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Cost-price squeeze is emerging for corn farmers

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Corn prices have risen precipitously since the turn of the century due primarily to the emergence of the corn ethanol industry. In 2000, the average Iowa corn price was \$1.78. By 2012, it had risen to \$6.67. This rise greatly increased corn farmer profits. However, a significant portion of this increase has been offset by higher production costs. This article examines the increased crop production costs and its implications for farmers. The cost information comes from Ag Decision Maker Information File A1-85, *Monthly Profitability of Corn Production*, <http://www.extension.iastate.edu/agdm/crops/html/a1-85.html>.

Corn production costs are divided into three sections. The first is annual production inputs such as seed, fertilizer, herbicides, fuel, repairs, insurance and other direct costs. The second is the cost of machinery ownership. These costs are depreciation (an estimate of actual depreciation, not tax depreciation) and interest payments on machinery debt. The third is the cost of cropland. The annual cost of cropland is estimated

using the cash rental rate. By charging a land cost equal to the cash rental rate, the return for producing corn is the return to the farm operator (does not include the landlord's return). Although production cost varies from farmer to farmer, these cost estimates are believed to be representative of Iowa corn farmers.

The cost of producing corn has risen substantially since 2000, as shown in Table 1. Seed cost per acre has more than tripled from \$30 in 2000 to over \$100 in 2013. The cost of fertilizer and lime per

