

March 9, 2004**FEFO 04-04**

CROP COSTS ON ILLINOIS GRAIN FARMS

In this article, crop costs on northern and central Illinois grain farms are examined. Crop costs, which include fertilizer, pesticide, and seed costs, are related to yields, profits and tillable acres. Results suggest that crop costs are not highly correlated with yields, profits, or acres farmed.

Farms and Crop Costs

Data used in the analysis come from farms enrolled in Illinois Farm Business Farm Management (FBFM). To be included in the analysis, farms had to be located in northern and central Illinois and receive the majority of their revenue from grain operations. Data for the farms also had to be complete. Further, farms had to have average soil productivity ratings above 80. This criterion limited the impacts of soil productive on crop costs. A total of 1,179 farms were included in the analysis.

Crop costs for these 1179 farms averaged \$98 per acre in 2002. Crop costs included fertilizer (\$37 per acre), pesticides (\$32 per acre), and seed costs (\$29 per acre). These costs are averaged over crops grown on the farm. Most farms raise corn and soybeans. For these farms, crops costs are averaged for corn and soybeans.

Variability of Crop Costs

While crop costs averaged \$98 per acre, there was variability of crop costs across the 1,179 farms. Fifty percent of the farms had crop costs between \$90 and \$110 per acre (see Table 1). Four percent of the farms had crop costs less than \$70 per acre and eight percent had crop costs greater than \$120 per acre.

Variability existed across all cost categories that compose crop costs. Fertilizer costs averaged \$37 per acre. One-third of the farms had fertilizer costs below \$33 per acre and one-third had costs higher than \$41 per acre. Pesticide costs averaged \$32 per acre. One-third of the farms had pesticide costs below \$27 per acre and one-third had costs higher than \$35 per acre. Seed costs averaged \$29 per acre. One-third of the farms had seed costs less than \$26 per acre and one-third had costs greater than \$31 per acre.

Table 1. Yields, Management Returns, and Tillable Acres by Crop Cost Categories, Northern and Central Illinois Grain Farms, 2002.

Crop Cost Category	Percent of Farms	Corn Yield	Soybean Yield	Mgt. Return	Tillable Acres
	Percent	Bu./acre	Bu./acre	\$/acre	Acres
Less than \$70	4%	151	49	1	1,219
Between \$70 and \$80	9%	147	49	-18	899
Between \$80 and \$90	17%	148	51	-10	1,036
Between \$90 and \$100	28%	150	51	-13	1,019
Between \$100 and \$110	22%	154	52	-21	1,016
Between \$110 and \$120	12%	152	52	-28	994
Greater than \$120	8%	156	51	-51	1,000

Source: Illinois Farm Business Farm Management.

Crop Costs, Yields, Management Returns, and Tillable Acres

Table 1 shows corn and soybean yields, management returns, and tillable acres for different amounts spent on crop costs. For example, farms that had less than \$70 of crop costs had an average corn yield of 151 bu. per acre, soybean yield of \$49 per acre, management return of \$1 per acre, and tillable acres of 1,219.

There is a slight increase in yields as crop costs increase. All crop cost categories greater than \$90 per acre averaged corn yields above 150 bu. per acre. Categories below \$90 had averages near or below 150 bu. Similarly, crop cost categories below \$80 per acre had average soybean yields below 50 bu. per acre while crop cost categories above \$80 averaged above 50 bu.

While yields increased slightly with higher crop costs, profits did not increase. Management return is a measure of profit. This return includes charges for operator and family labor and equity capital. Net income does not include these charges. Hence, management return always is below net income. Management return was the highest for the "less than \$70" crop cost category at \$1 per acre (see Table 1). For farms in the "greater than \$120" crop cost category, management return averaged -\$51 per acre.

Tillable acres showed no discernable trend across crop cost categories. All cost categories had close to 1,000 acre average, except for the two lowest crop cost categories. The "less than \$70" category had average tillable acres of 1,219 while the "between \$70 and \$80" category averaged 899 tillable acres (see Table 1). I attribute these differences to data anomalies.

Table 2 shows the relationships between crop costs and the other variables using correlation coefficients. A correlation coefficients range between 1 and -1 and measure how one variable changes with another variable. A correlation coefficient of 1 means that an increase in one variable always results in an increase in the other variable. A correlation coefficient of -1 means that an increase in one variable always leads to a decrease in the other variable. A correlation

coefficient of zero means that an increase in one variable does not hold any information about the movement of the other variable.

Table 2. Correlation Coefficients between Crop Costs and Other Variables, Northern and Central Illinois, 2002.

	Crop Costs	Corn Yield	Soybean Yield	Mgt. Return	Tillable Acres
Crop Costs	1.00				
Corn Yield	0.12	1.00			
Soybean Yield	0.11	0.46	1.00		
Mgt. Return	-0.17	0.35	0.34	1.00	
Tillable Acres	0.00	0.09	0.07	0.31	1.00

Source: Illinois Farm Business Farm Management.

In general, the correlation coefficients between crop costs and the other variables are close to zero, indicating that there is little predictive relationship between crop costs and the other variables. The correlation coefficient between crop costs and corn yields and soybean yields respectively are .12 and .11, indicating that farms with higher crop costs tended to have higher yields. The correlation coefficient between crop costs and management returns is -.17, indicating that management returns were lower for higher levels of crop costs. Again, however, these relationships are not strong. Some farms, for example, with low crop costs also will have higher yields. The correlation coefficient between crop costs and tillable acres is .00.

Summary

Crop costs vary across farms and there is not a strong relationship between crop costs and yields. Results do not suggest that farms with higher crop costs had higher yields that warranted the higher level of expenditures on crop related items. Results suggest that controlling crop costs is one factor in maintaining profits.

Acknowledgments

The author would like to acknowledge that data used in this study comes from the local Farm Business Farm Management (FBFM) Associations across the State of Illinois. Without their cooperation, information as comprehensive and accurate as this would not be available for educational purposes. FBFM, which consists of 6,000 plus farmers and 62 professional field staff, is a not-for-profit organization available to all farm operators in Illinois. FBFM field staff provides on-farm counsel with computerized recordkeeping, farm financial management, business entity planning and income tax management. For more information, please contact the State FBFM Office located at the University of Illinois Department of Agricultural and Consumer Economics at 217-333-5511 or visit the FBFM website at www.fbfm.org.

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