



A Benchmarking Approach to Evaluating Price, Yield, and Input Price Variability on Per-acre Net Returns for the 2023 Crop Year

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As CY2023 approaches, growers will be evaluating decisions regarding crop rotation, planting, marketing, and the procurement of input supplies. Uncertainty surrounding commodity markets and input supply chains is a common theme within the agricultural community. While fertilizer, fuel, and chemical prices are likely to remain elevated, growers can evaluate the impact this uncertainty could potentially have on their bottom line via *benchmarking analysis*. Benchmarking is measuring the financial performance of a particular farming operation, here a crop enterprise, and comparing present performance with the past. Benchmarking parameters are customizable allowing growers to input their farm's unique historical data. This then allows for the establishment of internal trends, unique to that particular grower and operation.

An Excel® spreadsheet was developed by the LSU AgCenter for corn, cotton, grain sorghum, rice, and soybean crops, aiding growers in evaluating the magnitude to which varying market prices, expected yields, and farm input prices could collectively affect per-acre net returns for specific crops for their operation. Higher market prices may partially offset rising input costs but may fail to consider the impact that average or below average yields could have on crop profitability (or margin). Additionally, cropland rental mechanisms may also play a role in assessing the expected performance of the 2023 crop in relation to that crop's performance over the past four years. To facilitate comparison, an enterprise budget which is relative to the rental mechanism employed has also been constructed. Therefore, it is useful to simultaneously consider all these factors when evaluating marginal returns and return on investment (ROI) on a crop-by-crop basis.

Growers are asked to input expected selling price, expected yield per acre, and land rent mechanism (cash amount or share rental percentage). The grower's share of gross revenue is then calculated based on these inputted values. The variable cost per acre for custom operations, diesel fuel, digital ag fees/services, drying, fertilizer, fungicide, herbicides, insecticide, hauling, insecticides, labor, seed, repair, interest on operating capital, and miscellaneous are then to be input by the grower. Total variable cost per acre, grower's share of Net Returns Above Variable Costs (NRAVC), Return on Investment (ROI), breakeven yield, and breakeven price are then calculated subject to commodity specific parameters.

An example of cash rented corn is presented in this report. The benchmarking methodology requires that historical farm data and input parameters be used for an internal comparison of the farm's projected costs and returns for corn in 2023. The ROI and breakeven analysis are also performed by the management tool subject to the farm information used. [BLUE](#) cells can be changed by the grower to reflect their farm specific parameters relative to the crop under consideration. Formulas and graphs will automatically adjust subject to the incorporated data.

Corn					
	2023	2022	2021	2020	2019
Price (\$/bu)	\$5.22	\$6.34	\$5.95	\$4.53	\$3.61
Yield (bu/ac)	180	180	190	185	195
Gross Revenue (\$/ac)	\$939.60	\$1,141.20	\$1,130.50	\$838.05	\$703.95
Land Rent					
Cash Rent Paid (\$/ac)	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00
Grower's Gross Revenue	\$814.60	\$1,016.20	\$1,005.50	\$713.05	\$578.95
Variable Costs (\$/ac)					
	2023	2022	2021	2020	2019
Custom Operations	\$34.00	\$34.00	\$34.00	\$31.00	\$44.00
Diesel Fuel	\$84.00	\$52.00	\$32.00	\$45.00	\$46.00
Digital Ag Services	\$12.00	\$11.00	\$10.00	\$10.00	\$10.00
Drying	\$36.00	\$36.00	\$36.00	\$36.00	\$36.00
Fertilizer - N	\$183.00	\$160.00	\$80.00	\$86.00	\$90.00
Fertilizer - P	\$27.00	\$20.00	\$12.00	\$11.00	\$17.00
Fertilizer - K	\$42.00	\$35.00	\$17.00	\$16.00	\$19.00
Fungicides	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Herbicides	\$48.00	\$44.00	\$36.00	\$29.00	\$40.00
Hauling	\$44.00	\$44.00	\$44.00	\$44.00	\$44.00
Insecticides	\$10.00	\$9.00	\$8.00	\$13.00	\$7.00
Labor	\$17.00	\$16.00	\$16.00	\$15.00	\$15.00
Seed	\$130.00	\$118.00	\$118.00	\$120.00	\$110.00
Repair	\$26.00	\$24.00	\$23.00	\$23.00	\$22.00
Misc.	\$11.00	\$10.00	\$9.00	\$20.00	\$0.00
Interest on Capital	\$13.00	\$12.00	\$10.00	\$14.00	\$16.00
Total Variable Costs (\$/ac)	▼ \$717.00	▼ \$625.00	▼ \$485.00	▼ \$513.00	▼ \$516.00
NRAVC to Grower	\$97.60	\$391.20	\$520.50	\$200.05	\$62.95
ROI	13.61%	62.59%	107.32%	39.00%	12.20%
Change in NRAVC 2023 compared to historical		-\$293.60	-\$422.90	-\$102.45	\$34.65
Change in NRAVC 2023 compared to historical		-48.98%	-93.71%	-25.38%	1.41%
Breakeven Yield Needed margin 2022 compared to historical	137.4	98.6 38.8	81.5 55.8	113.2 24.1	142.9 -5.6
Breakeven Price Needed margin 2023 compared to historical	\$3.98	\$3.29 \$0.69	\$2.62 \$1.36	\$2.63 \$1.35	\$2.65 \$1.34

