



AgEcon SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Estimating the Change In Total Production Expenses for the Major Row Crops as Fuel Prices Change

Background

- Row crop production agriculture has a common set of inputs that are used by many of the traditional crops.
 - These inputs include fertilizer, seed, fuel, machinery, labor, and land.
- However, each crop uses a different amount of a given input when compared to another crop.
 - For example, soybeans use no nitrogen fertilizer while corn uses a large amount of nitrogen fertilizer.
- Thus, as the price of an input changes the profitability of each crop will be affected differently.

Problem

- Fuel is a somewhat unique input for crop production because other input prices are correlated to the fuel price.
- In addition, the fuel price is very variable from year to year which makes estimating the most profitable crop mix difficult.
- This poster examines the profitability of corn, soybeans, and cotton as diesel prices change. Included in the analysis is a stochastic analysis of the variability of fuel prices and the effects on profitability.

Data

- Fuel prices come from the EIA
- Fertilizer prices come from the USDA
- Yearly data for the last 11 years (April of each year)

Procedure

- Estimate the dollars spent on fuel and fertilizer by using the Mississippi State Budget Generator
- Simulate diesel and fertilizer prices for the past 11 years to determine the relationship between diesel and fertilizer prices

Budgets for Corn, Soybeans, and Cotton

6
Table 1.A Estimated costs per acre
Corn, stale seedbed, BtRR, 8-row 38", 185 bu yield goal
Furrow irrigated, 13 ac-in., Delta Area, Mississippi, 2011

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
dollars dollars					
DIRECT EXPENSES					
CUSTOM SPRAY					
App by Air (5 gal)	appl	5.50	1.0000	5.50	
App by Air (3 gal)	appl	4.00	1.0000	4.00	
FERTILIZERS					
DAP	cwt	25.00	1.8000	45.00	
Potash (60% K2O)	cwt	23.00	1.3750	31.63	
Fert 10-34-0	cwt	22.00	0.5000	11.00	
UAN + Sulfur (28%)	cwt	12.00	3.5710	42.85	
UAN (32% N)	cwt	12.50	4.3750	54.69	
HERBICIDES					
Glyphosate 3lbs a.e.	pt	1.75	4.0000	7.00	
Clarity	pt	11.86	0.5000	5.93	
Lexar	pt	5.56	3.3000	18.35	
INSECTICIDES					
Intrepid ZF	oz	1.66	4.0000	6.64	
IRRIGATION SUPPLIES					
Roll-Out Pipe	ft	0.20	33.0000	6.60	
SEED/PLANTS					
Corn Seed BtRR	thous	2.90	30.0000	87.00	
CUSTOM FERTILIZE	acre	6.25	1.0000	6.25	
Custom Apply Fert	acre	6.25	1.0000	6.25	
HAULING					
Haul Corn/Field	bu	0.26	185.0000	48.10	
CUSTOM LIME					
Lime (Spread)	ton	46.00	0.5000	23.00	
OPERATOR LABOR					
Tractors	hour	11.35	0.4883	5.54	
Harvesters	hour	11.35	0.1009	1.15	
IRRIGATE LABOR					
Special Labor	hour	9.06	0.3250	2.96	
Implements	hour	9.06	0.0625	0.57	
HAND LABOR					
Implements	hour	9.06	0.1752	1.59	
UNALLOCATED LABOR	hour	11.35	0.4597	5.22	
DIESEL FUEL					
Tractors	gal	2.39	4.6505	11.11	
Harvesters	gal	2.39	1.6890	4.04	
Roll-Out Pipe Irr.	gal	2.39	10.5901	25.32	
REPAIR & MAINTENANCE					
Tractors	acre	6.30	1.0000	6.30	
Harvesters	acre	1.90	1.0000	1.90	
Roll-Out Pipe Irr.	acre	2.64	1.0000	2.64	
Roll-Out Pipe Irr.	acre	5.16	1.0000	5.16	
INTEREST ON OP. CAP.	acre	11.36	1.0000	11.36	
TOTAL DIRECT EXPENSES					
				488.40	
FIXED EXPENSES					
Implements	acre	9.08	1.0000	9.08	
Tractors	acre	12.28	1.0000	12.28	
Harvesters	acre	10.73	1.0000	10.73	
Roll-Out Pipe Irr.	acre	24.98	1.0000	24.98	
				57.07	
				545.47	
Note: Cost of production estimates are based on 2010 input prices. Fertilization decisions should be based on soil tests. Intrepid application is necessary only on refuge acres.					

