

## **LONG TERM WATER STRATEGY PLANNING USING CROP WATER ALLOCATOR (CWA)**

### **Danny H. Rogers**

Extension Agricultural Engineer  
Kansas State University  
Biological and Agricultural Engineering  
Manhattan, Kansas  
Voice: 785-532-2933  
Email: drogers@ksu.edu

### **Jonathan Aguilar**

Extension Agricultural Engineer  
Kansas State University  
Southwest Research-Extension Center  
Garden City, Kansas  
Voice: 620-275-9164  
Email: jaguilar@ksu.edu

### **Isaya Kisekka**

Research Agricultural Engineer  
Kansas State University  
Southwest Research-Extension Center  
Garden City, Kansas  
Voice: 620-275-9164  
Email: ikisekka@ksu.edu

### **Freddie R. Lamm**

Research Agricultural Engineer  
Kansas State University  
Northwest Research-Extension Center  
Colby, Kansas  
Voice: 785-462-6281  
Email: flamm@ksu.edu

## **INTRODUCTION**

Water supply for irrigation from the Ogallala continues to become more limited either by physical constraints, such as loss of well capacity associated with declining aquifer thickness, or institutional constraints, such as reduction in the total allowable volume of water that can be pumped for a given time period. Either way, the irrigation producer will need to adjust the management strategy to the water availability. A tool to help in this decision making process is the Crop Water Allocator (CWA). The CWA is a planning tool that can help producers find the optimum combination of crop mix and irrigation amount for a given land area and total water volume in terms of net return per acre (Klocke et al., 2006). The CWA model is user friendly and can be customized to an individual's production inputs and is available at <http://www.bae.ksu.edu/mobileirrigationlab>. Two versions of the program are available; a compiled version that is downloaded to your computer or a web-based version that can be operated on-line.

## **DESCRIPTION OF CWA**

The CWA allows program operators to customize the inputs to their specific conditions but loads with default values that represent typical costs, yields, etc. The opening input page is shown in Figure 1. The program operator can customize the model by clicking on each input box and either selecting an input option from the dropdown menu or entering the desired value. Boxes with a question mark provide additional background information on the input as a help to the user. Crops of interest to a producer would be checked by clicking on the crop box next to the name. The land split selection determines how the acreage can be divided between crops or irrigation amount. A 50-50 selection means one half of the field can be of one crop that receives a certain irrigation amount and the one-half of another crop or amount. The same crop could be selected but with

different irrigation amounts. The total amount of irrigation application however cannot exceed the annual gross irrigation amount specified, although one split could receive the total amount and the other split(s), a reduced amount or none.

For each crop selected for consideration, the user should select current or projected crop price and the maximum yield that might be expected for each crop if grown under well watered conditions. Embedded into CWA are yield-water relationship curves for each crop. These curves are specific to the annual rainfall which is also an input. Crop specific production costs can also be changed, if desired, by clicking on the “Costs/Returns” box.

Total Acres: <input type="text" value="130"/>	Annual Rainfall (inches): <input type="text" value="15"/>	Land Split: <input type="text" value=""/>
Soil: <input type="text" value="Silt Loam"/>	Annual Gross Irrigation Amount (inches): <input type="text" value="9"/>	<input type="radio"/> 100 <input type="radio"/> 33 - 33 - 33
Irrigation Costs and Capacity: <input type="button" value="Enter Irrigation Information"/>	Calculated Gross Water Volume: (ac-in) <input type="text" value="1,170"/>	<input checked="" type="radio"/> 50 - 50 <input type="radio"/> 50 - 25 - 25
Irrigation Efficiency %: <input type="text" value="90"/>		<input type="radio"/> 75 - 25 <input type="radio"/> 25 - 25 - 25 - 25

  

Select the Crops to Evaluate:			
	Price per unit: <input type="text" value=""/>	Maximum Yield / Acre: <input type="text" value=""/>	Input Costs & Returns <input type="text" value=""/>
<input type="checkbox"/> Alfalfa	<input type="text" value="150"/> \$/ton	<input type="text" value="10"/> tons	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Corn	<input type="text" value="4.5"/> \$/bu.	<input type="text" value="240"/> bushels	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Grain Sorghum	<input type="text" value="4.3"/> \$/bu.	<input type="text" value="170"/> bushels	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Soybeans	<input type="text" value="10."/> \$/bu.	<input type="text" value="60"/> bushels	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Sunflower	<input type="text" value="0.20"/> \$/lb.	<input type="text" value="3500"/> pounds	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Wheat	<input type="text" value="6.5"/> \$/bu.	<input type="text" value="70"/> bushels	<input type="button" value="Costs/Returns"/>
<input checked="" type="checkbox"/> Fallow			<input type="button" value="Costs/Returns"/>

[\\*Enable Batch Processing by Selecting 'Enable Batch Processing' from the Tools menu](#)

Figure 1: Main input page of the CWA.

