Irrigation Technology: Back to Basic Management Toolbox

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Kansas: 1989 – 2017 Irrigated Acres

Reporting Unit	1989 acres	2012 acres	2017 acres	Change in acres	% Change since 1989
GMD 1	291,574	198,377	177,528	-114,046	-39.1
GMD 3	1,572,470	1,424,923	1,393,101	-179,369	-11.4
GMD 4	359,016	387,286	392,003	32,987	9.2
Rest of Region 1 (West)	106,915	109,220	113,022	6,107	5.7
Total of Region 1 (West)	**2,329,975**	**2,119,806**	**2,075,654**	**-254,321**	**-10.9**
GMD 2	94,683	136,543	150,786	56,103	59.3
GMD 5	429,133	456,746	458,119	28,986	6.8
Rest of Region 2 (Central)	192,664	248,916	273,152	80,488	41.8
Total of Region 2 (Central)	**716,480**	**842,205**	**882,057**	**165,577**	**23.1**
Total of Region 3 (East)	**52,375**	**80,070**	**100,809**	**48,434**	**92.5**
State	**3,098,830**	**3,042,081**	**3,058,520**	**-40,310**	**-1.3**

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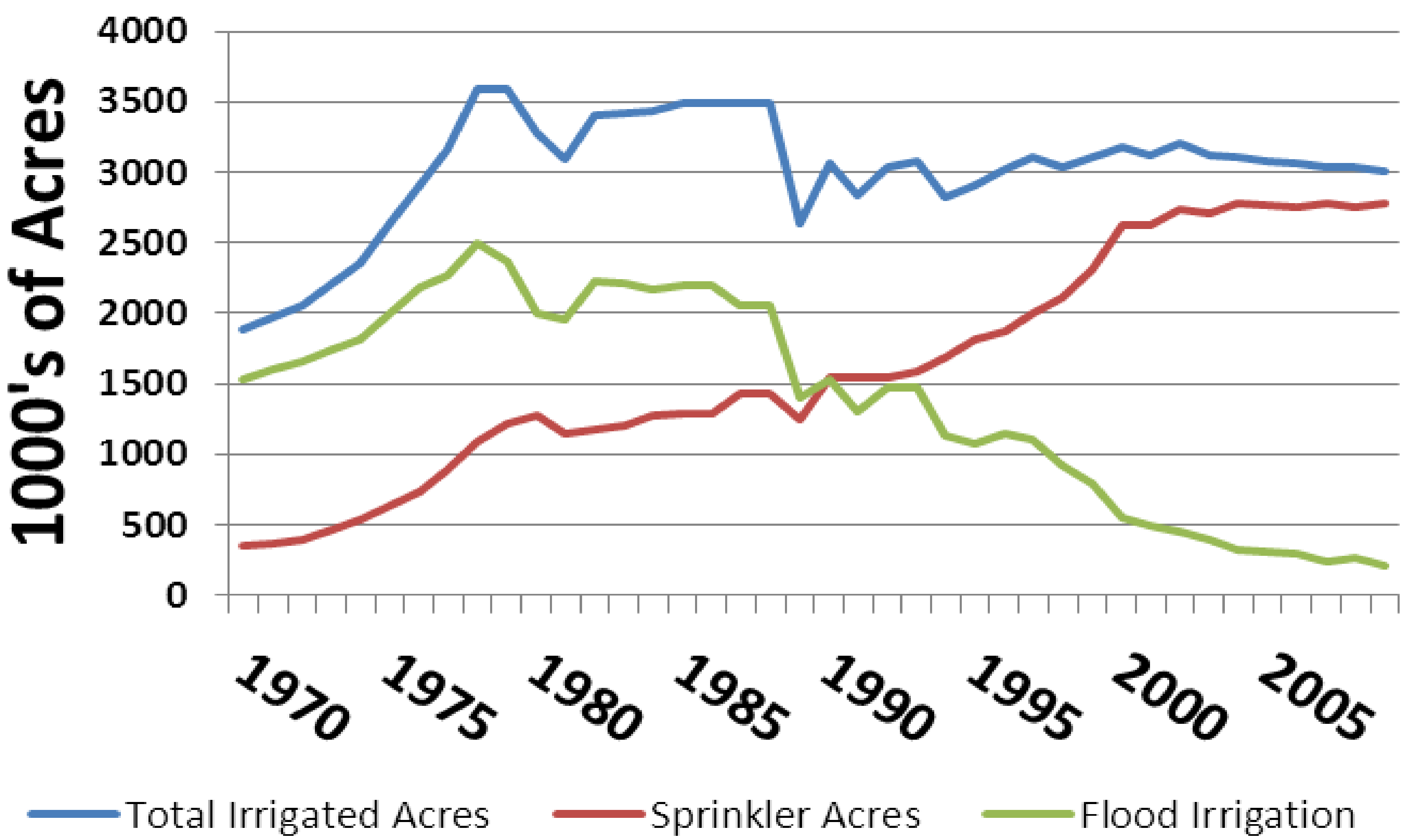
Total irrigated land area, sprinkler systems, and flood Irrigation system in Kansas

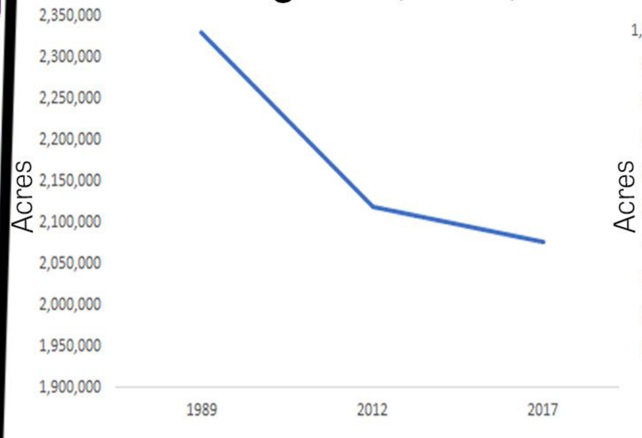


Top reason why you irrigate

- Increase yield
- Improve soil health
- Reduce impact of drought
- Increase profit
- Improve grain/product quality
- Keep land value high

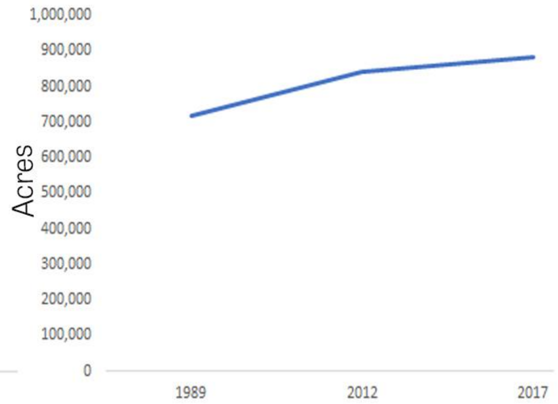
Kansas

Region 1 (West)



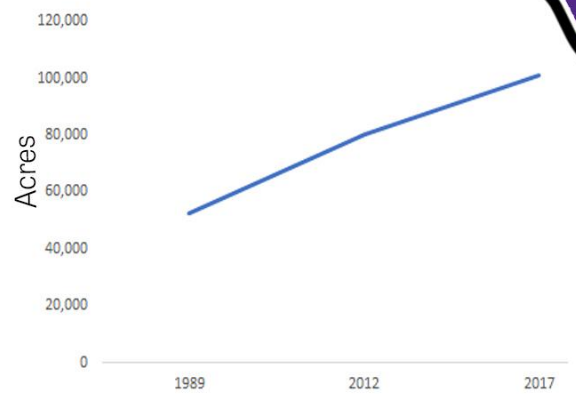
-254,321 acres
-11%

Region 2 (Central)



165, 577 acres
23%

Region 3 (East)

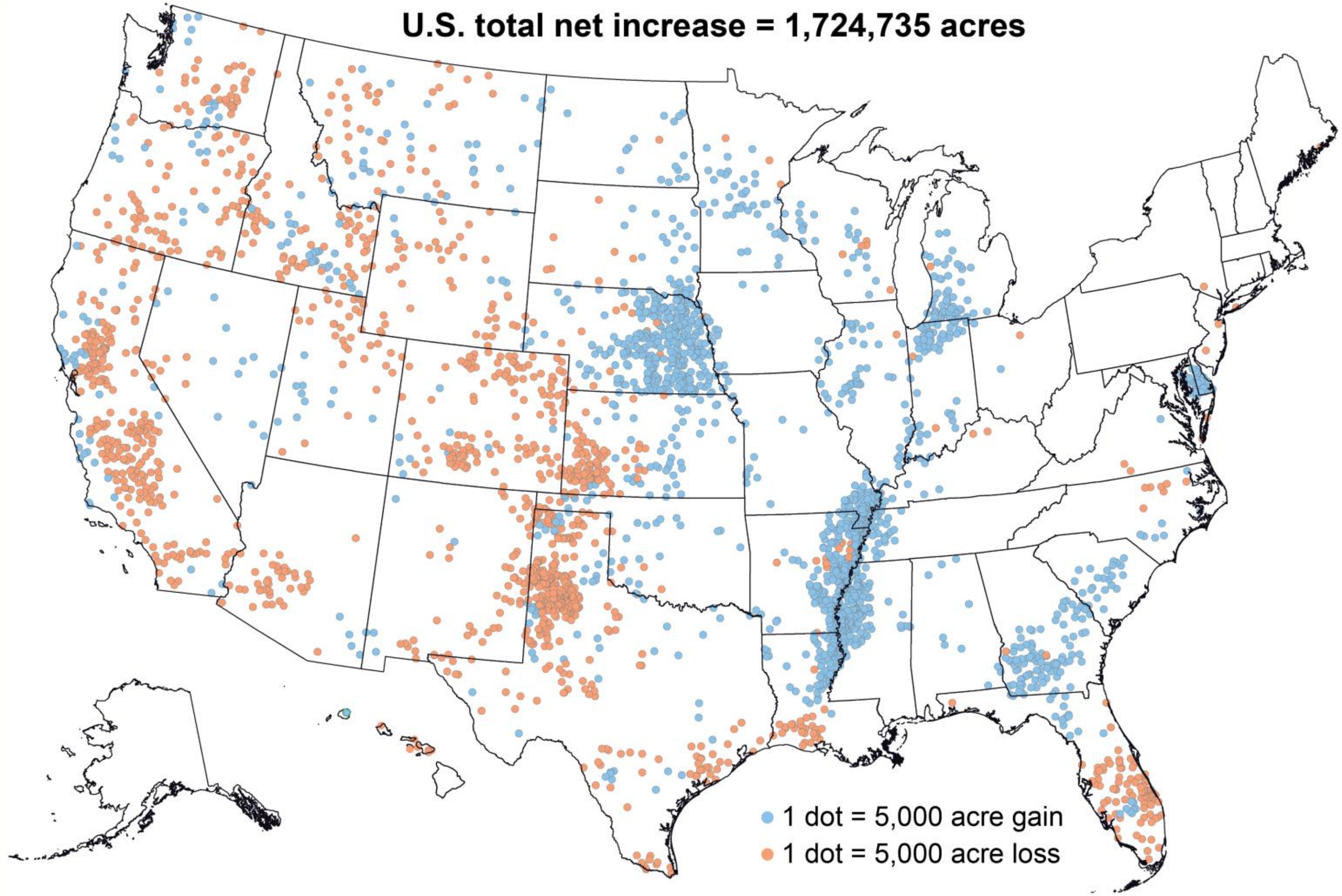


48,434 acres
93%

Irrigation Reduces Risks from Rainfall Variability

1989 - 2017 Irrigated Acres

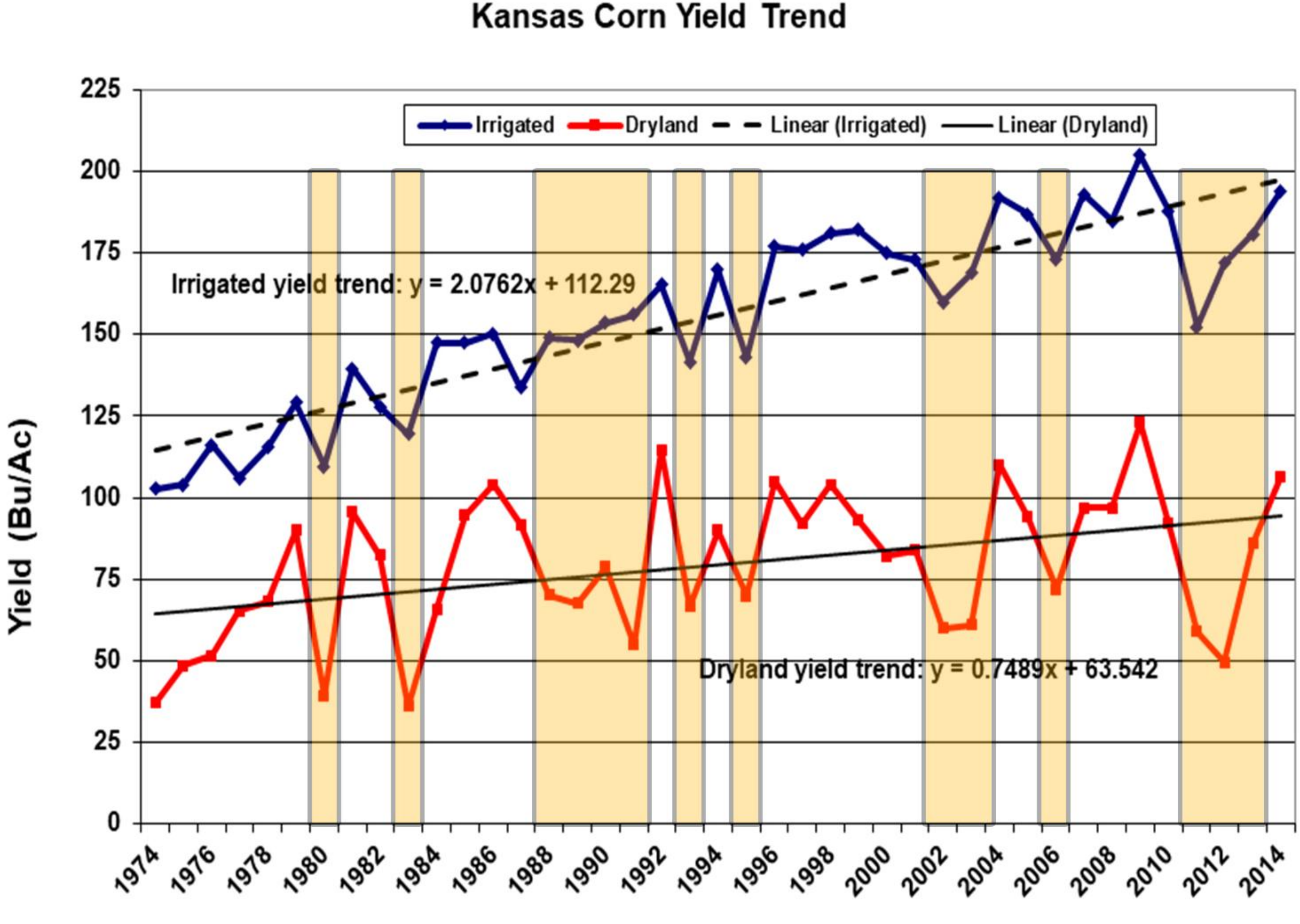
Change in U.S. acres of irrigated agricultural land by county, 1997-2017



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, 1997 and 2017 Census of Agriculture.

Why Irrigate?

Irrigation Stabilizes yield



Precision Irrigation

Time of Irrigation **Study at Scandia Exp. Farm**	**1991 Yield MT/ha**	**1991 Irrigation Date**	**1980-1991 MT/ha**
No Irrigation	**0.2**	None	**3.5**
Tassel	**7.8**	7/8	**8.9**
Tassel + 1 week	9.3	7/8, 7/15	10.0
Tassel + 1 + 2 week	9.8	7/8, 7/15, 7/25	10.3
65% depletion	10.0	7/1, 7/23	10.8

KNOWLEDGE CHECK:
WHAT'S THE HIGHEST RECORDED YIELD FOR CORN (*BU/AC*) A FARMER GOT?

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YIELD GAP

Solar Radiation, Temperature, Rainfall

Insects, Pests and Diseases

Water Mngt.

Nutrients

Seeding

Weeds

What is the largest (acreage) irrigated crop in the US?

Turf Grass

3X than Corn with an area larger than Mississippi

What is the largest (acreage) irrigated crop in the US?

