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Center-Pivot-Irrigated Sunflowers Cost-Return Budget

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Sunflower is an economically viable crop alternative for growers in the High Plains region, including Kansas, Colorado, and Nebraska. The state of Kansas ranked third in the nation in oil-type sunflower acreage in 2001 with 290,000 acres, behind North Dakota (860,000 acres) and South Dakota (661,000 acres). Kansas ranked fifth in the United States in non-oil (i.e., primarily confection and some birdseed) sunflower acres (33,000 acres), following North Dakota (215,000 acres), Texas (70,000 acres), Colorado (62,000 acres), and South Dakota (44,000 acres).

Irrigated confection and oil-type sunflowers are competitive cropping alternatives to irrigated corn and other crops in western Kansas. Sunflowers generally have lower water requirements than irrigated corn, and may be advantageous in situations where irrigation water is limited. Irrigated sunflowers may also be a "double crop" option following wheat in western Kansas where growing season length permits. The quality of farmland and the management expertise of crop producers can have large impacts on sunflower yields. Sunflower moth is a potential problem, but can be controlled with management practices such as planting date selection, diligent field scouting, and timely application of insecticides when needed.

Sunflower Prices

The sunflower prices used in these budgets do not include any premiums or discounts for oil content, foreign matter, or identification such as a mid-oleic or Nusun,, variety. For confection sunflowers it is assumed that 65 percent of sunflower seeds are graded as "large," with the remaining 35 percent graded as "small." The actual proportion of large versus small confection sunflower seed varies from year to year, depending on growing conditions and other factors. The existence of several major sunflower processing plants in the High Plains region provides area sunflower producers with local market outlets for the crop, and helps ensure the long run viability of the sunflower enterprise in the region.

Income Per Acre

Crop production costs per unit and net returns are highly dependent on yields. The following estimated budgets include three different yield levels, which are intended to represent expected yields for land of varying quality for a given level of management. Producers can compare the profitability of crop enterprises on farmland tracts with

Table 1A. *Production Inputs — Center-Pivot-Irrigated Oil-Type Sunflower*

	Yield Level (lbs)			
Item	1,800	2,300	2,800	
Seed, 1,000/ac	23.4	23.4	23.4	$0.81/1,000
Fertilizer:				
N (anhydrous)	90	115	140	$0.13/lb
N	0	0	0	$0.22/lb
P	33	42	51	$0.22/lb
K	0	0	0	$0.14/lb
Lime	0	0	0	$0.01/lb
Herbicide				
Prowl	3.6	3.6	3.6	$2.66/pt
Insecticide / Fungicide				
Warrior 1 EC	0.025	0.025	0.025	$301.60/lb
Warrior 1 EC	0.025	0.025	0.025	$301.60/lb
Irrigation water, in	8	10	12	$3.34/in

Table 1B. *Production Inputs — Center-Pivot-Irrigated Confectionary Sunflower*

	Yield Level (lbs)			
Item	1,700	2,200	2,600	
Seed, 1,000/ac	17.6	17.6	17.6	$0.99/1,000
Fertilizer:				
N (anhydrous)	85	110	130	$0.13/lb
N	0	0	0	$0.22/lb
P	32	41	48	$0.22/lb
K	0	0	0	$0.14/lb
Lime	0	0	0	$0.01/lb
Herbicide				
Prowl	3.6	3.6	3.6	$2.66/oz
Insecticide / Fungicide				
Warrior 1 EC	0.025	0.025	0.025	$301.60/lb
Warrior 1 EC	0.025	0.025	0.025	$301.60/lb
Irrigation water, in	8	10	12	$3.34/in

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varying yield potential by considering alternative expected yield scenarios. Land values and government payments have been adjusted for alternative yield levels in this budget. In customizing a budget to your farm, attention should be given to using land values representative of your farm's productive capacity and local farmland market conditions.

Price per hundred weight (cwt.) for oil-type sunflowers represents an expected harvest price in Goodland, Kan., accounting for government sunflower marketing loan price support levels. Sunflower producers in other regions of western Kansas should use an expected price that is representative for their location.

Crop insurance was not included as an input expense in this budget because yields reflect an average of all years (good and bad). If crop insurance is included as an input expense, then an expected value for indemnity payments should be included in the returns section. Historically, crop insurance indemnity payments have typically exceeded premiums due to government subsidies.

