KANSAS FARM MANAGEMENT & MARKETING HANDBOOK

KSU Farm Management Guide MF-586

Center-Pivot-Irrigated Soybeans

Department of Agricultural Economics Manhattan, Kansas

Daniel M. O'Brien
Extension Agricultural Economist, N.W.

James D. Sartwelle, III
Extension Agricultural Economist, S.W.

Variety development has led to new, higher-yielding soybean varieties that respond well to irrigation. Recent research has provided additional information on water management for optimum irrigation of soybeans. Soybean yields can be increased from 20 to 50 percent by irrigation, with the crops water needs being most critical during the reproductive stage. The soil moisture level should be maintained at or above 40 to 50 percent of its water holding capacity in the 0 to 24 inch depth in order to provide maximum fertilization of the flowers.

Adding a pivot irrigation system to a quarter section requires additional capital of $30,000 to $100,000 depending on depth to water, land preparation, location of well and type of equipment. MF-836, *Irrigation Capital requirements and Energy Costs*, shows the ranges of costs and the amounts used in this budget.

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 are the important factors affecting pumping costs. For instance, with 500 feet of TDH, $1 change in gas price results in $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 due to unlevel land; and (4) soil type. Capital requirements will run $20,000 to $40,000 higher for sprinkler over flood. However, labor requirements can be as much as 1 hour/acre less for the sprinkler system.

Yield Level

Cost per bushel and net returns in crop production are highly dependent on yields. The following estimated budget includes three different yield levels. Yield levels vary for a number of reasons such as soil type/ land quality, weather, input levels, and management. Budgeting at multiple yield levels can help producers examine the financial risk of a crop enterprise that is directly related to production risk as well as to compare the profitability of crop enterprises on farmland tracts with varying yield potentials.

Table 1. Factors Used for Cost-Return Budget

	Yield Level (bu)			
Item	**40**	**50**	**60**	
Water, 325 TDH	13 in.	15 in.	17 in.	$2.41/inch
Fertilizer:				
N (Anhy.)	0	0	0	$0.19/lb
N (Dry)	0	0	0	$0.29/lb
P	40	40	40	$0.27/lb
K	0	0	0	$0.13/lb
Lime	0	0	0	$0.01/lb
Seed (lbs/Acre)	45	50	50	
Seed Price, $/lb	$0.30	$0.30	$0.30	
Labor Hours	2.15	2.15	2.15	
Labor Price/Hour				$9.00
Land Value/Acre				$540.00
Land Interest Rate				6.00%
Machinery Investment				$191.00
Machinery Life				10 yrs
Interest Rate on Machinery				10.00%
Well, Pump and Gearhead Value				$290.00
Well, Pump and Gearhead Life				15 yrs
Power Unit and Meter Value				$50.00
Power Unit and Meter Life				7 yrs
Irrigation System Value				$385.00
Irrigation System Life				10 yrs
Insurance Rate on Machinery				0.25%
Interest on Variable Costs				10.00%

COST-RETURN PROJECTION—CENTER PIVOT IRRIGATED SOYBEANS[1]

	Yield Level (bu.)			
	40	50	60	Your Farm
VARIABLE COSTS PER ACRE:				
1. Labor ($2.15 hrs. × $9.00 per hr.)	$ 19.35	$ 19.35	$ 19.35	________
2. Seed (__ lbs. × $.30 per lb.)	13.50	15.00	15.00	________
3. Herbicide ($26.68) and Insecticide ($0.00)	26.68	26.68	26.68	________
4. Fertilizer and Lime (40 lbs. P_2O_5)	10.80	10.80	10.80	________
5. Fuel and Oil—Crop	5.17	5.17	5.17	________
6. Fuel and Oil—Pumping[2]	31.33	36.15	40.97	________
7. Crop Machinery Repairs	18.38	18.38	18.38	________
8. Irrigation Repairs and Maintenance	3.90	4.50	5.10	________
9. Crop Insurance	5.35	5.35	5.35	________
10. Drying ($___ per bu)	________	________	________	________
11. Custom Hire (________ operation)[3]	________	________	________	________
12. Crop Consulting	6.25	6.25	6.25	________
13. Miscellaneous	7.00	7.00	7.00	________
14. Interest on 1/2 Variable Cost @ 10%	7.39	7.73	8.00	________
A. TOTAL VARIABLE COSTS	$155.09	$162.36	$168.05	________
FIXED COSTS PER ACRE:				
15. Real Estate Taxes (including well) @ .5%	$ 4.15	$ 4.15	$ 4.15	________
16. Interest on Land and Well ($830/A × 6%)[4]	49.80	49.80	49.80	________
17. Rent for Rented Land[5]	________	________	________	________
18. Depreciation on Crop Machinery	12.45	12.45	12.45	________
19. Interest on Crop Machinery @ 10%[6]	12.92	12.92	12.92	________
20. Depreciation on Irrigation Equipment and Well	64.98	64.98	64.98	________
21. Interest on Irrigation Equipment @ 10%[6]	36.25	36.25	36.25	________
22. Insurance on Machinery and Equipment @ .25%	2.29	2.29	2.29	________
B. TOTAL FIXED COSTS	$182.84	$182.84	$182.84	________
C. TOTAL COSTS (A + B)	$337.93	$345.20	$350.89	________
D. YIELD PER ACRE	40	50	60	________
E. PRICE PER BUSHEL	$ 5.55	$ 5.55	$ 5.55	________
F. NET GOVERNMENT PAYMENTS[7]	________	________	________	________
G. RETURNS PER ACRE ((D × E)+F)	$222.00	$277.50	$333.00	________
H. RETURNS OVER VARIABLE COSTS (G – A)	$ 66.91	$115.14	$164.95	________
I. RETURNS OVER TOTAL COSTS (G – C)	–$115.93	$–67.70	$–17.89	________
J. VARIABLE COSTS PER BUSHEL (A ÷ D)	$ 3.88	$ 3.25	$ 2.81	________
K FIXED COSTS PER BUSHEL (B ÷ D)	$ 4.57	$ 3.66	$ 3.05	________
L. TOTAL COSTS PER BUSHEL (C ÷ D)	$ 8.45	$ 6.90	$ 5.85	________
M. ASSET TURNOVER (G ÷ INVESTMENT)[8]	24.22%	30.28%	36.33%	________
N. NET RETURN ON INVESTMENT ((I + 14 + 16 + 19 + 21) ÷ INVESTMENT)[8]	-1.04%	4.26%	9.72%	________

[1]See Table 1, page 1, for factors used. [2]See MF-836, "Irrigation Capital Requirements and Energy Costs." If using custom hire, adjust lines 5, 7, 18, and 19. [4]Assumes interest rate shown in Table 1. [5]If cash rented, insert zero in lines 15 and 16. [6]Assumes one-half the (original cost plus salvage value) at the interest rate shown in Table 1. [7]Net government payment equals yield per acre (D) times expected deficiency payment minus prorated cost of set-aside acres. Based on 15% flex acres and 5% ARP. The price used was a five-year average price. The 1995 farm program may have major changes. [8]Investment equals total value of all fixed assets shown in Table 1.

KSU
KANSAS STATE UNIVERSITY

COOPERATIVE EXTENSION SERVICE, MANHATTAN, KANSAS

MF-586 Revised — October 1995

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Richard D. Wootton, Associate Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or disability.

File Code: Farm Management 3-1

10-95—1.5M