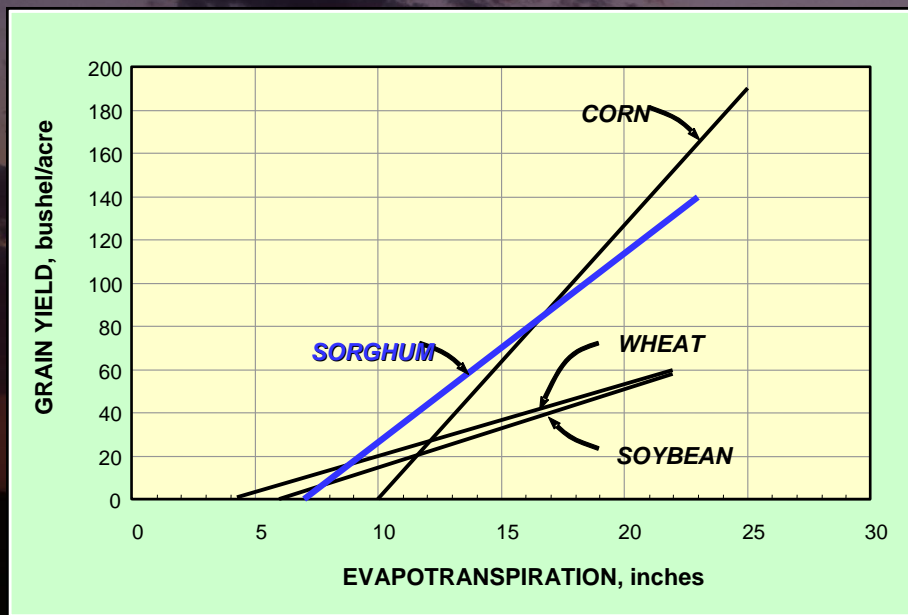


## Crop Water Use Efficiency of Corn, Soybean, and Sorghum under Dryland Conditions

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Watermark Sensors were installed at 1', 2', 3' and 4' depths in each plot and data was recorded every hour with Watermark dataloggers.



## Field Experimental Design

- **Datalogger (8 soil sensors/datalogger)**
- **4 sensors/crop**
- **Soil matric potential measured every ft. up to 4 ft.**
- **Matric potential converted to soil water in inch/ft using soil water retention curve.**


Crop	Replication
Sorghum	1
Corn	
Soybeans	
Corn	2
Soybeans	
Sorghum	
Soybeans	3
Corn	
Sorghum	