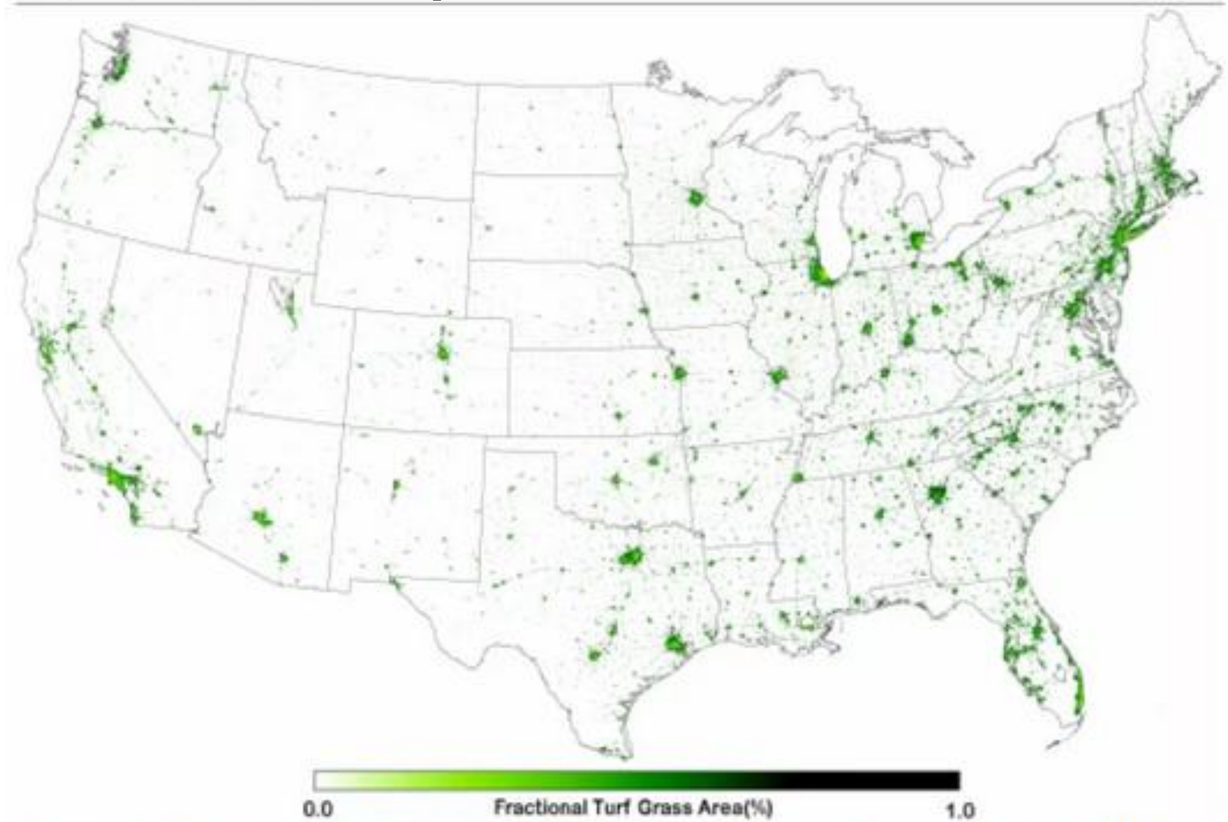


Figure 1. Distribution of the fractional turf grass area (%) in the conterminous U.S.

Kansas Water Plan Budget Accomplishments FY 2024-25

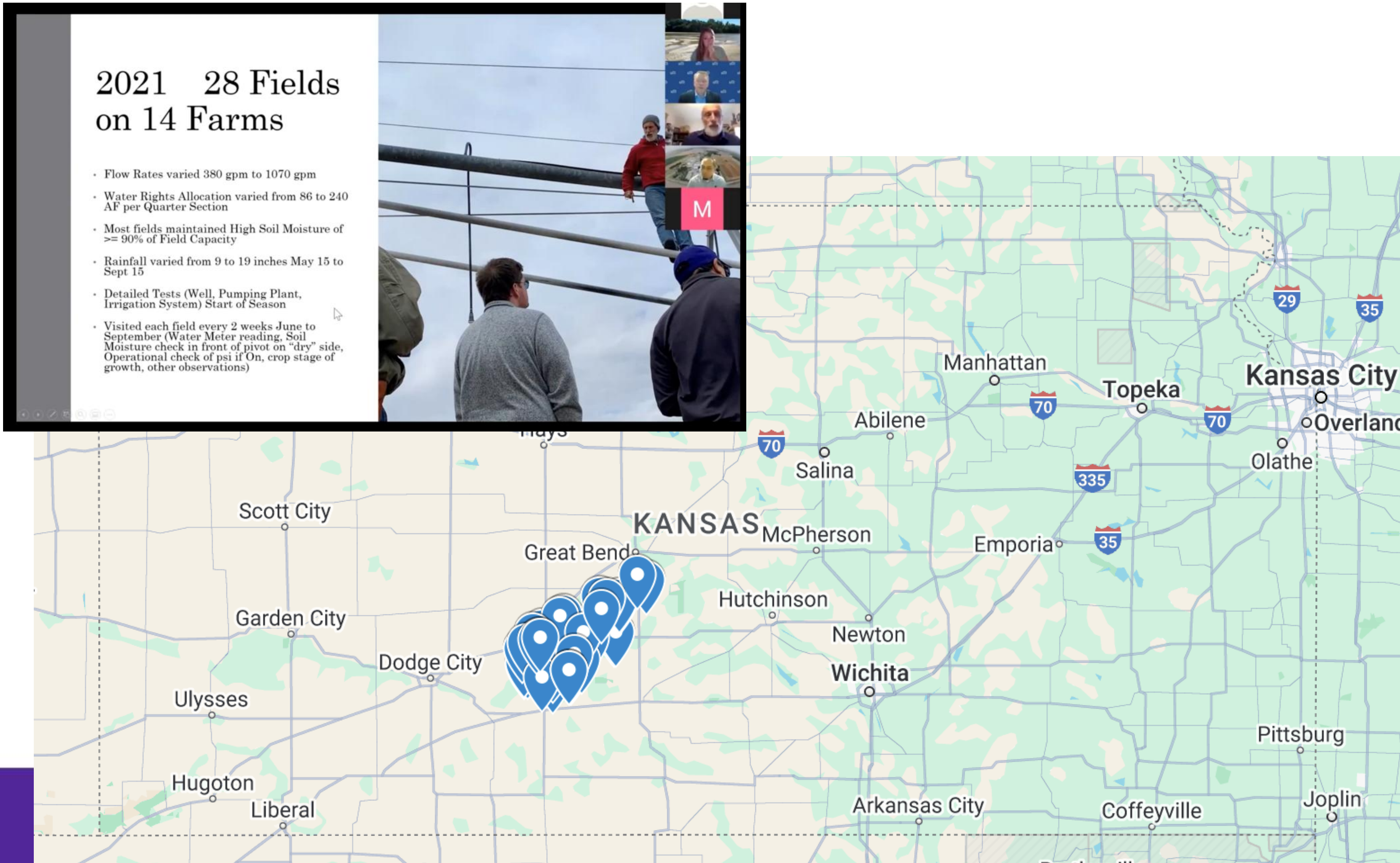
The following are highlights of the accomplishments thanks to funding the Kansas Water Plan in FY 2024 and the first half of FY 2025. These are organized by the **Guiding Principle** they serve; those principles include:

1. **Conserve and Extend the High Plains Aquifer**
2. **Secure, Protect and Restore our Kansas Reservoirs**
3. **Improve the State's Water Quality**
4. **Reduce our Vulnerability to Extreme Events (Resiliency)**
5. **Increase Awareness of Kansas Water Resources (Education)**

1. Conserve and Extend the High Plains Aquifer

- **Stockwater Pilot:** $500,000 for water-conserving technology in 15 livestock facilities; $11 million demand in FY 2024.
- **Conservation Districts:** $3.5 million matching funds for operational programming in FY 2025.
- **Soil and Water Conservation (FY 2024)**: $5 million for practices saving 60,068 tons of soil, protecting 128,748 acres.
- **Irrigation Technology:** $697,000 in FY 2024 for 34,808 acres; FY 2025 shifts $2.5 million to leverage $25 million in federal funds.
- **Water Leasing and Augmentation:**
  - FY 2025: $177,000 to lease 510 acre-feet of water rights and implement a pilot augmentation project.
  - $2.5 million to lease 1,800 acre-feet of irrigation water rights for five years in the Rattlesnake Basin to reduce stream depletions.

RATTLESNAKE CREEK IRRIGATION INNOVATION PROJECT



Checklist Adopted by Kansas Department of Agriculture

Checklist to Achieve similar Yields with Less Irrigation
IWM Toolbox by Lee Wheeler, Jonathan Aguilar, and Weston McCary

1. Make sure that your **irrigation system** is running at its **optimum condition**
   a. Do a baseline testing of well, pump and irrigation system
   b. Compare flow rate and pressure (psi) with Sprinkler Package Design
   c. Don't assume regulators perform as new
   d. Re-orifice package, adjust impellers, speed up pump engine, modify generator pulley as needed to get 480 Volts
   e. If the well can sustain the yield, reduce pivot flow rate to 5.4-6.7 gpm/acre (~0.27-0.33 in/day) for most row crop application
2. **Evaluate opportunities** for better water use
   a. Create All-Farm Water Use spreadsheet
   b. Group water use by crop
   c. Focus on yield per unit water used(bu/ac-in) or crop water use efficiency (WUE)
3. **Apply water evenly** in the field
   a. Maintain End Tower pressure 5 psi more than regulator setting
   b. Monitor center pivot end tower pressure (e.g. Ag Sense, FieldNet, Field Wise, etc.)
   c. Evaluate the seasonal graph of pressure and position (psi vs. angle 0-360)
   d. Use Aerial Imagery to monitor for crop development and sprinkler patterns, soil challenges, fertility issues, runoff, excess rain, etc.
   e. Increase last 3 sprinkler flow rates on overhang to apply water more evenly after removing end-gun
   f. Close the drain hoses at the end of the tower when running, and add purge valve if needed
   g. Avoid using butterfly valve at pump discharge
4. **Soak it in** where it is placed
   a. Improve infiltration at soil surface
   b. Increase wetted footprint where you see runoff (e.g., overhead sprinklers = 80 ft. vs. bubblers = 3 ft. wetted diameter); Use moving plates and space drops closer together whenever possible
   c. Use other practices such as cover crops, green manure crops, and dammer-diking to reduce runoff
   d. Minimize big droplets-impact erosion at soil surface
   e. Use outrigger booms at towers and overhang to increase wetted footprint
   f. In many cases do not go below 10 psi regulators to maintain moderate droplet size
   g. Use truss rod hose clips to widen wetted footprint
5. **Slow pivot down** to apply 0.8-1.2-in. depth irrigations if possible unless significant runoff occurs or in very sandy soils
   a. Improve portion of irrigation water entering root zone (application efficiency) by reducing "Service Factor" (i.e. loss of E on ET; can be ~0.17 in.) per irrigation event
   b. Consider 3-4 days irrigation frequency, unless sandy soils, then 2-2.5 days
6. **Make better use of rainfall**
   a. Measure rain at field. Use tipping rain gauge with telemetry if possible
   b. After a rain event, re-establish moisture lag of 2-4 day irrigation cycle through progressive watering (i.e., move fast when starting then gradually slow down [in incremental pies] to finish the cycle)
   c. If conditions allow, hold off irrigation if high probability of rainfall is in the forecast
7. **Properly schedule your irrigation**
   a. Use the same start/**stop** position near pivot road
   b. Use a checkbook budget like KanSched and Autonomous Pivot, to determine when to irrigate and how much
   c. Use Soil Moisture or Plant Based sensors with Telemetry to "close the loop"
      1. Install on "start" side of pivot start/stop position
      2. Install on soil type with lower water holding capacity, if prevalent

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Seven Points to Consider

1. Keep irrigation system at optimum condition
2. Evaluate opportunities to be better
3. Apply water evenly in the field
4. Soak the water in where it is placed
5. Slow down pivot speed
6. Make better use of rainfall
7. Properly schedule your irrigation

1. Make sure that your **irrigation system** is running at its **optimum condition**

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Off-season adjustments

Check your irrigation systems for operational, maintenance and uniformity problems

Irrigation Technology Initiative

The Equus Beds Groundwater Management District No. 2 (GMD2) has agreed to participate in a new initiative with the Kansas Department of Agriculture, Division of Conservation (KDA-DOC). The Irrigation Technology Initiative (ITI) has two parts; 1) system evaluations and 2) cost share.

ASSESSMENT COMPONENTS

There are 4 components that will be assessed during the evaluation.

I: THE WELL — Static Water Levels (SWL). Pumping Water Levels (PWL). Specific Capacity (GMP/Drawdown), well depth, drillers log, SWL at drilling, pump test available from drilling, location of the screens, location of the pump.

II: THE PUMP — Flow Rate GPM, PWL, PSI at Discharge. Energy use per hour. Overall Efficiency.

III: IRRIGATION SYSTEM — Irrigation Package Design (i.e. WISH), test GPM and PSI, compare uniformity patterns.

IV: IRRIGATION WATER MANAGEMENT — Compare Et crop (irrigation + effective rainfall), spot check water budget, crop water budget (irrigation + effective rain), compare total irrigation (other fields and similar crops).

FOR MORE INFORMATION VISIT: WWW.GMD2.ORG OR CALL 316-835-2224

Onboarding Steps

1. **GOOGLE EARTH ELEVATIONS** — Measure elevation at each well/pump, base of pivot, and at end tower.
2. **SPRINKLER PACKAGE DESIGN** — Design from WISH, V-Chart, Z-Chart or what applies to you.
3. **KANSAS GEOLOGICAL SURVEY DOCUMENTS** — Water Information Management and Analysis System (WIMAS), Water Well Completion Records (WWC5), Water Information Storage and Retrieval Database (WIZARD), or any other useful documents.
4. **PUMP DETAILS FROM AN INVOICE OR OTHERWISE** — Depth of well and pump intake, as well as pump assembly and design details.
5. **PSI/POSITION GRAPH** — Information from past and current years from AgSense, FieldNet, FieldWise, AP, or other. Desired location is the end tower.
6. **PRESSURE GAUGE ISO ATTACHMENT** — Isolation valve attachments s the pump discharge before/a valve and at the base of the p
7. **ANNUAL ENERGY USE PUMPING PLANT** — Energy annual water use rep natural gas usage, KWh total, energy total.
8. **YIELD MAP OF PREVIO**
9. **ACCESS TO WELL WAT MEASUREMENT** — With sounder cable
10. **CROPPING FOR PREVI YEAR**

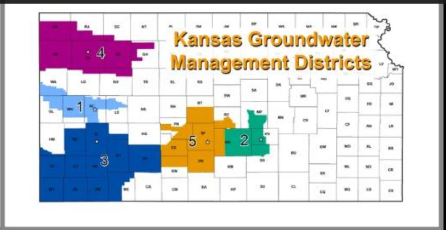
ITI System Evaluation

Local Support Starts with Local Discussions

The five Western Kansas Groundwater Management Districts and the Kansas Department of Agriculture's Division of Conservation are working together to provide assessments to help producers gain a better understanding of their water systems efficiency.

This approach will utilize practices and techniques selected in consultation with partners, including the Kansas Water Office and experienced irrigation conservation engineers. In part,

Kansas Department of Agriculture Division of Conservation



IRRIGATION TECHNOLOGY INITIATIVE

Working together to conserve water through technology

The objective of the Irrigation Technology Initiative (ITI) is to provide system assessments to help producers gain a better understanding of their water system's efficiency. The approach will utilize techniques and lessons learned from similar technology projects previously focused on the Rattlesnake Creek region (CIG Project).

The ITI is available for any irrigator within the boundaries of the groundwater management districts. This project is funded in-part by the State of Kansas Water Plan Fund and is limited, so don't hesitate to contact the office for additional details.

Ready to Get Started?

This is a cooperative project with Kansas Department of Agriculture's Division of Conservation and the five Groundwater Management Districts.

Prior to the system assessment, the water user is asked to complete onboarding steps that are broken down into nine categories. Upon completion and submission of the onboarding material, the water user may be

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WHAT DO YOU GET OUT OF IT?

