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*Advocating for Agriculture*

**Comparison of the  
Indiana Department of Local Government Finance (DLGF)  
Agricultural Base Rate Formula to Indiana's Crop Profitability  
from 2013 to 2025**

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## 1. What is the purpose of the DLGF agricultural base rate formula?

The purpose of the farmland base formula is to develop a Market-Value-In-Use valuation that is based on objectively verified data that conforms with the *Town of St. John* decision. This formula was determined by a working group of agricultural economists at Purdue University and farmer stakeholder representatives. The capitalized net income approach is in use in some form in eleven of the twelve states in the Midwest. The formula determines the value of farmland by evaluating the cash generated by farming or the state average rental rate for farming.

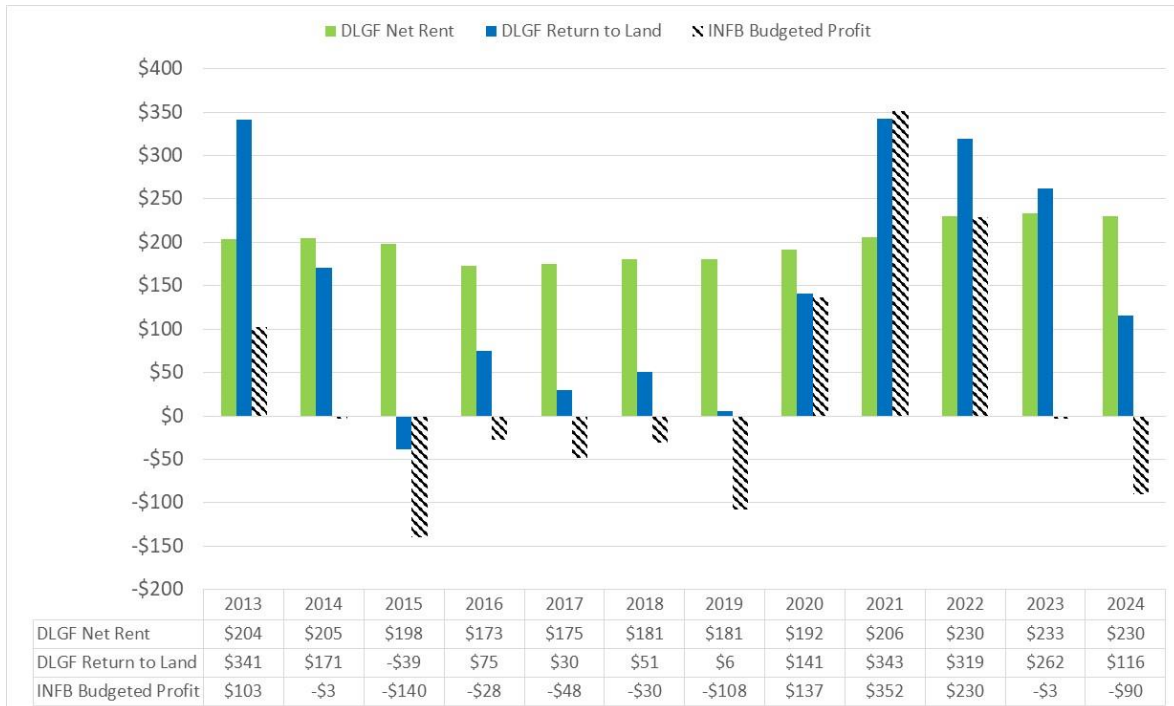


Figure 1. Comparison of DLGF's Net Rent and Return to Land to a Representative Farm's Profit from Corn and Soybean Production from 2013 to 2024).

The green bar in Figure 1 shows the Indiana average cash rental rate for soils with average productivity, as the Purdue University *Farmland Value and Cash Rent Survey* reported. The nominal state average rental rate ranged from \$173 per acre in 2016 to \$233 per acre in 2023, with an average rental rate of \$200 per acre over the 2013 to 2024 period.

