

PURDUE

AGRICULTURAL ECONOMICS REPORT

Title	2023 Purdue Crop Cost and Return Guide
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Summary	Production costs are expected to remain elevated in 2023. Despite this fact, it is not out of the realm of possibility to see positive margins in 2023, particularly for rotation corn and soybeans on high productivity ground.

The [2023 Purdue Crop Cost and Return Guide](#), which is available for free download from the Center for Commercial Agriculture website, gives estimated costs for planting, growing and harvesting a variety of crops, as well as estimated contribution margins and earnings. The guide is updated frequently as grain futures prices change and the costs of inputs, such as seed, fertilizer, pesticides and fuel, fluctuate. This paper discusses estimates made in mid-December.

The guide presents cost and return information for low, average, and high productivity soils. The discussion in this paper will focus on the estimates for average productivity soil. Table 1 presents crop budget information for continuous corn, rotation corn, rotation soybeans, wheat, and double-crop soybeans for average productivity soil. Double-crop soybeans are typically planted after wheat so it is typical to combine the contribution margin for these two crops when comparing to continuous corn, rotation corn, and rotation soybeans. The yield estimates reflect trend yields for Indiana for each crop. The contribution margin, obtained by subtracting total variable cost from market revenue, ranges from \$206 per acre for continuous corn to \$476 per acre for wheat/double-crop soybeans. The contribution margins for rotation corn and rotation soybeans on average productivity soil are \$318 and \$389 per acre, respectively. The contribution margin is used to cover overhead costs such as machinery ownership costs, family and hired labor, and cash rent. Failure to adequately cover these overhead costs typically puts downward pressure on cash rent and land values.

From 2007 to 2013, the contribution margin for rotation corn on average productivity soil was higher than the contribution margin for rotation soybeans. The average difference in the contribution margin was \$38 per acre during the 2007 to 2013 period. The situation was considerably different from 2014 to 2022. The average difference in the contribution margin during this period was an advantage for soybeans of \$54 per acre. The projected difference in contribution margins between corn and soybeans for 2023 is \$71 per acre in favor of rotation soybeans.

Table 1. 2023 Purdue Crop Budget for Average Productivity Soil.

	Continuous Corn	Rotation Corn	Rotation Soybeans	Wheat	Double- Crop Soybeans
Expected Yield per Acre	173	184	56	79	39
Harvest Price	5.75	5.75	13.60	7.40	13.60
Market Revenue	\$995	\$1,058	\$762	\$585	\$530
Less Variable Costs					
Fertilizer	318	288	111	164	82
Seed	124	124	74	44	86
Pesticides	126	119	75	45	65
Dryer Fuel	53	42	0	0	5
Machinery Fuel	32	32	20	20	14
Machinery Repairs	34	34	29	29	24
Hauling	18	19	6	8	4
Interest	36	34	17	16	15
Insurance and Miscellaneous	48	48	41	9	9
Total Variable Costs	\$789	\$740	\$373	\$335	\$304
Contribution Margin	\$206	\$318	\$389	\$250	\$226
Earnings	-\$191	-\$69	\$2	-\$137	\$226
Breakeven Price	\$6.86	\$6.13	\$13.57	\$9.14	\$7.79

See ID-166-W for more detail, December 2022 Estimates.

Figure 1 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation corn on average productivity soil from 2014 to 2023. Fertilizer costs in 2023 are expected to be similar to those in 2022, but \$137 (\$0.73 per bushel) higher than costs in 2021. Compared to the previous peak in 2013, fertilizer costs per acre are up \$141 per acre (\$0.67 per bushel). Cash rent per acre in 2023 is expected to be \$255 per acre (\$1.39 per bushel) or \$26 per acre higher than the most recent peak in 2014. Herbicide and seed costs are expected to be similar to 2022 levels.

Figure 1. Fertilizer, Seed, Pesticide, and Cash Rent Cost per Acre Rotation Corn in Indiana.

