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A Special Management Report From

Ag Equipment Intelligence

Benchmarking No-Till Farming in the U.S. – 2015

An *Ag Equipment Intelligence & No-Till Farmer* Staff Report

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SECTION 1 — INTRODUCTION

Emphasis on 'Soil Health' Increases Interest in No-Till Farming

As the emphasis on "soil health" has intensified in recent years, it has also boosted interest in no-till farming and other conservation tillage practices that leave the soil essentially undisturbed and a layer of crop residue to protect it. This together with cover crops, which are used for a variety of economical and ecological reasons ranging from improving soil structure to choking out weeds, offer additional credence to the growing awareness of the importance of "soil health."

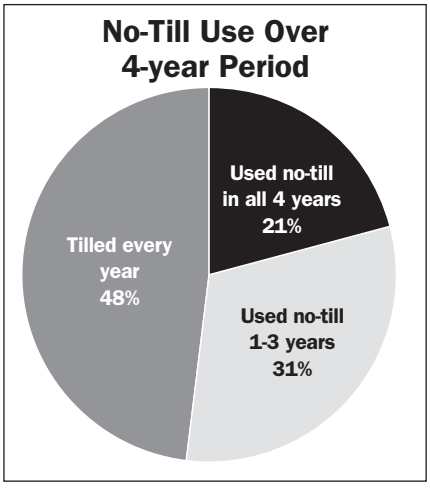
The reasons why no-tillage is advantageous vary depending upon one's point of view. For those concerned with climate change, they like the idea that undisturbed soil is useful for storing carbon. For environmentalists, undisturbed soil and a layer of crop residue helps greatly reduce wind and water erosion by holding soil, sediment and phosphorus in place. By doing so, they believe that oxygen depletion (hypoxia) in the Gulf of Mexico and phosphorus going into Lake Erie is reduced.

For farmers, the reasons to no-till are far more practical. It helps build organic matter, making soils more productive, increasing crop yield potential. One Texas farmer who switched to no-tillage in 2005 explained in a March 9, 2015, article in the *New York Times*, "My goal is to improve my soil so I can grow a better crop, so I can make more money. If I can help the environment in the process, fine, but that's not my main goal."

According to the Agricultural Resource Management Survey (ARMS) of the U.S. Dept. of Agriculture, no-till practices are used on over half of major cropland acres. Overall, an analysis of ARMS data by the Economic Research Service (ERS) of USDA estimates that about 36% of U.S. cropland (approximately 90 million acres) planted to the eight major crops was no-tilled. These crops — barley, corn, cotton, oats, rice, sorghum, soybeans and wheat — constitute more than 90% of total planted U.S. acreage.

Data reported in the ARMS "Farm Financial and Crop Production Practices" report (updated in December 2015) indicates that no-till practices are used on over half of major cropland acres. But while no-till production systems are increasingly used on land in corn, soybeans and wheat — the three largest U.S. crops by acreage — they are not necessarily used every year.

Farmers growing wheat in 2009, corn in 2010 and soybeans in 2012 were asked about no-till use in the survey year and the 3 previous years. "Field-level data collected through the ARMS, show that farmers often rotate no-till with other tillage systems," said the report. "No-till was used continuously over the 4-year period on 21% of surveyed acres. On almost half of the cropland surveyed (48%), farmers did not use no-till. Some of the benefit of using no-till, including higher organic matter and greater carbon sequestration, is realized only if no-till is applied continuously over a number of years. Nonetheless, because tilling the soil can help control weeds and pests, some farmers rotate tillage practices much like they rotate crops."

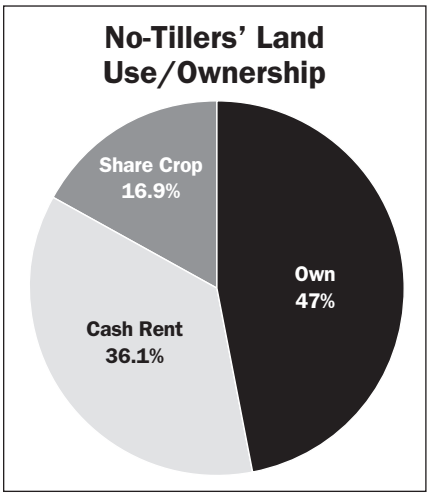


USDA survey data indicates that no-till practices are used on over half of major cropland acres. While no-till production systems are increasingly used on land in corn, soybeans and wheat — the three largest U.S. crops by acreage — they are not necessarily used every year.