Costs Per Acre

Production costs at the three production levels are shown on lines 1 through 13. Kansas Custom Rates for specific field operations are used to represent fuel and labor costs as well as machinery repair, depreciation, and interest expenses in these budgets. Tables 1A and 1B identify the typical seed, fertilizer, herbicide, and insecticide requirements (rate and cost/unit) for center-pivot-irrigated oil-type and confection

Table 2A. *Machinery and Land Resources — Center-Pivot-Irrigated Oil-Type Sunflower*

	Yield Level (lbs)			
ITEM	1,800	2,300	2,800	
Tillage/Planting/Chemical Applications:				
Chisel	1	1	1	$6.41/ac
Disk	1	1	1	$5.74/ac
Field cultivate	1	1	1	$5.49/ac
Plant	1	1	1	$9.23/ac
Anhydrous application	1	1	1	$5.58/ac
Fertilizer application	0	0	0	$3.66/ac
Herbicide application	1	1	1	$3.66/ac
Insecticide / fungicide application	2	2	2	$3.74/ac
Harvest				
Base charge	1	1	1	$17.53/ac
Extra charge for yields exceeding	0	0	0	$0.000/cwt
Hauling	1,800	2,300	2,800	$0.204/cwt
Non-machinery labor	0.50	0.50	0.50	$10.00/hr
Irrigation labor	0.50	0.50	0.50	$10.00/hr
Land value/acre	$553	$692	$830	5.75%
Interest on capital				8.0%
Irrigation Equipment	Investment, $/ac		Years	Salvage value
Well, pump and gearhead value	$377.00		15	0%
Power unit and meter	$63.00		7	0%
Irrigation system	$387.00		15	0%

Table 2B. *Machinery and Land Resources — Center-Pivot-Irrigated Confectionary Sunflower*

	Yield Level (lbs)			
ITEM	1,700	2,200	2,600	
Tillage/Planting/Chemical Applications:				
Chisel	1	1	1	$6.41/ac
Disk	1	1	1	$5.74/ac
Field cultivate	1	1	1	$5.49/ac
Plant	1	1	1	$9.23/ac
Anhydrous application	1	1	1	$5.58/ac
Fertilizer application	0	0	0	$3.66/ac
Herbicide application	1	1	1	$3.66/ac
Insecticide / fungicide application	2	2	2	$3.74/ac
Harvest				
Base charge	1	1	1	$17.53/ac
Extra charge for yields exceeding	0	0	0	$0.000/cwt
Hauling	1,700	2,200	2,600	$0.204/cwt
Non-machinery labor	0.50	0.50	0.50	$10.00/hr
Irrigation labor	0.50	0.50	0.50	$10.00/hr
Land value/acre	$553	$692	$830	5.75%
Interest on capital				8.0%
Irrigation Equipment	Investment, $/ac		Years	Salvage value
Well, pump and gearhead value	$377.00		15	0%
Power unit and meter	$63.00		7	0%
Irrigation system	$387.00		15	0%

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sunflowers, respectively. Herbicide requirements include both pre-crop and in-crop treatments. Tables 2A and 2B outline the machinery and land resources used for center-pivot-irrigated sunflowers. Each tillage, planting, and harvest operation is identified.

Irrigation Costs

Any land preparation costs are included with the land charge. Price of the energy source and Total Dynamic Head (TDH) are the major factors affecting pumping costs. For instance, at 300 TDH, an increase in natural gas prices from $3 to $4 per mcf causes pumping costs to increase from $2.22 to $2.97 per acre-inch. At 500 TDH, the same increase in natural gas price causes pumping costs to increase from $3.71 to $4.94 per acre-inch. See MF-836, *Irrigation Capital Requirements and Energy Costs*, for an explanation of Total Dynamic Head and other examples of pumping costs for natural gas, diesel, electricity and propane.

The choice of a flood or center pivot system depends on: (1) available capital; (2) labor availability during the growing season; (3) the terrain, which may require a center pivot system; and (4) soil type. Capital requirements will run $20,000 to $40,000 higher for sprinkler over flood irrigation systems. However, labor requirements can be considerably less for the sprinkler system.

Other Sunflower Production and Marketing Resources

K-State Research and Extension has a number of resources available relating to sunflower production and marketing. The *High Plains Sunflower Production Handbook*, MF-2384, provides information on recommended sunflower production practices for the High Plains region, including Kansas, Colorado, Nebraska, and Wyoming. *Sunflower Marketing in the High Plains*, L-887, addresses a number of practical marketing issues and the development of an effective sunflower marketing plan. Economic issues with Sunflowers, MF-2514, discusses a number of economic trends and issues affecting the U.S. and Kansas sunflower industry. These publications can be obtained through K-State Research and Extension offices or via the K-State Research and Extension website, *www.oznet.ksu.edu*.

