PURDUE AGRICULTURAL ECONOMICS REPORT

Title:	2021 Purdue Crop Cost and Return Guide
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Summary:	Expect tight margins for 2021. Dr. Langemeier and Dobbins emphasize the importance of carefully scrutinizing input and crop decisions. Producers encouraged to create crop budgets and, in general, improve their record keeping.

The 2021 *Purdue Crop Cost and Return Guide*, which is available for free download from the Center for Commercial Agriculture website (here), 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-November.

Table 1. 2021 Purdue Crop Budget for Average Productivity Soil.

	Continuous Corn	Rotation Corn	Rotation Soybeans	Wheat	Double-Crop Soybeans
Expected Yield per Acre	169	180	55	77	39
Harvest Price	3.80	3.80	10.10	5.70	10.10
Market Revenue	$642	$684	$556	$439	$394
Less Variable Costs					
Fertilizer	120	111	47	71	35
Seed	111	111	67	44	78
Pesticides	58	58	50	30	45
Dryer Fuel	33	27	0	0	5
Machinery Fuel	12	12	8	8	5
Machinery Repairs	22	22	18	18	15
Hauling	17	18	6	8	4
Interest	12	11	7	6	6
Insurance and Miscellaneous	38	38	34	9	9
Total Variable Costs	$423	$408	$237	$194	$202
Contribution Margin	$219	$276	$319	$245	$192

See ID-166-W for more detail, November 2020 Estimates.

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. It is important to note that crop yields have been modified in this year's guide. The current yield estimates reflect trend yields for Indiana for each crop. The contribution margin, obtained by subtracting total variable cost from market revenue, ranges from $219 per acre for continuous corn to $437 per acre for wheat/double-crop soybeans. The contribution margins for rotation corn and rotation soybeans on average productivity soil are $276 and $319 per acre, respectively. The contribution margin is used to cover overhead costs such as machinery 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 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 2020. The average difference in the contribution margin during this period was an advantage for soybeans of $69 per acre. The projected difference in contribution margins between corn and soybeans for 2021 is $43 per acre.