The blue bar in Figure 1 shows the DLGF's calculated Return to Land for a 1000-acre corn-soybean farm with an average soil productivity type. The return to owned land values in Figure 1 are from the DLGF's *Reference Materials for Valuing Agricultural Land* guide.

The black-white bar is the budgeted profitability for a 1,000 corn-soybean farm, assuming 50% of the land base is cash rented. This profit is the average contribution margin for a corn-soybean rotation, less machinery overhead, family living, plus government payments, less property tax on owned land, and less than 50% of the average cash rent. The budgeted profitability ranged from a loss of \$140 per acre in 2015 to a \$352 profit per acre in 2021. The average return to farming owned and rented land is \$30 per acre.

The Net Return to Land (green) and Average Cash Rent (blue) suggest that farm profitability is strong and unaffected by lower commodity prices and higher input costs. The budgeted profitability of a farm that rents half of the land base (black) shows declining profitability and significant variability in profits.

## 2. Why are capitalization rates used in the formula?

The value of farmland is determined by calculating the present value of cash flows over its life. Since farmland has an infinite life, the average cash flows (return to land and rent) are annualized using the average interest rate on operating and farm real estate loans.

The formula is:

$$\text{Value} = \text{Annual Cash Flow} \mid \text{Capitalization Rate}$$

where the *Annual Cash Flow* is the Net Return to Land and the Average Cash Rent

An example of how the capitalization rate affects the value of an asset is provided in the following table.

*Table 1. Example of Changes to the Capitalization Rate on Asset Value for Varying Rental Rates.*

Rent	Capitalization Rate						
	6%	7%	8%	9%	10%	11%	12%
\$150	\$2,500	\$2,143	\$1,875	\$1,667	\$1,500	\$1,364	\$1,250
\$250	\$4,167	\$3,571	\$3,125	\$2,778	\$2,500	\$2,273	\$2,083
\$350	\$5,833	\$5,000	\$4,375	\$3,889	\$3,500	\$3,182	\$2,917

The example provided in Table 1 illustrates how increasing the capitalization rate reduces the value of an asset. Notice how the value of farmland with a \$250 rent is \$4,167 at a 6% capitalization rate. Increasing the rate to 8% reduces this value to \$3,125. Table 1 demonstrates that larger capitalization rates will reduce the value of an asset.

The DLGF formula uses the annual average interest rate for agricultural operating loans and farm real estate, as the Chicago Federal Reserve Bank reported, as the initial capitalization rate to determine the agricultural land base rate.

### 3. What are the average operating and farm real estate interest rates from the Chicago Federal Reserve from 2013 to 2024?

To overcome the volatility base rate values from year to year due to volatility of farm income, the formula goes beyond a static capitalization interest rate as is used in Iowa and many other states across the country. If calculations determine an increase in the base rate value of more than 10%, then 8% cap rate is used. If the base rate value decreases more than 10%, the default cap rate is 6%. If neither a 10% increase nor decrease applies, then the cap rate is 7%.