Ability to walk through an evaluation on **up to two (2) systems** and receive a report that:

- evaluates the performance of the system
- details energy costs and projections
- identifies opportunities for improvement

After signing up, you can qualify for:

- **Up to $500 per system** to be paid to you upon completing onboarding
- Evaluation of your System **at no cost**

NORTHWEST KANSAS GROUNDWATER MANAGEMENT DISTRICT NO. 4

CONTACT US

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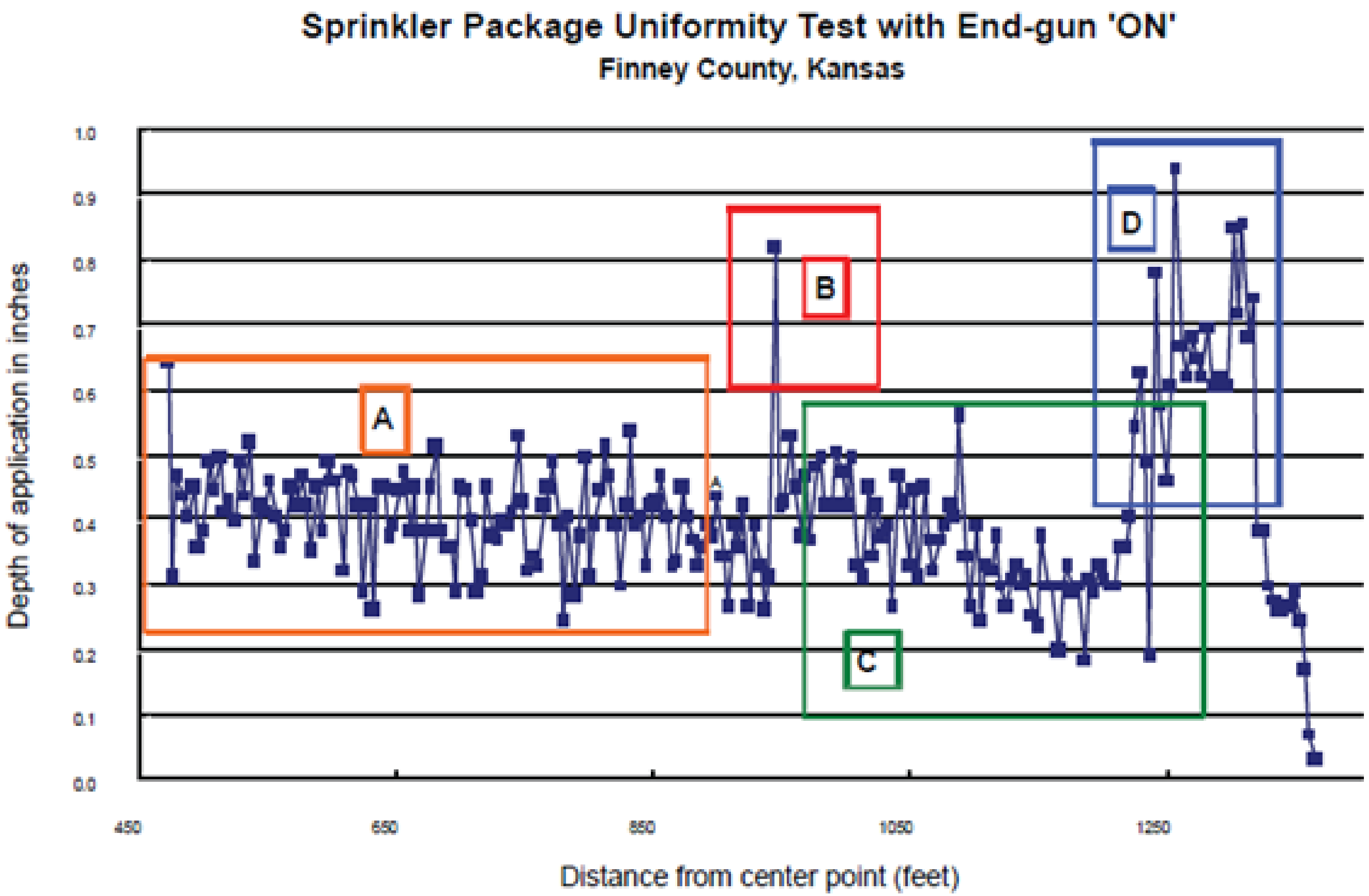
www.gmd4.org
1290 West 4th Street

NORTHWEST KANSAS GROUNDWATER MANAGEMENT DISTRICT NO. 4

2026 IRRIGATION TECHNOLOGY INITIATIVE

Uniformity test result

(Rogers et al. 2008).



At the Least, Walk Your System Before Irrigation System Starts

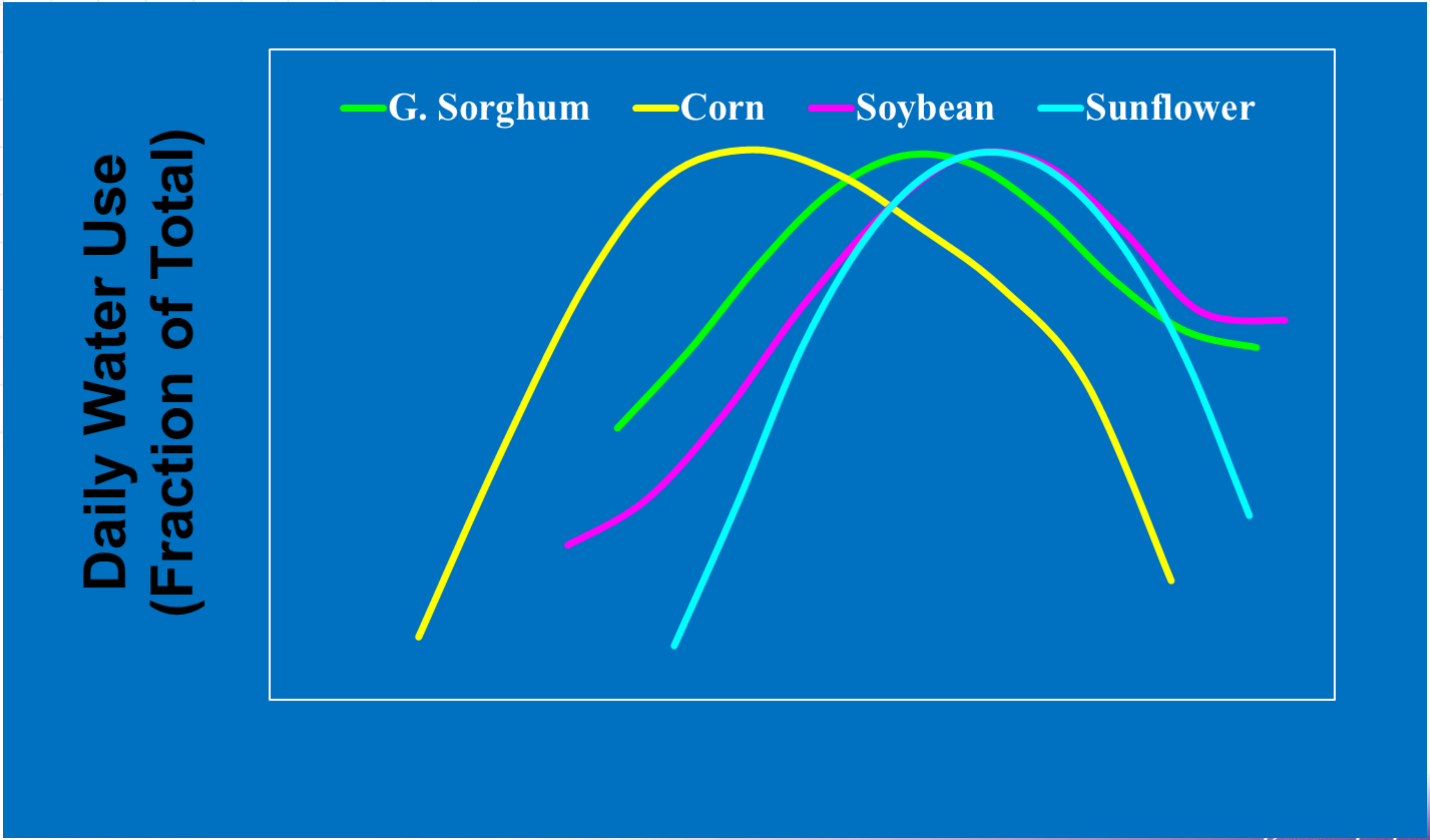
These are what I found in a recently renozzled pivot of a Water Tech Farm

Partially-opened valve

2. **Evaluate opportunities** for better water use

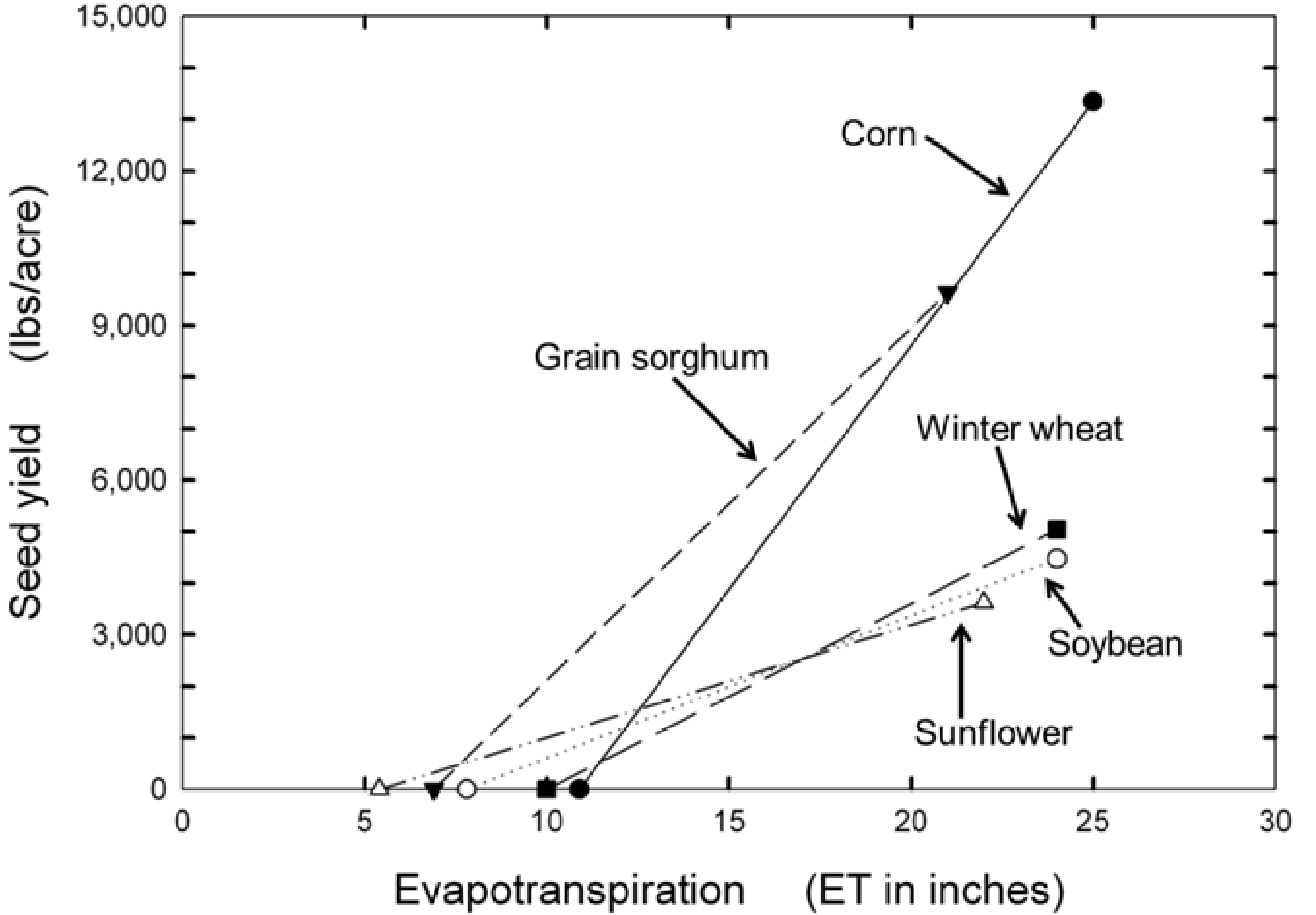
a. Create All-Farm Water Use spreadsheet
b. Group water use by crop
c. Focus on yield per unit water used(bu/ac-in) or crop water use efficiency (WUE)

Peak Water Use Timing



Staggenborg, S. KSU Agronomy

Crop Yield vs. ET Relationships



3. APPLY WATER EVENLY IN THE FIELD

a. Maintain End Tower pressure 5 psi more than regulator setting
b. Monitor center pivot end tower pressure (e.g. Ag Sense, FieldNet, Field Wise, etc.)
c. Evaluate the seasonal graph of pressure and position (psi vs. angle 0-360)
d. Use Aerial Imagery to monitor for crop development and sprinkler patterns, soil challenges, fertility issues, runoff, excess rain, etc.
e. Increase last 3 sprinkler flow rates on overhang to apply water more evenly after removing end-gun
f. Close the drain hoses at the end of the tower when running, and add purge valve if needed
g. Avoid using butterfly valve at pump discharge

Ideally, maybe we would like to see

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Adapted from F. Lamm, 2014

Knowledge for Life

But often, we saw irrigated fields like this

Solutions to Uniformity Problems

- Use proper nozzle spacing
  (not more than twice corn row width)
- Use appropriate proper nozzle height
  (e.g., 2 or 7 ft, but not corn ear height)
- Use residue management
- Use circular rows

If runoff or uniformity problems continue, permanently raise nozzles above the crop canopy.

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Adapted from F. Lamm, 2014

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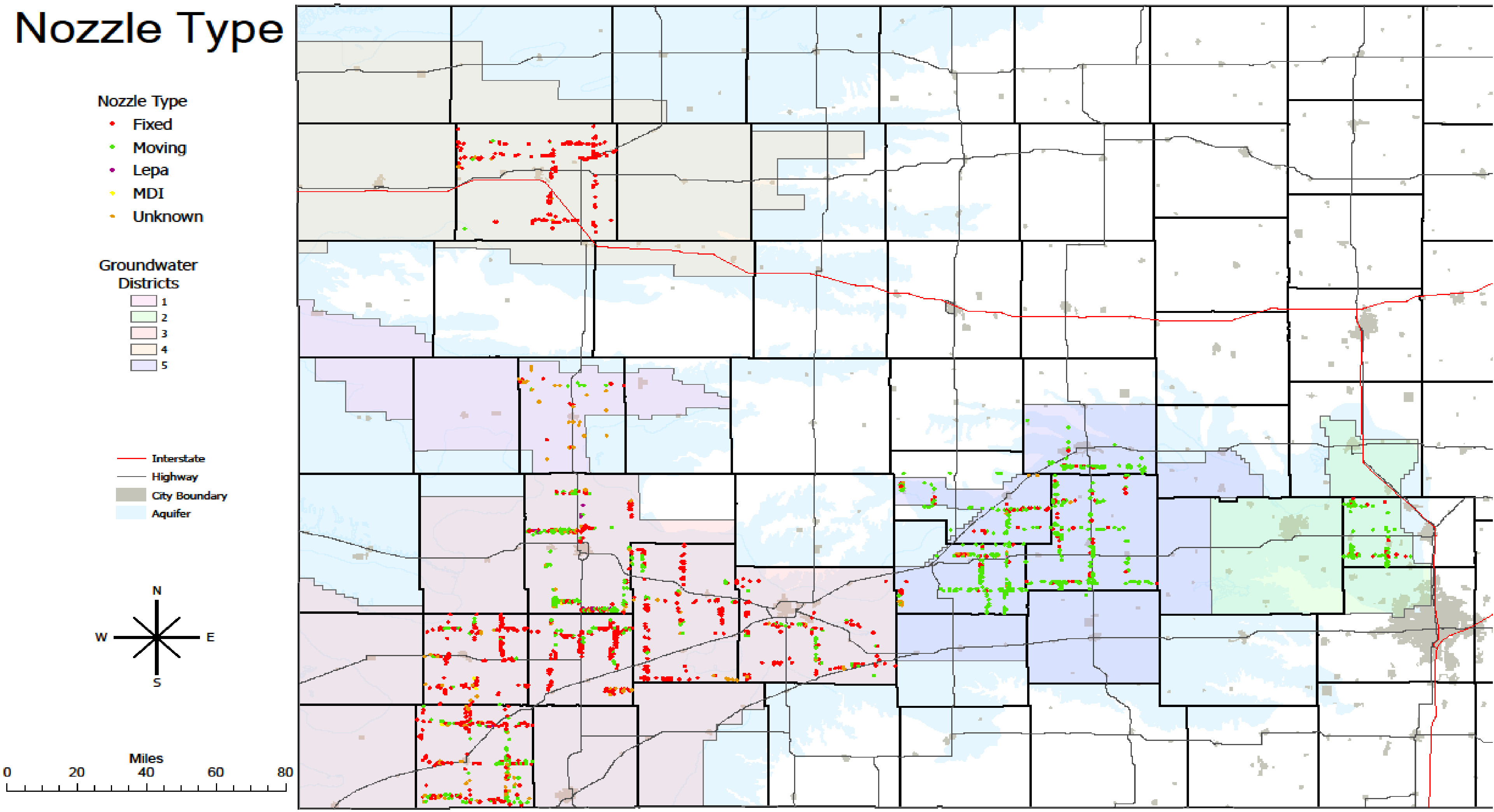
Center Pivot Survey



