



Tillage Benchmarks for Corn in Illinois

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October 26, 2020

farmdoc daily (10): 188

Recommended citation format: Sellars, S., G. Schnitkey, and L. Gentry. "Tillage Benchmarks for Corn in Illinois." *farmdoc daily* (10): 188, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, October 26, 2020.

Permalink: <https://farmdocdaily.illinois.edu/2020/10/tillage-benchmarks-for-corn-in-illinois.html>

Machinery costs, including tillage, make up a significant portion of the farm budget. Tillage practices in Illinois are diverse and have changed over time as new technologies have become available. Although a recent *farmdoc daily* article ([September 22, 2020](#)) suggests a brightened 2020 income outlook for Illinois grain farms, it is still important for farmers to take their tillage costs into careful consideration, as mentioned in this August *farmdoc daily* article ([August 18, 2020](#)). Tillage type and number of tillage passes also have important implications for soil health.

Precision Conservation Management (PCM)

We summarize data from corn production on farmland in central Illinois from 2015 to 2019. PCM is a farmer service program led by the Illinois Corn Growers Association in partnership with over 30 entities including other commodity associations, conservation groups, private foundations, supply chain providers, the Soil and Water Conservation Districts, and the Natural Resource Conservation Service (NRCS). In an effort to address the goals of the Illinois Nutrient Loss Reduction Strategy, the mission of PCM is to help farmers make decisions about adopting on-farm conservation practices in a financially responsible way. Through PCM's regional specialists, PCM works one-on-one with over 300 farmers enrolled in its 16-county service area, representing over 200,000 acres of Illinois farmland.

Tillage on Illinois Farms

Previously, a *farmdoc daily* article ([March 26, 2019](#)) provided data about the percentage of field passes falling into the various PCM tillage standards. This section provides an update of those numbers given in March 2019 for corn fields.

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Table 1. Percent of Corn Fields by Number of Field Passes, Precision Conservation Management, 2015-2019

Number of Tillage Passes	Percentage
No-till	15%
Strip-till	13
One-pass	34
Two-pass	35
Three+ pass	3

Source: Precision Conservation Management

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Compared to March 2019 article, the percentage of no-till field passes increased by 2%, one-pass field passes increased by 3%, and two-pass field passes decreased by 5%. The shift in percentages compared to the previous article is attributed to the addition of new farmers into PCM, and also some farmers in the dataset have changed their tillage practices over time.

Corn and Tillage

Table 2 displays the average operator and land return, yield, direct cost, power cost, and total non-land cost by tillage benchmark. The tillage benchmarks are defined as follows:

1. No-till – no-tillage before planting corn.
2. Strip-till – perform one strip-tillage pass before corn. Some fields had two strip-till passes. These two-strip-till systems are not summarized below.
3. One-pass-light – one tillage system without a deep tillage pass included.
4. Two-pass-light – two tillage pass systems with those tillage passes not including a deep tillage pass.
5. Two-pass-medium – two tillage passes that included one deeper tillage pass.
6. Two-plus –three or more tillage passes.

For each field in PCM, the farmer indicated all their field passes, as well as input usage and yield. These data were used to develop an economic analysis of each field. This report included:

1. Revenue from crop sales. The field's yield was multiplied by a standard yearly price applied uniformly across all farms.
2. Direct costs. Direct costs included seed, fertilizer, pesticides, drying, storage, and crop insurance. Actual input amounts recorded by each farmer were multiplied by a standard input price per unit (e.g. lb, gall, ton, etc) and applied uniformly across all farmers.
3. Power costs. Each field pass was assigned a cost-per-acre based on Machinery Cost Estimates from the University of Illinois based on the farmer's actual implement and a general tractor cost. The sum of all these field pass costs represented machinery-related power costs.
4. Overhead costs. Overhead costs were based on Illinois Farm Business Farm Management Association (FBFM) data and applied uniformly across all farms.

These economic reports resulted in operator and land returns, a measure of return for farmland. Operator and land return does not include land costs. Subtracting off a land cost, such as cash rent, would give a farmer net return.

Table 2. Average Operator and Land Return, Yield, and Cost by Tillage

Tillage Benchmark	Percent of Fields	Operator and Land Return	Yield	Direct Cost	Power Cost	Total Non-Land Cost
		\$/acre	bu/acre	\$/acre	\$/acre	\$/acre
2-Pass Light StripTill	14%	\$252	216	\$380	\$115	\$532
1-Pass Light NoTill	13	244	218	386	114	536
1-Pass Light NoTill	34	242	209	378	104	519
NoTill	15	234	205	377	97	511
2+ Pass	3	231	219	394	130	560
2-Pass Medium	21	229	213	380	118	535

Source: Precision Conservation Management **farmdocDAILY**

The 2-pass light tillage benchmark has the highest average operator and land return at \$252 per acre, followed by the strip-till benchmark at \$244 per acre. The 2-pass medium benchmark has the lowest operator and land return at \$229 per acre. The tillage benchmark with the highest average yield is the 2+ pass at 219 bushels per acre, followed by the strip-till benchmark at 218 bushels per acre.

Financial Benefits of Reducing Tillage

There are financial benefits to reducing tillage, such as a reduction in machinery and labor cost. Table 2 shows the average direct and power cost for each tillage benchmark. The average overhead cost for each benchmark is the same for all tillage benchmarks at \$37 per acre.

The no-till benchmark has the lowest average direct cost at \$377 per acre, as well as the lowest average power cost at \$97 per acre. As the number of tillage passes increase, the average direct and power costs tend to increase. The 2+ pass tillage benchmark had the highest direct, power, and total-nonland cost on average.

One tillage benchmark to highlight is the strip-till benchmark. The strip-till benchmark had the second highest average operator and land return and yield compared to the other benchmarks. If direct costs for strip-till can be kept low, then this provides a valuable option for farmers who are considering reducing their tillage.

Conclusion

Although the farm income outlook has improved for 2020, it is still important to watch tillage costs for both financial and soil health purposes. Reducing tillage can result in saving on both direct and power cost for farmers. Farmers should consider these financial and environmental implications of tillage when making their fall tillage decisions.

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