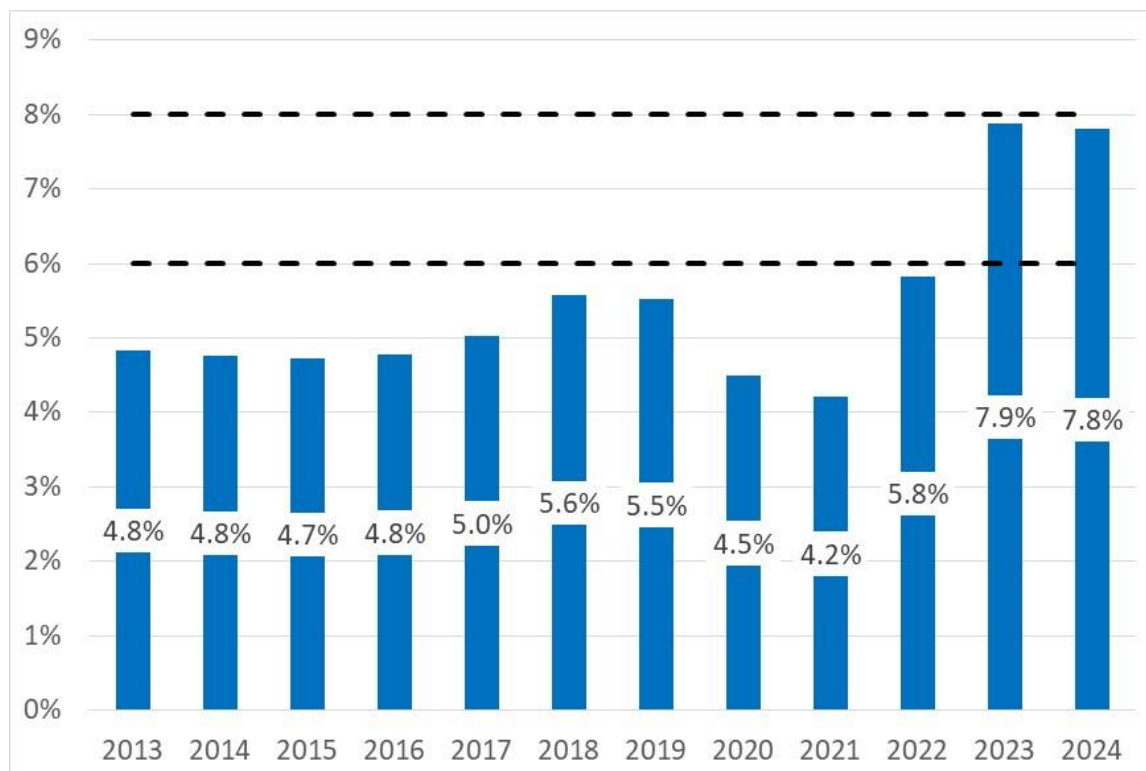


Figure 2. The Average of the Annual Interest Rate for Agricultural Operating Loans and Farm Real Estate Loans from 2013 to 2024.

The average interest rate for operating debt and farm real estate, as reported by the Chicago Federal Reserve from 2013 to 2024, is shown in Figure 2. The 6% and 8% rates are highlighted in the graph because the DLGF formula uses a capitalization rate of 6%, 7%, or 8% in determining the final base rate for agricultural land. The average interest farmers paid for operating loans or for farm real estate was less than 6% until 2023. The average interest rate farmers pay is approaching 8%, the largest capitalization rate used in the formula.

**4. How have the corn-soybean rotation’s revenue and total variable costs changed from 2013 to 2025?**

Figure 3 shows the average revenue for a corn-soybean rotation and the total variable costs per acre indexed to the 2013 values. Showing revenue and costs as an index better illustrates the percentage change over time.

Figure 3 illustrates the cyclical nature of commodity prices and farm revenue. The corn-soybean revenue declined from 2013 to 2019, when the rotation's revenue was about \$184 an acre, or 25% less, than in 2013.

Revenues increased from 2020 to 2022 in response to global events and transfer payments during the COVID crisis. The combination of higher global prices for commodities and government payments increased revenue by \$294 an acre, or a 40% increase compared to 2013. To date, budgeted revenue for an average Indiana corn-soybean farm is similar to what it was in 2013, at \$735 an acre.

Input costs for the corn-soybean rotation declined between 2013 and 2021 by \$17 an acre, or roughly 5%. Input costs increased dramatically in 2022 and 2023 to \$164 an acre, or 42% above the production costs in 2013. These production costs are sticky and are often slow to adjust lower and are currently \$149 an acre above the level in 2013.

In summary, the corn-soybean rotation for 2025 is budgeted to have revenue equal to that received in 2013, with total variable costs 40% higher than those paid in 2013. The combination of higher total variable costs with no change in rotation revenue means that the profitability budgeted for 2025 is lower than in 2013.