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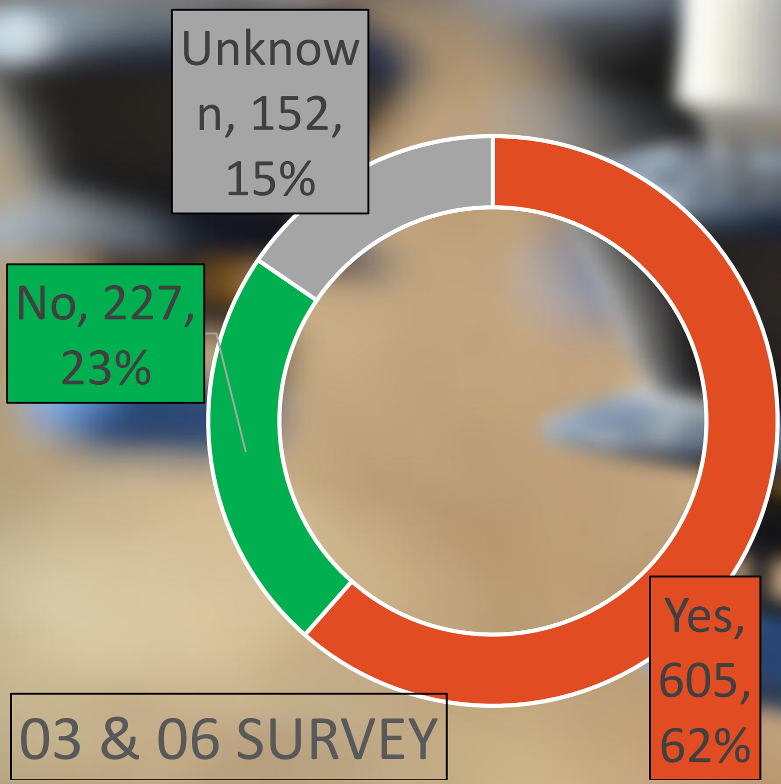
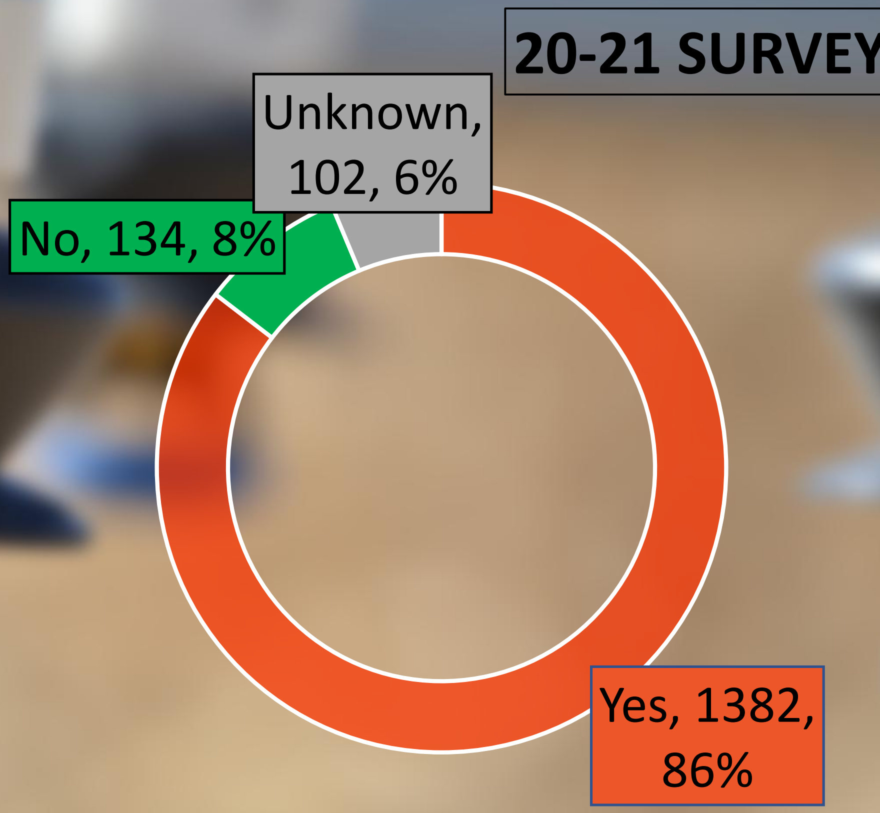
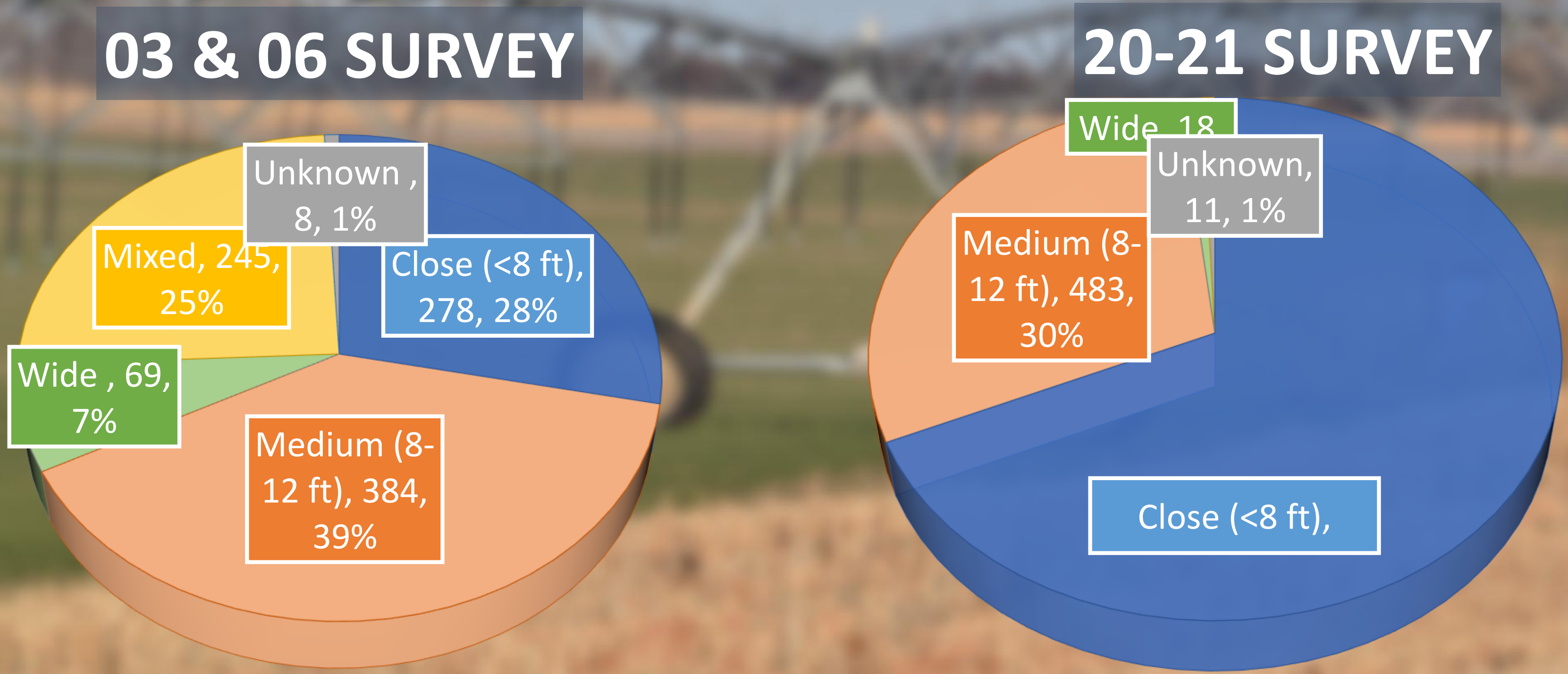
Pressure Regulators





Nozzle Spacing



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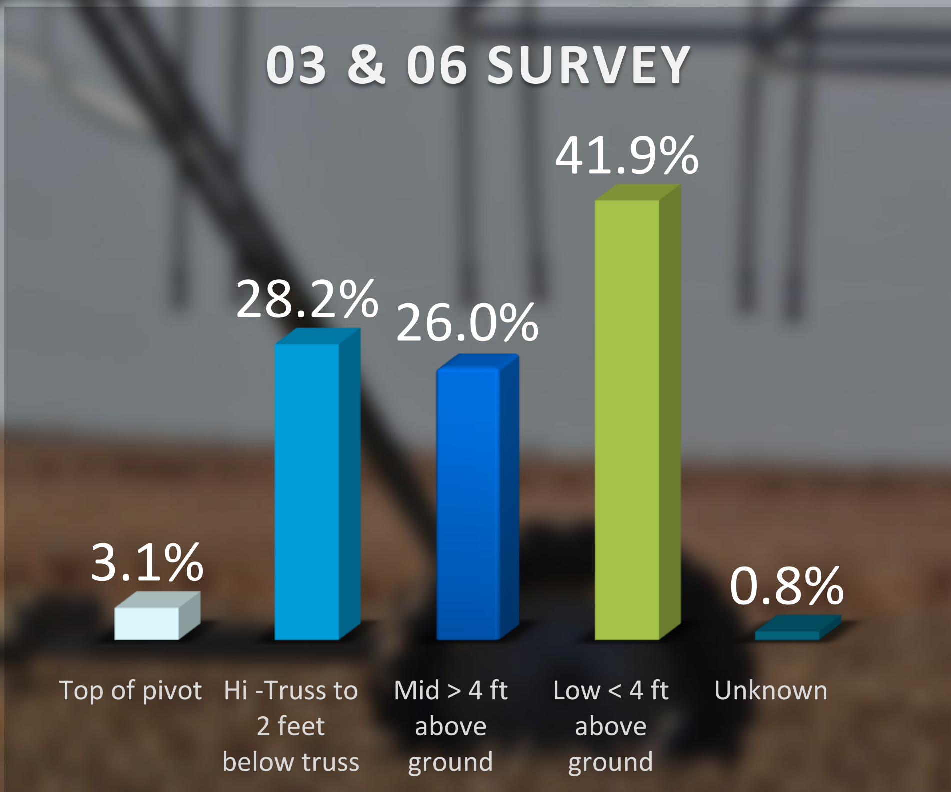
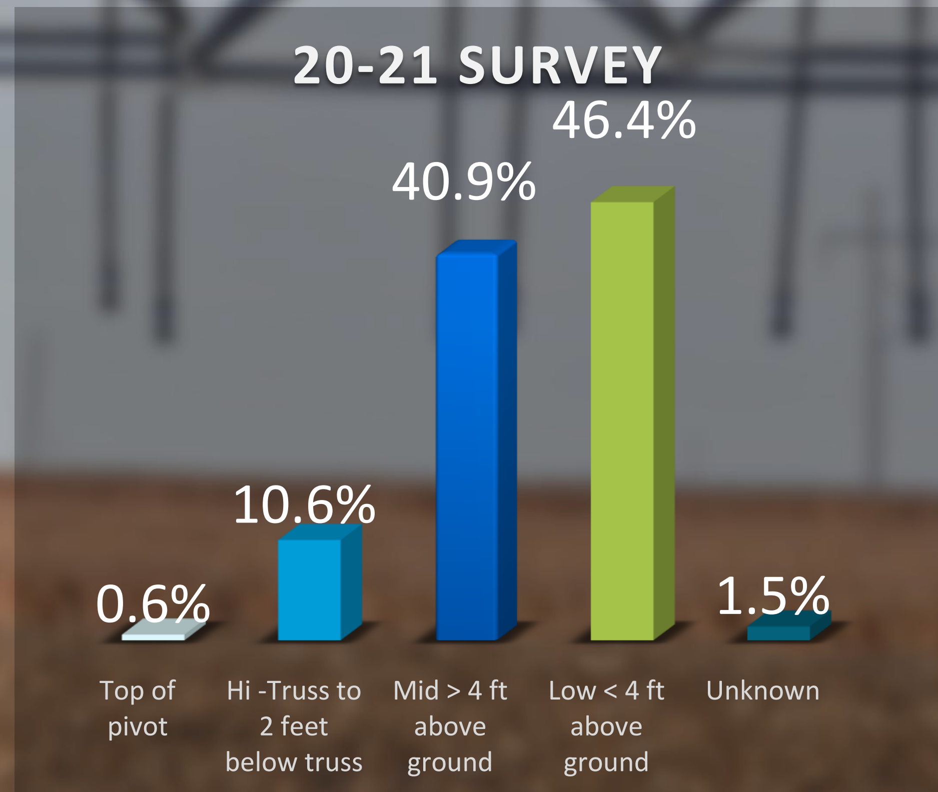
Nozzle/Drop Height





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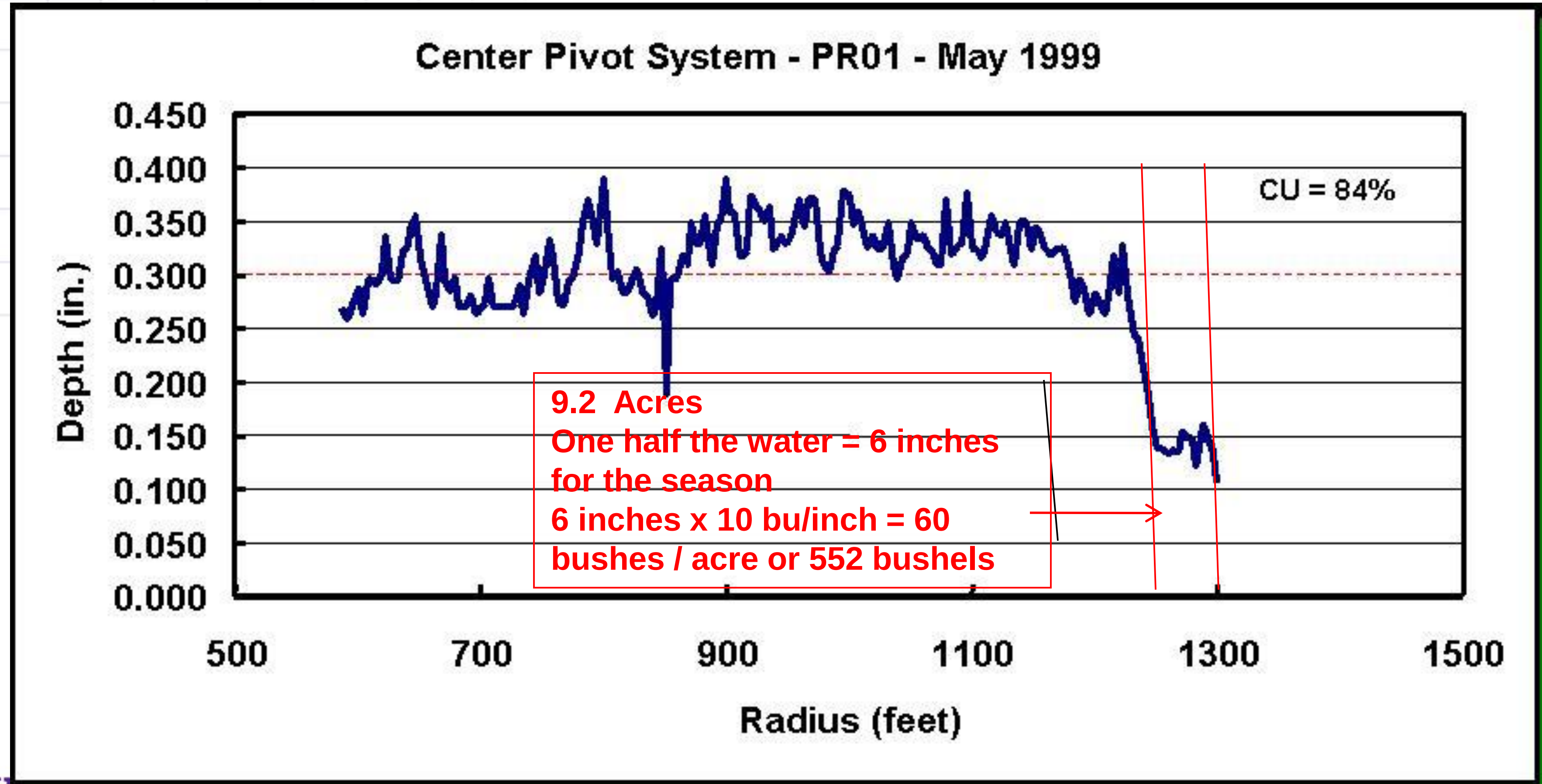
Center Pivot with un-installed nozzle and under sized orifices at outer edge.



IRRIGATION MANAGEMENT

100% MAX

System Efficiency

Application Efficiency

Planning Tools

Scheduling

Strategies

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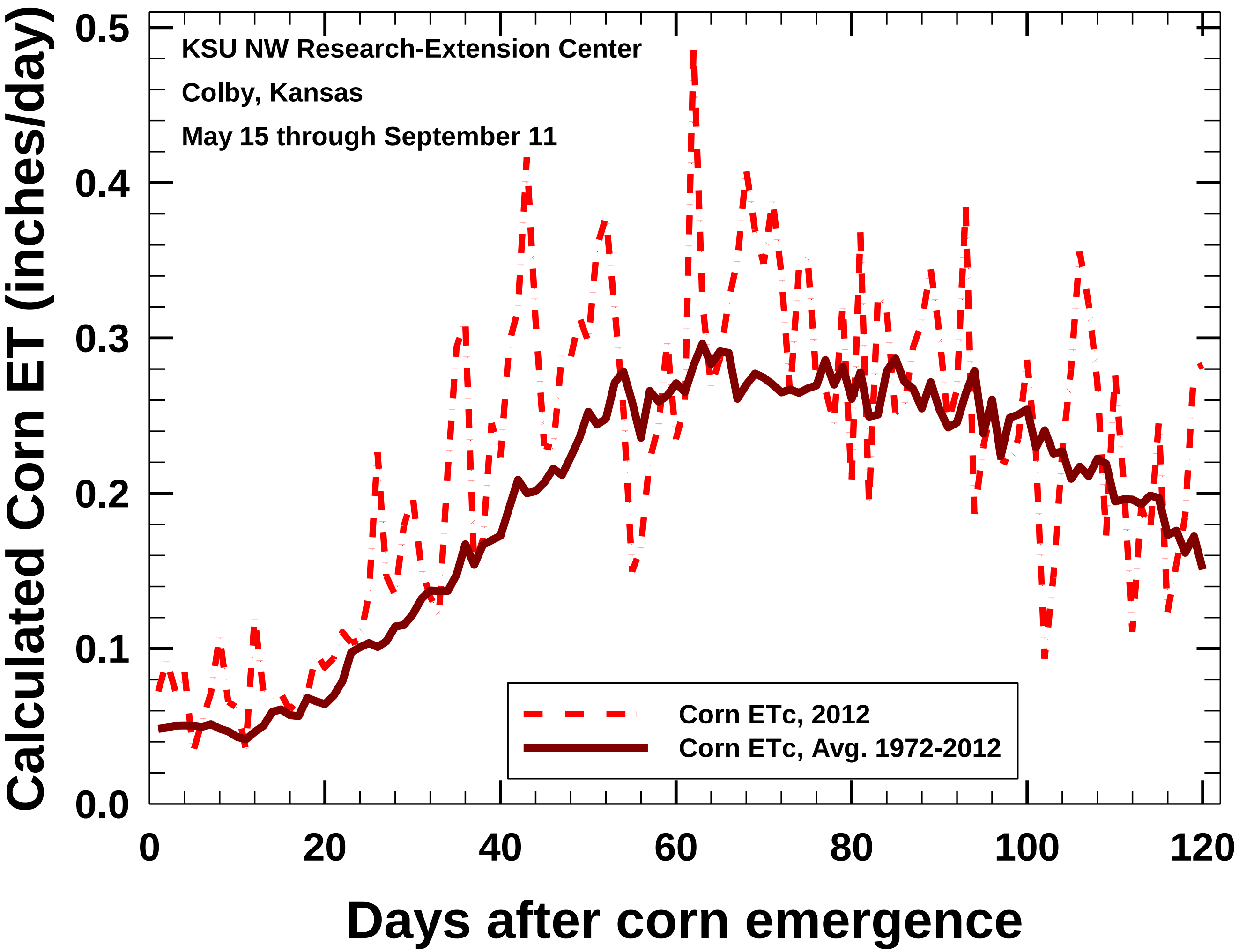
Not all days were created equal

Average daily corn ET (water use) at Colby, Kansas in 2012 was 16% greater than the long term average and on some days was nearly twice the average value.



