

Impact of Energy Price Increases on Non-Irrigated Crop Farms in Kansas

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June 2009

Introduction

This paper documents increases in seed expense; fertilizer and lime expense; herbicide and insecticide expense; gas, fuel, and oil expense; crop machinery cost; and crop production cost from 2003 to 2008 using data from non-irrigated crop farms participating in Kansas Farm Management Association (KFMA) program.

Data

Annual KFMA summary data for non-irrigated crop farms from 2003 to 2008 were used in this study. An average of 1,165 KFMA farms were classified as non-irrigated crop farms over the 2003 to 2008 time period. At least two-thirds of the labor for these farms was used to produce non-irrigated crops. Many of these farms also had a livestock enterprise and/or produced crops on irrigated land.

All costs and expenses are reported on an accrual basis. Crop machinery cost includes the crops' share of repairs, gas, fuel, oil, machine hire, economic depreciation, an opportunity charge on machinery and equipment investment, and an adjustment for machine work income. Crop production cost includes the crops' share of hired labor, machinery cost, seed, fertilizer and lime, herbicide and insecticide, storage and marketing, insurance, supplies, utilities, and dues and fees.

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Production cost is impacted by price changes, technology, and crop mix. Adopting technology (e.g., switching to a reduced tillage system) and changes in a farm's crop mix often change the optimal mix of inputs. It was not possible to disentangle the impacts of price changes, technology adoption, and crop mix changes in the analysis summarized below.

Analysis

Tables 1-4 contain summary information on crop related expenses for non-irrigated farms. On a per acre basis, crop production cost increased \$9.69 from 2003 to 2004, \$13.54 from 2004 to 2005, \$3.82 from 2005 to 2006, \$19.52 from 2006 to 2007, and \$33.64 from 2007 to 2008. These per acre crop production cost increases represented an 8.64% increase from 2003 to 2004, an 11.13% increase from 2004 to 2005, a 2.82% increase from 2005 to 2006, a 14.04% increase from 2006 to 2007, and a 21.20% increase from 2007 to 2008. Table 2 compares a five year average (2003-2007) to 2008. Crop production cost increased 44.17% on a per acre basis from 2003-2007 to 2008.

Increases in energy related expenses (fertilizer and lime; gas, fuel, and oil) were a major contributor to the increase in crop production cost. On a per acre basis, approximately 48% of the increase in crop production cost from the 2003-2007 to 2008 was attributable to increases in energy related expenses. Table 3 presents the increases in energy related expenses from 2003 to 2008. Energy related expenses increased 32.41% in 2008. In 2008, fertilizer expense increased by 33.90% and gas, fuel, and oil expense increased by 29.46%. The remaining increase in crop production cost per acre was due to increases in seed, herbicide and insecticide, hired labor, repairs, machine hire and lease, storage and marketing, insurance, supplies, utilities, dues and fees, economic depreciation, and opportunity charges on machinery and equipment investment. Table 4 compares a five year average (2003-2007) to 2008. Fertilizer expense per crop acre

increased 83.08% from 2003-2007 to 2008. Over the same time period, gas, fuel, and oil expense per crop acre increased 59.10%. Total energy related expense increased 74.46% per crop acre from 2003-2007 to 2008.

Summary

Increases in energy related expenses represented approximately 48% of the increase in crop production cost per acre from 2003-2007 to 2008. Increases in energy related expenses increased per acre cost by \$16.20 in 2008 and \$38.64 from 2003 to 2008. To put this in perspective, energy related expenses per acre have more than doubled within the last six years. Annual percentage changes in energy related expenses since 2003 have ranged from a 5.67% increase from 2005 to 2006 to a 32.41% increase from 2007 to 2008.

Table 1. Major Crop Related Expenses for Non-Irrigated KFMA Crop Farms from 2003-2008.