COST-RETURN PROJECTION — CENTER-PIVOT-IRRIGATED OIL-TYPE SUNFLOWERS

	Yield Level (lbs)			Your
	1,800	2,300	2,800	Farm
INCOME PER ACRE				
A. Yield per acre	1,800	2,300	2,800	
B. Price per hundredweight	$ 9.62	$ 9.62	$ 9.62	
C. Net government payment	$ 30.04	$ 32.65	$ 35.26	
D. Indemnity payments	$	$	$	
E. Miscellaneous income	$	$	$	
F. Returns/acre ((A × B) + C + D + E)	$ 203.20	$ 253.91	$ 304.62	
COSTS PER ACRE				
1. Seed	$ 18.95	$ 18.95	$ 18.95	
2. Herbicide	9.56	9.56	9.56	
3. Insecticide / Fungicide	15.08	15.08	15.08	
4. Fertilizer and Lime	18.96	24.19	29.42	
5. Crop Consulting	6.50	6.50	6.50	
6. Crop Insurance				
7. Drying				
8. Miscellaneous	10.00	10.00	10.00	
9. Custom Hire / Machinery Expense	64.79	65.81	66.83	
10. Non-machinery Labor	5.00	5.00	5.00	
11. Irrigation				
a. Labor	5.00	5.00	5.00	
b. Fuel and Oil	26.72	33.40	40.08	
c. Repairs and Maintenance	2.64	3.30	3.96	
d. Depreciation on Equipment and Well	59.93	59.93	59.93	
e. Interest on Equipment	33.08	33.08	33.08	
12. Land Charge / Rent	31.80	39.76	47.73	
G. SUB TOTAL	$ 308.02	$ 329.57	$ 351.13	
13. Interest on 1/2 Nonland Costs	7.33	7.87	8.42	
H. TOTAL COSTS	$ 315.35	$ 337.45	$ 359.54	
I. RETURNS OVER COSTS (F - H)	$–112.15	$ –83.54	$ –54.92	
J. TOTAL COSTS/CWT ((H ÷ A) × 100)	$ 17.52	$ 14.67	$ 12.84	
K. RETURN TO ANNUAL COST (I + 13) ÷ G	-34.03%	-22.96%	-13.24%	

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COST-RETURN PROJECTION — CENTER-PIVOT-IRRIGATED CONFECTIONARY SUNFLOWERS

	Yield Level (lbs)			Your
	1,700	2,200	2,600	Farm
INCOME PER ACRE				
A. Yield per acre	1,700	2,200	2,600	
B. Price per hundredweight	$ 13.50	$ 13.50	$ 13.50	
C. Net government payment	$ 30.04	$ 32.65	$ 35.26	
D. Indemnity payments	$	$	$	
E. Miscellaneous income	$	$	$	
F. Returns/acre ((A × B) + C + D + E)	$ 259.54	$ 329.65	$ 386.26	
COSTS PER ACRE				
1. Seed	$ 17.42	$ 17.42	$ 17.42	
2. Herbicide	9.56	9.56	9.56	
3. Insecticide / Fungicide	15.08	15.08	15.08	
4. Fertilizer and Lime	18.09	23.32	27.46	
5. Crop Consulting	6.50	6.50	6.50	
6. Crop Insurance				
7. Drying				
8. Miscellaneous	10.00	10.00	10.00	
9. Custom Hire / Machinery Expense	64.59	65.61	66.42	
10. Non-machinery Labor	5.00	5.00	5.00	
11. Irrigation				
a. Labor	5.00	5.00	5.00	
b. Fuel and Oil	26.72	33.40	40.08	
c. Repairs and Maintenance	2.64	3.30	3.96	
d. Depreciation on Equipment and Well	59.93	59.93	59.93	
e. Interest on Equipment	33.08	33.08	33.08	
12. Land Charge / Rent	31.80	39.76	47.73	
G. SUB TOTAL	$ 305.42	$ 326.97	$ 347.23	
13. Interest on 1/2 Nonland Costs	7.22	7.77	8.26	
H. TOTAL COSTS	$ 312.64	$ 334.74	$ 355.49	
I. RETURNS OVER COSTS (F - H)	$ –53.10	$ –5.09	$ 30.77	
J. TOTAL COSTS/CWT ((H ÷ A) × 100)	$ 18.39	$ 15.22	$ 13.67	
K. RETURN TO ANNUAL COST (I + 13) ÷ G	-15.02%	0.82%	11.24%	

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