Most regional irrigation systems are designed at less than 0.25 inches/day, and did not not cope well at critical growth stages with such large increases in daily ET.

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Adapted from F. Lamm, 2014

4. Soak it in where it is placed

a. Improve infiltration at soil surface
b. Increase wetted footprint where you see runoff (e.g., overhead sprinklers = 80 ft. vs. bubblers = 3 ft. wetted diameter); Use moving plates and space drops closer together whenever possible
c. Use other practices such as cover crops, green manure crops, and dammer-diking to reduce runoff
d. Minimize big droplets-impact erosion at soil surface
e. Use outrigger booms at towers and overhang to increase wetted footprint
f. In many cases do not go below 10 psi regulators to maintain moderate droplet size
g. Use truss rod hose clips to widen wetted footprint

Off-season adjustments

- **Increase irrigation system efficiency and/or uniformity**

Each of these systems can be very efficient and uniform, but many producers find moving from left to right improves their own water management.

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Adapted from F. Lamm, 2014

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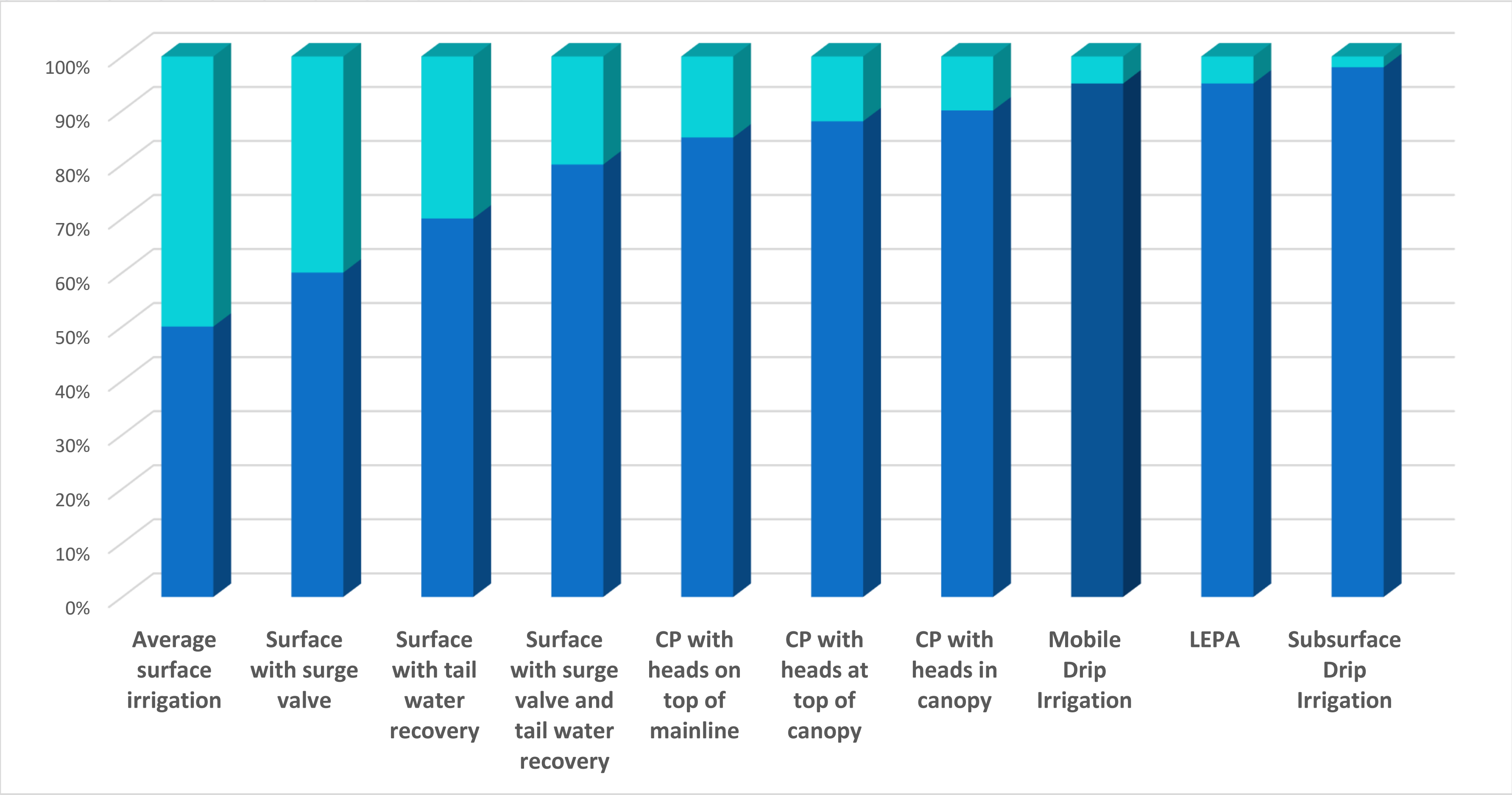
The Race for 100% Efficiency



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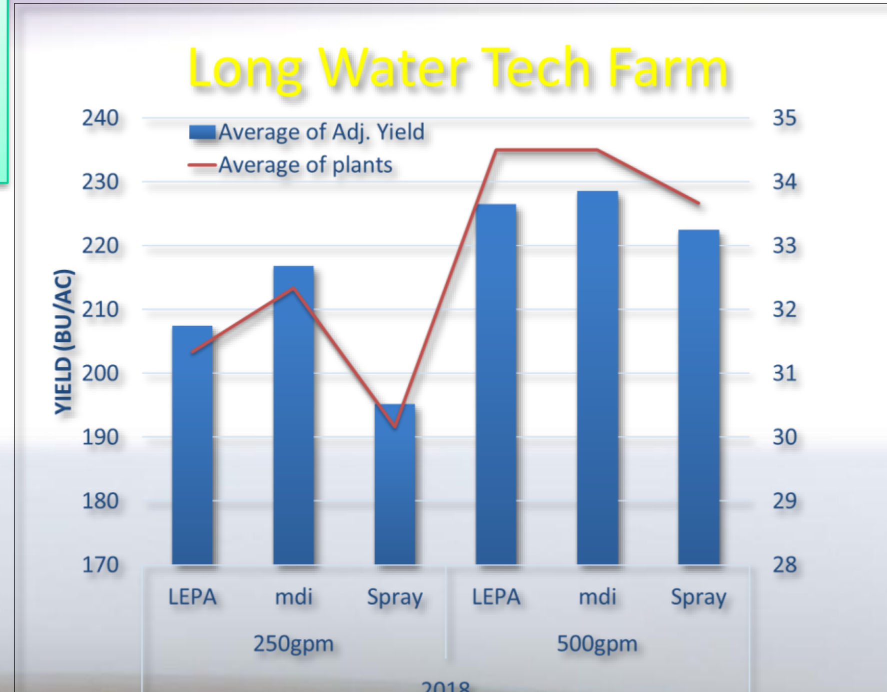
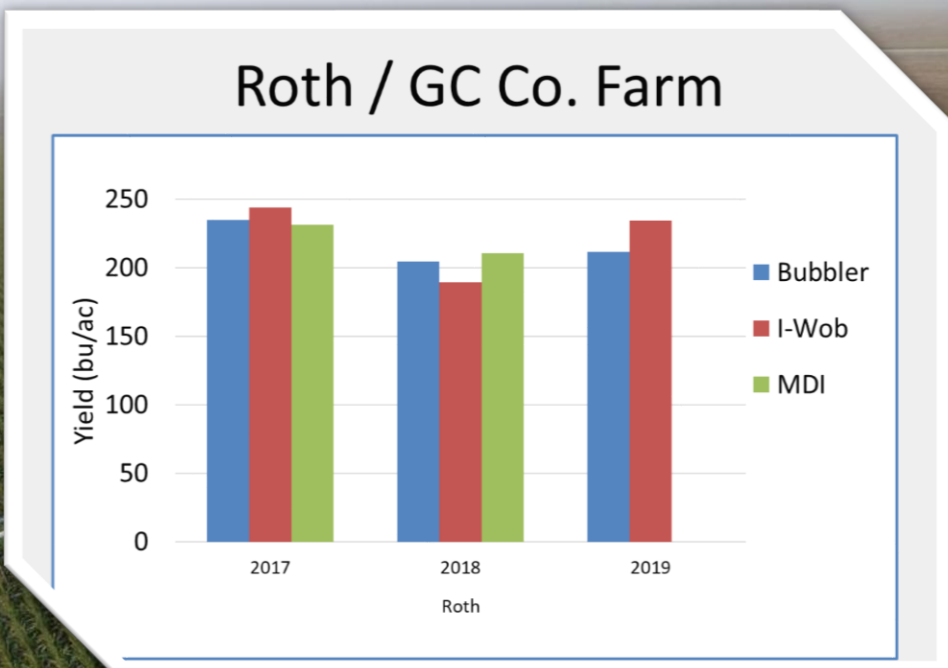
Water Tech Farms Data

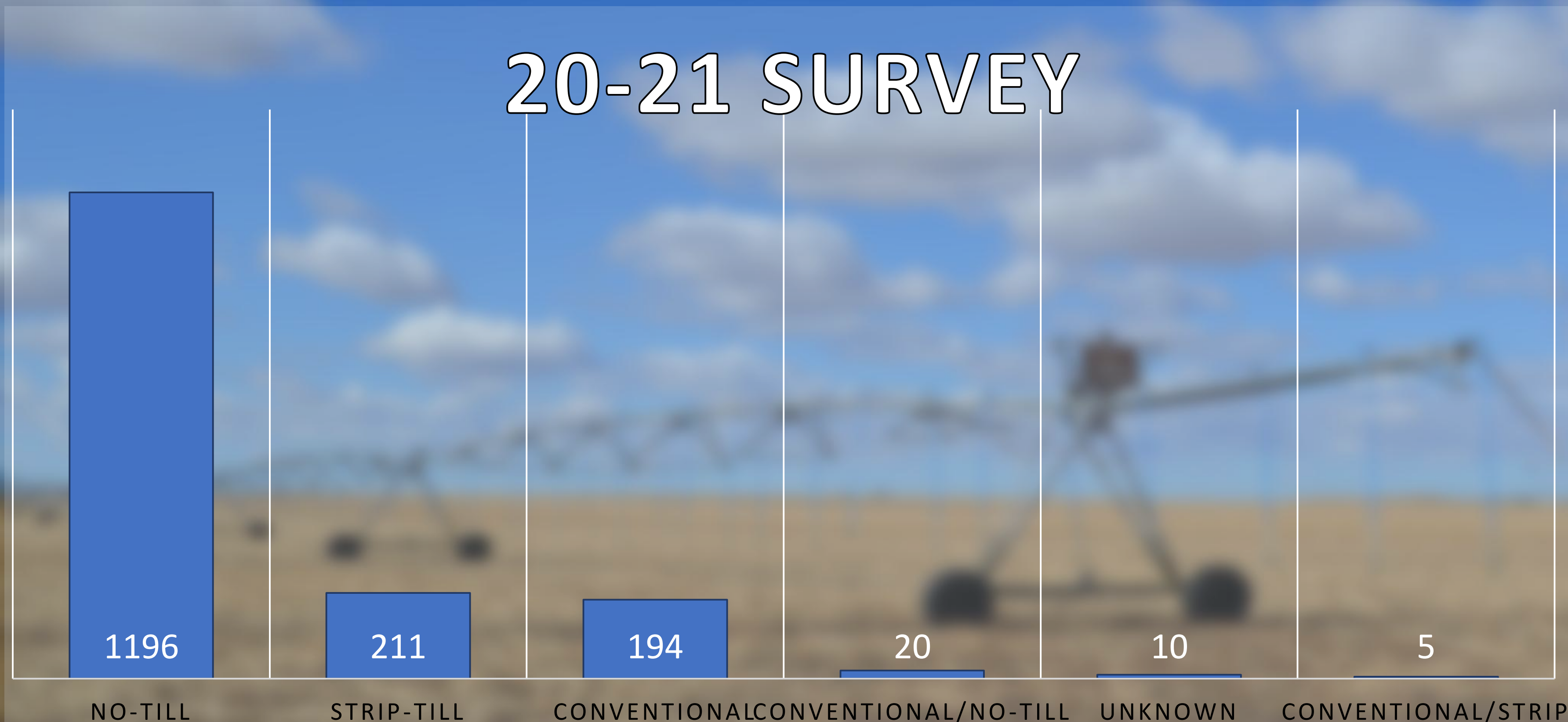
2018 ILS Farm Data

FIELD	TREATMENT	YIELD (Combine) (BU/AC)	YIELD (Hand) (BU/Ac)	IRRGN APPLIED (IN)	WATER USE EFFICIENCY (BU/Ac-IN)
NORTH 16	ALL	234	244	13.1	18.62
	MDI (70%)	231	243	9.8	24.8
	MDI (80%)		237	11.2	21.2
	SPRAY (100%)	249	259	14.0	18.5
SOUTH 15	SPRAY	232	237	15.3	15.5