CWA begins evaluating the possible combination when the “Generate Output” button is clicked. The results are then shown as options as shown in Figure 2. Option 1 would be the combination of crops and irrigation amount that resulted in the largest net return. Option 2, the next largest combination and so forth.

Sensitivity changes could be made by altering an input and generating new output. It is best to change only one input at a time.

## Evaluation Results

Land Split (acres)	Crop	Yield	Irrigation (inches) Gross / Net	Total Operating Costs**	Total Returns	*Net Return	
65.0	Grain Sorghum	70.4 bu./ac	3.6" / 3.2"	\$218 /acre	\$303 /acre	\$85 /acre	Details
65.0	Corn	201.2 bu./ac	14.4" / 13.0"	\$519 /acre	\$905 /acre	\$386 /acre	Details
<b>Option 1</b>				<b>*Net Return</b>		\$236 /acre	

\*Net returns to land, management, and irrigation equipment  
\*\*Includes irrigation costs

Compare this option Back

Figure 2: Example of evaluation results from CWA. Option 1 is the combination of crops and irrigation amount that resulted in the largest net return.

## DISCUSSION OF RESULTS

The result of an analysis for a 130 acre field of silt loam soil and a 50-50 split option with an irrigation pumping cost of \$1.96 per acre-inch and the crops, crop prices and yield levels as shown in Table 1 for a rainfall year of 18 inches and 11 inches of water availability for the field. The annual rainfall is approximately average for Colby, Kansas and the 11 inch average application depth is the amount of depth allowed by the Sheridan 6 Local Enhanced Management Area (LEMA) in GMD4 of northwest Kansas. The actual water depth allowed by the LEMA is 55 inches in 5 years, but CWA looks at annual values.

The top option in Table 1 is corn on both splits with the same water level of 11 inches. In this case, the net return for each half of the field is the same, so the field average net return also is \$375/acre. The next option selected is also corn on both halves but with one with an irrigation application depth of 13.2 and the other with 8.8. Notice the predicted yield levels also changed for the more deficit irrigated corn and the higher water side had yields higher than the 11 inch application of option 1. However, the average return for the field decreased to \$358 as compared to \$375. Wheat, soybean and fallow do not appear in the first 10 options as shown in Table 1 but were considered in the ranking process. Corn was selected in each of the ten options shown and received average or above average irrigation depth.

Tables 2 and 3 show the results from CWA for identical crop conditions expect the irrigation limitation is 11 (as in Table 1) and 9 inches in Table 2 and 7 and 5 inches in Table 3. The best option for 11 inches of irrigation was corn/corn at 11/11 inches of irrigation with a net return of \$375. The best option predicted for 9 inches of irrigation was sorghum/corn at 5.4/12.6 inches of irrigation with a net return estimate of \$308. The option with the best net return if irrigation is limited to 7 inches is a sorghum/corn mix with irrigation of 2.8/11.2 and a net return of \$255 (Table 7). The final example limited irrigation to 5 inches, the top option was still a sorghum/corn selection but the sorghum was dryland and corn received 10 inches for a net return of \$188. Corn was only selected as the most limited irrigated crop when paired with corn.

Table 1. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 18 inches and irrigation of 11 inches.

CWA Option Ranking	Crop Split Selected	Yield (bu/ac)*	Gross Irr. (inches)	Total Operating Cost (\$/acre) +	Total Returns (\$/acre)	NET Return (\$/acre)**
1	Corn	193	11	493	868	375
	Corn	193	11	493	868	375
					<b>Field Net</b>	<b>375</b>
2	Corn	158	8.8	432	709	277
	Corn	215	13.2	526	966	439
					<b>Field Net</b>	<b>358</b>
3	Sorghum	137	8.8	323	589	267
	Corn	215	13.2	526	966	439
					<b>Field Net</b>	<b>353</b>
4	Sorghum	120	6.6	291	516	225
	Corn	229	15.4	559	1032	473
					<b>Field Net</b>	<b>349</b>
5	Sunflower	2772	8.8	229	554	256
	Corn	215	13.2	526	966	439
					<b>Field Net</b>	<b>347</b>
6	Corn	133	6.6	387	600	213
	Corn	229	15.4	559	1032	473
					<b>Field Net</b>	<b>343</b>
7	Sunflower	2429	6.6	279	486	207
	Corn	229	15.4	559	559	473
					<b>Field Net</b>	<b>340</b>
8	Sorghum	151	11	350	648	298
	Corn	193	11	493	868	375
					<b>Field Net</b>	<b>337</b>
9	Sorghum	100	4.4	259	430	170
	Corn	237	17.6	582	1066	483
					<b>Field Net</b>	<b>327</b>
10	Sunflower	2100	4.4	262	420	158
	Corn	237	17.6	582	1066	483
					<b>Field Net</b>	<b>320</b>