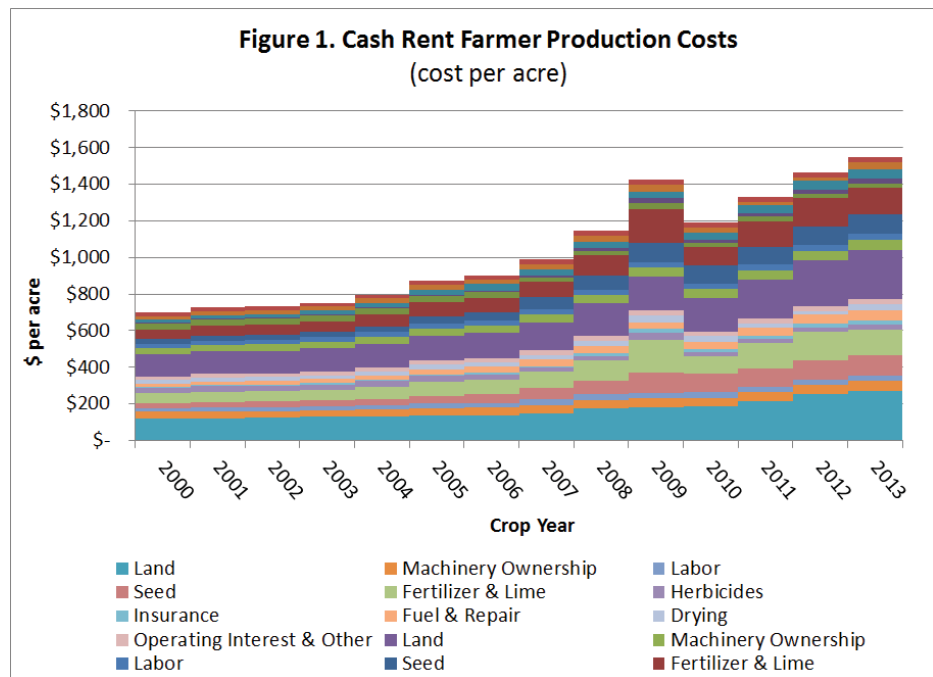


Table 1. Corn Production Costs per Acre

Crop Year	Seed	Fertilizer & Lime	Herbicide	Insurance	Fuel & Repair	Drying	Labor	Interest & Other	Machinery Ownership	Cash Rent	Total Cost
2000	\$30	\$52	\$30	\$6	\$19	\$17	\$20	\$21	\$36	\$120	\$351
2001	\$30	\$59	\$30	\$5	\$20	\$21	\$21	\$21	\$38	\$122	\$367
2002	\$30	\$57	\$31	\$6	\$20	\$20	\$21	\$19	\$37	\$124	\$365
2003	\$32	\$56	\$30	\$6	\$23	\$21	\$23	\$19	\$38	\$128	\$375
2004	\$30	\$67	\$32	\$7	\$24	\$24	\$25	\$19	\$39	\$131	\$397
2005	\$40	\$78	\$32	\$7	\$30	\$28	\$25	\$20	\$42	\$135	\$437
2006	\$45	\$79	\$32	\$7	\$34	\$25	\$27	\$23	\$44	\$135	\$451
2007	\$64	\$87	\$24	\$9	\$34	\$27	\$29	\$27	\$46	\$148	\$495
2008	\$74	\$112	\$25	\$15	\$36	\$33	\$29	\$27	\$46	\$176	\$573
2009	\$110	\$181	\$38	\$23	\$36	\$36	\$29	\$30	\$48	\$183	\$713
2010	\$101	\$101	\$25	\$17	\$36	\$32	\$29	\$27	\$49	\$184	\$601
2011	\$98	\$140	\$25	\$17	\$45	\$20	\$29	\$28	\$51	\$214	\$666
2012	\$102	\$163	\$20	\$23	\$50	\$16	\$30	\$29	\$52	\$252	\$737
2013	\$109	\$145	\$25	\$25	\$55	\$34	\$32	\$29	\$54	\$270	\$777

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acre has also tripled, rising from \$52 to \$145 during the same period. Although nitrogen, phosphorus and potash have all increased in price, the prices of nitrogen and potash have increased the most. Contrary to the cost trend of other production inputs, herbicide cost has actually dropped slightly over this period. The cost of fuel and repairs has also increased, driven in part by the price of diesel fuel. Although the need for corn drying varies from year to year, the cost of LP gas has also risen. Crop-land cash rent, a major cost of producing corn, has more than doubled over this time period.

The increase in corn production costs is shown graphically in Figure 1. Production costs started to increase rapidly in 2004 with the major expansion of the ethanol industry. In 2009, production costs spiked to over \$700 per acre but fell back in 2010. Subsequent to 2010, production costs have resumed their upward climb. Costs are estimated to reach \$777 per acre in 2013.

Cost per acre can be converted to cost per bushel to provide a different perspective of production costs. Because corn yield varies from year to year, the cost per bushel follows a somewhat different pattern than cost per acre. As shown in Table 2, corn yield has tended to trend upward since 2000. This trend has helped offset some of the rise in cost per acre.

Yield can also vary greatly between years, resulting in a significant impact on cost per bushel. Cost per bushel was relatively low in 2004 and 2009 due to corn yields over 180 bushels per acre. Conversely, cost per bushel was well over \$5.00 per bushel in 2012 due to the drought-reduced yield. A return to more normal yields in 2013 would result in a cost of about \$4.50 per bushel.

Although comparing the cost per bushel relative to its selling price indicates the profitability of corn production, examining the total cost of producing a corn crop provides an estimate of the increase in

working capital required for corn production. As shown in Table 3, the cost of producing 500 acres of corn has risen from about \$175,000 in 2000 to almost \$390,000 in 2013. Because these costs are generally cash costs, the working capital requirements of a corn farmer have more than doubled during this period. This means that a significant portion of a year's corn profits are required to fund the increase in working capital needed for the subsequent year's corn production.

Implications

Although corn production costs have risen substantially in recent years, the cost per bushel has not exceeded selling price. If corn prices are above cost per bushel in coming years, production costs will continue to rise to fill the gap between cost and price. If production input costs don't rise sufficiently to fill this gap, cash rental rates will fill it due to competition among farmers for farmland. Moreover, the current generous revenue insurance program reduces

Table 2. Corn Production Costs per Bushel

Crop Year	Corn Yield	Total Crop Inputs	Machinery Ownership	Cash Rent	Total Cost
2000	144	\$1.35	\$0.25	\$0.83	\$2.43
2001	146	\$1.42	\$0.26	\$0.84	\$2.51
2002	163	\$1.25	\$0.23	\$0.76	\$2.24
2003	157	\$1.34	\$0.24	\$0.82	\$2.39
2004	181	\$1.26	\$0.21	\$0.72	\$2.20
2005	173	\$1.50	\$0.24	\$0.78	\$2.52
2006	166	\$1.64	\$0.27	\$0.81	\$2.72
2007	171	\$1.76	\$0.27	\$0.87	\$2.89
2008	171	\$2.05	\$0.27	\$1.03	\$3.35
2009	182	\$2.65	\$0.26	\$1.01	\$3.92
2010	165	\$2.23	\$0.30	\$1.12	\$3.64
2011	172	\$2.34	\$0.30	\$1.24	\$3.88
2012	137	\$3.16	\$0.38	\$1.84	\$5.38
2013	172	\$2.64	\$0.31	\$1.57	\$4.52

