



FARM MANAGEMENT

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Newsletter

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1983 MISSOURI IRRIGATION SURVEY REPORT

This newsletter reports the results of a survey of irrigating farmers in Missouri in 1983. The survey was conducted in cooperation with Extension Specialists and farmers throughout Missouri.

Summary

According to 252 irrigators who responded to the survey, 1983 was not a good year for irrigators. Reported results show below average irrigated yields and increased costs in 1983 compared to the previous year. However, Missouri irrigators did have a much better year than most non-irrigators in 1983. The four major problems reported by Missouri irrigators in 1983 were:

1. One of the worst summer droughts on record during July and August. Many irrigators reported pollination problems for corn.
2. In many cases, heavy spring rains and compacted soils delayed plantings and reduced stands.
3. Excessive fuel expenses incurred.
4. Failure to apply more water.

Results

The analysis and comparisons in this report were based on a total of 252 replies

with 68 from the Bootheel. Due to significant differences in types of water supplies, systems, and soils, some survey results are reported with Bootheel figures separately. Economic and cost information results do not include the Bootheel counties in this report.

General Irrigation Information. Types of systems, water supplies, and pumping power were reported by Missouri irrigators. The predominant system used was the center pivot system except in Bootheel counties where the gated pipe system was reported by one-half of the respondents. For the state (not including Bootheel counties), reservoirs and wells dominated the water supplies of the irrigators reporting. Bootheel irrigators report exclusive use of wells. Type of fuel used by irrigators varied in the survey. However, diesel and propane were the predominant fuels used.

Irrigation Results. Missouri irrigation results by crops are shown in Tables 1 and 2. Crops irrigated were corn, single-crop soybeans, double-crop soybeans, and alfalfa.

As shown in Table 1, Missouri irrigators in 1983 applied increased amounts of water per acre on all crops. They averaged approximately 8.0 inches for corn, 6.0 inches for single-crop soybeans, 5.0 inches for double-crop soybeans and milo, and 4.3 inches for alfalfa. Some farmers with reservoirs reported insufficient water

supply for the year. Per acre yield results are also shown in this table. Irrigated corn averaged 103.2 bushels, single-crop soybeans averaged 35.1 bushels, double-crop soybeans averaged 23.0 bushels, grain sorghum averaged 95 bushels, and alfalfa averaged 4.9 tons per acre. The additional yields over non-irrigated crops were significant. For example, the reported yields per acre for irrigated corn averaged almost 75 bushels more than dryland corn. Almost 19 bushels more per acre for irrigated soybeans was achieved by irrigators in 1983. With higher average irrigated yields per acre, the Bootheel counties reported similar differences.

Fuel, Repair, and Maintenance Costs. Irrigators were asked to estimate their irrigation fuel costs per acre-inch and their irrigation repair and maintenance costs per acre. The average reported fuel cost was \$3.83 per acre-inch for Missouri irrigators in 1983. This figure was considerably higher than the cost of \$3.49 in 1982. The reported fuel costs per acre-inch for propane, diesel, and electricity are compared in Table 3. Irrigation repair and maintenance costs averaged \$2.97 per acre for Missouri irrigators in 1983.

Economic Results. The economic results are shown in the crop budgets for Tables 4 and 5. Assumptions are made regarding specific costs and prices. Using the approximate December 1 prices in Central Missouri, gross income for corn was \$350.90. Operating costs including interest at 13% were estimated at \$225.20 per acre for irrigated corn. Ownership costs of \$95.00 are charged against the corn. The \$60 charge for irrigation is an approximation of the fixed costs for de-

preciation and interest on the investment. For new systems, this cost could be higher, depending on the system investment. Adding operating costs and crop machinery and irrigation equipment, total average nonland cost per irrigated corn acre was estimated at \$320.20. Subtracting from the gross income results in \$30.70 per acre return to land and management. Irrigated single-crop soybeans returned \$42.70 per acre to land and management and irrigated milo returned only \$22.05 per acre. Return to land and management is the amount left to pay rent or interest on the land and a reward for management.

Differences in returns (not profit) over non-irrigated corn, soybeans, and milo are estimated in Table 5. Irrigated corn had an advantage of \$121.10 per acre above the non-irrigated corn. However, non-irrigated corn averaging only 28.5 bushels had a negative \$90.40 return to land and management. Irrigated single-crop soybeans generated \$48.85 more per acre than non-irrigated soybeans. Irrigated milo, on the other hand, was short \$2.30 returns to land and management per acre compared to dryland milo in 1983.

Long-run Irrigation Results. Eight-year irrigated and dryland yields are summarized in Table 6. The average irrigated yield reported for corn is 123 bushels per acre. This is a significant increase over average dryland yields for the period. Is the irrigated average yield for corn high enough to assure profits? An average of 42 bushels of soybeans per acre was reported by irrigators compared to 30 bushels for dryland farmers. Irrigated milo averaged 108 bushels over the seven-year period.