Enter expected 2023 selling price and yield along with the farm's historical average prices/yields for the previous 4 years.

Example is for cash-rented corn.

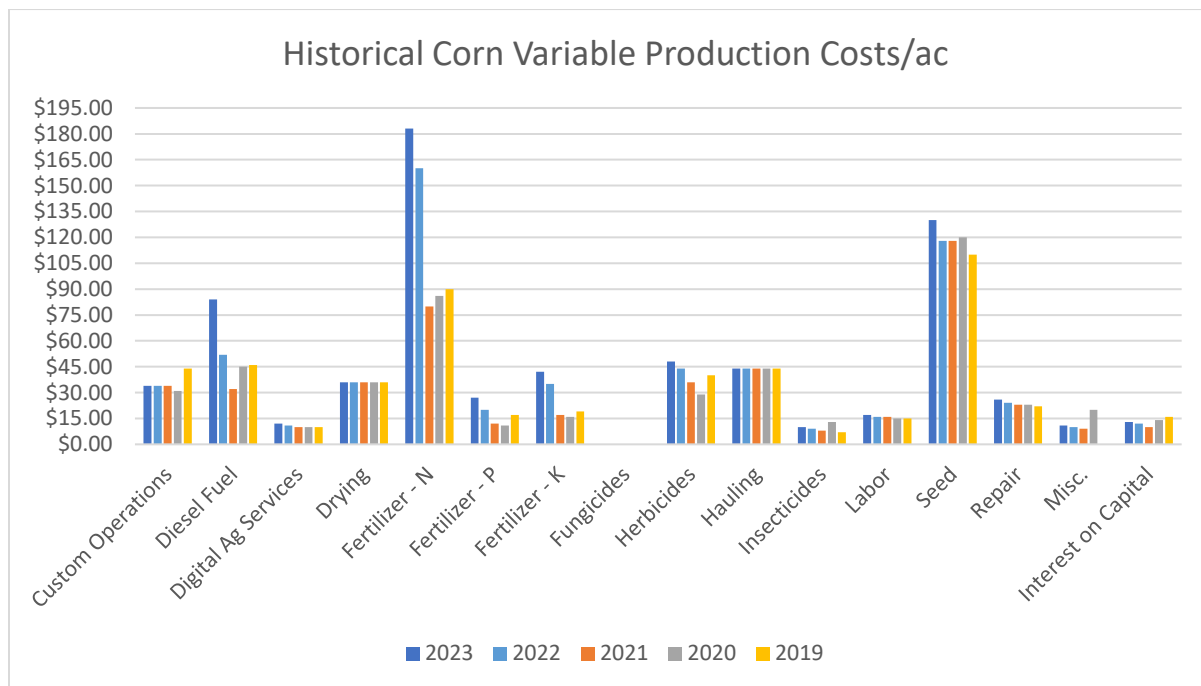
Enter early projections for 2023 corn production costs along with average production costs for the previous four years.

