



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 1996, producing 44 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, insuring a continued high level of demand for feedgrains.

Cost-Return Projections

Land preparation costs are included in land value. Other investments are shown in Table 1. Price of the energy source and total dynamic head are the important factors affecting pumping costs. For instance, a \$1 change in natural gas price causes a \$2.97 increase with 100 feet TDH. However, with 500 feet TDH, a \$1 change in gas price causes a \$14.83 change in costs for each acre foot of water pumped.

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 outlays will be \$20,000 to \$40,000 higher with a center pivot system, but labor requirements could be reduced by as much as 1 hour/acre compared to flood irrigation. MF-836, *Irrigation Capital Requirements and Energy Costs*, shows the irrigation costs and energy input amounts used in this budget.

Yield Goals, Return Factors

Cost per bushel and net returns in crop production are highly dependent on yields. The following estimated budget includes three different yield levels. Yield goals vary for a number of reasons such as soil type/land quality, historical weather patterns, input levels, and management. Budgeting for alternative yield goals can help producers compare the profitability of crop enterprises on farmland tracts with varying yield potentials.

Multi-peril crop insurance expenses at a 65 percent yield level are included in this budget as a cost of managing production risk in an area prone to great yield variability. Land values have been adjusted for alternative yield goals in this budget. In customizing this budget to fit 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 and other investments.

Table 1. Factors Used for Cost-Return Budget

Item	Yield Level (bu)			
	85	110	135	
Water, 325 TDH	10 in	14 in	16 in	\$2.55/inch
Fertilizer:				
N (Anhy.)	80	110	140	\$0.17/lb
N (Dry)	0	0	0	\$0.31/lb
P	40	40	40	\$0.28/lb
K	0	0	0	\$0.13/lb
Lime	0	0	0	\$0.005/lb
Seed, lbs	7	8	8	
Seed price, \$/lb	\$1.05	\$1.05	\$1.05	
Labor hours	1.66	1.75	1.84	
Labor price/hour				\$10.80
Land value/acre	\$480	\$600	\$720	
Land interest rate				6.00%
Land real estate tax rate				0.50%
Machinery investment				\$197
Machinery life				10 yrs
Machinery salvage value				35%
Interest rate on machinery				10.00%
Well, pump and gearhead value				\$290
Well, pump and gearhead life				15 yrs
Power unit and meter value				\$50
Power unit and meter life				7 yrs
Irrigation system value				\$385
Irrigation system life				10 yrs
Insurance rate on machinery				0.25%
Interest on variable costs				10.00%

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

	Yield Level (bu)			Your Farm
	85	110	135	
VARIABLE COSTS PER ACRE: ¹				
1. Labor	\$ 17.90	\$ 18.90	\$ 19.90	
2. Seed	7.35	8.40	8.40	
3. Herbicide	20.35	20.35	20.35	
4. Insecticide	10.44	10.44	10.44	
5. Fertilizer and Lime	24.80	29.90	35.00	
6. Fuel and Oil — Crop	7.04	7.43	7.83	
7. Fuel and Oil — Pumping ²	25.50	35.70	40.80	
8. Machinery and Equipment Repairs	15.44	16.30	17.16	
9. Irrigation Repairs and Maintenance	3.00	4.20	4.80	
10. Crop Insurance	3.70	3.73	3.95	
11. Drying	8.50	11.00	13.50	
12. Custom Hire ³				
13. Crop Consulting	6.25	6.25	6.25	
14. Miscellaneous	7.00	7.00	7.00	
15. Interest on 1/2 Variable Costs	7.86	8.98	9.77	
A. TOTAL VARIABLE COSTS	\$ 165.13	\$ 188.58	\$ 205.15	
FIXED COSTS PER ACRE: ¹				
16. Real Estate Taxes (including well)	3.85	4.45	5.05	
17. Interest on Land and Well ⁴	46.20	53.40	60.60	
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	64.98	64.98	64.98	
22. Interest on Irrigation Equipment ⁶	21.75	21.75	21.75	
23. Insurance on Machinery and Equipment	1.58	1.58	1.58	
B. TOTAL FIXED COSTS	\$ 164.46	\$ 172.26	\$ 180.06	
C. TOTAL COSTS (A + B)	\$ 329.58	\$ 360.84	\$ 385.21	
D. YIELD PER ACRE	85	110	135	
E. PRICE PER BUSHEL ⁷	\$ 2.33	\$ 2.33	\$ 2.33	
F. NET GOVERNMENT PAYMENT ⁷	\$ 12.18	\$ 13.23	\$ 14.29	
G. INDEMNITY PAYMENTS	\$	\$	\$	
H. MISCELLANEOUS INCOME	\$	\$	\$	
I. RETURNS PER ACRE [(D × E) + F + G + H]	\$ 210.23	\$ 269.53	\$ 328.84	
J. RETURNS OVER VARIABLE COSTS (I – A)	\$ 45.10	\$ 80.95	\$ 123.69	
K. RETURNS OVER TOTAL COSTS (I – C)	\$ -119.35	\$ -91.31	\$ -56.37	
L. VARIABLE COSTS PER BUSHEL (A ÷ D)	\$ 1.94	\$ 1.71	\$ 1.52	
M. TOTAL COSTS PER BUSHEL (C ÷ D)	\$ 3.88	\$ 3.28	\$ 2.85	
N. NET RETURN ON INVESTMENT				
[(K+15+17+20+22) ÷ INVESTMENT] ⁸	-3.10%	0.77%	5.35%	

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.**Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan, Kansas**

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