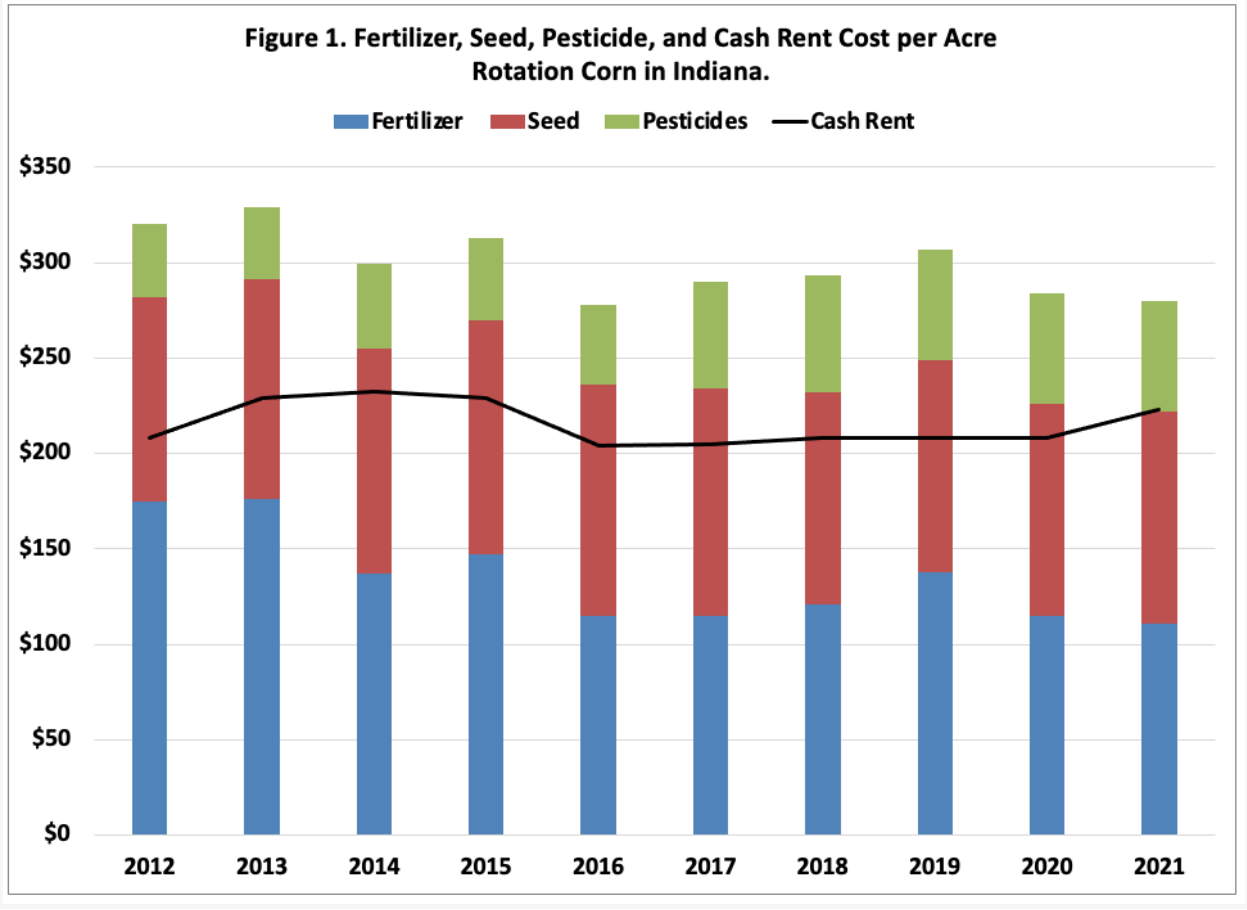
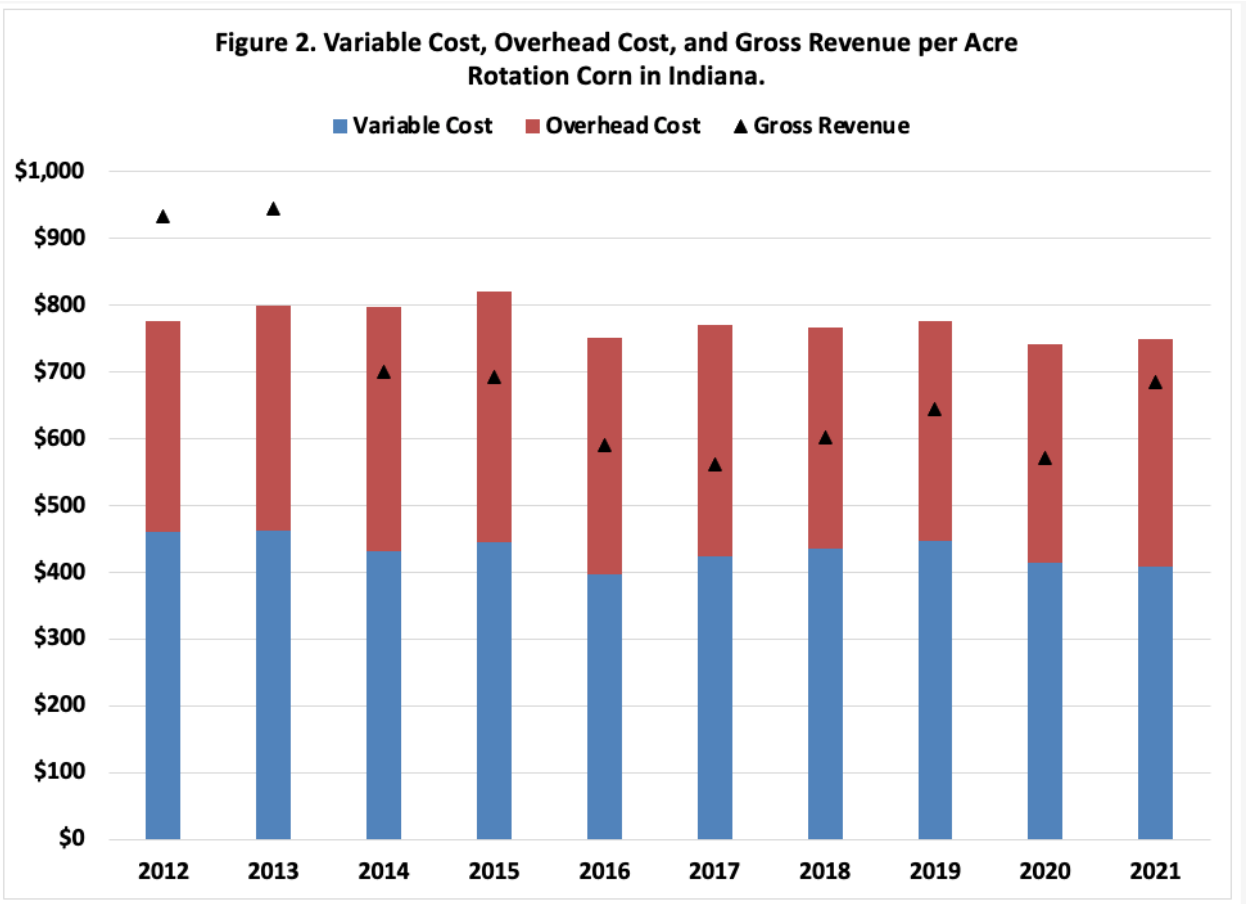