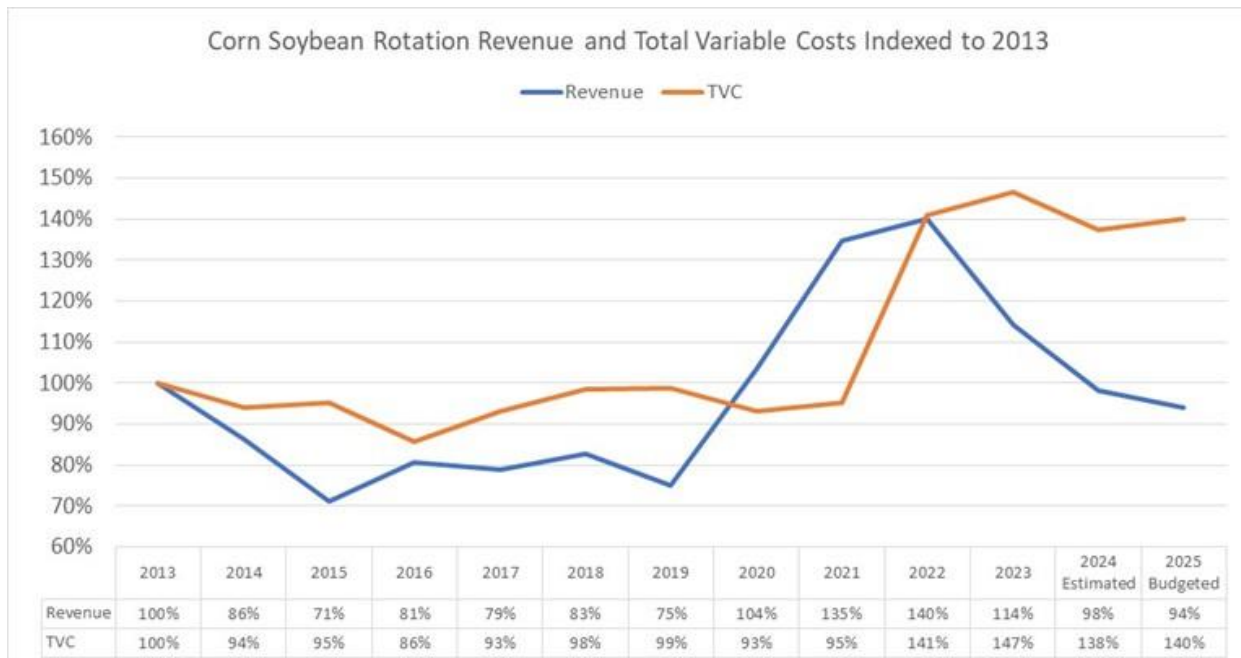


Figure 3. Indiana Average Revenue and Total Variable Costs for a Corn-Soybean Rotation from 2013 to 2025 (Budgeted) Indexed to 2013.

## 5. What is the farm profitability of producing corn and soybeans on owned land and on rented land for a 1,000-acre farm with average soil productivity in Indiana?

The formula assumes 50% owned and 50% rented land based on United State Department of Agriculture (USDA): National Agricultural Statistics Service's (NASS) reporting which is objectively verified data.

Figure 4 illustrates the profitability of the corn-soybean rotation for owned (in blue) and rented (in orange) farmland. The profitability is calculated using the state average corn and soybean yields and the state's marketing year average price for both crops. The Purdue University *Crop Cost and Return Guide* for a 1,000-acre farm with average soil productivity defines the total variable costs, machinery over, and family labor/family living expenses. The average cash rental rates are from the Purdue *Farmland and Cash Rent Survey*. The profitability of owning land also includes any government payments that add to revenue and the expense of property taxes, as reported in the DLGF *Reference Materials for Valuing Agricultural Land* guide.

The profitability of the rotation on owned land is calculated as the average return over total variable costs for the rotation plus government payments less property taxes, machinery overhead costs, and family labor/family living expenses.

The profitability of the corn-soybean rotation on rented land is calculated as the average return over total variable costs for the rotation less machinery overhead expense, family labor/family living expenses, and the average cash rental rate.