Total variable costs are calculated for 2023 and for the previous four years. NRAVC and ROI are then calculated for a benchmarking comparison.

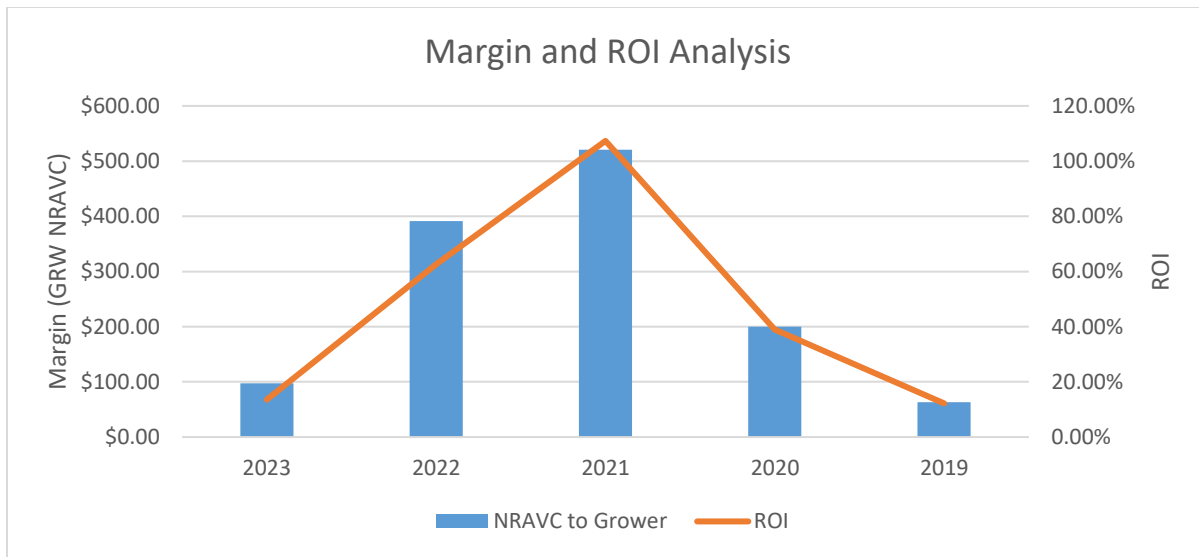
Breakeven yield and selling prices are compared for the corn crop.

In evaluating the benchmarking results for cash rented corn, the expected selling price for corn in 2023 is estimated by the grower to be \$5.22 per bushel. The 2023 variable production costs are estimated by the grower to increase over levels sustained in 2022. The effect from the expected increase selling price coupled with higher input costs still produces a NRAVC that is slightly lower than 2022. Similarly, ROI is lower for 2023 as compared to 2022. This type of analysis indicates that relatively strong commodity prices would be expected to only partially offset increases in 2023 production costs for cash rented corn based on grower-specified information.