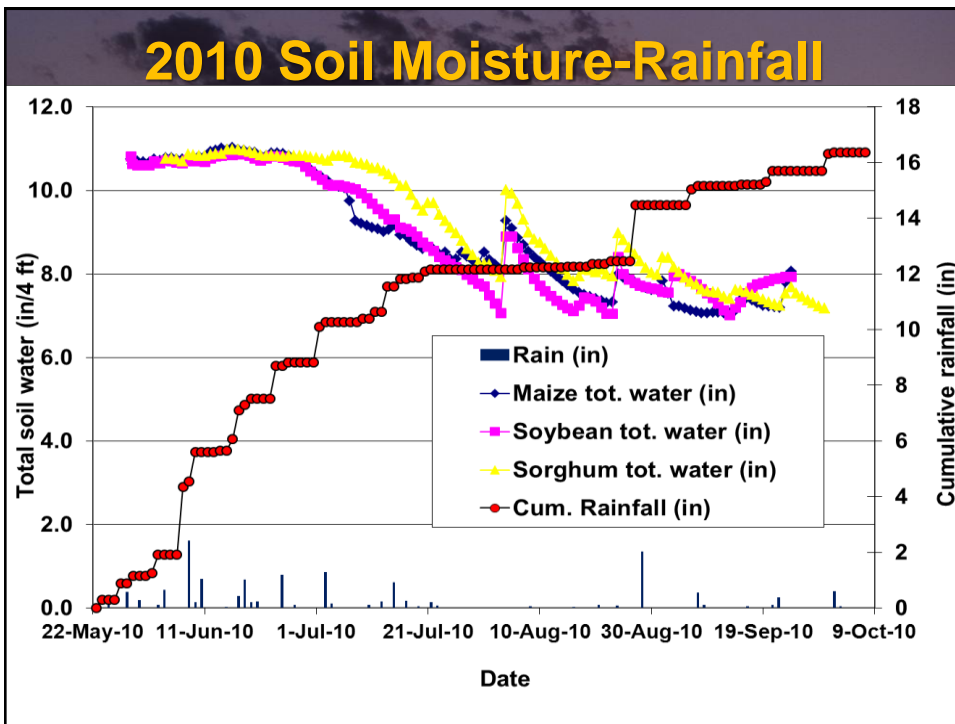
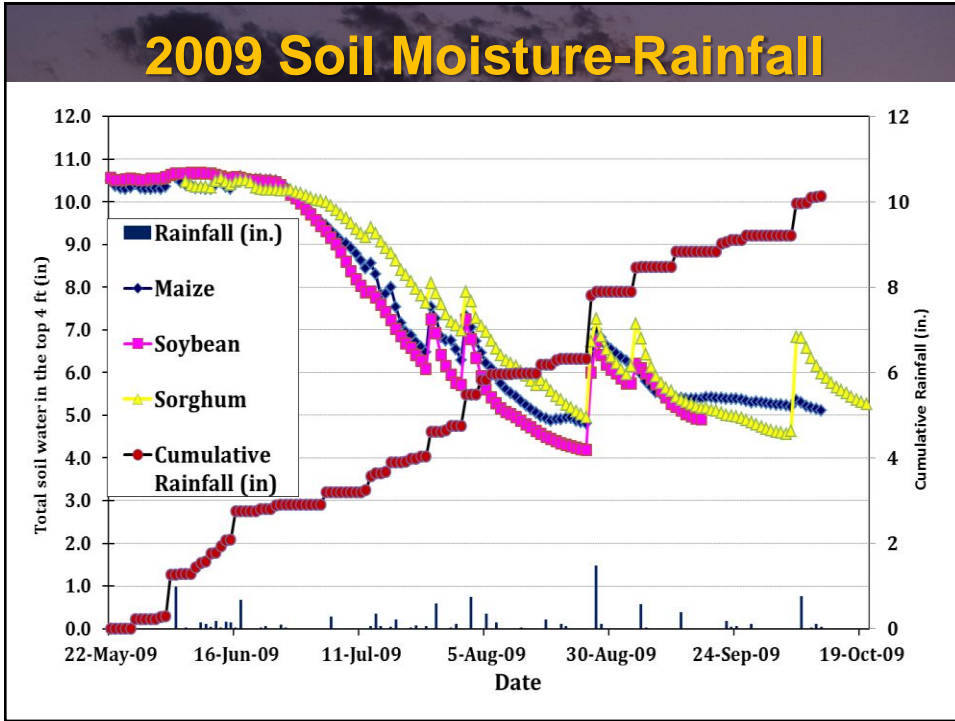
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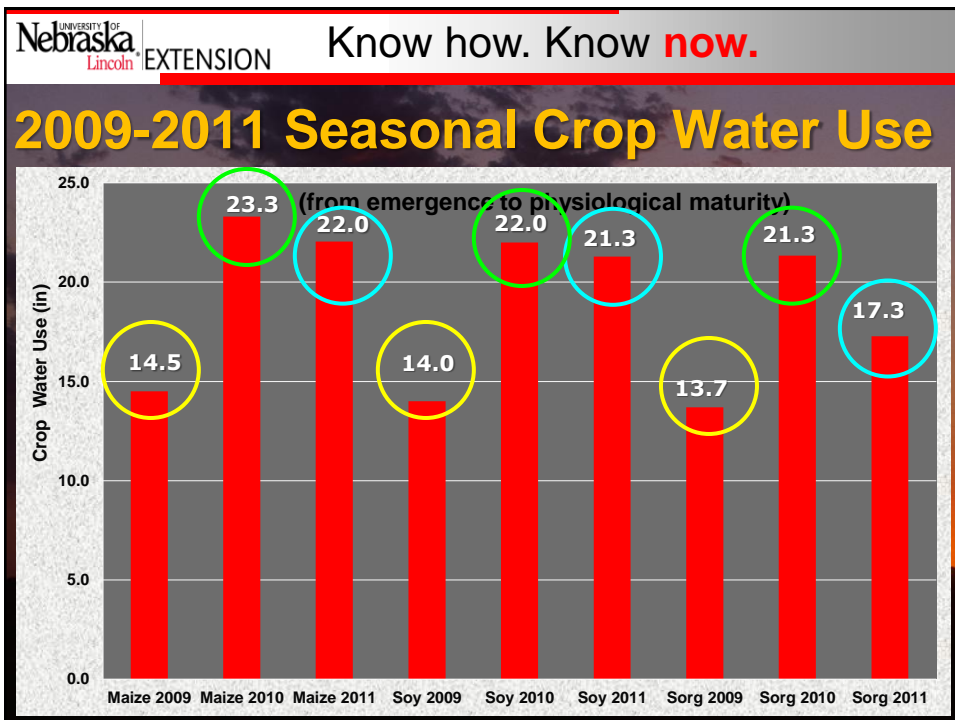
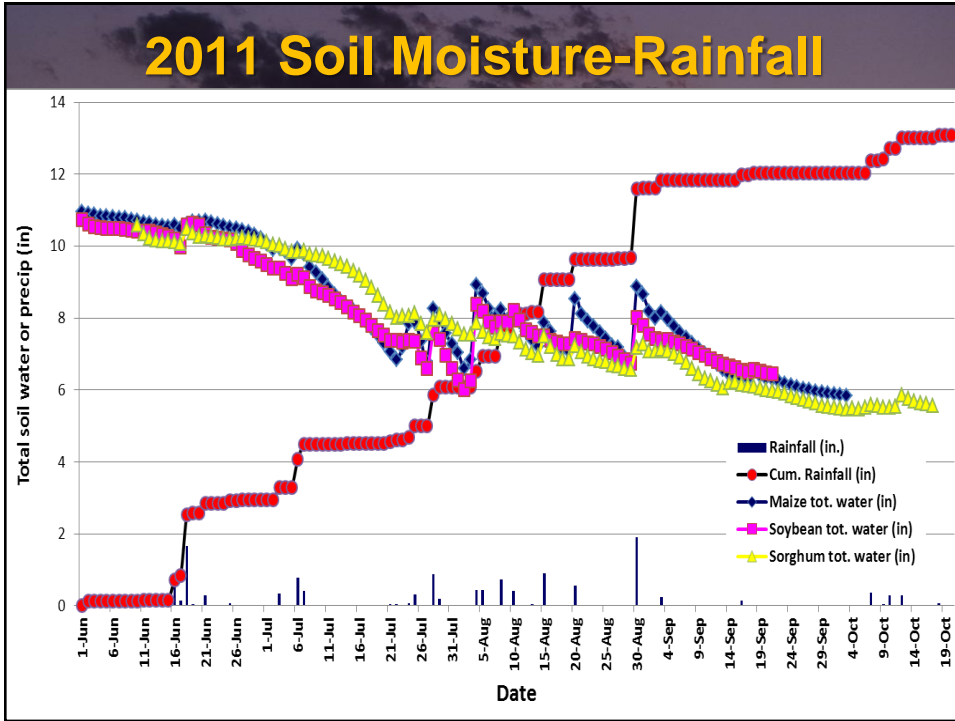
## 2009 Management Practices