Figure 1 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation corn on average productivity soil from 2012 to 2021. Fertilizer cost peaked in 2013 at $176 per acre ($1.08 per bushel). In 2021, fertilizer cost per acre is projected to be $111 per acre ($0.62 per

bushel). Cash rent per acre peaked in 2014 at $232 per acre ($1.42 per bushel). At $223 per acre ($1.24 per bushel), projected cash rent is $9 per acre lower than it was at the peak in 2014. Partially due to resistant weed problems, pesticide cost per acre in 2021 is expected to be higher than its level in 2013 and 2014, the peak cost years for fertilizer cost and cash rent.



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. Variable cost per acre peaked in 2013 at $462 per acre ($2.83 per bushel), and is projected to be $408 per acre ($2.27 per bushel) in 2021. Fixed cost (overhead cost) per acre peaked in 2015 at $375, and is projected to be $342 per acre in 2020. The breakeven price needed to cover variable and fixed costs varied from $4.77 to $4.98 per bushel from 2012 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 and $4.20 per bushel, respectively. The projected breakeven price for 2020 is $4.17 per bushel. Gross revenue for rotation corn has declined from $945 per acre in 2013 to $684 per acre in 2021. The expected loss per acre for rotation corn in 2021 is $66 per acre.

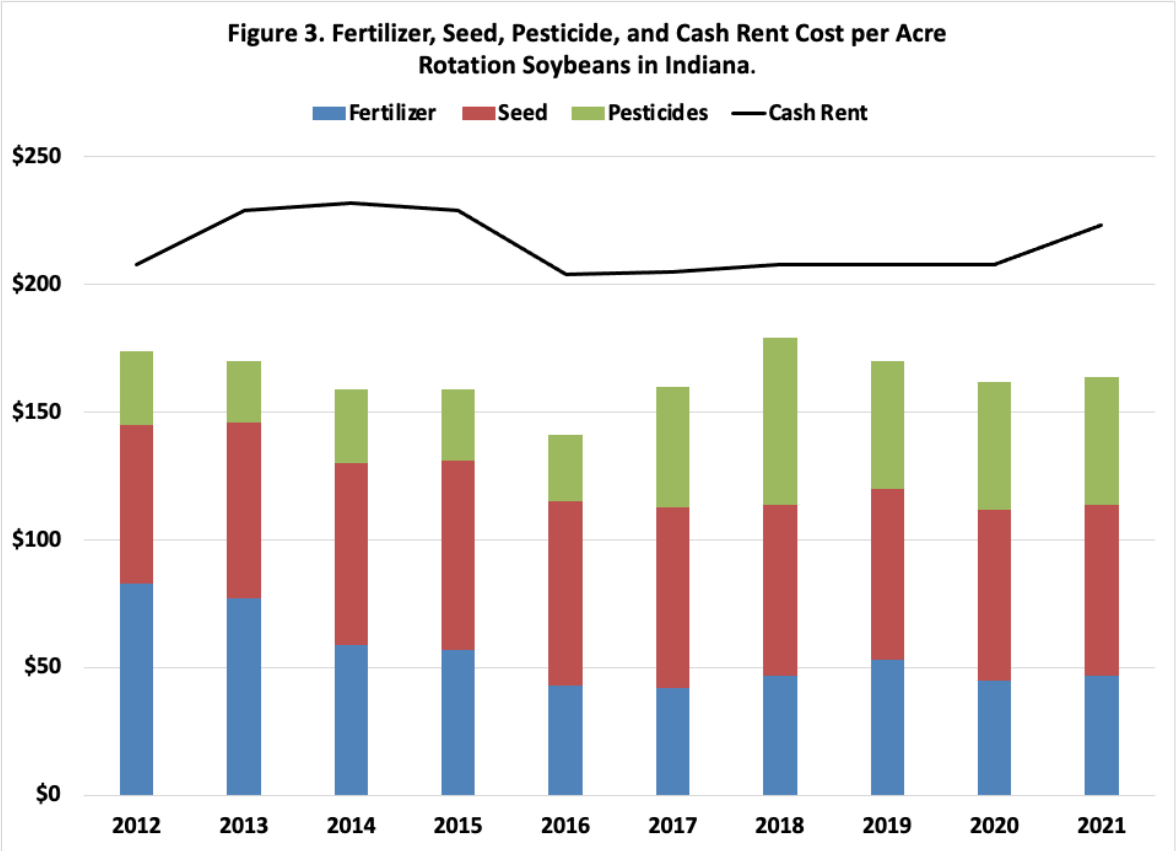
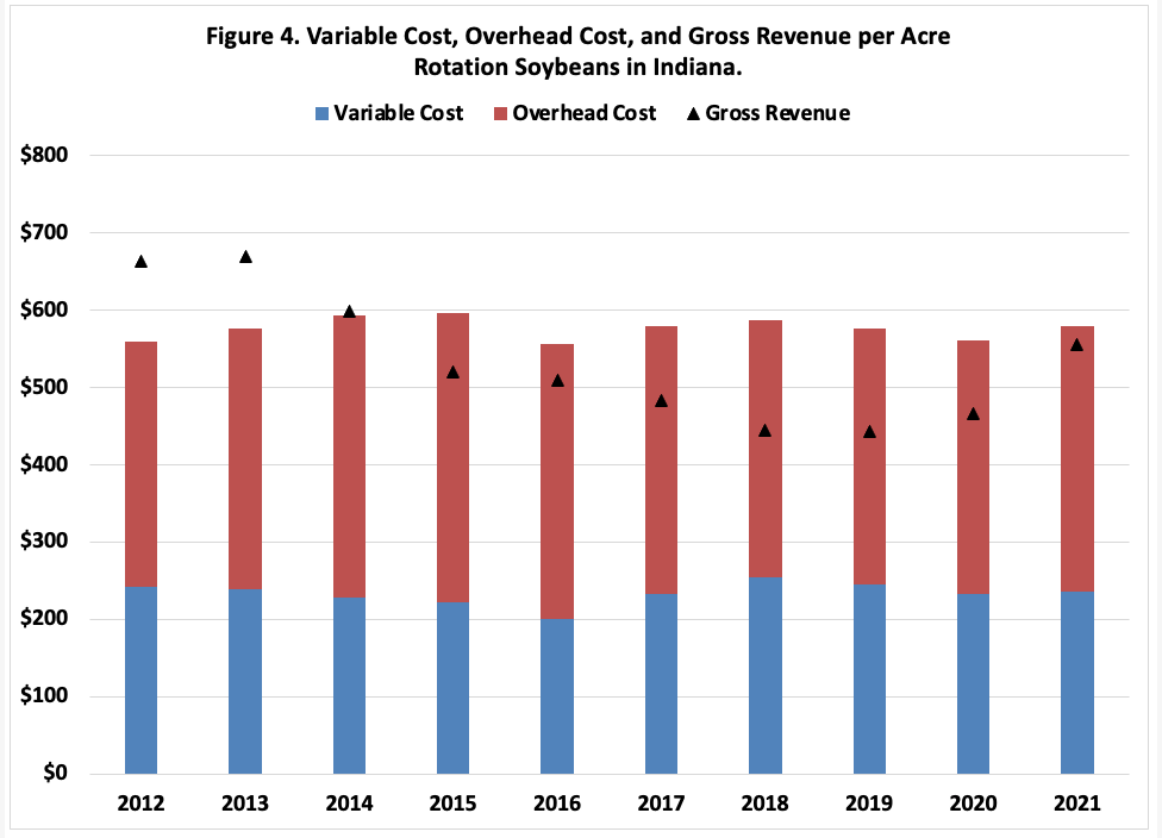


Figure 3 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation soybeans from 2012 to 2021. Fertilizer cost and cash rent have declined since their peaks in 2013 and 2014. Resistant weed problems have put upward pressure on pesticide cost for rotation soybeans.



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. Primarily due to higher herbicide cost, variable cost per acre in 2021 is projected to be $237 per acre ($4.31 per bushel), which is $18 below the peak variable cost of $255 in 2018. Like corn, fixed cost per acre peaked in 2015 at $375, and is projected to be $342 per acre in 2021. The breakeven price needed to cover variable and fixed costs declined from $11.94 per bushel in 2015 to $10.39 in 2020. Expected breakeven price in 2021 is $10.55 per bushel. Gross revenue for rotation soybeans has declined from $670 per acre in 2013 to $556 per acre in 2021. The expected loss in 2021 for rotation soybeans is $24 per acre.

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 $3.80 and $9.68 per bushel, respectively. The breakeven prices for low productivity land are expected to be $4.56 and $11.66 per bushel for corn and soybeans, respectively. The breakeven price for corn on high productivity soil is the same as the expected corn price, and the breakeven price for soybeans on high productivity soil is below the expected soybean price.

In summary, margins will be tight again in 2021. This increases the importance of carefully scrutinizing input and crop decisions. Producers are encouraged to create crop budgets and in general improve their record keeping. Relatively low crop margins and expected reductions in government payments will adversely impact a farm's liquidity position and financial performance.