

2021 Purdue Crop Cost & Return Guide

October 2020 Estimates

Both product prices and input prices may have significantly changed since these estimates were prepared.

Table 1. Estimated per Acre Crop Budgets for Low, Average, and High Productivity Indiana Soils

	Crop Budgets for Three Yield Levels ¹														
	Low Productivity Soil					Average Productivity Soil					High Productivity Soil				
	Cont. Corn	Rot. Corn	Rot. Beans	Wheat	DC Beans	Cont. Corn	Rot. Corn	Rot. Beans	Wheat	DC Beans	Cont. Corn	Rot. Corn	Rot. Beans	Wheat	DC Beans
Expected yield per acre ²	135	144	44	62	31	169	180	55	77	39	203	216	66	93	46
Harvest price ³	\$3.65	\$3.65	\$9.45	\$5.70	\$9.45	\$3.65	\$3.65	\$9.45	\$5.70	\$9.45	\$3.65	\$3.65	\$9.45	\$5.70	\$9.45
Market revenue	\$493	\$526	\$416	\$353	\$293	\$617	\$657	\$520	\$439	\$369	\$741	\$788	\$624	\$530	\$435
Less variable costs ⁴															
Fertilizer ⁵	\$108	\$98	\$36	\$53	\$27	\$115	\$106	\$44	\$69	\$33	\$123	\$114	\$52	\$86	\$38
Seed ⁶	91	91	67	44	78	111	111	67	44	78	111	111	67	44	78
Pesticides ⁷	58	58	50	30	45	58	58	50	30	45	58	58	50	30	45
Dryer fuel ⁸	26	21	N/A	N/A	4	32	26	N/A	N/A	5	39	31	N/A	N/A	6
Machinery fuel @ \$1.70	13	13	8	8	5	13	13	8	8	5	13	13	8	8	5
Machinery repairs ⁹	22	22	18	18	15	22	22	18	18	15	22	22	18	18	15
Hauling ¹⁰	14	14	4	6	3	17	18	6	8	4	20	22	7	9	5
Interest ¹¹	11	10	7	5	6	12	11	7	6	6	12	12	7	7	7
Insurance/misc. ¹²	36	36	31	9	9	38	38	34	9	9	40	40	34	9	9
Total variable cost	\$379	\$363	\$221	\$173	\$192	\$418	\$403	\$234	\$192	\$200	\$438	\$423	\$243	\$211	\$208
Contribution margin ¹³ (Revenue - variable costs) per acre	\$114	\$163	\$195	\$180	\$101	\$199	\$254	\$286	\$247	\$169	\$303	\$365	\$381	\$319	\$227

¹Estimated yields and costs are for yields with average management for three different soils representing low, average, and high productivity. The high productivity soils represent soils capable of producing corn and soybeans with yields about 20% higher than average soils. Low productivity soils represent soils capable of producing corn and soybeans with yields about 20% lower than the average soils.

²These yields assume average weather conditions and timely plant/harvest dates, except soybean double-crop yield, which is based on a July 1 planting date. Rotation corn, rotation soybean, and wheat yields for average soils are based on the long-run trends in state average yields reported by the Indiana office of the National Agricultural Statistics Service. Continuous corn yields are 94% of rotation corn yields. Double-crop soybean yields are 70% of full-season soybean yields. Continuous corn yields assume a chisel plow tillage system. Double-crop soybean yields apply to central and southern Indiana.

³Harvest corn price is December 2021 CME Group futures price less \$0.25 basis. Harvest soybean price is November 2021 CME Group futures price less \$0.35 basis. Harvest wheat price is July 2021 CME Group futures price less \$.35 basis. Harvest prices were based on opening prices on October 27, 2020. These prices will change.

Table 1 (Continued)

⁴Input prices for variable costs reflect expected prices for 2021. These prices will vary by location and time of the year. Users need to adjust these prices to reflect their own expectations and price situation.

⁵Phosphate, potash, and lime applications are based on Tri-State Fertilizer Recommendations (Source: Purdue Extension Bulletin, AY-9-32, July 1995). Lime amounts represent the pounds of standard ag lime needed to neutralize the acidity from the nitrogen supplied from sources other than ammonium sulfate. Nitrogen application rate for corn is based on research from the Department of Agronomy, Purdue University. Anhydrous ammonia is used as the nitrogen source for corn. Urea is used as the nitrogen source for wheat. Pounds of N, P₂O₅, K₂O, and lime by crop and soil were as follows: continuous corn, 240-47-55-720, 240-59-63-720, 240-71-72-720; rotation corn, 200-50-57-600, 200-63-66-600, 200-75-75-600; rotation beans, 0-34-79-0, 0-42-93-0, 0-50-107-0; wheat, 58-38-42-172, 84-47-48-251, 110-57-53-330; double crop beans, 0-23-61-0, 0-29-70-0, 0-34-80-0. Fertilizer prices per lb.: NH₃ @ \$0.26; urea @ \$0.38; P₂O₅ @ \$0.41; K₂O @ \$0.27; lime @ \$19.00/ton spread on the field. For very poorly drained soils, consider increasing N rates by 5-10%. For well-drained soils, consider reducing N rates by 5-10%. All soil tests for phosphorus and potassium are assumed to be in the maintenance range, and the pH is in the recommended range.