Parameter	LAWRENCE		
	Corn	Soybean	Sorghum
Planting date	May 7	May 8	May 19
Emergence date	May 16	May 16	May 23
Maturity day/group	113-day	2.6	Medium-long
"Full" maturity date	Oct 5	Sept 15	Oct 6
Planting population (ppa)	20,000	135,000	65,000
Hybrid/variety	33T57	92M61	85Y40
Row spacing/planted rows	30"/12r	30"/12r	30"/12r

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<b>2010 Management Practices</b>			
Parameter	LAWRENCE		
	Corn	Soybean	Sorghum
<b>Planting date</b>	<b>May 7</b>	<b>May 7</b>	<b>May 28</b>
<b>Emergence date</b>	<b>May 17</b>	<b>May 17</b>	<b>June 4</b>
<b>Maturity day/group</b>	<b>113-day</b>	<b>2.6</b>	<b>Medium-long</b>
<b>"Full" maturity date</b>	<b>Sept. 12</b>	<b>Aug. 30</b>	<b>Oct. 4</b>
<b>Planting population (ppa)</b>	<b>20,000</b>	<b>135,000</b>	<b>65,000</b>
<b>Hybrid/variety</b>	<b>33T57</b>	<b>92M61</b>	<b>85Y40</b>
<b>Row spacing/planted rows</b>	<b>30"/12r</b>	<b>30"/12r</b>	<b>30"/12r</b>