Source: USDA, Economic Research Service and National Agricultural Statistics Service

In terms of tillage, the results of *No-Till Farmer's* "2015 Operational Benchmark Study," which was conducted in February, indicated that some no-tillers do utilize some forms of tillage from time to time. Of the 436 farmers who participated in the survey this year, 93.8% said they practice no-till, 29.2% utilize minimum tillage, 20.2% have incorporated vertical tillage into their operations and 14.9% operate with strip-till. A very small percentage of these farmers — 1.8% — said they use a moldboard plow.

According to USDA's Economic Research Service (ERS), no-till farming has seen increases in acreage across all major crops, said John Horowitz, an economist with the USDA's Resource and Rural Economics Division. No-till increased for corn, cotton, soybeans and rice (four crops for which ARMS data are sufficient for researchers to calculate a trend) at a median rate of roughly 1.5% per year. Across all crops, rates of conservation tillage in



U.S. no-till farmers rent and/or share crop more than half of the acreage they worked in 2014; a little less than half (47%) own their cropland.

Southern states lag Northern rates.

The 436 farmers who responded to *No-Till Farmer's* "2015 Operational Benchmark Study" reported they no-till 86% of their soybean acres. For corn, the farmers say they no-till 67% of their acres. For small grains (wheat, etc.), farmers in the survey reported that they no-tilled 86% of their acres.

Growing Role for Cover Crops

Another trend that is gaining momentum among U.S. farmers is the use of cover crops, which is often utilized in conjunction with one or more conservation tillage practices. "Though they have been grown for generations, cover crops are among today's exciting frontiers in conservation," the North Central Sustainable Agriculture Research and Education (SARE) program and Conservation Technology Information Center (CTIC) said in their report, "2012-2013 Cover Crop Survey."

They define cover crops as seasonal crops planted to cover, protect or build the soil and grown during the periods between cash crops. Typical cover crops include a wide range of grasses, legumes, brassicas and other plants. Farmers participating in *No-Till Farmer's* survey listed the following cover crops that they most often utilize. The numbers shown in the list below indicate the percentage of farmers using that particular cover.

- Cereal rye 58.2%
- Radishes 35.5%
- Small grains 21.7%
- Annual ryegrass 20.4%
- Clover 19.1%
- Peas 11.2%
- Hairy vetch 7.6%
- Sorghum-Sudangrass 6.8%
- Buckwheat 2.6%
- Millet 2.6%
- Others 17.4%

Respondents to the CTIC/SARE survey utilized cover crops on an estimated 218,608 acres in 36 states during the 2012-13 growing season. On average, respondents planted cover crops on 42% of their acreage. In total, they planned to plant 301,100 acres of cover crops in the summer or fall of 2013. Overall, 69.7% of farmers responding to the *No-Till Farmer* study said they planted cover crops on 38.5% of their acres in 2014.

Benchmarking No-Till Practices

While USDA generally tracks the growth and usage of no-till farming, the data gathered through *No-Till Farmer's* annual survey of growers is the only information available on financial and operational aspects of no-till operations.

Starting in 2009, *No-Till Farmer*, a sister publication to *Ag Equipment Intelligence* at Lessiter Publications, initiated its annual "No-Till Practices" survey. Its most recent study in February 2015 garnered responses from 436 farmers from the publication's paid circulation list.

The aim of the survey is to provide growers with meaningful operational benchmarks in the areas of cropping, land use, crop yield, seeding, crop protection, fertilizing and equipment data. It also produces quantitative information on no-till operating expenses and producer income.

In addition, the data resulting from the survey has also proven valuable to farm equipment manufacturers and companies that produce seed, fertilizer and crop protection products.

For this update to our 2011 and 2013 special reports, the editors of *Ag Equipment Intelligence* have added the last 2 years of data that was collected from *No-Till Farmer*'s 2014 and 2015 surveys. As in the past, Darrell Bruggink, executive editor and publisher, and John Dobberstein, managing editor, of *No-Till Farmer* and the *Conservation Tillage Guide*, provide the analysis of the most recent survey results in Section 2 of this report.

In Section 3, all of the data compiled over the past 5 years provides the ongoing trends in no-till farming, providing year-to-year comparisons and significant movements that have taken place during the last 5 years the survey has been conducted.