⁶Corn seed prices assume a biotech variety with multiple traits. A 20%-refuge is planted with varieties that do not contain insect resistant traits, but do include herbicide tolerance. Seeding rates for corn are 27,000 seeds per acre on low productivity soils and 33,000 seeds per acre on average and high productivity soils. Soybean seed prices include Round-Up Ready® varieties. Rotation soybeans are drilled with a seeding rate of 169,000 seeds per acre with a 90% germination rate. Double-crop soybeans are drilled with a seeding rate of 195,000 seeds per acre. The seeding rate for wheat is two bushels per acre.

⁷Includes insecticides and herbicides. For corn, rootworm insecticide is applied to the refuge acres. In some areas of Indiana, this may not be required. These costs do not include the application of fungicide to corn. If fungicide is applied, this will add an additional \$28 to \$32 per acre for material and application. Pesticide costs can vary widely based on herbicides selected, required rate of application, and product pricing.

⁸Fuel used to dry crop to a safe moisture level for storage. For double-crop soybeans, the drying charge represents the drying of wheat in order to allow an earlier planting of soybeans.

⁹Repairs are based on approximately 5-year-old machinery. For older machinery, per acre repairs and downtime cost will be higher.

¹⁰Hauling charge represents moving grain from field to storage.

¹¹Interest is based on 5% annual rate for 9 months for seed, fertilizer, and chemicals, and for 6 months for half the machinery fuel and repairs, and all miscellaneous expenses.

¹²Includes crop insurance, general farm insurance, and miscellaneous cost. The cost of crop insurance represents the premium projected for a Revenue Protection (RP) policy at the 80% coverage level. Crop insurance is included in budgets for corn and full-season soybeans, but is not included for wheat and double-crop soybeans.

¹³Contribution margin is the return to labor and management, machinery ownership, land resources, and risk.

Table 2. Estimated per Acre Government Payments, Overhead Costs & Earnings for Low, Average, and High Productivity Indiana Soils

	Low Productivity Soil				Average Productivity Soil				High Productivity Soil			
Farm Acres	900	1000	2700	3000	900	1000	2700	3000	900	1000	2700	3000
Rotation ¹	c-c	c-b	c-c	c-b	c-c	c-b	c-c	c-b	c-c	c-b	c-c	c-b
Crop contribution margin ²	\$114	\$179	\$114	\$179	\$199	\$270	\$199	\$270	\$303	\$373	\$303	\$373
Government payment ³	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10
Total contribution margin	\$124	\$189	\$124	\$189	\$209	\$280	\$209	\$280	\$313	\$383	\$313	\$383
Annual overhead costs:												
Machinery ownership ⁴	\$138	\$130	\$85	\$80	\$138	\$130	\$85	\$80	\$138	\$130	\$85	\$80
Family and hired labor ⁵	\$72	\$64	\$43	\$39	\$72	\$64	\$43	\$39	\$72	\$64	\$43	\$39
Land ⁶	\$171	\$171	\$171	\$171	\$223	\$223	\$223	\$223	\$274	\$274	\$274	\$274
Earnings or (losses)	-\$257	-\$176	-\$175	-\$101	-\$224	-\$137	-\$142	-\$62	-\$171	-\$85	-\$89	-\$10

¹Rotations are as follows: c-c = all of the farm acres in continuous corn; c-b = one-half of the farm acres in rotation corn and one-half in rotation soybeans.

²Crop's contribution margin is the per acre contribution margin from Table 1.

³It is assumed that the current farm bill will provide PLC payments for corn base acres in 2021.

⁴The same basic machinery set, which is timely for each rotation, is used for both the c-c and c-b rotation. The larger farm size requires larger, more expensive machinery. Corn production utilizes a chisel plow tillage system, and soybeans utilize no-till. Average annual replacement costs for the larger farm size were calculated using the Purdue Machinery Cost Calculator for a timely machinery set. Seven-year trading policy is assumed for combine and planter, 10-year policy for other field machinery. On livestock farms where fewer hours each day are available for crops, or on small farms, machinery costs and/or labor costs will be higher. On well-drained soils where more days are suitable for spring field work, machinery costs could be lower. A 10-year trading policy was assumed for all machinery on the smaller acreages. Machinery ownership costs are likely to vary widely from farm to farm.

⁵For the larger acreages, labor expense includes a family living withdrawal of \$64,488 (\$84,991 of family living expenses less \$45,217 in net nonfarm income plus \$24,714 in income and self-employment taxes); a full-time employee with total compensation of \$47,141; and a part-time employee with compensation of \$4,066. Family living withdrawal information is based on Illinois FBFM summary information. Employee compensation is based on Employee Wage Rates and Compensation Packages on Kansas Farms, Kansas State University, August 2012. For the smaller acreages, labor expense includes the same family living withdrawal and no hired labor. Labor costs are likely to vary widely from farm to farm.

⁶Based on 2020 cash rent per bushel of corn yield reported in the article entitled "Indiana Farmland Values Increase but Signal Concern of Potential COVID-19 Slump," Purdue Agricultural Economics Report, July, 2020. The relatively tight margins expected in 2020 will likely dampen increases in cash rents, thus 2021 cash rents are assumed to be the same as 2020 cash rents.

Prepared by: Michael R. Langemeier and Craig L. Dobbins, Department of Agricultural Economics; Bob Nielsen, Tony J. Vyn, and Shaun Casteel, Department of Agronomy; and Bill Johnson, Department of Botany and Plant Pathology, Purdue University.

Date: 10/27/20

It is the policy of the Purdue University Cooperative Extension Service that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue University is an Affirmative Action institution.