 <b>Know how. Know now.</b>			
<b>2011 Management Practices</b>			
Parameter	LAWRENCE		
	Corn	Soybean	Sorghum
<b>Planting date</b>	<b>May 5</b>	<b>May 5</b>	<b>May 23</b>
<b>Emergence date</b>	<b>May 20</b>	<b>May 23</b>	<b>June 3</b>
<b>Maturity day/group</b>	<b>113-day</b>	<b>2.6</b>	<b>Medium-long</b>
<b>"Full" maturity date</b>	<b>Sept. 16</b>	<b>Sept. 9</b>	<b>Oct. 8</b>
<b>Planting population (ppa)</b>	<b>20,000</b>	<b>135,000</b>	<b>65,000</b>
<b>Hybrid/variety</b>	<b>33T57</b>	<b>92M61</b>	<b>85Y40</b>
<b>Row spacing/planted rows</b>	<b>30"/12r</b>	<b>30"/12 r</b>	<b>30"/12 r</b>






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## Crop Water Use Efficiency 2009-2011

	2011 Etc (in)	2011 Yield (bu/ac)	2011 CWUE (bu/in)	2010 Etc (in)	2010 Yield (bu/ac)	2010 CWUE (bu/in)	2009 Etc (in)	2009 Yield (bu)	2009 CWUE (bu/in)
<b>Corn</b>	22.0	127.2	5.8	23.3	101.2	4.3	14.5	97.5	6.7
<b>Soybean</b>	21.3	61.3	2.9	22.0	44.0	2.0	14	33.4	2.4
<b>Sorghum</b>	17.3	138.9	8.0	21.3	118.0	5.5	13.7	77.4	5.6




## Averages for 2009-2011

Crop	2009-2011 Avg Etc (in)	2009-2011 Avg Yield (bu/acre)	2009-2011 Avg CWUE (bu/in)
<b>Corn</b>	<b>19.9</b>	<b>108.6</b>	<b>5.6</b>
<b>Soybean</b>	<b>19.1</b>	<b>42.3</b>	<b>2.4</b>
<b>Sorghum</b>	<b>17.4</b>	<b>111.4</b>	<b>6.4</b>

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## Conclusions from Water Use Study

- Over the years of 2009-2011 in the Lawrence, NE location, sorghum on average had a higher crop water use efficiency and used over 2" less ET than corn or soybean in a rainfed environment.



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## Thank You!

- John Dolnicek
- Nebraska Grain Sorghum Board
- Little Blue NRD-Daryl Andersen
- Dr. Suat Irmak-UNL Extension Irrigation Specialist
- Dr. Charlie Wortmann-UNL Extension Soils Specialist
- Dr. Mark Bernards-former UNL Extension Weed Scientist
- Lowell Sandell-UNL Extension Weed Scientist
- Dr. Ray Ward, Ward Labs Kearney
- Dan Stork, Syngenta





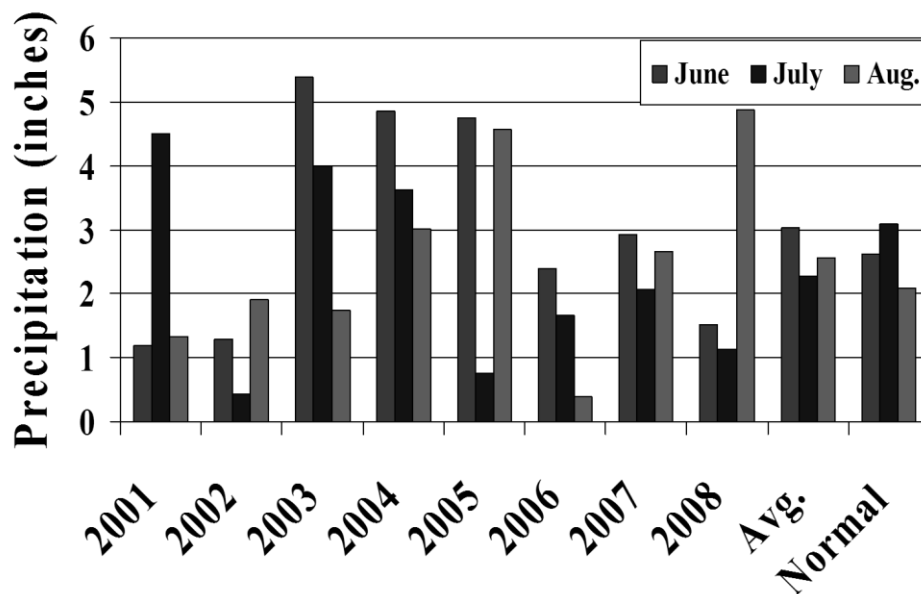
## Are Other Crops Better than Corn Under Limited Irrigation?

