farmdoc DAILY

Department of Agricultural and Consumer Economics, University of Illinois Urbana-Champaign

# Five-Year Income Projections for Grain Farms

**Krista Swanson, Gary Schnitkey, Jonathan Coppess and Nick Paulson**

**Department of Agricultural and Consumer Economics**
**University of Illinois**

**June 26, 2018**

***farmdoc daily* (8): 117**

**Gardner Policy Series**

Recommended citation format: Swanson, K., G. Schnitkey, J. Coppess and N. Paulson. "Five-Year Income Projections for Grain Farms." *farmdoc daily* (8): 117, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, June 26, 2018.

Permalink: https://farmdocdaily.illinois.edu/2018/06/five-year-income-projections-for-grain-farms.html

Five-year financial projections for Illinois grain farms suggests continued low farm incomes, given that yields are at trend levels with corn prices near $3.60 per bushel and soybean prices ranging from $9.60 to $10.00 per bushel. Income at these levels will result in stable but tight working capital positions, increases in debt levels, and decreases in net worth.

## Background

The Gardner Farm Income and Policy Simulator (GFIPS) simulates farm financial performance for five years beginning with the base year balance sheet and farm size information (*farmdoc daily*, March 6, 2018). GFIPS works through detailed economic and financial modeling using a case farm developed from data collected by the Illinois Farm Business Farm Management Association (FBFM). A more detailed description of the model is available at (*farmdoc daily*, March 6, 2018). The model has been updated with 2017 data and begins with 2017 as the base year.

## Central Illinois High-Productivity Farm

Table 1 shows the simulation of the central Illinois case farm with high-productivity farmland. A total of 1,700 acres are farmed with 14% owned, 45% share-rented, and 41% cash-rented. The base year financial starting position is formulated using averaged Illinois Farm Business Farm Management (FBFM) data, while the base year income and expenses come from the *farmdoc Revenue and Costs* publication for 2017. The average cash rent is $267 per acre in 2017. This farm represents the average of 1,500 to 2,000 acre farms in McLean County, Illinois. In this year, the farm had $100,032 of simulated net farm income and net worth of $3,660,000.

The $100,032 of simulated net farm income is higher than the average net income reported by Illinois FBFM. Much of the difference relates to inventory values used by FBFM for grain inventory values at the end of 2017 compared to the sales prices the GFIPS used for 2017. For unsold grain, FBFM used the following prices to value unpriced grain at the end of 2017: $3.20 per bushel price for corn and a $9.10 per bushel for soybeans. These end-of-year values heavily influence incomes as farmers on average

deliver over three-quarters of their grain inventories in the year following production. For 2017 production, the GFIPS models value all 2017 grain at a $3.40 per bushel price for corn and $9.70 for soybean. The GFIPS prices are higher by $.20 per bushel for corn and $.60 per bushel for soybeans and will result in higher 2017 net incomes. Given this set of projections, FBFM incomes in 2018 will be higher than GFIPS estimates because FBFM will include an inventory gain for 2017 grain sold in 2018. GFIPS and FBFM net incomes will even out over time.

In 2017, the farm's current ratio was 1.59, the debt-to-asset ratio was .259, and the debt-to-coverage ratio was 114.8%. All of these 2017 values are based on averages of central Illinois farmland with between 1,500 and 2,000 acres.

Net income is projected to decline from $100,032 in 2017 to $34,190 in 2018. Lower yields and lower soybean price offset higher corn prices contribute to lower incomes. Corn yield of 227 bushels per acre occurred in 2017, while 2018 corn yield is projected at 205 per bushel. Corn price rises from $3.50 in 2017 to $3.60 in 2018. Also, an Agricultural Risk Coverage (ARC) payment is expected in 2017, but not in 2018.

Yields used in the projection period follow a longer-term trend, estimated using a formula accounting for historical yields and prices, and are much lower than recent yields experienced on Illinois farms. In recent years, yields have been high relative to trend (see *farmdoc daily*, March 20, 2018; *farmdocDaily*, May 10, 2017). Whether this will continue into the future is an open question. Those trend yields result in higher estimated farm incomes in 2020 through 2022.

In 2019, net farm income rises 28% from the prior year to $43,669 boosted by an increase in soybean price while corn price and yields are unchanged. Despite the increase in income, net worth falls from $3,680,000 to $3,630,000 as total liabilities rise relative to total assets

Income continues to increase through the remainder of the projection period, trending upward from $60,786 in 2020 to $76,818 in 2022. Yields continue to increase at trend rates and prices remain relatively stable within a $0.10 range.