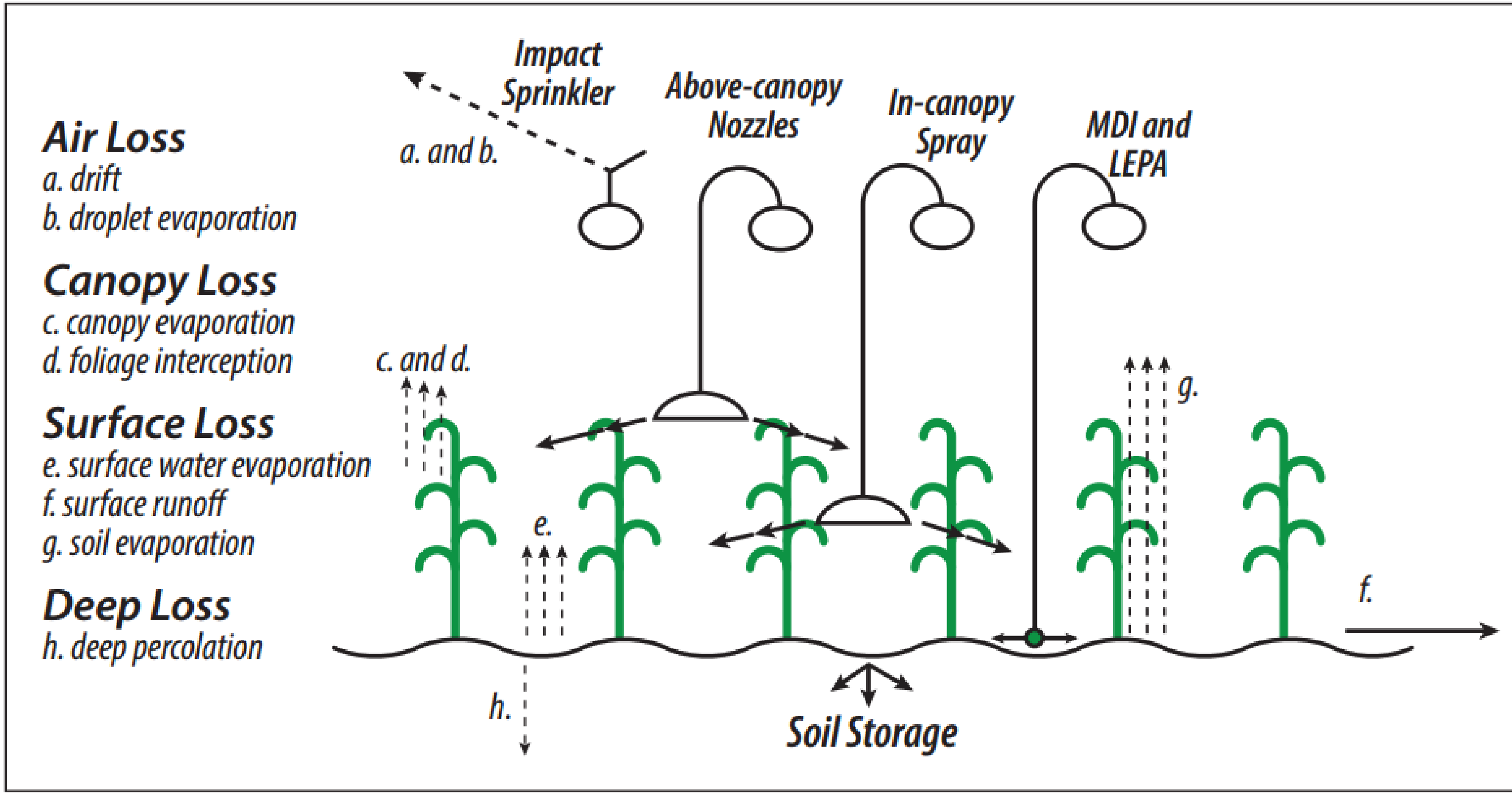




Tillage


20-21 SURVEY
1196
211
194
20
10
5
NO-TILL
STRIP-TILL
CONVENTIONAL
CONVENTIONAL/NO-TILL
UNKNOWN
CONVENTIONAL/STRIP

Sources of Losses on Irrigation Systems



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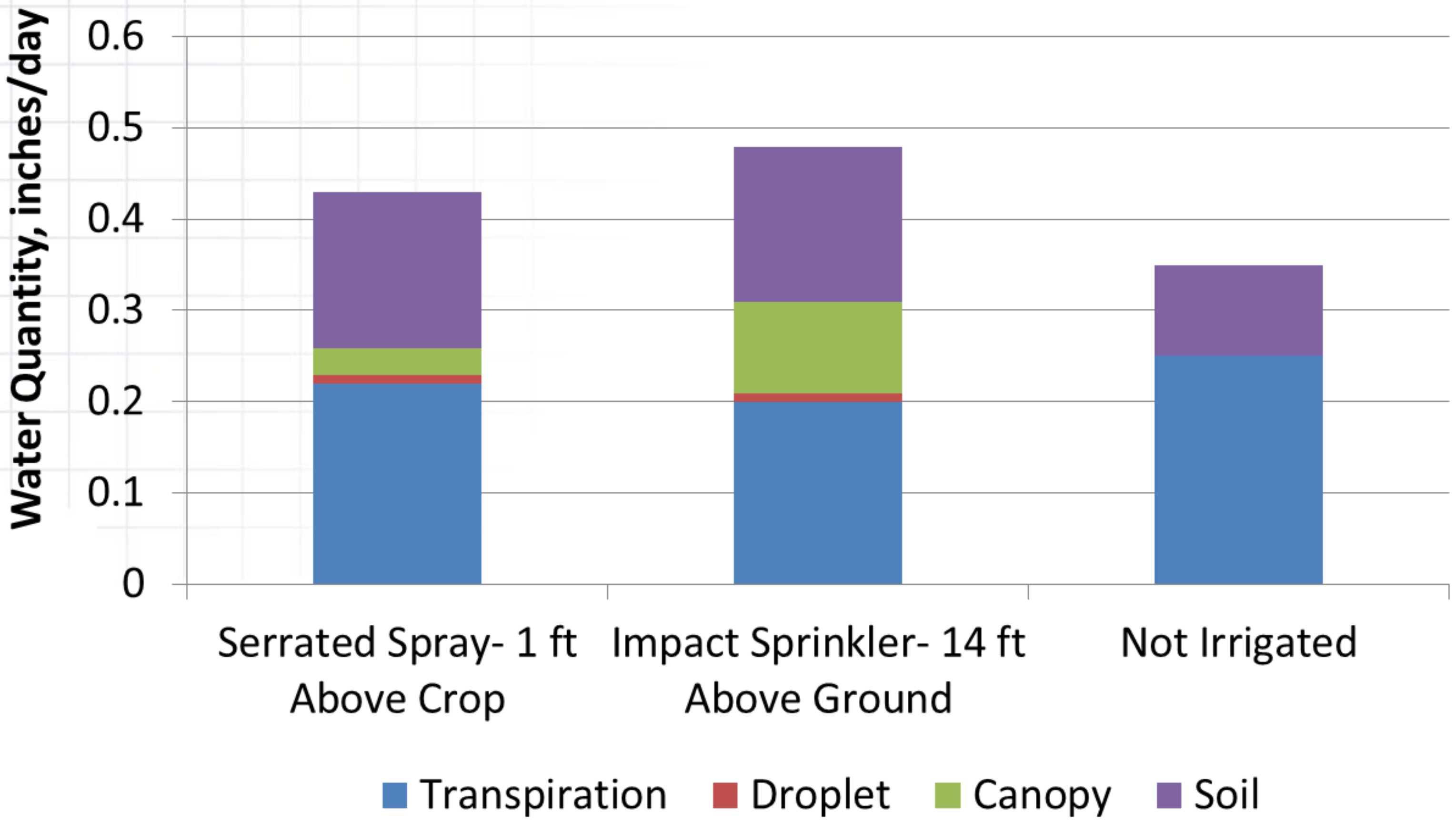
5. Slow pivot down to apply 0.8-1.2-in. depth irrigations if possible unless significant runoff occurs or in very sandy soils

a. Improve portion of irrigation water entering root zone (application efficiency) by reducing "Service Factor" (i.e. loss of E on ET; can be ~0.17 in.) per irrigation event
b. Consider 3-4 days irrigation frequency, unless sandy soils, then 2-2.5 days

Evaporative Losses for Impact and Spray Devices



Bushland, TX: 1992, 90 F, 15 mph, dry Thompson, et al. (1997)

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Example of effect of application depth on efficiency

Water Loss Component	1 inch applied	1 inch applied	0.75 inch applied	1.25 inch applied
Air evaporation and drift	0.02	0.02	0.02	0.02
Net canopy evaporation	0.08	0.08	0.08	0.08
Plant interception	0.07	0.07	0.07	0.07
Evaporation from the soil	Small	Small	Small	Small
Deep percolation	None	None	None	None
Run off	None	0.10	None	None
Total Water Loss	0.17	0.27	0.17	0.17
Efficiency %	83	73	77.3	86.4

0.17in.

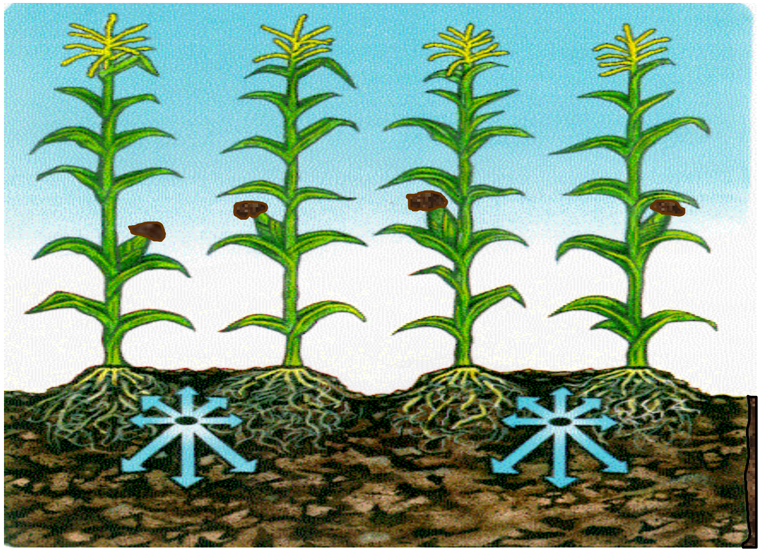
PER IRRGN EVENT

Any Service Fee*

Cooling, Heating, Plumbing, Electrical, Appliance

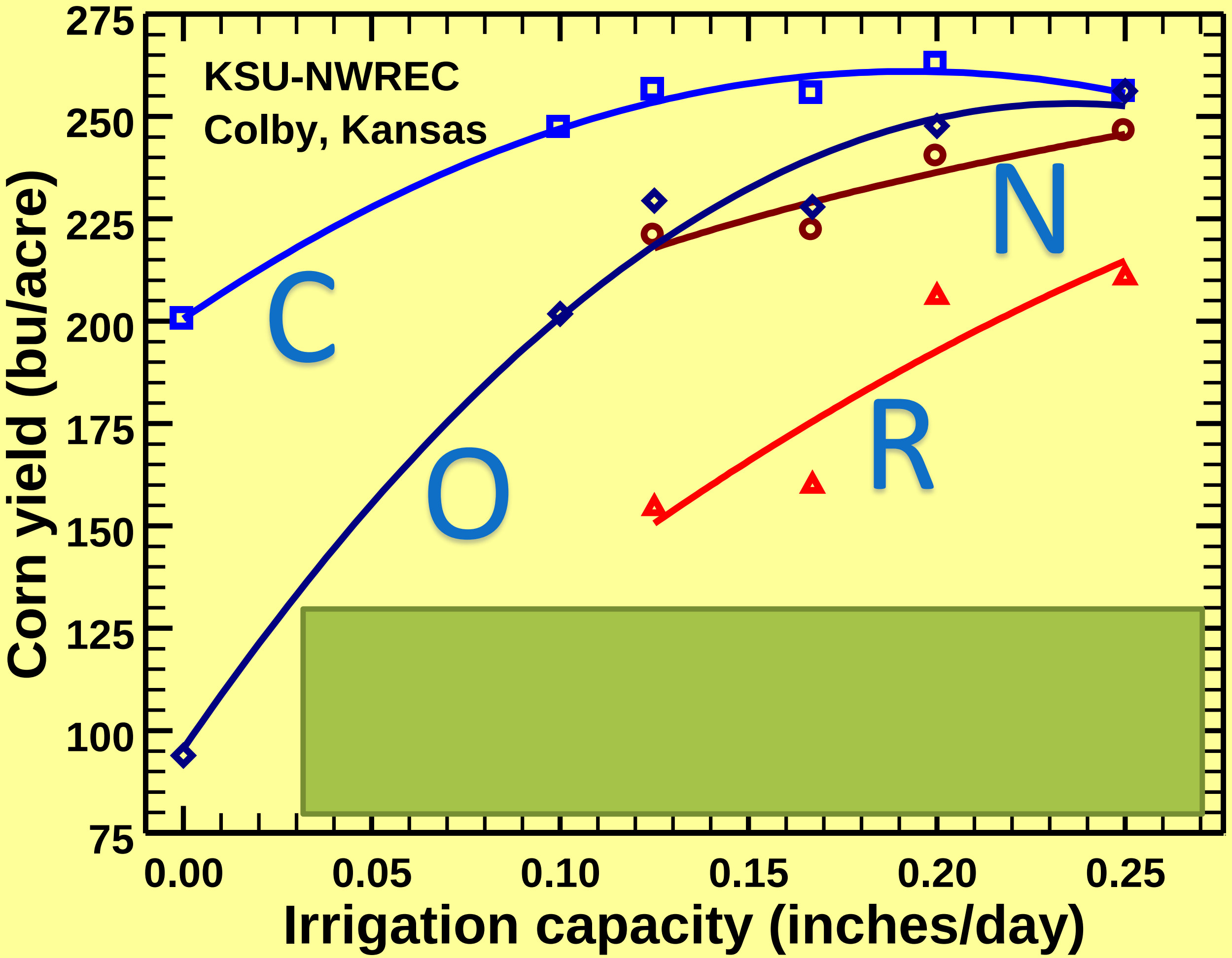
*Excludes service fees on Home Warranty or Bronze, Silver, or Gold Agreements. Not valid with any other offer.

Subsurface drip irrigation (SDI) applies water below the soil surface to the crop root zone with small emission points (emitters) that are in a series of plastic lines typically spaced between alternate pairs of crop rows.



Adapted from F. Lamm, 2014

Knowledge for Life



Does SDI really increase crop per drop?

There is growing evidence that subsurface drip irrigation (SDI) can stabilize yields at a greater level with less irrigation than in-canopy sprinklers.

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Adapted from F. Lamm, 2014

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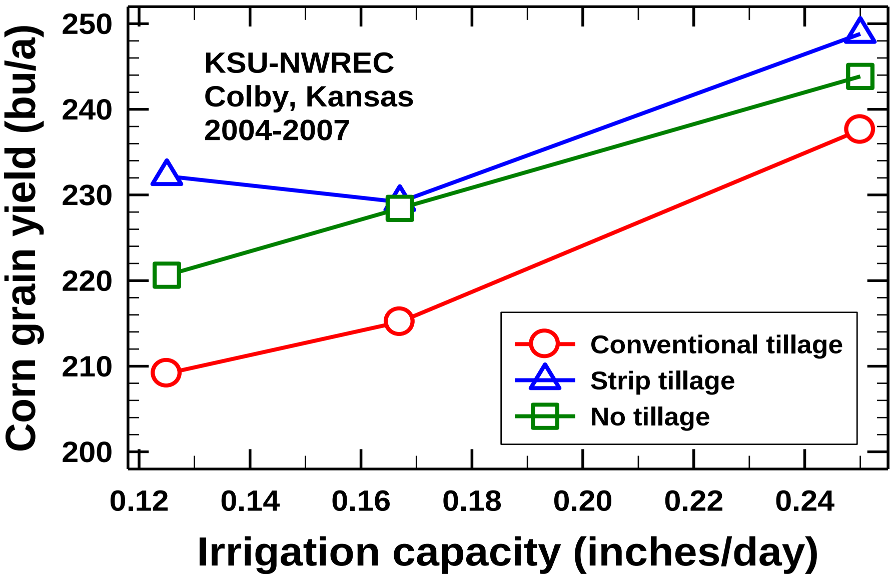
6. Make better use of rainfall

a. Measure rain at field. Use tipping rain gauge with telemetry if possible
b. After a rain event, re-establish moisture lag of 2-4 day irrigation cycle through progressive watering (i.e., move fast when starting then gradually slow down [in incremental pies] to finish the cycle)
c. If conditions allow, hold off irrigation if high probability of rainfall is in the forecast

Off-season adjustments

- Increase irrigation efficiency and/or uniformity
- Adopt irrigation scheduling
- **Improved management of precipitation and soil water through cultural practices**

Reduction of tillage increases yields.



Great adoption of strip tillage

Increasing adoption of reduced or no tillage planting

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Adapted from F. Lamm, 2014

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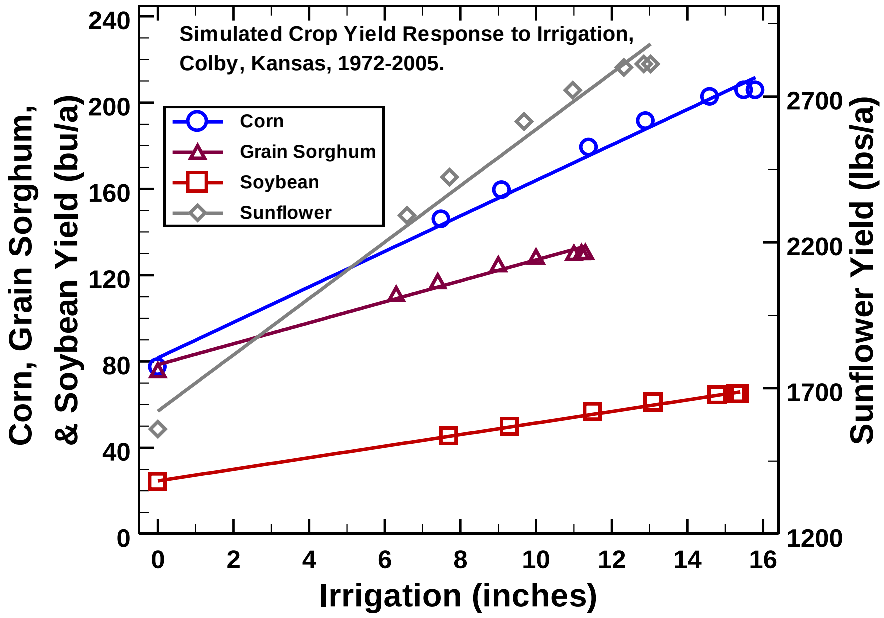
Off-season adjustments

- Increase irrigation efficiency and/or uniformity
- Adopt irrigation scheduling
- Improve management of precipitation and soil water through cultural practices
- Change crops or mixture of irrigated crops



Center pivot with multiple crops.

CROP WATER ALLOCATOR

K-State software that helps with decisions

Adapted from F. Lamm, 2014

Knowledge for Life

7. PROPERLY SCHEDULE YOUR IRRIGATION

a. Use the same start/**stop** position near pivot road
b. Use a checkbook budget like KanSched and Autonomous Pivot, to determine when to irrigate and how much
c. Use Soil Moisture or Plant Based sensors with Telemetry to "close the loop"
    1. Install on "start" side of pivot start/stop position
    2. Install on soil type with lower water holding capacity, if prevalent

Irrigation Scheduling

21st century definition (Lamm, et al. 2014):

Process of delaying any unnecessary irrigation with the hope that the cropping season will end before the next irrigation is needed.

<u>Off-season</u> adjustments

- Increase irrigation efficiency and/or uniformity
- **Adopt irrigation scheduling**

KanSched
Mobile Irrigation Lab

Lots of good science-based methods are available now

Monitoring available soil water

Infrared thermometers to monitor plant water stress

and more are on the way!!

We do need to improve adoption rates!!