12
Table 2.A Estimated costs per acre
Soybeans, early-planted, RR, stale seedbed, 12R 20"
Furrow irrigated, 9 ac-in., Delta Area, Mississippi, 2011

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
dollars dollars					
DIRECT EXPENSES					
CUSTOM SPRAY					
App by Air (5 gal)	appl	5.50	3.5000	19.25	
App by Air (3 gal)	appl	4.00	3.2500	13.00	
HARVEST AIDS					
Gramoxone Inteon	oz	0.25	4.0000	1.00	
Sodium Chlorate 3L	gal	3.35	0.2500	0.84	
FERTILIZERS					
Phosphorus(46% P2O5)	cwt	22.00	0.4000	8.80	
Potash (60% K2O)	cwt	23.00	0.6000	13.80	
FUNGICIDES					
Apron Maxx RTA	oz	0.74	2.5000	1.85	
Quicks	oz	2.52	3.0000	7.56	
HERBICIDES					
Glyphosate 3lbs a.e.	pt	1.75	6.0000	10.50	
2,4-D Amine 4	pt	1.74	2.0000	3.48	
Valor SX	oz	4.72	2.0000	9.44	
Dual Magnum	pt	12.64	1.0000	12.64	
INSECTICIDES					
Gaucho 600	oz	6.56	1.0000	6.56	
Karate Z	oz	2.87	0.9600	2.76	
Acephate 90SP	lb	6.46	0.7500	4.85	
Intrepid ZF	oz	1.66	1.0000	1.66	
IRRIGATION SUPPLIES					
Roll-Out Pipe	ft	0.20	33.0000	6.60	
SEED/PLANTS					
Soybean Seed RR	lb	0.99	50.0000	49.50	
ADJUVANTS	pt	2.44	0.0750	0.18	
Surfactant	pt	2.44	0.0750	0.18	
HAULING					
Haul Soybeans/Field	bu	0.26	65.0000	16.90	
CUSTOM LIME					
Lime (Spread)	ton	46.00	0.2000	9.20	
INOCULANT					
Nitrogin S	oz	0.27	2.7500	0.74	
OPERATOR LABOR					
Tractors	hour	11.35	0.5051	5.73	
Harvesters	hour	11.35	0.1021	1.16	
IRRIGATE LABOR					
Special Labor	hour	9.06	0.3000	2.73	
Implements	hour	9.06	0.0625	0.57	
HAND LABOR					
Implements	hour	9.06	0.1393	1.26	
UNALLOCATED LABOR	hour	11.36	0.4798	5.41	
DIESEL FUEL					
Tractors	gal	2.39	4.8145	11.50	
Harvesters	gal	2.39	1.3935	3.33	
Roll-Out Pipe Irr.	gal	2.39	7.3316	17.52	
REPAIR & MAINTENANCE					
Tractors	acre	4.16	1.0000	4.16	
Harvesters	acre	1.97	1.0000	1.97	
Roll-Out Pipe Irr.	acre	2.46	1.0000	2.46	
Roll-Out Pipe Irr.	acre	5.16	1.0000	5.16	
INTEREST ON OP. CAP.	acre	5.42	1.0000	5.42	
				256.50	
TOTAL DIRECT EXPENSES					
				9.76	
				12.71	
				9.99	
				46.78	
				79.24	
				335.74	
TOTAL FIXED EXPENSES					
				79.24	
				335.74	
TOTAL SPECIFIED EXPENSES					
				256.50	
Note: Cost of production estimates are based on 2010 input prices. These fertilizer rates are based on the assumption that 30-40% of the soybean fields would be mixed to light textured fields and not heavy clay exclusively. Also, rates are based on maintenance levels associated with the expected yield in the budget. Fertilization decisions should be based on soil tests. The budget does not include a second fungicide application to control Asian soybean rust, but the cost of treatment could range from \$7 to \$12 per acre.					