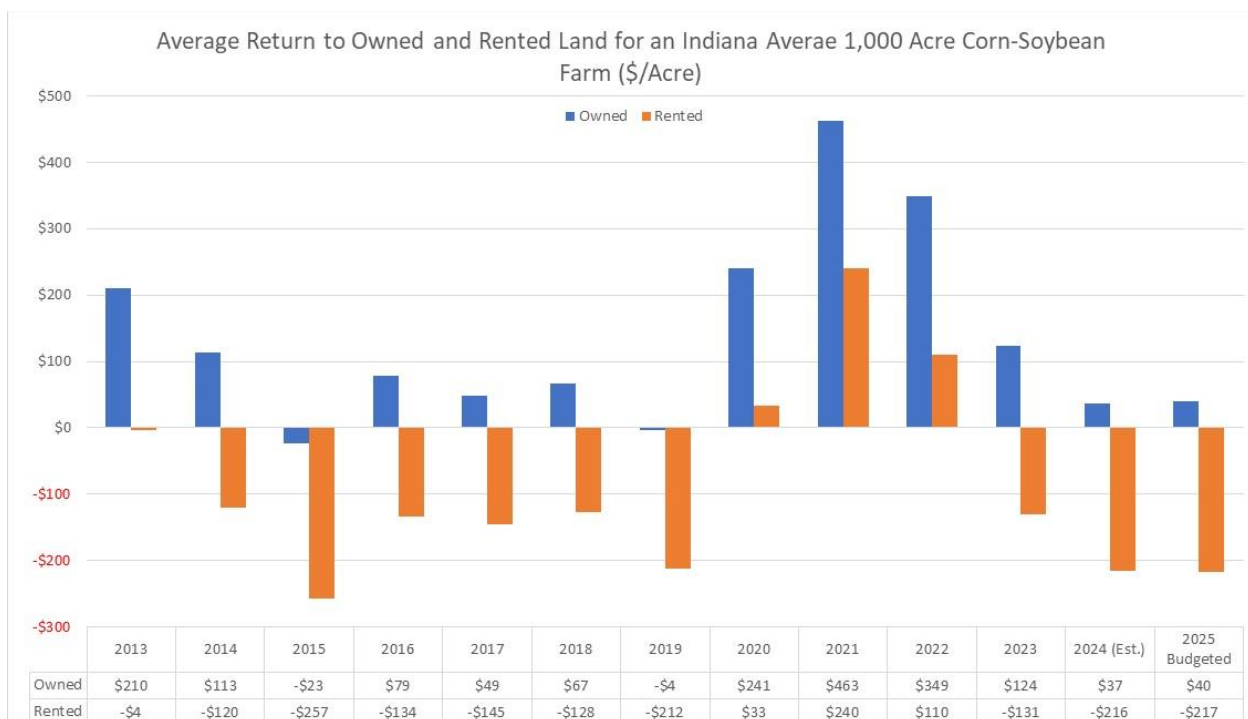


Figure 4. Profitability of the Corn-Soybean Rotation on an Indiana Farm with Average Soil Productivity for Owned (blue) and Rented (orange) Land for a 1,000-Acre Farm (\$/acre).

The profitability of the corn-soybean rotation produced on owned land (blue) has ranged from a loss of \$23 in 2015 to a profit of \$463 in 2021, which illustrates the significant influx of government payments throughout the economy in response to COVID. The profitability of the owned land was positive except for 2015 and 2019.

The profitability of the rotation produced on rented land (orange) ranged from -\$257 in 2015 to \$240 in 2021. Again, the significant increase in government transfer payments significantly improved the profitability of the rotation produced on rented land.

Notice that the profitability of the corn-soybean rotation has been steadily declining on both owned and rented land since 2022. The budgeted profitability of the rotation for 2025 is +\$40/acre on owned farmland and a return of -\$217/acre on rented farmland.