\*Yield for sunflower is pounds per acre. +Includes irrigation costs

\*\* Net returns to land, management and irrigation equipment

Table 2. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 18 inches and irrigation of 11 and 9 inches.

CWA Option Ranking	11 inches of irrigation			9 inches of irrigation		
	Crop Split Selected	Yield (IRR) (Bu/Ac) * (In)	NET Return (\$/acre)**	Crop Split Selected	Yield (IRR) (Bu/Ac) * (In)	NET Return (\$/acre)**
1	Corn	193 (11)	375	Sorghum	109 (5.4)	195
	Corn	193 (11)	375	Corn	208 (12.6)	420
	<b>Field Net</b>		<b>375</b>	<b>Field Net</b>		<b>308</b>
2	Corn	158 (8.8)	277	Sorghum	93 (3.6)	150
	Corn	215 (13.2)	439	Corn	223 (14.4)	454
	<b>Field Net</b>		<b>358</b>	<b>Field Net</b>		<b>302</b>
3	Sorghum	137 (8.8)	267	Sorghum	125 (7.2)	234
	Corn	215 (13.2)	439	Corn	190 (10.8)	368
	<b>Field Net</b>		<b>353</b>	<b>Field Net</b>		<b>301</b>
4	Sorghum	120 (6.6)	225	Corn	141 (7.2)	229
	Corn	229 (15.4)	473	Corn	190 (10.8)	368
	<b>Field Net</b>		<b>349</b>	<b>Field Net</b>		<b>298</b>
5	Sunflower	2772 (8.8)	256	Sunflower	2100 (5.4)	156
	Corn	215 (13.2)	439	Corn	208 (12.6)	420
	<b>Field Net</b>		<b>347</b>	<b>Field Net</b>		<b>288</b>
6	Corn	133 (6.6)	213	Sorghum	73 (1.8)	97
	Corn	229 (15.4)	473	Corn	232 (16.2)	479
	<b>Field Net</b>		<b>343</b>	<b>Field Net</b>		<b>288</b>
7	Sunflower	2429 (6.6)	207	Sunflower	2450 (7.2)	206
	Corn	229 (15.4)	473	Corn	190 (10.8)	368
	<b>Field Net</b>		<b>340</b>	<b>Field Net</b>		<b>287</b>
8	Sorghum	151 (11)	298	Corn	161 (9)	286
	Corn	193 (11)	375	Corn	161 (9)	286
	<b>Field Net</b>		<b>337</b>	<b>Field Net</b>		<b>286</b>
9	Sorghum	100 (4.4)	170	Sunflower	1834 (3.6)	116
	Corn	237 (17.6)	483	Corn	223 (14.4))	454
	<b>Field Net</b>		<b>327</b>	<b>Field Net</b>		<b>285</b>
10	Sunflower	2100 (4.4)	158	Corn	113 (5.4)	150
	Corn	237 (17.6)	483	Corn	208 (12.6)	420
	<b>Field Net</b>		<b>320</b>	<b>Field Net</b>		<b>285</b>

\*Yield for sunflower is pounds per acre. \*\* Net returns to land, management and irrigation equipment

Table 3. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 18 inches and irrigation of 7 and 5 inches.