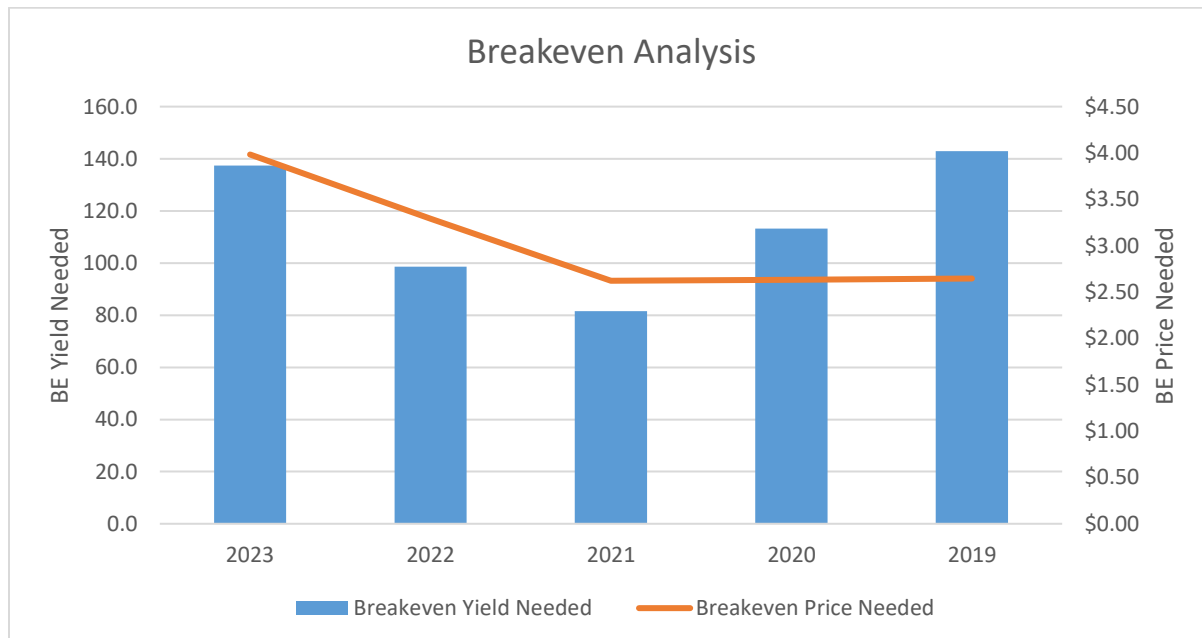
Graphical representation of the grower-specified production costs for the five-year period can provide an illustration as to the magnitude of the projected 2023 input pricing and expenditure level per planted acre. From the graph below, nitrogen fertilizer costs and herbicide costs are two cost categories that are projected to increase subject to grower-specified data.



ROI is defined as the grower's NRAVC per acre divided by the total variable cost per acre. Although there is no set rule for what this percentage should be, positive returns are sought. The higher the ROI, the larger degree profits (margin) offset the investment made via inputs to grow the crop. The inclusion of ROI into this management tool provides growers with a unique ROI number based on the farm's individual characteristics and expected price, yield, and input usage relative to historical performance.



Another useful graphical aid is the breakeven analysis of yield and price (below). Breakeven price is also referred to as the *cost of production per unit*. From grower-specified information, breakeven yield has increased for the 2023 crop year (137.4 bushels per acre) as production costs are projected to increase. More production is required to offset increased unit costs. By projecting a yield that follows the historical trend of a farm, the 2023 breakeven price is \$3.98 per bushel. Based on the anticipated selling price of \$5.22 per bushel, the overall strength in the commodity market can act to alleviate an increase in commodity price needed to cover variable production cost with the strength of the market price acting as the profit margin.



This file report contains downloadable, customizable Excel® spreadsheets for the following crop and rental mechanism (listed in table below).

Corn	Cash Rent	Share Rent
Cotton	Cash Rent	Share Rent
Grain Sorghum	Cash Rent	Share Rent
Rice	Cash Rent	Share Rent
Soybeans	Cash Rent	Share Rent

It should be noted that market price information and expected crop yields are presented for educational purposes only and do *not* reflect any official forecast by the authors for 2023. However, unit prices for both fertilizer and diesel fuel *have* been adjusted based on national trends to-date. Unit prices for nitrogen are currently estimated at \$0.87 per pound of active ingredient, phosphate at \$0.88 per pound of active ingredient, and potash at \$0.70 per pound of active ingredient. The price for farm diesel price is estimated to be \$4.56 per gallon. Variable cost expenditures, both on a per-acre and a unit quantity, that have been applied for other specified categories were drawn from historical LSU AgCenter enterprise budgets for the 2022-2019 crop years. Values for the 2023 crop year expenditures have been increased relative to 2022 total expenditure levels per category. For illustrative purposes, categorical expenditures for 2023 have been increased 10% year-over-year. These assumptions have been applied to all crops and rental spreadsheets that accompany this report. The management intensity of a crop will vary field-to-field as will fertility needs and weed, disease, and insect pressure. In an attempt to model the uncertainty of continued input price volatility and supply chain disruptions, growers are strongly encouraged to adjust these spreadsheets based on their specific farming situation.

This report and accompanying spreadsheet can be access electronically at: https://www.lsuagcenter.com/portals/our_offices/departments/ag-economics-agribusiness/extension_outreach

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