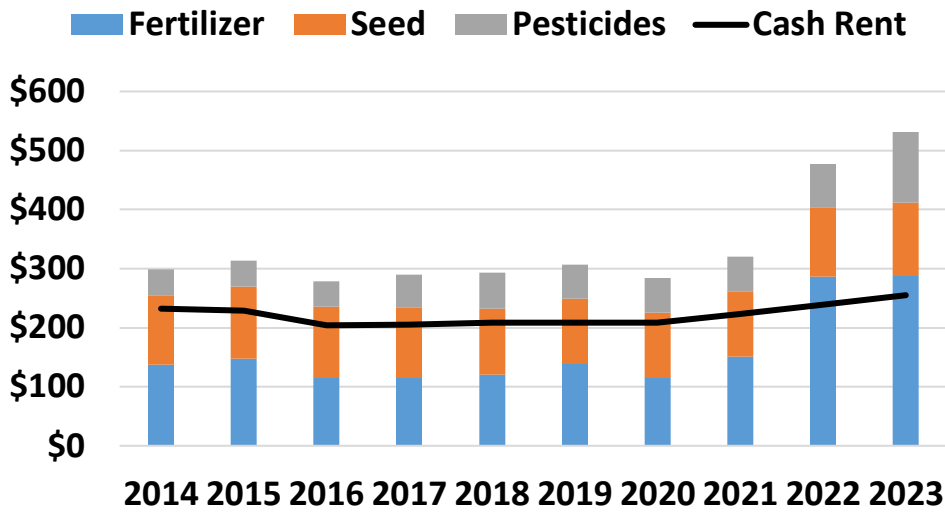
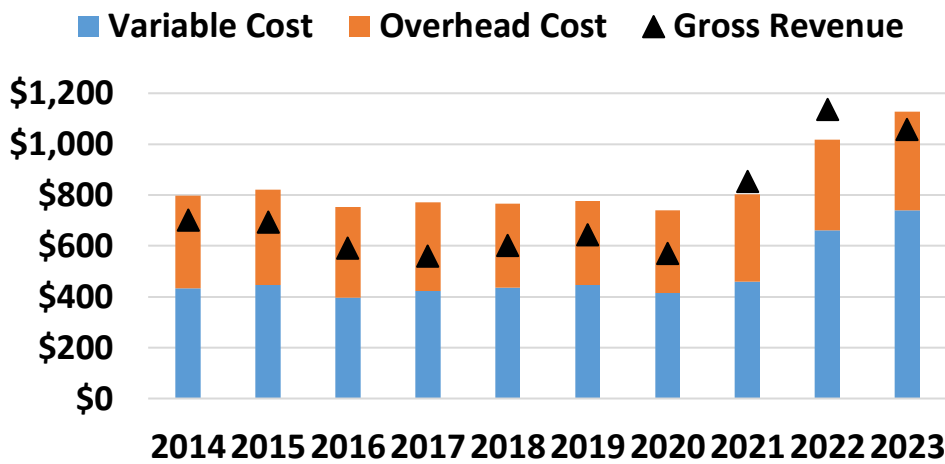


Figure 2. Variable Cost, Overhead Cost, and Gross Revenue per Acre Rotation Corn in Indiana.



Gross revenue (market revenue plus government payments), variable cost, and overhead cost per acre for rotation corn on average productivity soil is illustrated in figure 2. Government payments are expected to zero in 2023. Variable cost per acre in 2023 is expected to be \$80 higher than it was in the 2022 budget, which represents a 12.1 percent increase. Variable cost per bushel in 2023 is estimated to be \$4.02. Fixed cost (overhead cost) per acre is projected to be \$387, which is higher than the previous peak of \$375 in

2015. The breakeven price needed to cover variable and fixed costs varied from \$4.89 to \$4.98 per bushel from 2013 to 2015. In 2016 and 2017, the breakeven price declined to approximately \$4.55 per bushel. The breakeven prices in 2018 and 2019 were approximately \$4.45 per bushel, respectively. Breakeven prices in 2020 and 2021 were approximately \$4.20 and \$4.45, respectively. The projected breakeven price for 2022 was \$5.59 per bushel, which was 25.5 percent higher than the 2021 breakeven price. In 2023, the breakeven price is expected to increase another 9.5 percent, reaching \$6.13 per bushel. Gross revenue for rotation corn in 2023 is expected to be \$1,058 per acre or 7 percent lower than gross revenue in 2022. Combining the expected gross revenue for 2023 with total production costs (variable plus fixed costs) results in an expected loss for rotation corn of \$69 per acre.