CWA Option Ranking	7 inches of irrigation			5 inches of irrigation		
	Crop Split Selected	Yield (IRR) (Bu/Ac) * (In)	NET Return (\$/acre)**	Crop Split Selected	Yield (IRR) (Bu/Ac) * (In)	NET Return (\$/acre)**
1	Sorghum	84 (2.8)	128	Sorghum	51 (0)	40
	Corn	195 (11.2)	382	Corn	180 (10)	336
	<b>Field Net</b>		<b>255</b>	<b>Field Net</b>		<b>188</b>
2	Sorghum	68 (1.4)	83	Sorghum	105 (5)	185
	Corn	208 (12.6)	420	Sorghum	105 (5)	185
	<b>Field Net</b>		<b>251</b>	<b>Field Net</b>		<b>185</b>
3	Sorghum	98 (4.2)	165	Sorghum	96 (4)	160
	Corn	176 (9.8)	333	Sorghum	115 (6)	210
	<b>Field Net</b>		<b>249</b>	<b>Field Net</b>		<b>235</b>
4	Sorghum	51 (0)	40	Sorghum	87 (3)	134
	Corn	220 (14)	447	Sorghum	123 (7)	230
	<b>Field Net</b>		<b>244</b>	<b>Field Net</b>		<b>182</b>
5	Sunflower	1750 (2.8)	103	Sorghum	76 (2)	103
	Corn	195 (11.2)	382	Corn	151 (8)	257
	<b>Field Net</b>		<b>243</b>	<b>Field Net</b>		<b>180</b>
6	Sunflower	1491 (1.4)	64	Sorghum	63 (1)	69
	Corn	208 (12.6)	420	Corn	161 (9)	286
	<b>Field Net</b>		<b>242</b>	<b>Field Net</b>		<b>178</b>
7	Sunflower	2023 (4.2)	145	Sorghum	87 (3)	134
	Corn	176 (9.8)	333	Corn	138 (7)	221
	<b>Field Net</b>		<b>239</b>	<b>Field Net</b>		<b>177</b>
8	Sorghum	111 (5.6)	200	Sorghum	76 (2)	103
	Corn	154 (8.4)	267	Corn	131 (8)	250
	<b>Field Net</b>		<b>234</b>	<b>Field Net</b>		<b>177</b>
9	Sorghum	123 (7)	230	Sunflower	1680 (2)	94
	Sorghum	123 (7)	230	Corn	151 (8)	257
	<b>Field Net</b>		<b>230</b>	<b>Field Net</b>		<b>175</b>
10	Sorghum	111 (5.6)	200	Sunflower	1960 (4)	135
	Sorghum	134 (8.4)	258	Sorghum	115 (6)	210
	<b>Field Net</b>		<b>229</b>	<b>Field Net</b>		<b>173</b>

\*Yield for sunflower is pounds per acre. \*\* Net returns to land, management and irrigation equipment

Tables 4, 5 and 6 show the results of the 9 inch irrigation for 18, 21, and 15 inches of annual rainfall respectively. This would show what effect rainfall might have on the selection of the best option.

The top option for the three rainfall years are also show in Table 7. The best option for the 18 inch (average year) was a crop split of sorghum/ corn at irrigation of 5.4/12.6 inches with an estimated field net return of \$308. The selection for the 21 inch (above average rainfall year) was a corn/corn split with irrigaiton of 7.2 /10.8 with a net return of \$393. The top option for the drier year (15 inches) was a sorghum/corn split with irrigation at 3.6/14.4 inches with a field net return of \$236 per acre. If the top option for the three rainfall years were the same then the crop mix choice might be easier. The top crop mix selection may be overridden by other economic considerations or producer preference. For example, crop rotation preference due to the ease of transition or weed pressures may be factors that were not accounted for. Another option with only a small estimated field net return loss may be a better fit for a producer's operation and therefore may be selected by a producer as the preferred option

The effect of annual rainfall is also illustrated in Table 7 on the top option of the three years. A crop mix of sorghum/corn was selected for the 18 and 15 inch rainfall years and corn/corn for the 21 inch rainfall year.

A corn/corn split in the average year (18 inch) was option 4. It had an irrigation split of 7.2/10.8 and a field net return estimate of \$298, a lower amount than the 21 inch rainfall year. The 21 inch rainfall year had a net return of \$393, which was a \$95 advantage over the 18 inch year. The corn/corn split for the dry year did not appear in the top ten options. It was option 31 with an irrigation split of 7.2/10.8 and a field net return estimate of \$188 or \$110 less than the corn/corn split in an average year.

The sorghum/corn split was the top option for the average and dry year. In the wet year, the sorghum/corn mix appeared as option 4 with a net return of \$368. In the wet year, the corn/corn split's net return estimate was \$393, which gave it an advantage of \$25 over the sorghum/corn mix. The comparison seems to suggest the sorghum/corn slection may be the more robust selection for the range of rainfall conditions used.

This example illustrates how CWA might be used as a tool for long term term comparison of crop options for a given amount of irrigation under varying rainfall conditions. It can be used to compare production options for any of the production inputs, such as yield, irrigation amount, and crop prices.