No-Till Equipment Use & Purchasing Trends

If history holds true, no-till farmers will end up investing more in new equipment in 2015 than they originally planned to do. But at the moment, these growers said they will reduce their purchases of ag machinery by 33% this year, according to the "2015 Operational Benchmark Study."

A year ago, the results of the 2014 survey showed *No-Till Farmer* readers said they would spend an average of $59,337 in 2014, or $40.48 per acre for new equipment. They ended up spending $64,938, or

Defining No-Till Farming

No-till farming is often included under the umbrella of conservation tillage, which covers a broad range of soil tillage systems. In no-till, a residue cover is left on the soil surface, substantially reducing the effects of soil erosion from wind and water. Besides no-till, other specific types of conservation tillage include minimum tillage, zone-tillage, ridge-till, mulch-till, reduced-till and strip-till.

With these approaches, the soil is left undisturbed from harvest to planting except for nutrient and chemical application. Weed control is accomplished primarily with herbicides, limited cultivation and with cover crops.

The Conservation Technology Information Center (CTIC)) specifies that 30% or more of crop residue must be left after planting to qualify as a conservation tillage system.

According to the USDA-NRCS report, Conservation Tillage and Crop Residue Management, "Reducing tillage operations improves soil surface properties, including improved soil aggregation accounting for increased infiltration and percolation; less compaction due to less usage of field implements; and more biological activity due to an increase in organic matter."

By leaving crop residue undisturbed for as long as possible, microbial and other biological activity in the soil feeds on the stalks, leaves and other crop residues. This increases organic matter, improves soil tilth and, ultimately, increases soil productivity, says the CTIC. Better soil retains more moisture for dry periods, yet the improved structure speeds natural infiltration in wet spots.

In addition, no-till reduces labor, equipment costs and fuel use, helping to increase producer profits. Conservation tillage is expected to increase rapidly over the next few years because of these reasons and its beneficial impact on the environment.

No-Tillers' Equipment Purchasing Plans – 2009-15							
	2015	2014	2013	2012	2011	2010	2009
Tractors	10.8%	17.5%	20.4%	19.0%	16.1%	13.6%	12.4%
Planters	7.3%	12.0%	15.1%	17.0%	13.7%	13.6%	12.0%
Combines	4.4%	10.0%	12.0%	11.0%	10.4%	10.8%	10.2%
SP sprayers	4.4%	5.3%	9.5%	8.0%	6.6%	7.0%	5.3%
Drills	4.1%	5.5%	10.0%	8.0%	6.4%	5.3%	6.9%
Tillage tools	2.8%	4.1%	4.0%	6.0%	4.0%	N/A	N/A
Pull-type sprayer	2.3%	3.3%	2.8%	4.0%	3.8%	6.6%	4.0%

Source: No-Till Farmer's May 2015 Conservation Tillage Guide

Equipment Owned & Operated by No-Tillers (% of survey respondents)	
Planter	95.0%
Combine	82.3%
Drill	62.2%
Grain cart	53.7%
SP sprayer	42.4%
Fertilizer applicator	37.2%
Pull-type sprayer	39.2%
Strip-till rig	13.3%
Air seeder	19.0%

Besides tractors, planting equipment are the implements most often owned by U.S. no-till farmers. Nearly all (95%) own their own planters, two-thirds own drills and a little less than 20% operate air seeders.

Planter Attachments Used by No-Tillers (% of survey respondents)	
Closing wheels	85.3%
Row cleaners	78.7%
Seed firmer	76.6%
Coulter	46.6%
Pop-up applicator	42.3%
2x2 applicator	40.6%
Down-pressure system	40.3%
Metering system	28.7%
Nitrogen applicator	24.4%

No-tillers in the 2015 survey report using a variety of planter attachments. At 85%, closing wheels are the most popular, followed by row cleaners at 79% and seed firmers at 77% of no-till farmers.

$55.88 per acre. Ahead of the 2016 cropping season, *No-Till Farmer* readers say they're planning to spend $42,186 per farm, or $36.30 per acre.