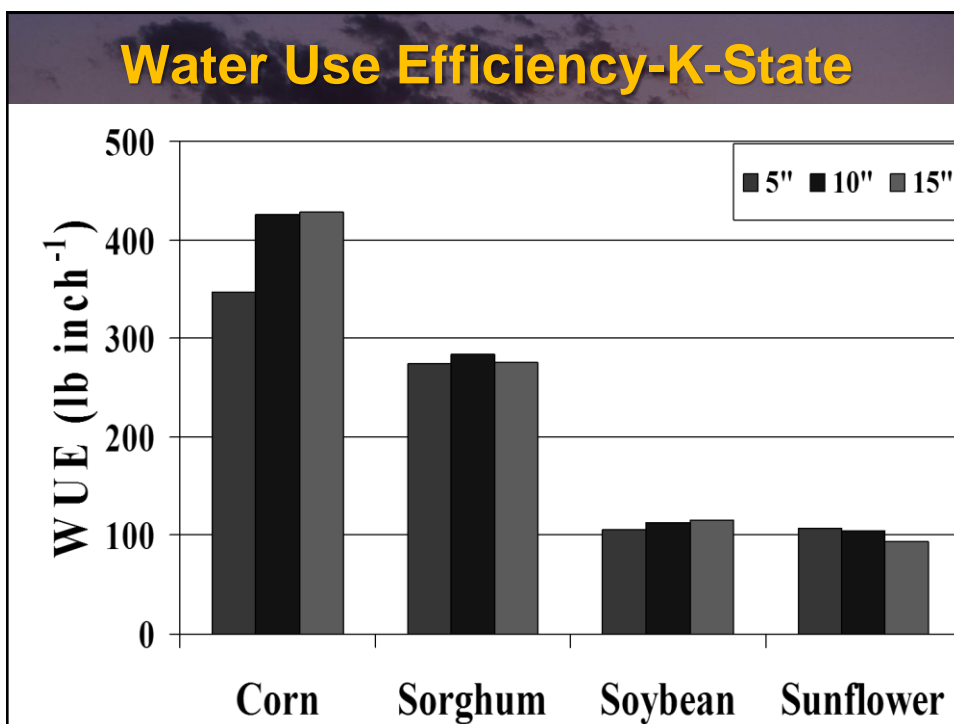
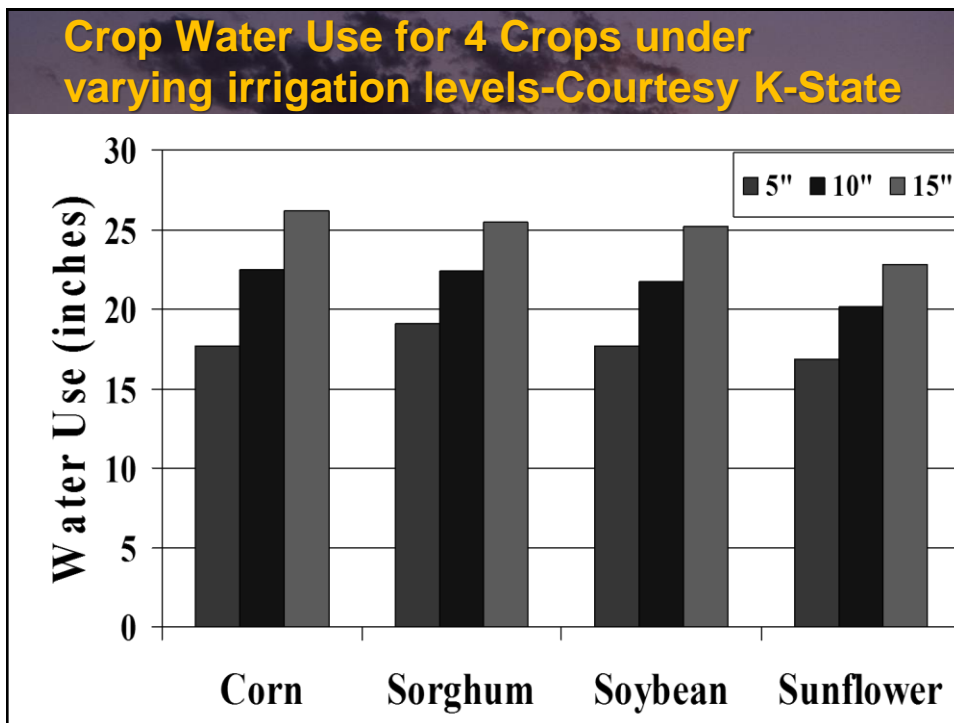
Alan Schlegel, Loyd Stone, Troy Dumler