Figure 4 illustrates the economic reality of farmland owned outright without any real estate debt subsidizing the growth of the farm on rented farmland. A young and beginning farmer who does not own a large land base without debt has a greater challenge with profitability. The farm business must continue to expand as commodity margins are always tightening, and the pathway to increased profitability is through increased acreage farmed.



## 6. How does the DLGF Assessed Base Value for Farmland compare to the budgeted farm profitability from 2013 to 2025?

Figure 5 shows the moving average component of the DLGF formula. Farm profitability from 2020 to 2022, assisted by government payments, steadily increased the base rate. In contrast, budgeted profitability, assuming 50% of the farm is rented, has experienced steadily declining profitability since 2022.

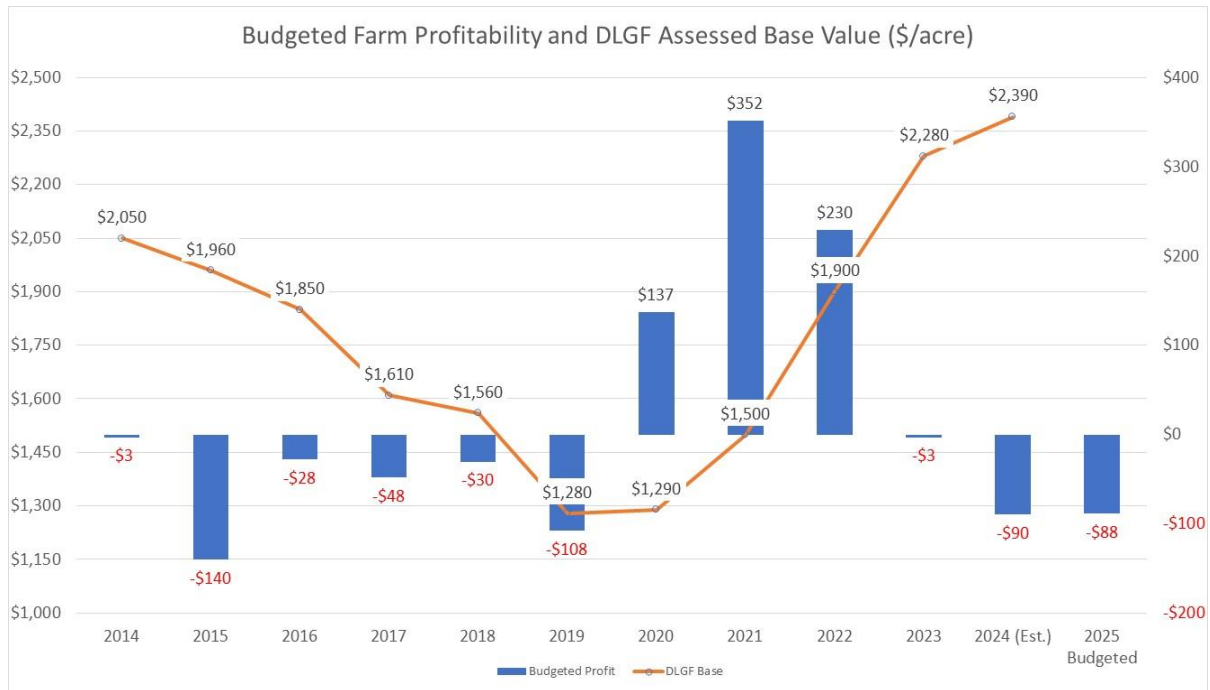


Figure 5. Comparison of the DLGF Agriculture Base Rate to the Profitability of Corn-Soybean Production from 2013 to 2025 (Budgeted) (\$/acre).

The mismatch of farm profitability to base rate value is due to delay in available data. By the time the base rate value is determined the most recent data in the formula is two years old. Many variations of the years to be used in the formula have been discussed. In 2013, the Indiana General Assembly adopted the Olympic Average technique where the highest of six years was eliminated in an attempt to cut the peaks and valleys off the base rate and provide more certainty for farmers.