Table 1 also includes three key ratios representing the financial health of the farm: current ratio, a measure of liquidity; debt to asset ratio, a measure of solvency; and debt coverage ratio, a measure of yearly cash flow.

Current ratio equals current assets divided by current liabilities and is a measure of working capital. The current ratio improves from 1.59 in 2017 to 1.68 in 2018, then declines annually to 1.59 in 2022. A decline in working capital may seem counterintuitive given the higher income levels from 2019 through 2021. The reason the ratio of current assets to current liabilities weakens is two-fold. Income, although higher, is still not enough for all obligations. Therefore, bank balance decline annually, lowering current assets. And second, estimated tax liability, considered a current liability, is greater in years in which income is higher. Similar to the other two ratios, the current ratio is color-coded to represent an acceptable range (green), questionable range (yellow), and warning zone (red). During the projection period, liquidity would be acceptable levels for most lenders.

The debt-to-asset ratio equals debt divided by assets. Higher debt-to-asset ratios mean higher debt relative to assets. Over the five-year simulation, the debt-to-asset ratio stays in the acceptable range, increasing slightly from .259 in 2017 to .276 in 2022 as the farm accumulates debt over the five-year period.

The debt coverage ratio measures the farm's ability to provide for debt payments. A value of 114.8 means the operation generates 14.8% more funds than is sufficient to cover debt obligations. Values below 100% mean that the operation is not generating sufficient funds to cover debt payments. Over the five-year simulation, debt coverage ratio decreases from 114.8% in 2017 (in the questionable range) to a low of 104.4% in 2018 (in the warning zone) before recovering through the rest of the projection period and ending at 115.1% in 2022.

**Table 1. Five Year Projection for Central Illinois High Productivity Case Farm**
**University of Illinois**
**Gardner Farm Income & Policy Simulator**

| *Central High - 2017 Base* | Base Year 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| Corn Price/Yield (bu/acre) | $3.40 / 227 | $3.60 / 205 | $3.60 / 205 | $3.64 / 207 | $3.69 / 209 | $3.66 / 211 |
| Soybean Price/Yield (bu/acre) | $9.70 / 68 | $9.60 / 63 | $9.88 / 63 | $9.94 / 63 | $9.89 / 64 | $9.86 / 64 |
| Net Farm Income | $100,032 | $34,190 | $43,669 | $60,786 | $73,474 | $76,818 |
| Net Worth (Millions) | $3.66 | $3.68 | $3.63 | $3.59 | $3.56 | $3.53 |
| Current Ratio | 1.59 | 1.68 | 1.65 | 1.62 | 1.61 | 1.59 |
| Debt/Asset Ratio | 25.9% | 24.9% | 25.7% | 26.5% | 27.1% | 27.6% |
| Debt Coverage Ratio | 114.8% | 104.4% | 106.1% | 114.4% | 118.7% | 115.1% |


## Summary

Financial simulation results present a picture of caution. If prices stay at levels in the simulation and trend yields occur over the next five years, the financial position is relatively stable in working capital, debt coverage, but there continue to be weakening debt positions and decreasing net worth. This set of projections would not cause the exit of farms with near average financial positions. However, financial positions are not improving either.

These financial results likely will continue as long as corn prices are below $4 per bushel and soybean prices are below $10 per bushel. Some optimism for higher prices exits (*farmdoc daily*, May 22, 2018) but that optimism has been tempered by falling grain prices in recent weeks. Current price levels are below those used in long-run projections. Also, tariffs on soybeans exported to China could have a large negative impact on prices and incomes (*farmdoc daily*, April 17, 2018). As is usual in agriculture, much can change.


## References


Irwin, S., T. Hubbs and D. Good. "What's Driving the Non-Linear Trend in U.S. Average Soybean Yields?." *farmdoc daily* (7):86, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, May 10, 2017.

Schnitkey, G. "Exceptional Corn and Soybean Yields in 2017." *farmdoc daily* (8):49, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, March 20, 2018.

Schnitkey, G. "Revenue and Costs for Corn, Soybeans, Wheat, and Double-Crop Soybeans, Actual for 2011 through 2017, Projected 2018." Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, June 2018.

Swanson, K., G. Schnitkey, J. Coppess and N. Paulson. "Introducing the Gardner Farm Income and Policy Simulator." *farmdoc daily* (8):39, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, March 6, 2018.