Expense Category	2003	2004	2005	2006	2007	2008
<u>Expense per Crop Acre</u>						
Seed	\$12.44	\$14.28	\$16.01	\$16.77	\$19.85	\$21.42
Fertilizer and Lime	\$17.93	\$20.00	\$24.99	\$25.37	\$33.23	\$44.50
Herbicide and Insecticide	\$11.82	\$11.79	\$12.93	\$13.81	\$15.62	\$20.90
Gas, Fuel, and Oil	\$9.62	\$11.32	\$14.31	\$16.16	\$16.75	\$21.69
Machinery Cost	\$44.62	\$47.87	\$53.42	\$54.32	\$58.96	\$67.78
Crop Production Cost	\$112.04	\$121.73	\$135.27	\$139.09	\$158.61	\$192.25
<u>Annual Percentage Change in per Crop Acre Expense</u>						
Seed		14.76%	12.13%	4.71%	18.37%	7.93%
Fertilizer and Lime		11.56%	24.94%	1.50%	31.00%	33.90%
Herbicide and Insecticide		-0.24%	9.67%	6.86%	13.08%	33.80%
Gas, Fuel, and Oil		17.68%	26.38%	12.96%	3.67%	29.46%
Crop Machinery Cost		7.29%	11.58%	1.70%	8.53%	14.97%
Crop Production Cost		8.64%	11.13%	2.82%	14.04%	21.20%

Source: Kansas Farm Management Association 2008 Databank.

Table 2. Major Crop Related Expenses for Non-Irrigated KFMA Crop Farms, 5-Year Average and 2008.

Expense Category	2003-2007	2008	% Change
<u>Expense per Acre</u>			
Seed	\$15.87	\$21.42	34.98%
Fertilizer and Lime	\$24.31	\$44.50	83.08%
Herbicide and Insecticide	\$13.19	\$20.90	58.43%
Gas, Fuel, and Oil	\$13.63	\$21.69	59.10%
Machinery Cost	\$51.84	\$67.78	30.76%
Crop Production Cost	\$133.35	\$192.25	44.17%

Source: Kansas Farm Management Association 2008 Databank.

Table 3. Energy Intensive Expenses for Non-Irrigated KFMA Crop Farms from 2003-2008.

Expense Category	2003	2004	2005	2006	2007	2008
<u>Fertilizer and Lime</u>						
Crop Expense	\$24,710	\$27,986	\$36,315	\$37,951	\$49,748	\$70,129
Expense per Crop Acre	\$17.93	\$20.00	\$24.99	\$25.37	\$33.23	\$44.50
Annual Percentage Change in per Acre Expense		11.56%	24.94%	1.50%	31.00%	33.90%
<u>Gas, Fuel, and Oil</u>						
Crop Expense	\$13,257	\$15,838	\$20,789	\$24,179	\$25,082	\$34,185
Expense per Crop Acre	\$9.62	\$11.32	\$14.31	\$16.16	\$16.75	\$21.69
Annual Percentage Change in per Acre Expense		17.68%	26.38%	12.96%	3.67%	29.46%
<u>Total Energy Related Expense</u>						
Crop Expense	\$37,967	\$43,824	\$57,104	\$62,130	\$74,830	\$104,314
Expense per Crop Acre	\$27.55	\$31.33	\$39.30	\$41.53	\$49.99	\$66.19
Annual Percentage Change in per Acre Expense		13.69%	25.46%	5.67%	20.36%	32.41%

Source: Kansas Farm Management Association 2008 Databank.

Table 4. Energy Intensive Expenses for Non-Irrigated KFMA Crop Farms, 5-Year Average and 2008.

Expense Category	2003-2007	2008	% Change
<u>Fertilizer and Lime</u>			
Crop Expense	\$35,342	\$70,129	98.43%
Expense per Crop Acre	\$24.31	\$44.50	83.08%
<u>Gas, Fuel, and Oil</u>			
Crop Expense	\$19,829	\$34,185	72.40%
Expense per Crop Acre	\$13.63	\$21.69	59.10%
<u>Total Energy Related Expense</u>			
Crop Expense	\$55,171	\$104,314	89.07%
Expense per Crop Acre	\$37.94	\$66.19	74.46%

Source: Kansas Farm Management Association 2008 Databank.