"Throughout the history of this benchmark study, farmers have always underestimated what they plan to spend in the coming year for equipment," said Darrell Bruggink, publisher of *No-Till Farmer*. "When we survey them the next year, we find they actually spent much more than they predicted. That's likely because a lot of their actual purchasing decisions occur at the end of the year after they've been able to look at their yields and what they've earned for their crops. At that point, they've also had a chance to listen to what their accountants might be recommending in equipment purchases to reduce their tax burden.

"Had you talked to farmers last fall at the farm shows prior to harvest, many of them would have been very anxious about farm economics because grain prices had fallen considerably throughout the summer," Bruggink says. "But the mood was much better this spring after they got a chance to look at their financial picture following harvest. Some 81% of our readers say they made a net profit last year, and only 11% said they had a net loss."

Which is to say that a lot of farmers are in a relatively strong financial position heading into the 2015 planting season, but remain cautious about purchasing capital equipment. On average, no-tillers had net income of $73,011.

According to the results of the 2015 survey, no-till farmers will cut back spending on most major equipment categories: 11% have or are planning to purchase a tractor for the 2015 cropping season compared to 17.5% who planned to buy a tractor a year earlier. Only 4.4% plan to purchase a combine this year vs. 10% last year; 7.3% will buy a planter compared to 12% a year ago. The same trend of declining investment in equipment holds for drills, self-propelled and pull-type sprayers.

Planting Equipment is Critical

Tractors aside, arguably, planters are the single most important implements used by no-till farmers. Getting seeds placed and spaced properly through a mat of crop residue gives emphasis to the no-tiller's planting equipment and operation. Compared to a heavily tilled and readied seedbed, planting conditions for the no-tiller are far more challenging.

The importance of planting equipment is borne out by the number of no-till growers who own and operate their own equipment. Asked what equipment do they own and operate, planters ranked first on the list with 95% of no-tillers indicating they utilize their own planters. Number two on the list are combines (82.3%), followed by grain drills (62.2%) in third place. In addition, 19% of survey respondents say they own and operate an air seeder.

No-till planters can also be far more complicated in their construction than conventional seeding equipment. To ensure proper seed placement in seedbeds covered with crop residue while creating minimum soil disruption, no-till planters are typically equipped with various attachments. Chief among these, according to the *No-Till Farmer* survey are closing wheels, row cleaners and seed firmers.

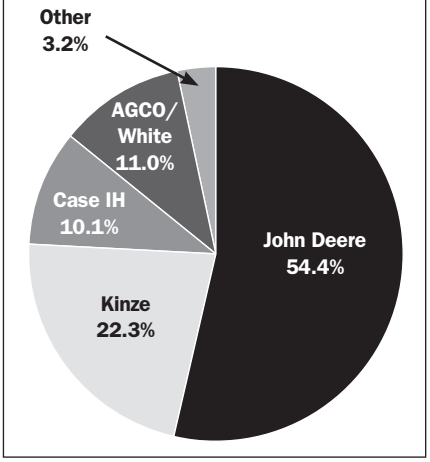
As for brand of planters used, John Deere equipment is dominant. For corn, 54.4% of no-tillers utilize Deere planters as do 51.4% of those sowing soybeans.

Kinze is ranked as the second most often used equipment brand for planting corn and soybeans. In addition, nearly 51% of soybean growers who utilize no-till practices use planters as their primary seeding equipment followed by drills (24.8%), both planter and drill (12.8%) and air seeders (11.5%).

In addition to planting equipment preferences, no-tillers and those utilizing other conservation tillage methods also have predilections

Brand of Corn Planting Equipment Used by No-Tillers

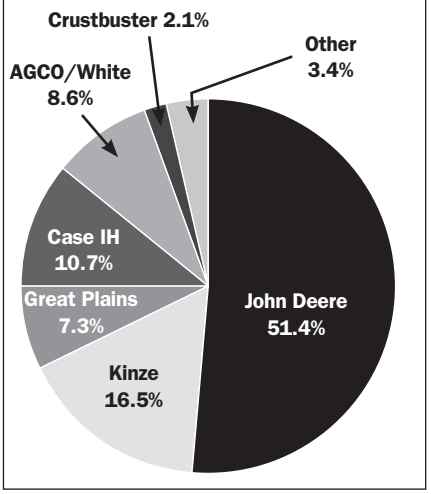
(% of survey respondents)



Nearly 55% of no-tillers responding to the *NTF* survey use a John Deere planter for corn. Kinze is the next most popular brand for corn, followed by AGCO/White.