6
Table 1.A Estimated costs per acre
Cotton, 8R-38" solid, conservation tillage
B2RF variety, Delta Area, Mississippi, 2011

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
dollars dollars					
DIRECT EXPENSES					
CUSTOM SPRAY					
App by Air (5 gal)	appl	5.50	2.0000	11.00	
App by Air (3 gal)	appl	4.00	3.2500	13.00	
HARVEST AIDS					
Thialaruron 4lb	oz	1.74	2.0000	3.48	
Ethephon 6E	pt	2.85	1.3300	3.79	
Tribufos 6lb	pt	6.53	0.5000	3.27	
GROWING					
Gin & Haul	lb	0.09	900.0000	81.00	
FERTILIZERS					
Potash (60% K2O)	cwt	23.00	1.5000	34.50	
UAN (32% N)	cwt	12.50	4.0000	50.00	
FUNGICIDES					
Cotton Seed Trt.	acre	20.00	1.0000	20.00	
HERBICIDES					
Clarity	pt	11.86	0.5000	5.93	
Glyphosate 3lbs a.e.	oz	0.11	128.0000	14.08	
Dual Magnum	pt	12.64	1.0000	12.64	
Diuron 80V	lb	4.55	1.0000	4.55	
INSECTICIDES					
Acephate 90S	lb	8.21	1.5200	12.48	
Centric 40WG	oz	4.22	2.0000	8.44	
Karate Z	oz	2.87	0.5000	1.44	
Bidrin BWN	oz	0.85	2.0000	1.70	
Incidental Pest Trt	acre	12.00	1.0000	12.00	
SEED/PLANTS					
Cotton Seed B2RF	thous	0.61	45.0000	27.45	
TECHNOLOGY FEE					
B2RF Cot Tech Fee	thous	1.49	45.0000	67.05	
GROWTH REGULATORS					
Metquat Chloride	oz	0.10	16.0000	1.60	
CUSTOM FERTILIZE					
Custom Apply Fert	acre	6.25	1.0000	6.25	
ERADICATION FEE					
Eradication	acre	2.00	1.0000	2.00	
INSECT SCOUTING					
Insect Scouting	acre	7.00	1.0000	7.00	
CUSTOM LIME					
Lime (Spread)	ton	46.00	0.5000	23.00	
OPERATOR LABOR					
Tractors	hour	11.35	1.1134	12.65	
Self-Propelled	hour	11.35	0.3018	3.43	
HAND LABOR					
Implements	hour	9.06	0.4491	4.07	
Self-Propelled	hour	9.06	0.2798	2.54	
UNALLOCATED LABOR					
Tractors	gal	11.34	1.1322	12.84	
DIESEL FUEL					
Tractors	gal	2.39	10.8888	26.03	
Self-Propelled	gal	2.39	5.0405	12.05	
REPAIR & MAINTENANCE					
Implements	acre	9.46	1.0000	9.46	
Tractors	acre	4.45	1.0000	4.45	
Self-Propelled	acre	14.49	1.0000	14.49	
INTEREST ON OP. CAP.	acre	9.06	1.0000	9.06	
				538.73	
TOTAL DIRECT EXPENSES					
				16.18	
				28.84	
				59.84	
				104.86	
TOTAL FIXED EXPENSES					
				643.59	
TOTAL SPECIFIED EXPENSES					
				643.59	
Note: Cost of production estimates are based on 2010 input prices. Fertilization decisions should be based on soil tests. This budget may be converted to an irrigated budget by adding the costs from either Appendix Table 8 or 9. Adjustments in yields may be required with the addition of supplemental irrigation.					

In addition, Cotton irrigation adds \$23 to fuel costs plus \$100 in other costs.

Results

- Table 1 shows the dollar amounts of fuel and fertilizer relative to total expenses
- Simulating fuel and fertilizer prices and then comparing the difference between fuel and fertilizer price for each simulated data point shows that the percent change in fertilizer prices is less than one percent lower than the percent change in fuel prices (0.94 correlation).
- Thus if fuel goes up 10%, fertilizer prices are expected to rise by nearly 10%.
- Corn is most affected by fuel changes.

	Corn	Soybeans	Cotton
Fuel	\$ 40.47	\$ 32.35	\$ 61.08
Fertilizer	\$ 185.17	\$ 22.60	\$ 84.50
Fuel + Fertilizer	\$ 225.64	\$ 54.95	\$ 145.58
Total Expenses	\$ 545.47	\$ 335.74	\$ 766.59
Fuel & Ferl as % of Total	41%	16%	19%

