

Center Pivot Irrigation

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Management Considerations

- Irrigation is not a substitute for poor management
- High level management is needed for success
- Stabilize yields and income
- Benefit marketing plan
- Crop Insurance
- Timing and scheduling decisions often make the difference in the success of a system



Management Considerations

- Activation of soil applied herbicides & fertilizers
- Crop germination in dry soils
- Increase crop flexibility with potatoes, horse radish, rice, forages and double crop
- Germination of cover crops in the fall
- Help to “Assure” crop

**TABLE 14B.-- YIELD INCREASE DUE TO IRRIGATION FOR CORN
1997-2011 Bootheel Irrigation Survey
Showing yield enhancement (bu/ac) and sample size**

Soil Type	Fixed Pivot	Towable Pivot	Rigid/Poly with Surge Flow	Rigid/Poly without Surge Flow	Average
Sand	66.4 n = 69	67.7 n = 9	63.4 n = 10	75.5 n = 26	68.3 n = 114
Silt	46.9 n = 53	61.4 n = 5	69.4 n = 9	54.5 n = 56	52.6 n = 123
Clay/Gumbo	46.7 n = 19	20.0 n = 2	46.0 n = 4	38.9 n = 10	42.9 n = 35
Other	45.0 n = 4	38.0 n = 1	---	15.0 n = 2	35.4 n = 7
Average	56.1 n = 145	58.5 n = 17	62.7 n = 23	57.8 n = 94	57.3 n = 279

TABLE 15B.-- YIELD INCREASE DUE TO IRRIGATION FOR COTTON
1997-2011 Bootheel Irrigation Survey
 Showing yield enhancement (lbs/ac) and sample size

Soil Type	Fixed Pivot	Towable Pivot	Rigid/Poly with Surge Flow	Rigid/Poly without Surge Flow	Average
Sand	250.1 n = 45	223.8 n = 13	115.1 n = 11	331.6 n = 32	257.9 n = 101
Silt	153.5 n = 6	245.1 n = 10	373.8 n = 6	301.1 n = 21	277.7 n = 43
Clay/Gumbo	127.5 n = 6	30.0 n = 2	295.5 n = 2	39.4 n = 5	107.5 n = 15
Other	310.0 n = 10	---	504.2 n = 6	250.0 n = 2	368.1 n = 18
Average	239.4 n = 67	216.8 n = 25	285.0 n = 25	293.9 n = 60	261.1 n = 177

**TABLE 16B.-- YIELD INCREASE DUE TO IRRIGATION FOR FULL-SEASON SOYBEAN
1997-2011 Bootheel Irrigation Survey
Showing yield enhancement (bu/ac) and sample size**

Soil Type	Fixed Pivot	Towable Pivot	Rigid/Poly with Surge Flow	Rigid/Poly without Surge Flow	Average
Sand	19.7 n = 38	11.0 n = 4	15.5 n = 2	22.3 n = 24	20.0 n = 68
Silt	14.8 n = 13	17.5 n = 14	20.1 n = 11	23.0 n = 37	20.1 n = 75
Clay/Gumbo	16.0 n = 16	10.0 n = 8	15.3 n = 8	21.1 n = 27	17.4 n = 59
Other	20.3 n = 3	25.0 n = 3	37.0 n = 3	---	27.4 n = 9
Average	18.0 n = 70	15.3 n = 29	20.2 n = 24	22.2 n = 88	19.6 n = 211

TABLE 17B.-- YIELD INCREASE DUE TO IRRIGATION FOR DOUBLE-CROP SOYBEANS
1997-2011 Bootheel Irrigation Survey
 Showing yield enhancement (bu/ac) and sample size

