Managing farm costs key to profitability in 2021

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Corn and soybeans futures prices have recently rallied to their highest levels in years, providing hope for a market-driven, profitable 2021 crop year. However, the only certainty about future prices is that they will continue to change until their expiration date, and they could plummet as fast as they rallied. Unless farm operators use futures or options to create a floor for their crop prices, current future prices might foster a false sense of security.

Winter is a great time for farm operators to concentrate on calculating their own costs of crop production, not only because they have more control over costs than crop prices, but also because knowing their break-even prices might ease the struggle to lock in profits before harvest time. The latest issue of the Iowa State University Extension and Outreach, Estimated Costs of Crop Production, www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf, reports average cost estimates.

Handbook updates
For subscribers of the handbook, the following updates are included.
- Crop Planning Prices – A1-10 (1 page)
- Historical Costs of Crop Production – A1-21 (2 pages)
- Revenue Protection Crop Insurance – A1-54 (3 pages)
- Livestock Planning Prices – B1-10 (1 page)
- Monthly Swine Feeding Returns – B1-31 (5 pages)
- Monthly Cattle Feeding Returns – B1-36 (2 pages)
- Historic Hog and Lamb Prices – B2-10 (5 pages)
- Historical Cattle Prices – B2-12 (5 pages)
- Lean Hog Basis – B2-41 (1 page)

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for Iowa farms in 2021, and provides guidelines to help farmers calculate their own costs of production.

Total costs for corn and soybean production per acre are expected to increase, respectively, by 2.1%–3.4% and 2.6% in 2021. However, higher expected corn yields over a 30-year trend for 2021 suggest that on a per bushel basis, costs would increase by 1.0%–2.6% to remain below their 2019 marks (Figure 1). Fuel and insecticide costs, interest expenses on pre-harvest input financing, and crop insurance premiums are projected lower in 2021.

The estimated cost of production for continuous corn is $3.88 per bushel for a target yield of 166 bushels per acre, and it goes down to $3.82 for target yields of 184 and 202 bushels per acre. The estimated costs of production per bushel for corn following soybeans are $3.34, $3.31, and $3.32 for target yields of 181, 201, and 221 bushels per acre, respectively.

Cost of production estimates for herbicide tolerant soybeans amount to $9.16, $8.94 and $8.74 per bushel for target yields of 50, 56, and 62 bushels per acre, respectively. The total cost per bushel of soybeans is projected at $9.04 for non-herbicide-tolerant beans at 56 bushels per acre, according to the report.

The cost estimates are representative of average costs for farms in Iowa. Very large or small farms may have lower or higher fixed costs per acre. The full report is available online through the Ag Decision Maker website, www.extension.iastate.edu/agdm. The publication also includes budgets for alfalfa hay establishment with an oat companion crop and by direct seeding. Annual production costs for established alfalfa or alfalfa-grass hay as well as a budget for maintaining grass pastures are included. Actual costs can be entered in the column for “Your Estimates,” or by using the electronic spreadsheet Decision Tools on the Ag Decision Maker website, www.extension.iastate.edu/agdm/crops/html/a1-20.html.

Breakdown of costs for 2021
For corn, land costs account for about one-third of total costs of production (Figure 2). Values of $187, $222, and $256 per acre rent charges for the low, medium, and high quality land were assumed. Variable costs represent just over half of the costs of production, and nitrogen and seed costs account for about 43% of the variable costs. Nitrogen price is projected stable at $.34 per pound in 2021, but total nitrogen costs are projected to go up by 6%–11% reflecting the higher application rates recommended by the Iowa State University Corn Nitrogen Rate Calculator, http://cnrc.agron.iastate.edu/nRate.aspx. Corn seed costs are expected to increase by 2% to $262 per bag.

Land costs account for 44% of total costs of soybean production, and variable costs account for an additional 42%. Seed and fertilizers amount to 44% of variable costs. Phosphorus and potassium were charged, respectively, at $.39 and $.30 per pound. Machinery costs are projected to decline by 6% primarily due to lower diesel costs: $2.02 in 2021 versus $2.53 in 2020.

Profitability prospects for 2021
There is substantial uncertainty regarding crop prices in the coming season. The most recent USDA projections for 2021/22, published in October 2020, put the average US farm prices for corn and soybeans at $3.65 and $10.00. In this scenario, production of herbicide tolerant and non-herbicide tolerant
soybean would be profitable for all target yields considered in the report. Net returns per acre to herbicide-tolerant soybean production would range from $42 to $78 per acre, depending on target yield and tillage practice.

Corn production would not be profitable in a continuous corn scenario if the price per bushel is $3.65. Net returns to corn following soybeans would range from $55 to $74 per acre under conventional tillage, and average $82 and $75, respectively, under strip tillage and no-till.

Current futures prices seem to indicate that corn and soybean prices might average $4.45 and $11.40 per bushel in 2021/22, respectively. In this optimistic scenario, corn production would generate profits north of $95 per acre in a continuous corn rotation, and above $200 per acre following soybeans. Profits from soybean production would exceed $110 per acre. However, futures prices are currently reflecting a market reaction to unexpected USDA production and stocks figures, and they could retrench fast once the market reassess the real impact of the new information. In any case, farm operators can always improve their profitability or limit losses by focusing on managing costs and using their break-even estimations to implement a tailored marketing plan.