Table 4. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 18 inches and irrigation of 9 inches.

<b>CWA Option Ranking</b>	<b>Crop Split Selected</b>	<b>Yield (bu/ac)*</b>	<b>Gross Irr. (inches)</b>	<b>Total Operating Cost (\$/acre) +</b>	<b>Total Returns (\$/acre)</b>	<b>NET Return (\$/acre)**</b>
<b>1</b>	Sorghum	109	5.4	274	469	195
	Corn	208	12.6	517	936	420
					<b>Field Net</b>	<b>308</b>
<b>2</b>	Sorghum	93	3.6	248	389	150
	Corn	223	14.4	549	1003	454
					<b>Field Net</b>	<b>302</b>
<b>3</b>	Sorghum	125	7.2	303	537	234
	Corn	190	10.8	489	857	368
					<b>Field Net</b>	<b>301</b>
<b>4</b>	Corn	141	7.2	407	636	229
	Corn	190	10.8	489	857	368
					<b>Field Net</b>	<b>298</b>
<b>5</b>	Sunflower	2100	5.4	264	420	156
	Corn	208	12.6	517	936	420
					<b>Field Net</b>	<b>288</b>
<b>6</b>	Sorghum	73	1.8	218	314	97
	Corn	232	16.2	564	1043	479
					<b>Field Net</b>	<b>288</b>
<b>7</b>	Sunflower	2450	7.2	284	490	206
	Corn	190	10.8	489	857	368
					<b>Field Net</b>	<b>287</b>
<b>8</b>	Corn	161	9	437	723	286
	Corn	161	9	437	723	286
					<b>Field Net</b>	<b>286</b>
<b>9</b>	Sunflower	1834	3.6	251	367	116
	Corn	223	14.4	549	1003	454
					<b>Field Net</b>	<b>285</b>
<b>10</b>	Corn	113	5.4	356	506	150
	Corn	208	12.6	517	939	420
					<b>Field Net</b>	<b>285</b>

\*Yield for sunflower is pounds per acre.

+Includes irrigation costs

\*\* Net returns to land, management and irrigation equipment



Table 5. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 21 inches and irrigation of 9 inches.

CWA Option Ranking	Crop Split Selected	Yield (bu/ac)*	Gross Irr. (inches)	Total Operating Cost (\$/acre) +	Total Returns (\$/acre)	NET Return (\$/acre)**
1	Corn	176	7.2	454	793	338
	Corn	216	10.8	523	971	447
					<b>Field Net</b>	<b>393</b>
2	Corn	194	9	481	872	390
	Corn	194	9	481	872	390
					<b>Field Net</b>	<b>390</b>
3	Corn	149	5.4	405	670	265
	Corn	227	12.6	542	1023	480
					<b>Field Net</b>	<b>372</b>
4	Sorghum	130	5.4	302	558	256
	Corn	227	12.6	542	1023	480
					<b>Field Net</b>	<b>368</b>
5	Sorghum	144	7.2	328	617	289
	Corn	216	10.8	523	971	447
					<b>Field Net</b>	<b>368</b>
6	Sunflower	2800	7.2	297	560	263
	Corn	216	10.8	523	971	447
					<b>Field Net</b>	<b>355</b>
7	Sorghum	115	3.6	278	493	205
	Corn	236	14.4	565	1058	493
					<b>Field Net</b>	<b>354</b>
8	Sorghum	154	9	345	660	315
	Corn	194	9	481	872	390
					<b>Field Net</b>	<b>352</b>
9	Sunflower	2450	5.4	227	490	213
	Corn	227	12.6	542	1023	480
					<b>Field Net</b>	<b>347</b>
10	Soybeans	41	5.4	210	412	202
	Corn	227	12.6	542	1023	480
					<b>Field Net</b>	<b>341</b>

\*Yield for sunflower is pounds per acre. +Includes irrigation costs

\*\* Net returns to land, management and irrigation equipment

Table 6. CWA results for the selection of crops, crop prices, yield levels for annual rainfall of 15 inches and irrigation of 9 inches.