Table 3. Corn Production Costs for All Corn Acres

Crop Year	Corn Acres	Total Crop Inputs	Machinery Ownership	Cash Rent	Total Cost
2000	500	\$97,418	\$18,000	\$60,000	\$175,418
2001	500	\$103,703	\$18,750	\$61,000	\$183,453
2002	500	\$102,194	\$18,500	\$62,000	\$182,694
2003	500	\$104,799	\$18,750	\$64,000	\$187,549
2004	500	\$113,815	\$19,250	\$65,500	\$198,565
2005	500	\$130,095	\$20,750	\$67,500	\$218,345
2006	500	\$135,913	\$22,000	\$67,500	\$225,413
2007	500	\$150,280	\$23,000	\$74,000	\$247,280
2008	500	\$175,433	\$23,125	\$88,000	\$286,558
2009	500	\$241,313	\$23,875	\$91,500	\$356,688
2010	500	\$183,785	\$24,625	\$92,000	\$300,410
2011	500	\$200,821	\$25,375	\$107,000	\$333,196
2012	500	\$216,309	\$26,125	\$126,000	\$368,434
2013	500	\$226,809	\$26,875	\$135,000	\$388,684

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the need for a risk premium in the profit structure of corn production, allowing corn farmers to bid cropland rents even higher. So, the higher corn prices generated by the corn ethanol industry are, or will soon be, fully capitalized into the corn farmer's cost structure.

A decline in the ethanol industry would have a significant detrimental impact on the profitability of corn production. Although corn ethanol is viable as an octane enhancer (3 to 5 percent blend rate), its market value as a gasoline substitute is questionable, except at a deep price discount to gasoline (ethanol has two-thirds the energy content of gasoline). If it were not for the corn-ethanol mandates contained in the Renewable Fuel Standard, the market for ethanol blends at 10 percent or higher may not be viable except at discounted ethanol prices. Depending on gasoline price, producing corn-ethanol at the discounted price will probably not be profitable due to the increased cost of producing corn. The Renewable Fuel Standard needs to continue to support the corn-ethanol

industry so corn demand and price are sufficiently high to cover the increased corn production costs plus provide a profit for corn farmers. Of course, other demand factors also impact the situation.

The impact of a decline in the demand for corn-ethanol would be felt beyond the corn farmer. As corn acreage has expanded due to the demand for corn for producing ethanol, it has impacted other crops such as soybeans and minor oilseeds, wheat and other small grains, cotton, etc. Because of the relatively fixed size of the U.S. cropland acreage, more acres of corn mean fewer acres of other crops. To maintain their acreage, the selling prices of other crops have also risen to be competitive with corn. Higher prices for these other crops means improved profits for a large number of non-corn farmers. If the demand for corn ethanol drops, the demand for corn will also drop, reducing the competition for acres and causing a price drop for other crops. This will result in a cost-price squeeze for growers of corn and other crops.

Updates, continued from page 1

Internet Updates

The following information files and decision tool have been updated on www.extension.iastate.edu/agdm.

How Often Can Cattle Feeders Hedge a Profit with Futures? – B2-54 (4 pages)

Historic Farmland Value Survey Data (Iowa State University) – C2-70 (Decision Tool)

Historic Farmland Values – C2-72 (10 pages)

Getting Started in Farming: Inheriting a Farm – C4-07 (8 pages)

Types of Term Loan Payment Schedules – C5-93 (4 pages)

Current Profitability

The following tools have been updated on www.extension.iastate.edu/agdm/info/outlook.html.

Corn Profitability – A1-85

Soybean Profitability – A1-86

Iowa Cash Corn and Soybean Prices – A2-11

Season Average Price Calculator – A2-15

Ethanol Profitability – D1-10

Biodiesel Profitability – D1-15

Returns for Farrow-to-Finish – B1-30

Returns for Weaned Pigs – B1-33

Returns for Steer Calves – B1-35

Returns for Yearling Steers – B1-35

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