Soil Type	Fixed Pivot	Towable Pivot	Rigid/Poly with Surge Flow	Rigid/Poly without Surge Flow	Average
Sand	19.2 n = 33	19.3 n = 6	21.8 n = 4	12.2 n = 5	18.7 n = 48
Silt	14.1 n = 14	22.3 n = 5	30.0 n = 1	15.7 n = 23	16.3 n = 43
Clay/Gumbo	14.0 n = 10	11.8 n = 4	3.0 n = 2	10.4 n = 5	11.7 n = 21
Other	16.7 n = 3	---	3.0 n = 1	19.7 n = 3	16.0 n = 7
Average	17.0 n = 60	18.3 n = 15	15.8 n = 8	14.8 n = 36	16.4 n = 119

2015 CENTER PIVOT IRRIGATION INVESTMENT AND OWNERSHIP COST

160 ACRE NON TOWABLE ELECTRIC DRIVE, LOW PRESSURE, CENTER PIVOT
 134 ACRES ACTUALLY IRRIGATED

OWNERSHIP COST:

ITEMS:	LIFE	INTEREST RATE	COST FACTOR	INVESTMENT	ANNUAL COST
	-----	-----	-----	-----	-----
PIVOT MACHINE, ELECTRIC GENERATOR & CONCRETE PAD	25	5	0.0650	\$88,000	\$5,720.00
POWER UNIT	15	5	0.0917	\$22,000	\$2,016.67
12" WELL 100' DEEP	25	5	0.0650	\$7,100	\$461.50
12" 2 STAGE TURBINE PUMP	25	5	0.0650	\$9,500	\$617.50
FUEL TANK	25	5	0.0650	\$1,100	\$71.50
TOTAL INVESTMENT				\$127,700	\$8,887.17
TAXES & INSURANCE (TOTAL INVESTMENT @ 1%)					\$1,277.00
LOSS OF INCOME DUE TO ACREAGE OUT OF PRODUCTION					\$100.00
ANNUAL OWNERSHIP COST					\$10,264.17

ANNUAL OWNERSHIP COST CORN					
OPERATING COST:		UNITS OR ACRES	COST PER UNIT	TOTAL COST	PER ACRE IRR.
		-----	-----	-----	-----
FUEL AND OIL (ACRE INCHES)		12.00	\$3.00	\$4,824.00	\$36.00
REPAIR & MAINTENANCE		134	\$10.00	\$1,340.00	\$10.00
LABOR		134	\$4.00	\$536.00	\$4.00
SEED (ADDITIONAL)		134	\$26.00	\$3,484.00	\$26.00
FERTILIZER (ADDITIONAL)		134	\$40.10	\$5,373.40	\$40.10
DRYING & HAULING (ADDITIONAL)		134	\$19.00	\$2,546.00	\$19.00
				-----	-----
TOTAL OPERATING COST				\$18,103.40	\$135.10



SUMMARY				
				COST/ACRE

INVESTMENT PER ACRE IRRIGATED				\$952.99
OWNERSHIP COST PER ACRE IRRIGATED				\$76.60
OPERATING COST PER ACRE IRRIGATED				\$135.10

TOTAL COST PER ACRE IRRIGATED				\$211.70

160 ACRE NON TOWABLE PIVOT WITH 134 ACRES ACTUALLY IRRIGATED						
CASH FLOW PROJECTION						Irrigated
						ACRE

						=====
INITIAL INVESTMENT					\$127,700	
7 Year Loan		5 Interest			\$22,069	\$164.69
ADDITIONAL OPERATING COST					\$18,103	\$135.10
TAXES, INSURANCE & LAND OUT OF PROD.					\$1,377	\$10.28
TOTAL COST					\$41,549	\$310.07
INCOME:						
5 YEAR AVERAGE BARGE CASH CORN PRICE						\$4.00
7 YEAR AVERAGE YIELD INCREASE IN CORN WITH IRRIGATION						57
TOTAL REVENUE						\$228.00
NET CASH FLOW						(\$82.07)