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Adapted from F. Lamm, 2014

THE VALUE OF SCHEDULING

Direct

- Reduce Pumping cost
  ($4-6 in/ac)
- Increase Net Returns

Indirect

- Save on Input costs
  (N-20% ~$11/ac)
- Invest on future value

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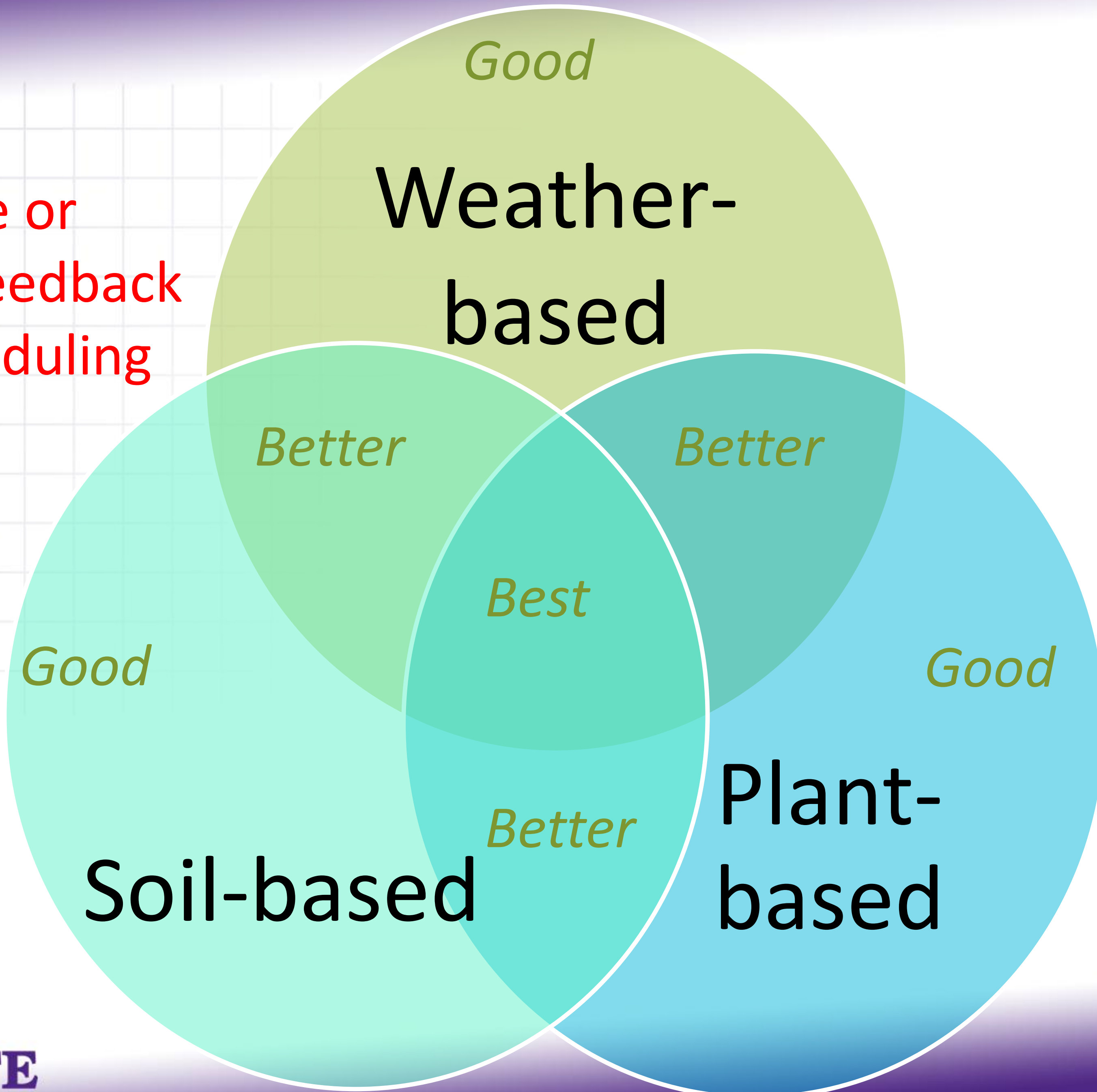
Use One or More Feedback for Scheduling



IRRIGATION SCHEDULING Starts by knowing what you have to manage

KanSched Mobile Irrigation Lab

Home | Groups | Background | Setup | Budget | Chart | Notes | Summary

FIELD: SLAN2

KanSched Mobile Irrigation Lab

Home | Groups | Background | Setup | Budget | Chart | Notes | Summary

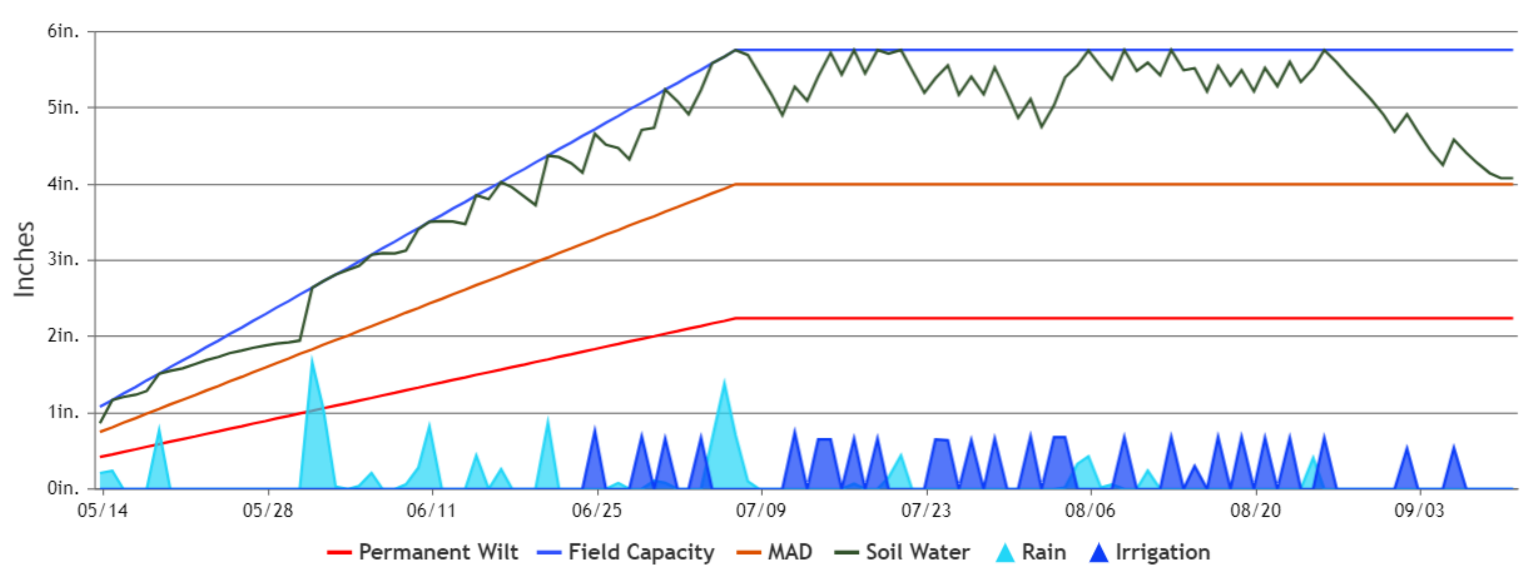
Unmasquerade | My account | Log

Growth Details

Stage

- Emergence
- Crop canopy exceeds 10% of the fiel
- Crop canopy exceeds 70% of the fiel
- Initial maturation of the crop
- End of the growing season

Soil Water



From: [Reset] To: [Reset]