Brand of Soybean Planting Equipment Used by No-Tillers

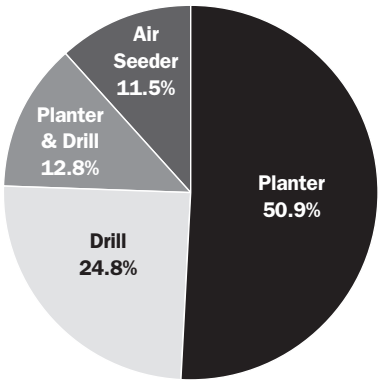
(% of survey respondents)



Slightly over one-half of no-tillers use a John Deere planter or drill to seed soybeans. Kinze planters were number 2 on the list followed by Case IH equipment.

Type of Planting Equipment Used by No-Tillers

(% of survey respondents)



At 51%, a slight majority of no-tillers use a planter to seed soybeans vs. one-quarter who utilize a drill.

when it comes to the size of their planting equipment (number of rows, planter length) as well as the spacing between the rows they plant.

About one-third (32.7%) of no-tillers used 12-row seeding equipment for corn, followed by 6 rows (26%) and 16 rows (22.1%). When it comes to row width, a huge majority — 91% — favor 30-inch rows, with 36-inch rows a distant second choice as only about 9% utilize that row width. Less than 4% of no-till farmers report using a twin-row configuration for planting corn.

For soybeans, 15-foot equipment is the favored size of drill or air seeder, followed by 30-foot units. The row spacing preferred by no-tillers growing soybeans is 15 inches, with over one-half (52.4%) utilizing narrow rows. Just under 42% of no-till farmers say they still space their rows 30 inches apart.

Investment in Precision Equipment Slows in 2015

While the no-tillers said they'll also reduce their investment in precision farming products — from $3,468 projected a year ago to $2,674 for 2015 — many of these growers are considered early adopters of emerging technologies in their cropping operations. According to the 2015 survey, the percentage of no-till farmers using advanced precision technologies include:

- GPS–Tractor auto-steer 48.4%
- Yield monitor data analysis 41.1%
- Field mapping 39.9%
- GPS guidance–lightbar 41.7%
- Variable-rate fertilizing 31.9%
- Variable-rate seeding 20.6%
- Satellite aerial imagery 7.8%
- GPS–implement auto-steer ... 6.9%
- Soil electrical conductivity mapping 5.3%
- Remote sensing 1.1%
- Drones 2.5

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No-Tillers' Preferred Planter Size & Row Spacing — Corn & Soybeans 2015

(% of survey respondents)

Corn				Soybeans			
Planter Rows*		Row Spacing*		Planter Length		Row Spacing	
12	32.7%	30 in.	90.9%	15 ft.	36.3%	15 in.	52.4%
6	26.0%	35 in.	8.9%	30 ft.	19.1%	30 in.	41.9%
16	22.1%	15 in.	5.7%	40 ft.	14.9%	20 in.	5.7%
24	11.9%	20 in.	4.7%	20 ft.	12.1%		
8	10.4%	22 in.	1.2%	10 ft.	9.3%		
36	0.8%	Other	3.7%	Other	8.4%		
Other	9.6%						

U.S. no-tillers favored 12-row planters and 30-inch row spacing for corn in 2015. For soybeans, survey respondents favored 15-foot planters and 15-inch rows.

**No-tillers reported using more than one type of planter and various row spacing when planting corn:*

Comparing Crop Yields by Tillage System

	2014	2013
Corn		
No-Till	169	161
Strip-Till	182	172
Min-Till	175	178
Vertical-Till	178	175
Soybeans		
No-Till	52	49
Strip-Till	52	—
Min-Till	53	48

Strip-tilling resulted in the highest corn yields in 2014. For soybeans, there was virtually no difference which conservation tillage practice was used. Yields in 2014 surpassed those achieved in the prior year.

High Yields Help No-Tillers Stay in the Black

Even as grain prices continued their slide, 8 in 10 no-tillers had a profitable 2014, and most plan to keep investing.

By John Dobberstein, Managing Editor

Even though commodity prices have fallen from historic highs, it hasn't stopped U.S. no-tillers from innovating and staying profitable.

Some 81% of no-tillers participating in *No-Till Farmer*'s exclusive yearly operational survey told us they had a profitable year in 2014, while 11% had a loss and 8% said net income was flat.