CWA Option Ranking	Crop Split Selected	Yield (bu/ac)*	Gross Irr. (inches)	Total Operating Cost (\$/acre) +	Total Returns (\$/acre)	NET Return (\$/acre)**
1	Sorghum	70	3.6	218	303	85
	Corn	201	14.4	519	905	386
				303	<b>Field Net</b>	<b>236</b>
2	Sorghum	88	5.4	246	380	135
	Corn	178	12.6	476	800	324
					<b>Field Net</b>	<b>229</b>
3	Sorghum	48	1.8	183	206	23
	Corn	217	16.2	544	975	432
					<b>Field Net</b>	<b>227</b>
4	Sunflower	1484	3.6	238	297	58
	Corn	201	14.4	519	905	386
					<b>Field Net</b>	<b>222</b>
5	Sorghum	104	7.2	275	449	174
	Corn	157	10.8	444	705	262
					<b>Field Net</b>	<b>218</b>
6	Sorghum	118	9	298	509	211
	Sorghum	118	9	298	509	211
					<b>Field Net</b>	<b>211</b>
7	Sunflower	1750	5.4	252	350	98
	Corn	178	12.6	476	800	324
					<b>Field Net</b>	<b>211</b>
8	Sorghum	104	7.2	275	449	174
	Sorghum	137	10.8	326	575	248
					<b>Field Net</b>	<b>211</b>
9	Fallow	0	0	38	0	-38
	Corn	230	18	573	1030	458
					<b>Field Net</b>	<b>210</b>
10	Sorghum	24	0	142	102	-40
	Corn	229	18	573	1030	458
					<b>Field Net</b>	<b>209</b>

\*Yield for sunflower is pounds per acre. +Includes irrigation costs

\*\* Net returns to land, management and irrigation equipment

Table 7. Top option of CWA results for 18, 21 and 15 inch rainfall years and that crop mix in the ranking for the other rainfall years with 9 inches of irrigation.

<b>CWA Option Ranking and (rainfall)</b>	<b>Crop Split Selected</b>	<b>Yield (bu/ac)*</b>	<b>Gross Irr. (inches)</b>	<b>Total Operating Cost (\$/acre) +</b>	<b>Total Returns (\$/acre)</b>	<b>NET Return (\$/acre)**</b>
<b>1 (18)</b>	<u>Sorghum</u>	<u>109</u>	<u>5.4</u>	<u>274</u>	<u>469</u>	<u>195</u>
	<u>Corn</u>	<u>208</u>	<u>12.6</u>	<u>517</u>	<u>936</u>	<u>420</u>
					<b>Field Net</b>	<b>308</b>
<b>1 (21)</b>	<b>Corn</b>	<b>176</b>	<b>7.2</b>	<b>454</b>	<b>793</b>	<b>338</b>
	<b>Corn</b>	<b>216</b>	<b>10.8</b>	<b>523</b>	<b>971</b>	<b>447</b>
					<b>Field Net</b>	<b>393</b>
<b>1 (15)</b>	<u>Sorghum</u>	<u>70</u>	<u>3.6</u>	<u>218</u>	<u>303</u>	<u>85</u>
	<u>Corn</u>	<u>201</u>	<u>14.4</u>	<u>519</u>	<u>905</u>	<u>386</u>
					<b>Field Net</b>	<b>236</b>
<b>4 (18)</b>	<b>Corn</b>	<b>141</b>	<b>7.2</b>	<b>407</b>	<b>636</b>	<b>229</b>
	<b>Corn</b>	<b>190</b>	<b>10.8</b>	<b>489</b>	<b>857</b>	<b>368</b>
					<b>Field Net</b>	<b>298</b>
<b>4 (21)</b>	<u>Sorghum</u>	<u>130</u>	<u>5.4</u>	<u>302</u>	<u>558</u>	<u>256</u>
	<u>Corn</u>	<u>227</u>	<u>12.6</u>	<u>542</u>	<u>1023</u>	<u>480</u>
					<b>Field Net</b>	<b>368</b>
<b>31** (15)</b>	<b>Corn</b>	<b>105</b>	<b>7.2</b>	<b>359</b>	<b>474</b>	<b>115</b>
	<b>Corn</b>	<b>157</b>	<b>10.8</b>	<b>444</b>	<b>705</b>	<b>262</b>
					<b>Field Net</b>	<b>188</b>

\*Yield for sunflower is pounds per acre.

+ Includes irrigation costs

\*\* Net returns to land, management and irrigation equipment

++ The corn/corn selection option ranked 31<sup>st</sup> of all possible crop and irrigation water combinations.

## CONCLUSIONS

Producers need to make decisions on how to use their available land and irrigation water resources that result in the optimal economic returns. Many factors influence the outcome. The Crop Water Allocator program may be a tool to help them determine the best crop acreage mix for the increasingly limited water resources available to them.

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