Kansas State University



## Summer Precipitation-SWREC-Tribune, KS

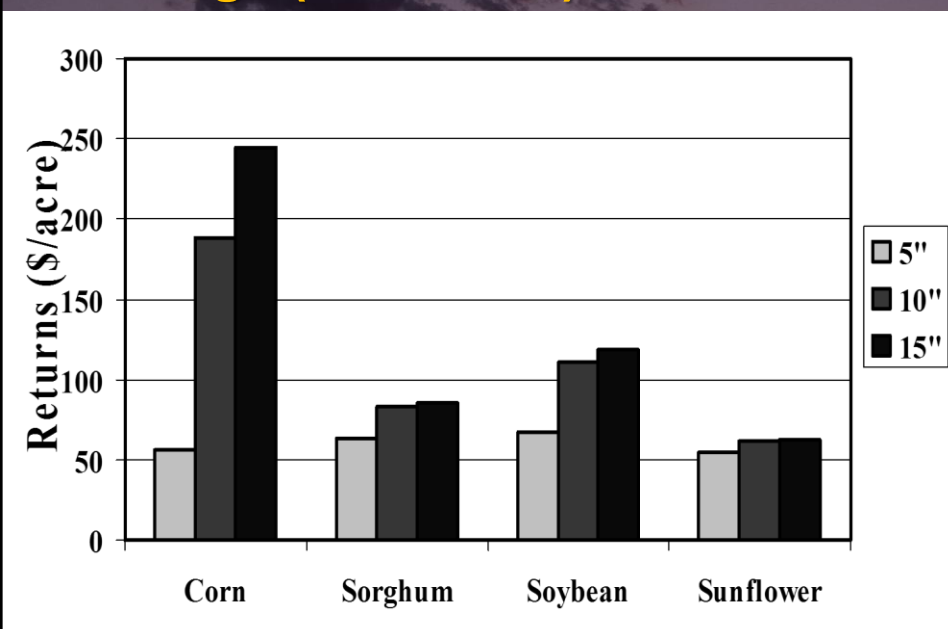




## Average Grain Yield (2001-2008)- SWREC-Tribune, KS

Irrigation Amt (acre/in)	Corn Yield (bu/acre)	Grain Sorghum Yield (bu/acre)	Soybean Yield (bu/acre)	Sunflower Yield (lb/acre)
5	113	94	31	1800
10	172	111	42	2080
15	201	123	47	2160

## Average (2001-2008) Net Returns



## Conclusions from K-State Study

- Under limited irrigation (under 10"), several crops (sorghum, soybean, sunflower) are as profitable as corn.
- These crops can also help break pest cycles.
- Irrigation amounts of 10" or greater annually make corn the most profitable crop.



## Texas Alliance for Water Conservation (2005-2011)

Crop	Yield/ acre	Inch/ acre	Yield/ inch	Profit/ acre	Profit/ inch
Sorghum	114.8	7.9	14.5	\$248.30	\$31.40
Corn	213.6	17.4	12.3	\$479.40	\$27.60
Cotton	1275	12.8	99.6	\$336.50	\$26.30


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## Conclusions and Discussion:

The UNL dryland study showed sorghum was the most crop water use efficient and used over 2" less ET over 3 years than corn or soybeans (this is with the best hybrids/varieties for area but not compared to drought tolerant corn hybrids).

The K-State limited irrigation study showed that sorghum is as economical as corn when less than 10" of irrigation water is available. If 10" or more of water is available, corn is the most economical option.

Sorghum is a good choice for dryland and limited irrigation environments in Nebraska.



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