



Center-Pivot-Irrigated Grain Sorghum Cost-Return Budget

Department of Agricultural Economics



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This budget provides cost and return estimates for center-pivot-irrigated grain sorghum in Western Kansas. Kansas led the nation in grain sorghum production during 1999, producing 43 percent of the U.S. total. Historically, greater than two-thirds of the state's irrigated grain sorghum crop is harvested in Western Kansas. The area is home to the state's large cattle feeding complex and a developing hog industry, ensuring a continued high level of demand for feedgrains.

Cost-Return Projections

Any land preparation costs are included with the land charge. Other investments are shown in Table 1. Price of the energy source and Total Dynamic Head (TDH) are the important 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 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 as much as 1 hour/acre less for the sprinkler system.

Expected Yields and Enterprise Returns

Crop production costs per unit and net returns are highly dependent on yields. The following estimated budget includes three different yield levels, which are intended to represent expected yields for land of varying quality for a given level of management. Alternative expected yields can help producers compare the profitability of crop enterprises on farmland tracts with varying yield potentials. Land values, government payments and some variable inputs have been adjusted for alternative yield levels in this budget. In customizing this budget to your farm, attention should be given to using land values representative of your farm's productive capacity. Projections of net percentage return on

investment permit comparisons to be made among alternative enterprises or other investments.

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, MPCI indemnity payments have exceeded premiums due to government subsidies.

Table 1. Factors Used for Cost-Return Budget

Item	Yield Level (bu)			
	87	96	105	
Water, 325 TDH	10 in	14 in	16 in	\$3.76/inch
Fertilizer:				
N (Anhy.)	75	83	91	\$0.15/lb
N (Dry)	25	28	30	\$0.24/lb
P	39	43	48	\$0.18/lb
K	0	0	0	\$0.14/lb
Lime	0	0	0	\$0.01/lb
Seed, lbs.	6.0	6.5	6.5	
Seed price, \$/lb*	\$1.25	\$1.25	\$1.25	
Labor hours	1.80	1.90	2.00	
Labor price/hour				\$10.80
Land value/acre	\$558	\$697	\$836	
Land interest rate				6.00%
Land real estate tax				0.50%
Machinery investment				\$197
Machinery life				10 yrs
Salvage value				35%
Well, pump and gearhead value				\$317.42
Well, pump and gearhead life				15 yrs
Power unit and meter value				\$41.27
Power unit and meter life				7 yrs
Irrigation system value				\$360.90
Irrigation system life				10 yrs
Interest rate on machinery and equipment				10.00%
Insurance rate on machinery and equipment				0.25%
Interest on variable costs				10.00%

*Assumes seed is treated with Concep.

COST-RETURN PROJECTION — CENTER-PIVOT-IRRIGATED GRAIN SORGHUM

	Yield Level (bu)			Your Farm
	87	96	105	
VARIABLE COSTS PER ACRE: ¹				
1. Labor	\$ 19.43	\$ 20.52	\$ 21.61	
2. Seed	7.50	8.13	8.13	
3. Herbicide	23.99	23.99	23.99	
4. Insecticide	9.36	9.36	9.36	
5. Fertilizer and Lime	24.27	26.91	29.49	
6. Fuel and Oil — Crop	13.58	14.34	15.10	
7. Fuel and Oil — Pumping ²	37.60	52.64	60.16	
8. Machinery and Equipment Repairs	19.82	20.93	22.04	
9. Irrigation Repairs and Maintenance	3.00	4.20	4.80	
10. Crop Insurance				
11. Drying	8.70	9.60	10.50	
12. Custom Hire ³				
13. Crop Consulting	6.25	6.25	6.25	
14. Miscellaneous	8.00	8.00	8.00	
15. Interest on 1/2 Variable Costs	9.08	10.24	10.97	
A. TOTAL VARIABLE COSTS	\$ 190.58	\$215.11	\$ 230.39	
FIXED COSTS PER ACRE: ¹				
16. Real Estate Taxes (including well)	4.38	5.07	5.77	
17. Interest on Land and Well ⁴	52.53	60.87	69.21	
18. Rent for Rented Land ⁵				
19. Depreciation on Crop Machinery	12.81	12.81	12.81	
20. Interest on Crop Machinery ⁶	13.30	13.30	13.30	
21. Depreciation on Irrigation Equipment and Well	63.15	63.15	63.15	
22. Interest on Irrigation Equipment ⁶	20.11	20.11	20.11	
23. Insurance on Machinery and Equipment	1.50	1.50	1.50	
B. TOTAL FIXED COSTS	\$ 167.76	\$176.79	\$ 185.83	
C. TOTAL COSTS (A + B)	\$ 358.33	\$391.90	\$ 416.22	
D. YIELD PER ACRE	87	96	105	
E. PRICE PER BUSHEL ⁷	\$ 1.78	\$ 1.78	\$ 1.78	
F. NET GOVERNMENT PAYMENT ⁷	\$ 8.67	\$ 9.42	\$ 10.17	
G. INDEMNITY PAYMENTS	\$	\$	\$	
H. MISCELLANEOUS INCOME	\$	\$	\$	
I. RETURNS PER ACRE [(D × E) + F + G + H]	\$ 163.53	\$180.30	\$ 197.07	
J. RETURNS OVER VARIABLE COSTS (I – A)	\$ -27.05	\$ -34.81	\$ -33.32	
K. RETURNS OVER TOTAL COSTS (I – C)	\$-194.80	\$-211.60	\$-219.15	
L. VARIABLE COSTS PER BUSHEL (A ÷ D)	\$ 2.19	\$ 2.24	\$ 2.19	
M. TOTAL COSTS PER BUSHEL (C ÷ D)	\$ 4.12	\$ 4.08	\$ 3.96	
N. NET RETURN ON INVESTMENT				
[(K+15+17+20+22) ÷ INVESTMENT] ⁸	-6.77%	-6.64%	-6.02%	

¹Totals were derived using information listed in Table 1. ²See MF-836, "Irrigation Capital Requirements and Energy Costs." ³If using custom hire, adjust lines 6, 8, 19, and 20. ⁴Assumes interest rate shown in Table 1. ⁵If cash rented, insert zero in lines 16 and 17. ⁶Assumes one-half the average investment [(initial investment + salvage value) ÷ 2] at the interest rate shown in Table 1. ⁷See MF-1013 "Prices for Crop and Livestock Cost-Return Budgets" and MF-2236 "Government Program Payments for Crop Cost-Return Budgets" for additional information on crop prices and program payments. ⁸Investment equals total value of all fixed assets shown in Table 1.

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