Cash Flow Returns - Loan and Production Costs

Yield	----- Dollars Per Bushel -----						
(Bu)	\$3.25	\$3.75	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00
45	(\$163.82)	(\$141.32)	(\$130.07)	(\$107.57)	(\$85.07)	(\$62.57)	(\$40.07)
50	(\$147.57)	(\$122.57)	(\$110.07)	(\$85.07)	(\$60.07)	(\$35.07)	(\$10.07)
55	(\$131.32)	(\$103.82)	(\$90.07)	(\$62.57)	(\$35.07)	(\$7.57)	\$19.93
60	(\$115.07)	(\$85.07)	(\$70.07)	(\$40.07)	(\$10.07)	\$19.93	\$49.93
65	(\$98.82)	(\$66.32)	(\$50.07)	(\$17.57)	\$14.93	\$47.43	\$79.93
70	(\$82.57)	(\$47.57)	(\$30.07)	\$4.93	\$39.93	\$74.93	\$109.93
75	(\$66.32)	(\$28.82)	(\$10.07)	\$27.43	\$64.93	\$102.43	\$139.93
80	(\$50.07)	(\$10.07)	\$9.93	\$49.93	\$89.93	\$129.93	\$169.93
85	(\$33.82)	\$8.68	\$29.93	\$72.43	\$114.93	\$157.43	\$199.93
90	(\$17.57)	\$27.43	\$49.93	\$94.93	\$139.93	\$184.93	\$229.93
95	(\$1.32)	\$46.18	\$69.93	\$117.43	\$164.93	\$212.43	\$259.93

160 ACRE NON TOWABLE PIVOT WITH 134 ACRES ACTUALLY IRRIGATED						
CASH FLOW PROJECTION - OWNERSHIP & USEFUL LIFE						Irrigated
						ACRE
						YEAR

INITIAL INVESTMENT				\$127,700		
OWNERSHIP COST PER ACRE IRRIGATED				\$10,264		\$76.60
ADDITIONAL OPERATING COST				\$18,103		\$135.10
TOTAL COST				\$28,368		\$211.70
INCOME:						
5 YEAR AVERAGE BARGE CASH CORN PRICE					\$4.00	
7 YEAR AVERAGE YIELD INCREASE IN CORN WITH IRRIGATION					57	
TOTAL REVENUE						\$228.00
NET CASH FLOW						\$16.30

Cash Flow Returns -Ownership & Production Cost

Yield (Bu)	----- Dollars Per Bushel -----						
	\$3.25	\$3.75	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00
45	(\$65.45)	(\$42.95)	(\$31.70)	(\$9.20)	\$13.30	\$35.80	\$58.30
50	(\$49.20)	(\$24.20)	(\$11.70)	\$13.30	\$38.30	\$63.30	\$88.30
55	(\$32.95)	(\$5.45)	\$8.30	\$35.80	\$63.30	\$90.80	\$118.30
60	(\$16.70)	\$13.30	\$28.30	\$58.30	\$88.30	\$118.30	\$148.30
65	(\$0.45)	\$32.05	\$48.30	\$80.80	\$113.30	\$145.80	\$178.30
70	\$15.80	\$50.80	\$68.30	\$103.30	\$138.30	\$173.30	\$208.30
75	\$32.05	\$69.55	\$88.30	\$125.80	\$163.30	\$200.80	\$238.30
80	\$48.30	\$88.30	\$108.30	\$148.30	\$188.30	\$228.30	\$268.30
85	\$64.55	\$107.05	\$128.30	\$170.80	\$213.30	\$255.80	\$298.30
90	\$80.80	\$125.80	\$148.30	\$193.30	\$238.30	\$283.30	\$328.30
95	\$97.05	\$144.55	\$168.30	\$215.80	\$263.30	\$310.80	\$358.30

2015 CENTER PIVOT IRRIGATION INVESTMENT AND OWNERSHIP COST

160 ACRE ELECTRIC DRIVE, LOW PRESSURE, CENTER PIVOT WITH
CORNER SYSTEM. 154 ACRES ACTUALLY IRRIGATED

OWNERSHIP COST:

ITEMS:	LIFE	INTEREST RATE	COST FACTOR	INVESTMENT	ANNUAL COST
	-----	-----	-----	-----	-----
PIVOT MACHINE, ELECTRIC GENERATOR & CONCRETE PAD	25	5	0.0650	\$145,000	\$9,425.00
POWER UNIT	15	5	0.0917	\$23,000	\$2,108.33
12" WELL 100' DEEP	25	5	0.0650	\$7,100	\$461.50
12" 2 STAGE TURBINE PUMP	25	5	0.0650	\$9,500	\$617.50
FUEL TANK	25	5	0.0650	\$1,100	\$71.50
TOTAL INVESTMENT				\$185,700	\$12,683.83
TAXES & INSURANCE (TOTAL INVESTMENT @ 1%)					\$1,857.00
LOSS OF INCOME DUE TO ACREAGE OUT OF PRODUCTION					\$100.00
ANNUAL OWNERSHIP COST					\$14,640.83

OPERATING COST:		UNITS OR ACRES	COST PER UNIT	TOTAL COST	PER ACRE IRR.
FUEL AND OIL (ACRE INCHES)		12.00	\$3.00	\$5,544.00	\$36.00
REPAIR & MAINTENANCE		154	\$10.00	\$1,540.00	\$10.00
LABOR		154	\$4.00	\$616.00	\$4.00
SEED (ADDITIONAL)		154	\$26.00	\$4,004.00	\$26.00
FERTILIZER (ADDITIONAL)		154	\$40.10	\$6,175.40	\$40.10
DRYING (ADDITIONAL)		154	\$19.00	\$2,926.00	\$19.00
TOTAL OPERATING COST				\$20,805.40	\$135.10



SUMMARY				
				COST/ACRE

INVESTMENT PER ACRE IRRIGATED				\$1,205.84
OWNERSHIP COST PER ACRE IRRIGATED				\$95.07
OPERATING COST PER ACRE IRRIGATED				\$135.10

TOTAL COST PER ACRE IRRIGATED				\$230.17

160 ACRE PIVOT WITH CORNER SYSTEM WITH 154 ACRES ACTUALLY IRRIGATED						
CASH FLOW PROJECTION						
					YEAR	ACRE
					-----	-----
INITIAL INVESTMENT			\$185,700			
7 YEAR LOAN @ 5%					\$44,085	\$286.26
ADDITIONAL OPERATING COST					\$20,805	\$135.10
TAXES, INSURANCE & LAND OUT OF PROD.					\$1,957	\$12.71
					-----	-----
TOTAL COST					\$66,847	\$434.07
INCOME:						
7 YEAR AVERAGE BARGE CASH CORN PRICE						\$4.00
7 YEAR AVERAGE YIELD INCREASE IN CORN WITH IRRIGATION						57

TOTAL REVENUE						\$228.00

NET CASH FLOW						(\$206.07)
						=====

Cash Flow Returns - Loan and Production Costs

Yield (Bu)	----- Dollars Per Bushel -----						
	\$3.25	\$3.75	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00
45	(\$287.82)	(\$265.32)	(\$254.07)	(\$231.57)	(\$209.07)	(\$186.57)	(\$164.07)
50	(\$271.57)	(\$246.57)	(\$234.07)	(\$209.07)	(\$184.07)	(\$159.07)	(\$134.07)
55	(\$255.32)	(\$227.82)	(\$214.07)	(\$186.57)	(\$159.07)	(\$131.57)	(\$104.07)
60	(\$239.07)	(\$209.07)	(\$194.07)	(\$164.07)	(\$134.07)	(\$104.07)	(\$74.07)
65	(\$222.82)	(\$190.32)	(\$174.07)	(\$141.57)	(\$109.07)	(\$76.57)	(\$44.07)
70	(\$206.57)	(\$171.57)	(\$154.07)	(\$119.07)	(\$84.07)	(\$49.07)	(\$14.07)
75	(\$190.32)	(\$152.82)	(\$134.07)	(\$96.57)	(\$59.07)	(\$21.57)	\$15.93
80	(\$174.07)	(\$134.07)	(\$114.07)	(\$74.07)	(\$34.07)	\$5.93	\$45.93
85	(\$157.82)	(\$115.32)	(\$94.07)	(\$51.57)	(\$9.07)	\$33.43	\$75.93
90	(\$141.57)	(\$96.57)	(\$74.07)	(\$29.07)	\$15.93	\$60.93	\$105.93
95	(\$125.32)	(\$77.82)	(\$54.07)	(\$6.57)	\$40.93	\$88.43	\$135.93

