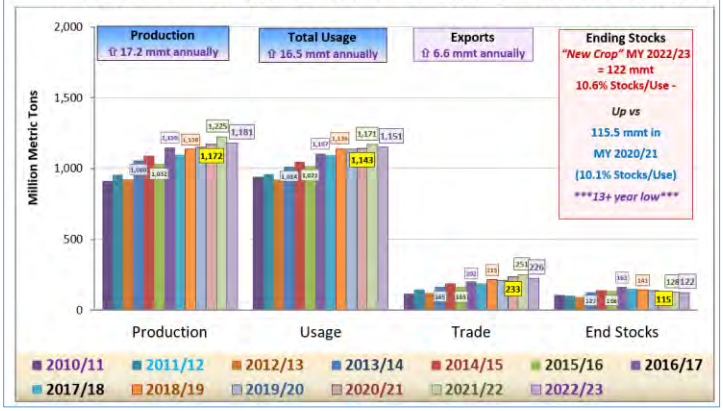
MY 2021/22 as of the September 12, 2022 USDA WASDE report

Trends in U.S. Grain Sorghum Use: MY 2006/07 - "New Crop"

MY 2022/23 as of the September 12, 2022 USDA WASDE report

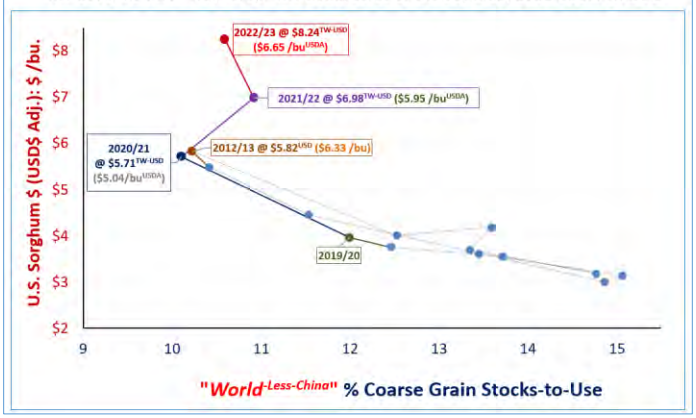
"World Less-China" Coarse Grain Supply-Demand:

MY 2007/08 thru "New Crop" 2022/23 as of the September 12, 2022 USDA WASDE



U.S. Sorghum $'s USD$ Adj. vs World Coarse Grain Less-China % S/U

MY 1975/76 thru "New Crop" MY 2022/23 as of the Sept. 12, 2022 USDA WASDE



K-STATE Research and Extension

Limited Irrigation Corn Management Field Day
September 13, 2022
Thomas Co – McInay Farms

Please rank the value of the topic/session	No Value 1	2	Some Value 3	4	Very Valuable 5	Did attending increase your knowledge?
Limited Irrigation Strategies *Lucas Haag and Joel Schneekloth*						
Corn Hybrid Discussion *seed company reps*						
Time to browse the plot						
How will a small High Plains corn & sorghum plot affect regional basis? *Dan O'Brien*						

1. Was attending this field day a good value for your time? _____ Yes _____ Somewhat _____ No

2. Did you learn about a topic that you plan to implement in your operation/business?
   _____ Yes _____ Maybe _____ No
   If so, what will you implement in your operation?

3. What was the best thing about this field day?

4. What was the worst thing about this field day?

5. Please choose what best describes you.
   _____ Producer _____ Consultant _____ Retail/Sales _____ Other _____

6. How many acres do you operate or consult for?
   - 0 - 500
   - 501 - 1,500
   - 1,501 - 2,500
   - 2,501 - 5,000
   - 5,001 - 10,000
   - 10,001 - 30,000
   - 30,000 +

7. What economic value do you believe the information obtained at this field day will have on your farming operation?
   - None
   - $1 - $5/acre
   - $5 - $10/acre
   - $10 - $20/acre
   - $20+/acre

Over →

8. What is the well capacity on the farms that you manage or consult for?
   Highest gpm/ac _____
   Average gpm/ac _____
   Lowest gpm/ac _____

9. Do you use preseason irrigation?
   Always
   Sometimes
   Never

10. How did you find out about this meeting? Check all that apply.

_____ Postcard _____ Flier _____ Email _____ Facebook _____ Twitter

_____ Other, please specify_____

11. Any other comments about this field day or suggestions you have for future meetings/field days?

Thank you for your feedback!