Soil Layer Details

Soil Type: **Loamy Sand**

Percentage Profile: **100**

Field Capacity: **0.18**

Permanent Wilt: **0.07**

Budget Details

Reference ET: **26.38 inches**

Crop ET: **21.38 inches**

Rain: **12.23 inches**

Effective Rain: **6.06 inches**

Gross Irrigation: **16.88 inches**

Net Irrigation: **14.35 inches**

Initial Root Depth: **6 inches**

Maximum Root Depth: **32 inches**

Irrigation S

Rainfall Dis

Yield: 215 bu/ac

Water Use Eff.: 11.6 bu/ac-in

KanSched
Mobile Irrigation Lab

Home | Groups | Background | Setup | Budget | Chart | Notes | Summary

Unmasquerade | My account | Log out

FIELD: CSE10

Growth Details

Stage

Emergence

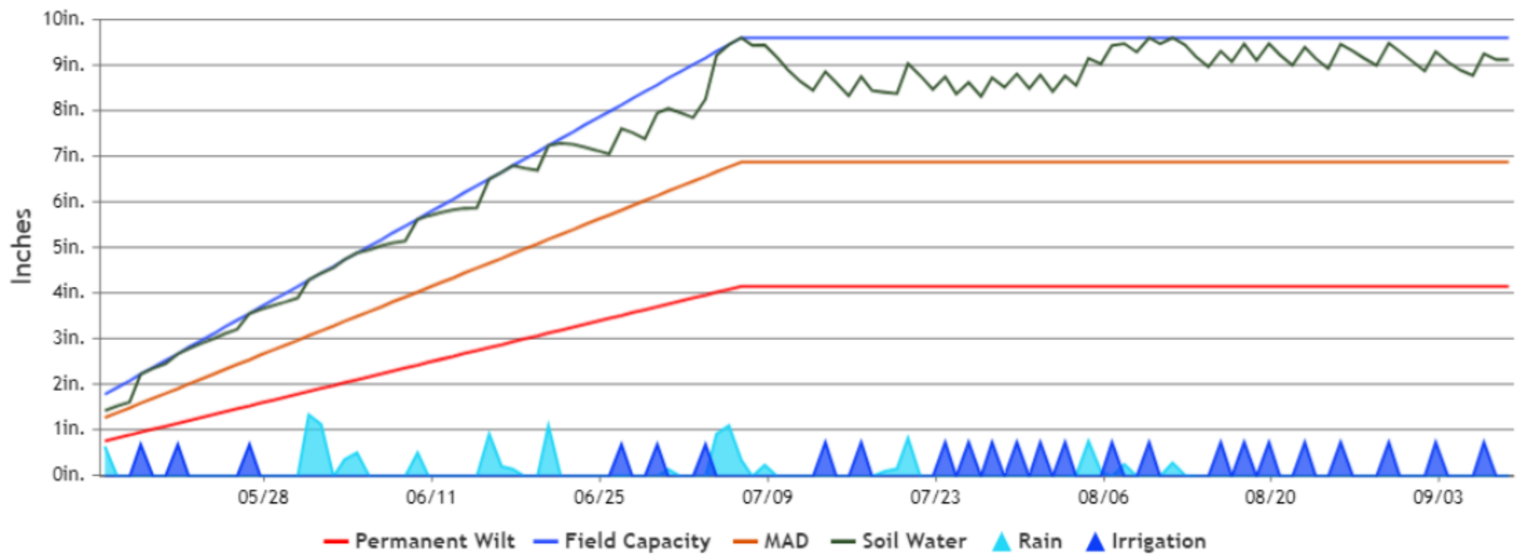
Crop canopy exceeds 10% of th

Crop canopy exceeds 70% of th

Initial maturation of the crop

End of the growing season

Soil Water



From: Reset

To: Reset

Soil Layer Details

Soil Type: Fine Sandy Loam

Percentage Profile: 100

Field Capacity: 0.3

Permanent Wilt: 0.13

Budget Details

Reference ET: 26.15 inches

Crop ET: 20.80 inches

Rain: 12.43 inches

Effective Rain: 6.60 inches

Gross Irrigation: 17.70 inches

Net Irrigation: 15.05 inches

Soil Details

Initial Soil Water: 80%

Initial Root Depth: 6 inches

Maximum Root Depth: 32 inches

Advanced Details

MAD: 50%

Irrigation System Efficiency: 85%

Rainfall Discount: 0.00 inches

Yield: 240 bu/ac

Water Use Eff.: 13.6 bu/ac-in

KanSched Mobile Irrigation Lab

KanSched Mobile Irrigation Lab

Home | Groups | Background | Setup | Budget | Chart | Notes | Summary

Unmasquerade | My account | Log out

FIELD: DNUM2

Growth Details

Stage

Emergence

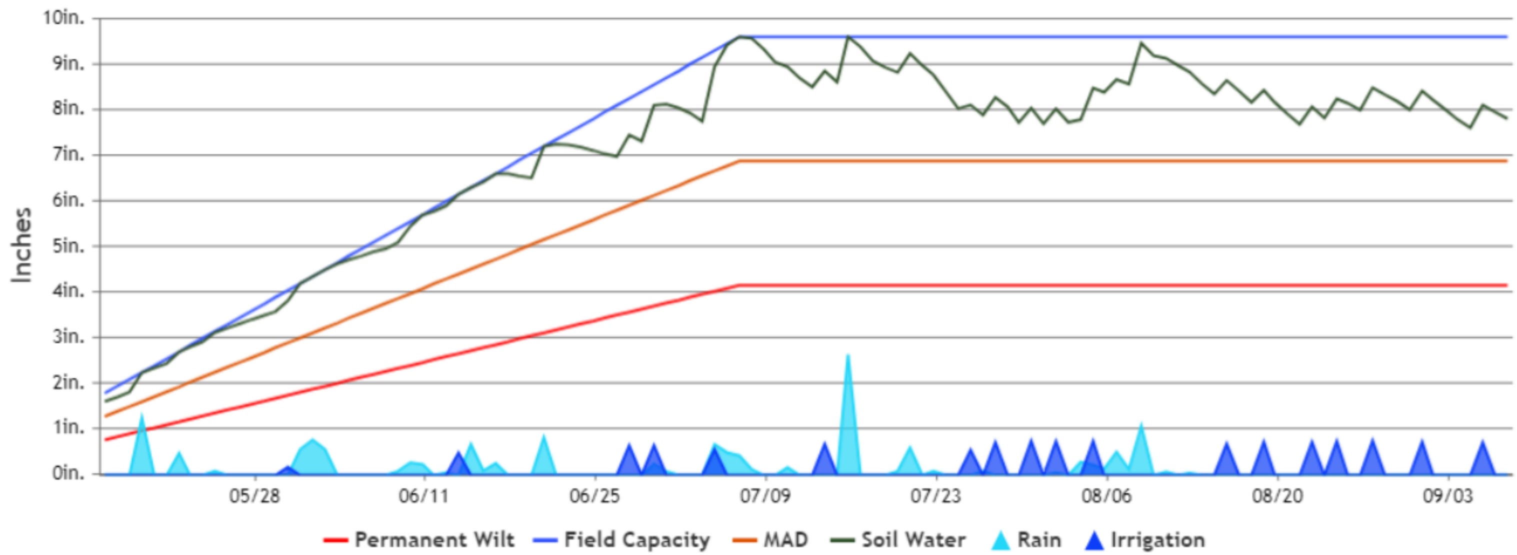
Crop canopy exceeds 10%

Crop canopy exceeds 70%

Initial maturation of the cr

End of the growing season

Soil Water



From: Reset

To: Reset

Soil Layer Details

Soil Type: **Fine Sandy Loam**

Percentage Profile: **100**

Field Capacity: **0.3**

Permanent Wilt: **0.13**

Budget Details

Reference ET: **25.85 inches**

Crop ET: **20.61 inches**

Rain: **14.63 inches**

Effective Rain: **9.14 inches**

Gross Irrigation: **11.84 inches**

Net Irrigation: **10.06 inches**

Soil Details

Initial Soil Water: **90%**

Initial Root Depth: **6 inches**

Maximum Root Depth: **32 inches**

Advanced Details

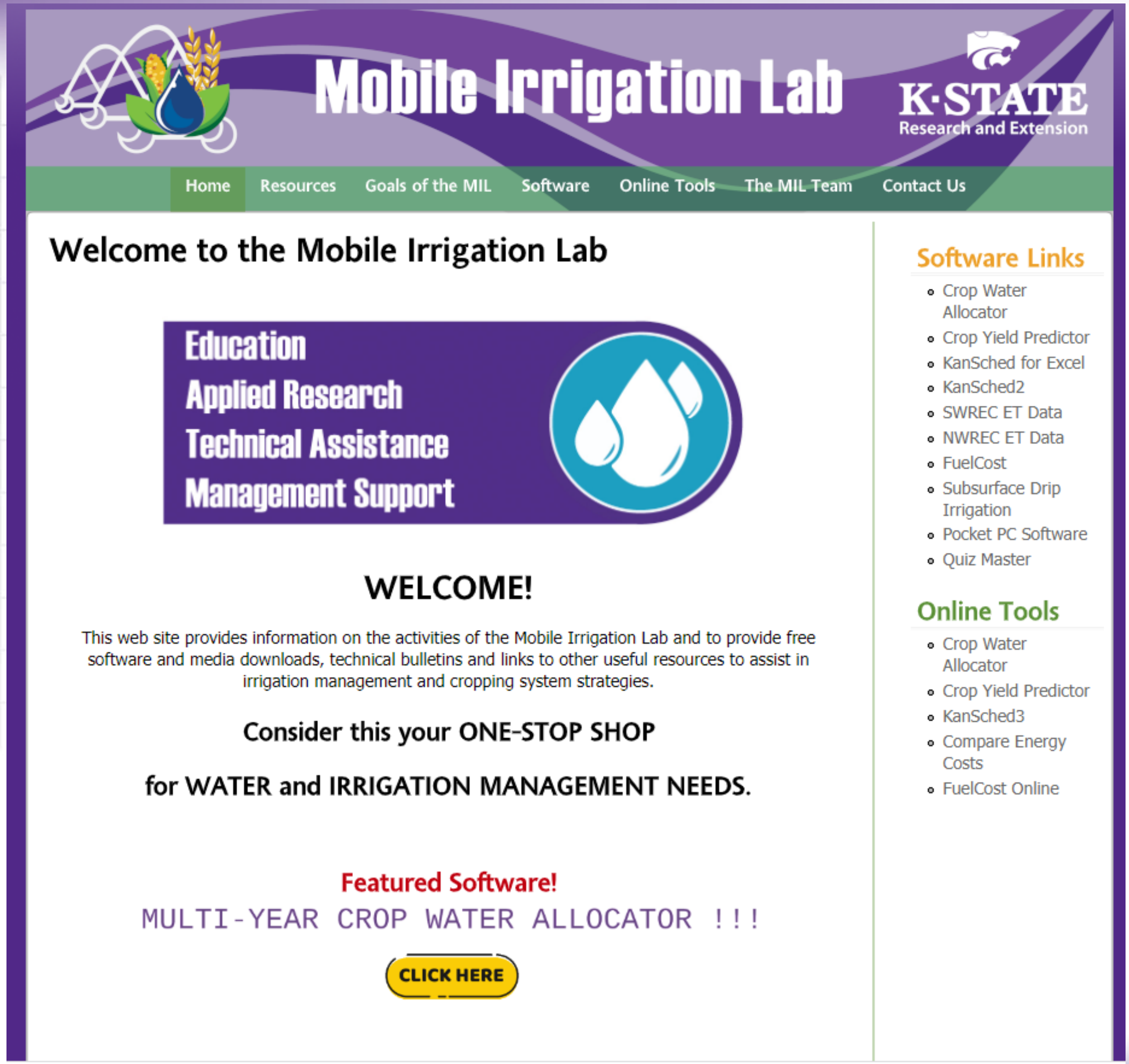
MAD: **50%**

Irrigation System Efficiency: **85%**

Rainfall Discount: **0.00 inches**

Yield: 181 bu/ac

Water Use Eff.: 13.4 bu/ac-in



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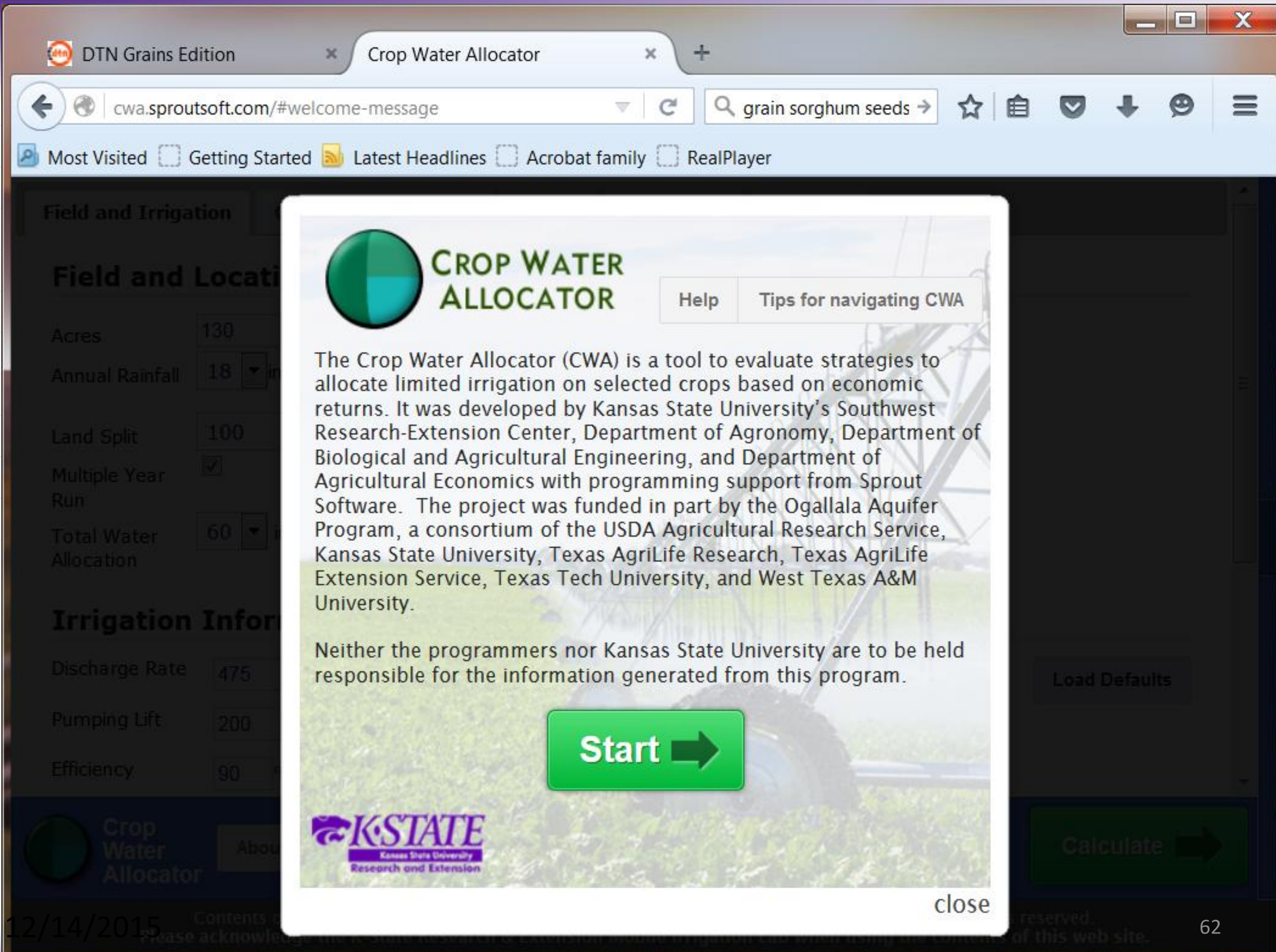
DTN Grains Edition
Crop Water Allocator
cwa.sproutsoft.com/#welcome-message
grain sorghum seeds
Most Visited
Getting Started
Latest Headlines
Acrobat family
RealPlayer
Field and Irrigation
Field and Locati
Acres
130
Annual Rainfall
18
Land Split
100
Multiple Year Run
Total Water Allocation
60
Irrigation Infor
Discharge Rate
475
Pumping Lift
200
Efficiency
90
Load Defaults
Calculate
CROP WATER ALLOCATOR
Help
Tips for navigating CWA
The Crop Water Allocator (CWA) is a tool to evaluate strategies to allocate limited irrigation on selected crops based on economic returns. It was developed by Kansas State University's Southwest Research-Extension Center, Department of Agronomy, Department of Biological and Agricultural Engineering, and Department of Agricultural Economics with programming support from Sprout Software. The project was funded in part by the Ogallala Aquifer Program, a consortium of the USDA Agricultural Research Service, Kansas State University, Texas AgriLife Research, Texas AgriLife Extension Service, Texas Tech University, and West Texas A&M University.
Neither the programmers nor Kansas State University are to be held responsible for the information generated from this program.
Start
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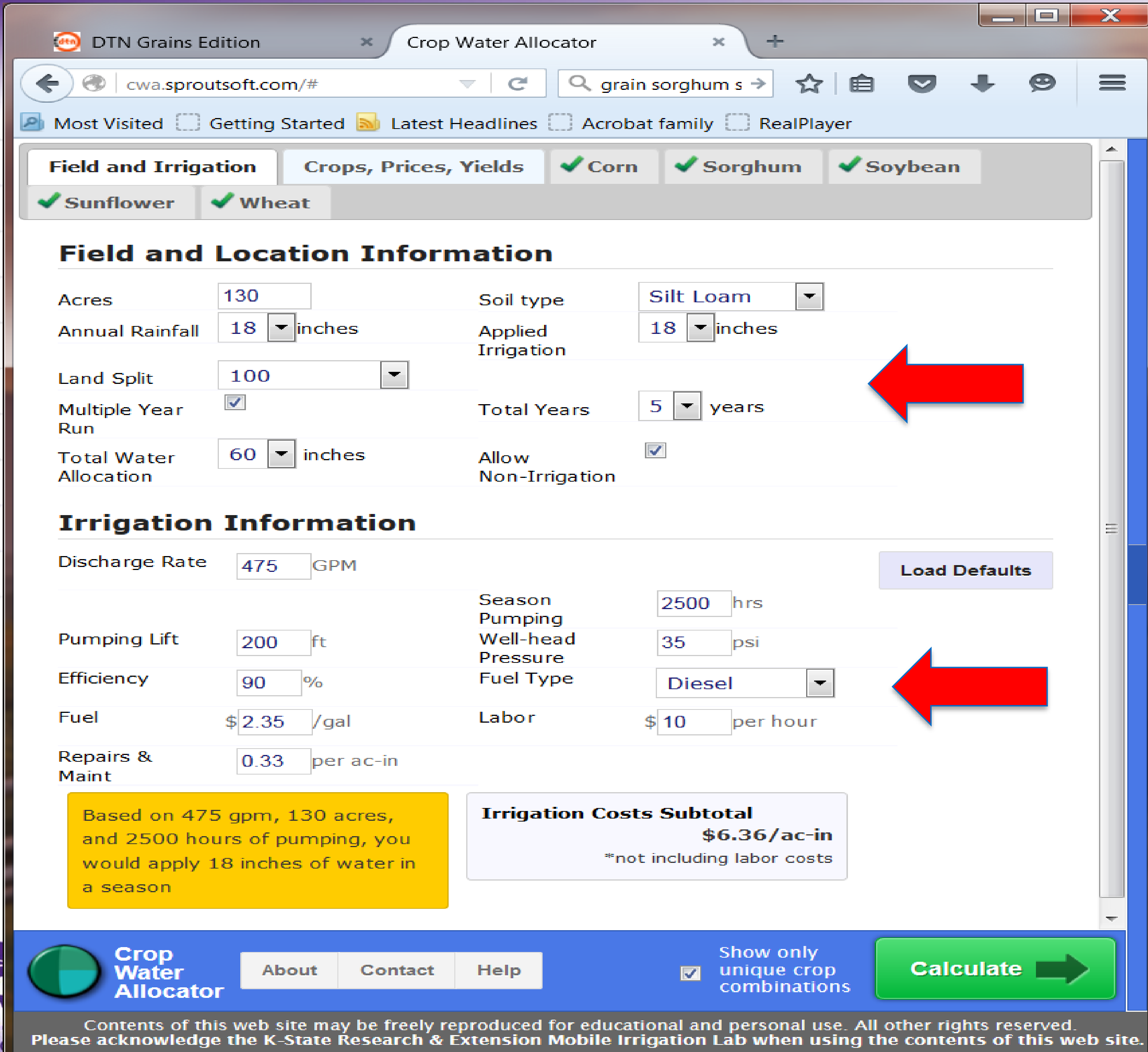
close


DTN Grains Edition
Crop Water Allocator
cwa.sproutsoft.com/#
grain sorghum s
Most Visited
Getting Started
Latest Headlines
Acrobat family
RealPlayer
Field and Irrigation
Crops, Prices, Yields
Corn
Sorghum
Soybean
Sunflower
Wheat
Field and Location Information
Acres
130
Soil type
Silt Loam
Annual Rainfall
18
inches
Applied Irrigation
18
inches
Land Split
100
Multiple Year Run
Total Years
5
years
Total Water Allocation
60
inches
Allow Non-Irrigation
Irrigation Information
Discharge Rate
475
GPM
Load Defaults
Season Pumping
2500
hrs
Pumping Lift
200
ft
Well-head Pressure
35
psi
Efficiency
90
%
Fuel Type
Diesel
Fuel
$ 2.35
/gal
Labor
$ 10
per hour
Repairs & Maint
0.33
per ac-in
Based on 475 gpm, 130 acres, and 2500 hours of pumping, you would apply 18 inches of water in a season
Irrigation Costs Subtotal
$6.36/ac-in
*not including labor costs
Crop Water Allocator
About
Contact
Help
Show only unique crop combinations
Calculate
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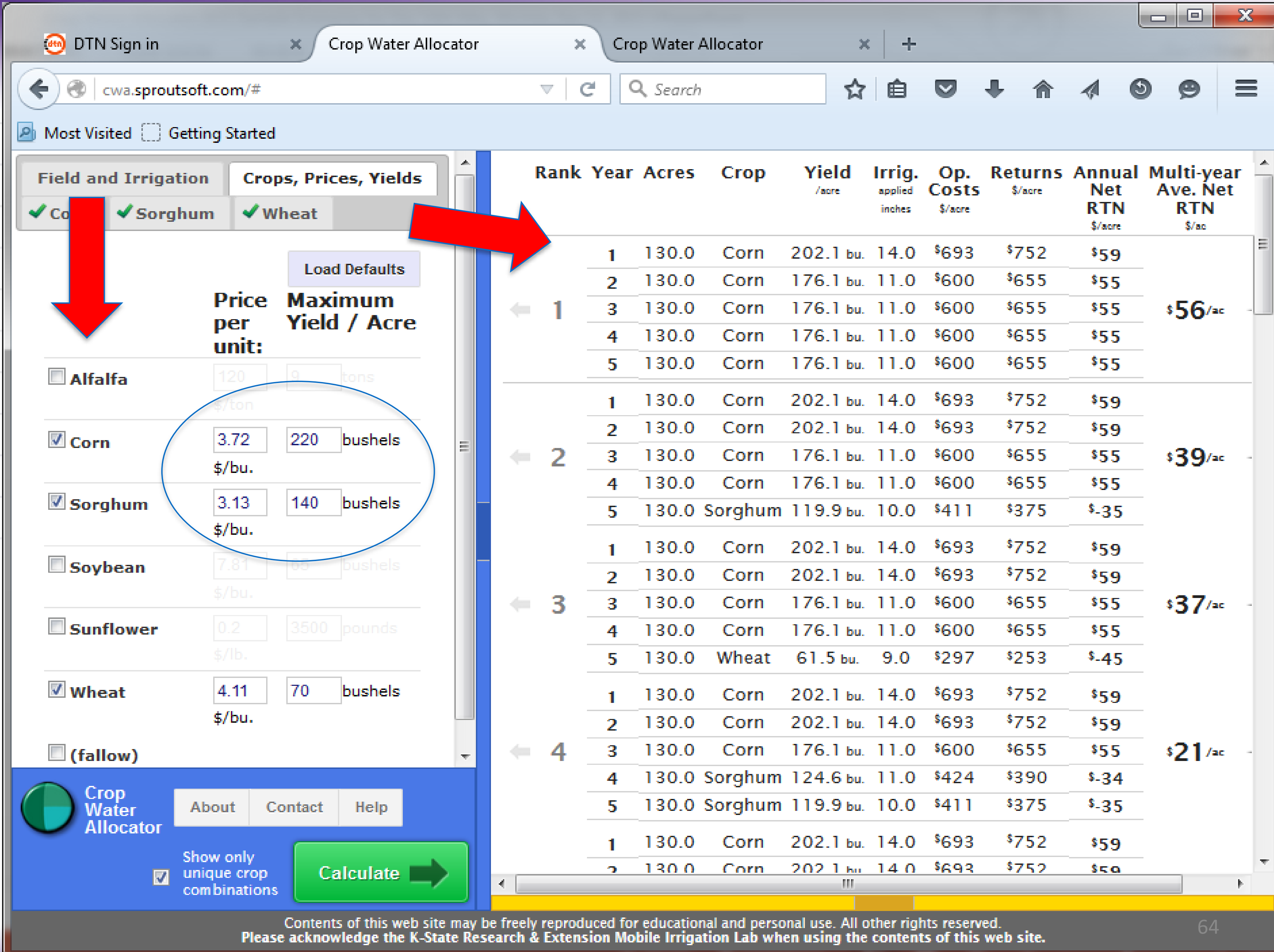

Rank	Year	Acres	Crop	Yield /acre	Irrig. applied inches	Op. Costs $/acre	Returns $/acre	Annual Net RTN $/acre	Multi-year Ave. Net RTN $/ac
1	1	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	$56/ac
	2	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	3	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	4	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	5	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
2	1	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	$39/ac
	2	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	
	3	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	4	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	5	130.0	Sorghum	119.9 bu.	10.0	$411	$375	$-35	
3	1	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	$37/ac
	2	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	
	3	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	4	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	5	130.0	Wheat	61.5 bu.	9.0	$297	$253	$-45	
4	1	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	$21/ac
	2	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	
	3	130.0	Corn	176.1 bu.	11.0	$600	$655	$55	
	4	130.0	Sorghum	124.6 bu.	11.0	$424	$390	$-34	
	5	130.0	Sorghum	119.9 bu.	10.0	$411	$375	$-35	
	1	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	
	2	130.0	Corn	202.1 bu.	14.0	$693	$752	$59	

Seven Points to Consider

To Complement Irrigation Systems

1. Keep irrigation system at optimum condition
2. Evaluate opportunities to be better
3. Apply water evenly in the field
4. Soak the water in where it is placed
5. Slow down pivot speed
6. Make better use of rainfall
7. Properly schedule your irrigation

Acknowledgment

- Kansas Water Office
- USDA OAP
- Kansas Water Office
- *Private industry:* Dragon-line, Netafim, Servi-tech, Monsanto, and more
- Kansas Corn Commission
- K-State Global Food System
- USDA NRCS Conservation Innovation Grant
- USDA-NIFA

OgallalaWater.org
OPTIMIZING WATER USE TO SUSTAIN FOOD SYSTEMS

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THANK YOU

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