160 ACRE PIVOT WITH CORNER SYSTEM WITH 154 ACRES ACTUALLY IRRIGATED

CASH FLOW PROJECTION - OWNERSHIP & USEFUL LIFE					Irrigated
				YEAR	ACRE
				-----	-----
INITIAL INVESTMENT		\$185,700			
OWNERSHIP COST PER ACRE IRRIGATED				\$14,641	\$95.07
ADDITIONAL OPERATING COST				\$20,805	\$135.10
				-----	-----
TOTAL COST				\$35,446	\$230.17
INCOME:					
5 YEAR AVERAGE BARGE CASH CORN PRICE					\$4.00
7 YEAR AVERAGE YIELD INCREASE IN CORN WITH IRRIGATION					57

TOTAL REVENUE					\$228.00

NET CASH FLOW					(\$2.17)
					=====

Cash Flow Returns -Ownership & Production Cost

Yield (Bu)	----- Dollars Per Bushel -----						
	\$3.25	\$3.75	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00
45	(\$83.92)	(\$61.42)	(\$50.17)	(\$27.67)	(\$5.17)	\$17.33	\$39.83
50	(\$67.67)	(\$42.67)	(\$30.17)	(\$5.17)	\$19.83	\$44.83	\$69.83
55	(\$51.42)	(\$23.92)	(\$10.17)	\$17.33	\$44.83	\$72.33	\$99.83
60	(\$35.17)	(\$5.17)	\$9.83	\$39.83	\$69.83	\$99.83	\$129.83
65	(\$18.92)	\$13.58	\$29.83	\$62.33	\$94.83	\$127.33	\$159.83
70	(\$2.67)	\$32.33	\$49.83	\$84.83	\$119.83	\$154.83	\$189.83
75	\$13.58	\$51.08	\$69.83	\$107.33	\$144.83	\$182.33	\$219.83
80	\$29.83	\$69.83	\$89.83	\$129.83	\$169.83	\$209.83	\$249.83
85	\$46.08	\$88.58	\$109.83	\$152.33	\$194.83	\$237.33	\$279.83
90	\$62.33	\$107.33	\$129.83	\$174.83	\$219.83	\$264.83	\$309.83
95	\$78.58	\$126.08	\$149.83	\$197.33	\$244.83	\$292.33	\$339.83

160 ACRE NON TOWABLE PIVOT & CORNER SYSTEM

Summary

	160	Corner System	Difference	Cost for the Corner
Acres Irrigated	134	154	20	
Total Investment	\$127,700	\$185,700	\$58,000	
Annual Ownership Cost	\$10,264	\$14,641	\$4,377	
Investment Irrigated Acre	\$953	\$1,206	\$253	\$2,900
Ownership Irrigated Acre	\$77	\$95	\$18	\$219
Operating Costs Irrigated Acre	\$135	\$135	\$0	\$135
Total Costs Irrigated Acre	\$212	\$230	\$18	\$354
Net Cash Flow	(\$82)	(\$206)	(\$124)	(\$1,037)
Net Cash Flow - Investment	\$16	(\$2)	(\$18)	(\$126)



Summary & Observations

- Management is a key to success
- Some irrigation systems may not be feasible
- Long run – Irrigation is profitable
- Short Run – May not completely cash flow
- Can reduce production risk; stabilize income
- Benefits marketing plan and crop insurance
- Can work for landowner and producer
- Irrigation is a management tool that can enhance profitability



Questions? Comments?

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