**Cost Calculations**

Knowing costs is key, as is understanding the assumptions behind the budgets used in the calculations. When using the Iowa State cost of production estimates for 2021, keep several things in mind. First, fertilizer and lime costs include volume and early purchase discounts. Second, farmers paying land rents higher than the ones projected in the report might face higher costs of production. Operator/landowners on fully paid land will have much lower accounting costs, since the cash rent used in the report will only be an opportunity cost and not a cash cost (as it is for tenants).

Reference yields for corn and soybean budgets in the annual Iowa State University Extension and Outreach report reflect 30-year trend yields. In the latest projections used for the 2021 report, corn yields are two bushels higher than for 2020, while soybean yields remained unchanged.

Starting in 2021, the amount of nitrogen applied to corn production follows the recommendations from the Iowa State University Corn Nitrogen Rate Calculator. The projected corn-to-nitrogen price ratio used in the calculator amounted to 12.35. Such methodological adjustment resulted in an average 6% increase in the amount of nitrogen applied to corn following corn, and an 11% increase in the amount applied to corn following soybeans.

**Conclusions**

Producers must have a strong grasp of their own production costs, and the ISU Extension and Outreach report provides a step-by-step guide to help them estimate break-even costs, and serves to benchmark operations and trigger relevant questions on how to better manage enterprise costs.
The upward pricing pattern for corn and soybeans that established itself during the latter half of 2020 subsided as we entered 2021, but the price volatility that supported the price gains remains. The markets have experienced large price swings in both directions since New Year’s Day. Both bears and bulls have found reasons to trade so far this year, and both types of traders can find reasons to support their outlook in the market data.

Bulls point to the strong pace of export sales for both crops. Bears are concentrating on the pace of actual shipments and the potential for sales cancellations. Figures 1 and 2 highlight these issues for corn and soybeans. For corn, the pace of international sales this year has been much stronger than in the previous couple of years. With sales approaching 2 billion bushels already, the data is supportive of USDA's projection of 2.55 billion bushels of corn exports. But while corn sales have been robust, corn shipments (actual deliveries of those export sales) have been lagging behind. At the end of January, less than 750 million bushels of corn had been delivered to international markets. Roughly 40% of sales have been converted to shipments. Thus, the corn market does face some risk from trade cancellations. Burrowing into the individual country data, China and Mexico have received approximately half of their corn purchases, running ahead of the overall average. Out of our top markets, it's Japan and Taiwan where outstanding sales are much larger than accumulated exports.

Soybeans face a different issue in the export markets. Shipments have been brisk throughout the fall and winter, while sales have slipped. The early rush for beans has put the market already very close to USDA’s export target, but the sales pace has raised some concern in the trade. Overall, roughly 80% of soybean export sales have been shipped. So the threat of cancellations is smaller for soybeans than for corn. For China, the dominant market in the arena, shipments stand at 90%. Countries where shipments are lagging include Japan (65%), Taiwan (58%), and Mexico (56%).
Both the corn and soybean markets will remain extremely sensitive to export news. Corn traders will focus on the pace of actual shipments and the potential for cancellations. Soybean traders are looking for some additional sales before the global markets turn toward the South American crops.

Another feature that has supported prices over the last few months and has definitely added to the volatility in the crop markets has been the strength of speculative trade in the crop markets. As we discussed last month, outside investors have moved significantly into agriculture over the past several months, flipping from being short in both corn and soybeans to establishing long positions (the longest we have seen in the past couple of years) for both crops.

Figures 3 and 4 provide updates on speculative positions. For corn, speculative interest has plateaued over the last month. That support has helped hold corn prices in the $5 range.

Meanwhile, for soybeans, speculators have been shrinking their net long position over January. The pullback in speculative interest coincides with a pullback in soybean futures prices. Overall, speculators remain bullish on soybeans, holding a billion bushel net long position, but they have shaved that position down noticeably over the past few weeks.

Farmers have enjoyed an incredible run in crop prices since the derecho. Figure 5 shows the evolution of the 2020/21 season-average price since the beginning of last year. The roughly $1.50 per bushel swing in corn and $4 per bushel bump in soybean prices have improved the financial outlooks for many. While January has been turbulent, crop prices remain at very strong levels. Corn has been able to weather the mid-month jitters and finished the month with the highest price projection for the marketing year. Soybeans were not as fortunate, coming down from a peak earlier in the month.

As we move forward into February and March, traders will begin to shift their focus to the prospects for the 2021 crops. Weather conditions, such as the lingering drought in the Great Plains, will add to the volatility mix in the markets. Traders in both the corn and soybean markets are preparing for roughly 90 million acres planted to each crop. An increase in overall planted area is expected, but with the potential for diminished soil moisture, questions will center on the potential for additional crop production. As farmers look to gear up to meet the greater crop usage we have seen over the past several months, traders will
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be watching for and will be wary of the potential for that usage to slip, especially from the international perspective.

For more market outlook through the month, the latest outlook presentation is always available on the Ag Decision Maker Outlook page, www.extension.iastate.edu/agdm/outlook.html.

**Figure 5. 2020/21 projected season-average prices (derived from futures)**

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Please add these files to your handbook and remove the out-of-date material.

**Internet Updates**
The following Information Files and Decision Tools have been updated on www.extension.iastate.edu/agdm:

- 2018 Farm Bill Payment Estimator by County for ARC-CO and PLC – A1-33 (Decision Tool)
- Feeder Steer-Heifer Price Spread – B2-45 (1 page)

**Current Profitability**
The following profitability 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

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