Table 1. 1983 Missouri Irrigation Results*

	Corn	Soybeans	D.C. Soybeans	Milo	Alfalfa
Number reporting	124	110	59	18	8
Average acres irrigated	115	102	96	94	70
Inches/application	1.4	1.4	1.4	1.3	1.6
Times irrigated	5.7	4.3	3.6	3.9	2.7
Total inches/acre	8.0	6.0	5.0	5.0	4.3
Irrigated yield/acre	103.2	35.1	23.0	94.6	4.9 T.
Dryland yield/acre	28.5	16.3	9.4	60.7	3.4
Difference	74.7	18.8	13.6	33.9	1.5 T.

*Does not include Bootheel counties.

Table 2. 1983 Bootheel Irrigation Results

	Corn	Soybeans	D.C. Soybeans	Milo
Number reporting	28	22	46	28
Average acres irrigated	141	114	139	112
Inches/application	1.7	1.8	1.7	1.8
Times irrigated	6.6	5.5	5.5	4.8
Total inches/acre	<u>11.2</u>	<u>9.9</u>	<u>9.4</u>	<u>8.6</u>
Irrigated yield/acre	124.8	39.4	34.0	111.7
Dryland yield/acre	58.9	22.7	19.8	83.2
Difference	<u>65.9</u>	<u>16.7</u>	<u>14.2</u>	<u>28.5</u>

Table 3. Average Fuel and Repair Costs Reported in 1983

	Cost per ac.-inch	Repair cost per acre
Propane	\$4.54	-
Diesel	3.77	-
Electricity	3.23	-
Average all	\$3.83	\$2.97

Table 4. Estimated Costs and Returns for Irrigated Crops in Missouri, 1983

	Corn	Single Soybeans	Milo
Yield/acre (bu.)	103.2	35.1	94.6
Price/bu (12/1/83)	\$ 3.40	\$ 7.70	\$ 3.06
Gross income	\$350.90	\$270.25	\$289.50
Operating Costs:			
Seed	\$ 18.00	\$ 10.00	\$ 5.00
Fertilizer and lime	59.50	20.50	54.50
Chemicals	20.00	14.00	14.00
Machinery	34.00	29.00	29.00
Harvesting, hauling, and drying	16.50	2.80	15.15
Labor	30.00	25.00	25.00
Irrig. fuel @ \$3.83/ac.-inch	30.50	23.00	19.15
Irrig. repairs, etc.	2.95	2.95	2.95
Interest @ 13%	13.75	8.30	10.85
	<u>\$225.20</u>	<u>\$135.55</u>	<u>\$175.60</u>
Ownership Costs:			
Machinery	\$ 35.00	\$ 32.00	\$ 32.00
Irrigation equipment	60.00	60.00	60.00
	<u>\$ 95.00</u>	<u>\$ 92.00</u>	<u>\$ 92.00</u>
Total non-land costs	\$320.20	\$227.55	\$267.45
Return to land and management	\$ 30.70	\$ 42.70	\$ 22.05

Table 5. Estimated Added Costs and Returns for Irrigated Crops in Missouri, 1983

	Corn	Single Soybeans	Milo
Added yield/acre (bu.)	74.7	18.8	33.9
Price/bu.	\$ 3.40	\$ 7.70	\$ 3.06
Added gross income	\$254.00	\$145.00	\$103.50
Added Operating Costs:			
Seed	\$ 3.00		
Fertilizer	15.00	\$ 3.00	\$ 12.00
Harvesting, hauling, and drying	12.00	1.50	5.40
Labor	5.00	3.50	3.50
Irrig. fuel (\$3.83/ac.-inch)	30.50	23.00	19.15
Irrig. repairs, etc.	2.95	2.95	2.95
Interest @ 13%	4.45	2.20	2.80
	\$ 72.90	\$ 36.15	\$ 45.80
Added Ownership Costs:			
Irrigation equipment	\$ 60.00	\$ 60.00	\$ 60.00
Total added non-land costs	\$132.90	\$ 96.15	\$105.80
Difference in return to land and management	\$121.10	\$ 48.85	-\$ 2.30

Table 6. Eight Year Irrigated and Dryland Yields (Bu./Acre) (as reported by Missouri irrigators surveyed)

		1976	1977	1978	1979	1980	1981	1982	1983	Average	
CORN:	Irrigated	113	130	121	149	84	146	138	103	123	
	Dryland	53	95	86	92	34	127	116	38	79	
	Difference	60	35	35	57	50	19	22	75	44	
SOYBEANS:	First crop:	Irrigated	36	50	42	47	37	43	45	35	42
		Dryland	23	41	32	30	22	36	39	16	30
		Difference	13	9	10	17	15	7	6	19	12
	Second crop:	Irrigated	19	37	31	21	23	25	30	23	26
		Dryland	8	27	23	6	11	19	23	9	16
		Difference	11	10	8	15	12	6	7	14	10
MILO*:	Irrigated	119	117	110	128	76	114	--	95	108	
	Dryland	77	92	92	84	39	97	--	61	77	
	Difference	42	25	18	44	37	27	--	34	31	

*Seven-year average omitting 1982 (too few yields to report).

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