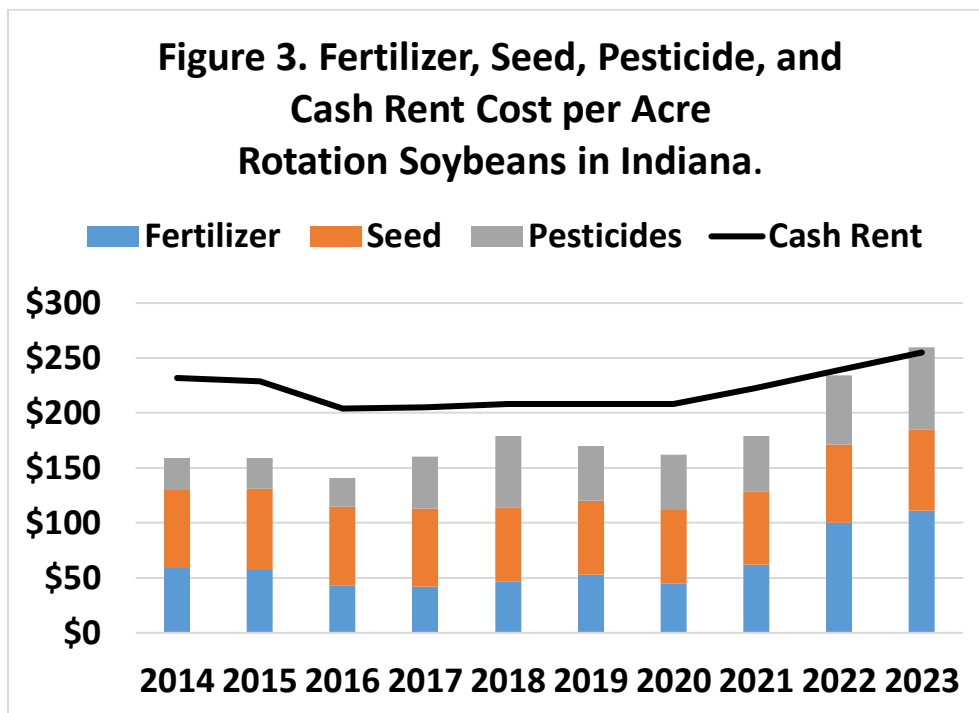
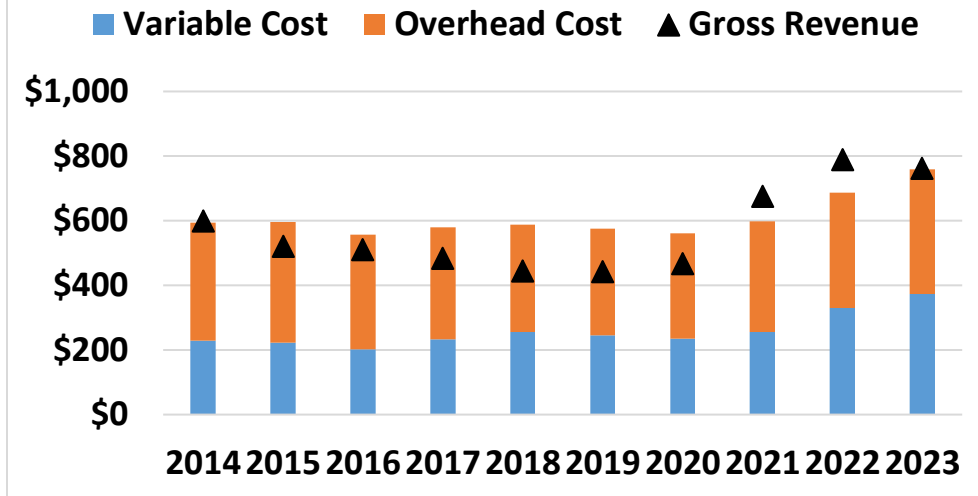


Figure 3 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation soybeans from 2014 to 2023. Fertilizer and herbicide costs in 2023 are expected to be similar to costs in 2022, but substantially higher than those experienced from 2014 to 2021.

Gross revenue (market revenue plus government payments), variable cost, and overhead cost per acre for rotation soybeans on average productivity level is illustrated in figure 4. Government payments are expected to be zero in 2023. Variable cost per acre in 2023 is projected to be \$373 per acre (\$6.66 per bushel), or approximately 13.4 percent higher than they were in 2022. Like corn, fixed cost per acre peaked in 2015 at \$375, and is projected to be \$387 per acre in 2023. The breakeven price needed to cover variable and fixed costs is expected to increase from \$12.49 in 2022 to \$13.57 per bushel in 2023, which represents an 8.6 percent increase. The expected profit in 2023 for rotation soybeans is \$2 per acre.

Figure 4. Variable Cost, Overhead Cost, and Gross Revenue per Acre Rotation Soybeans in Indiana.



The breakeven prices for rotation corn and rotation soybeans discussed above were for average productivity land. For high productivity land, the breakeven prices for rotation corn and rotation soybeans are expected to be \$5.62 and \$12.64 per bushel, respectively. Though the difference in relative profits is smaller than it was on average productivity land, rotation soybeans are expected to be more profitable than rotation corn on high productivity land. The breakeven prices for low productivity land are expected to be \$6.72 and \$14.98 per bushel for corn and soybeans, respectively. Rotation soybeans are expected to be more profitable than rotation corn on low productivity soil.

In summary, despite substantially higher production costs, it is not out of the realm of possibility to see positive margins in 2023, particularly for rotation corn and soybeans produced on high productivity ground. The higher cost structure along with relatively tight margins, increases the importance of carefully scrutinizing input and crop decisions. Producers are encouraged to create crop budgets and in general improve their record keeping.