Data indicates that as no-tillers worked hard to stay in the black, more tried their hand at cover crops and were aggressive with their fertility programs. They also maintained healthy investments in machinery and seed technology — albeit at reduced rates compared to previous years.

Yields for no-tilled corn reached an average of 169 bushels an acre last year among participating no-tillers, the highest on record since *No-Till Farmer* debuted its No-Till Operational Benchmark Study in 2009.

No-tillers spent an average of $392.41 per acre on inputs in 2014 — a 12.9% increase over the $347.69 spent last year. ***(See Table 1.)*** But the average net profit per farm in 2014 was still a healthy $73,011, which shows no-tillers are continuing to reap the benefits of their investments.

(Results from Table 1 came from the following question: "How much do you estimate your entire farming operation spent in 2014?")

"The mood of farmers prior to harvest was somewhat grim, as they watched grain prices fall through the summer and farm-show period," *No-Till Farmer* editor Frank Lessiter reports. "However, the majority of farmers saw excellent yields and their mood seems to have improved considerably after taking a more objective look at their operation's financial picture.

"That said, it's on to 2015 and everybody is wondering what the new cropping year will bring and probably are a bit anxious."

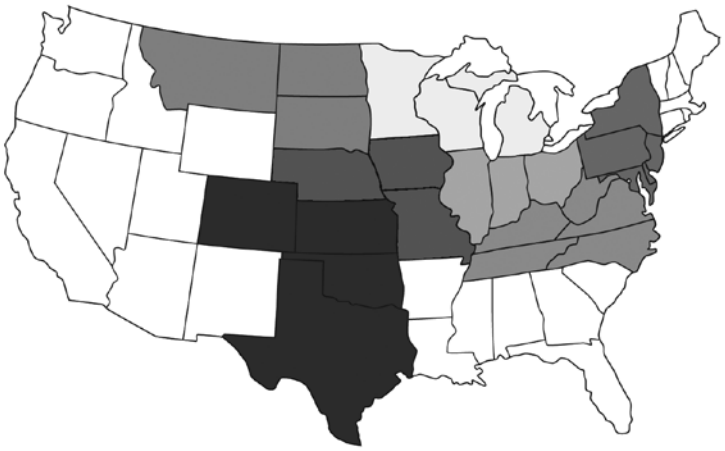
This annual random survey shows the average farm size for *No-Till Farmer* readers is 1,162 acres, a record low after a 1,466-acre, record-high average farm size was recorded in last year's survey.

Last year's average expenditures of $392.41 per acre compares closely to 2012, where no-tillers spent an average of $394.74 an acre on inputs, just $2.33 more.

The data reported in our 7th annual Benchmark Study is the result of 436 readers of *No-Till Farmer* taking the time to complete a 4-page, 70-question survey. A total of 2,500 surveys were distributed to the states highlighted in the map on this page.

This is a one-of-a-kind industry survey exclusive to *No-Till Farmer*.

No-Till Benchmark Survey Regions



- **Eastern Corn Belt (ECB)** — Illinois, Indiana, Ohio
- **Western Corn Belt (WCB)** — Iowa, Nebraska, Missouri
- **Great Lakes (GL)** — Michigan, Wisconsin, Minnesota
- **Southern Plains (SP)** — Kansas, Colorado, Oklahoma, Texas
- **Northern Plains (NP)** — South Dakota, North Dakota, Montana
- **Northeast (NE)** — New York, Pennsylvania, Maryland, Delaware, New Jersey
- **Appalachia (AP)** — Kentucky, Tennessee, West Virginia, Virginia, North Carolina

Table 1. Evaluation of 2014 Operating Expenses

	Average Farm Acres	Average Operating Expenses (Per Farm)	Average Operating Expenses (Per Acre)
Total	**1,162**	**$455,981**	**$392.41**
Eastern Corn Belt	1,052	$471,123	$447.84
Western Corn Belt	1,256	$495,925	$394.84
Great Lakes	735	$294,646	$400.88
Northeast	668	$287,152	$429.87
Southern Plains	1,711	$405,769	$237.15
Northern Plains	2,941	$1,134,247	$385.67
Appalachia	1,379	$530,285	$384.54

Per-Farm Spending Declines

No-Till Farmer readers spent an average of $455,981 for their entire farm in 2014, which was $53,727, or 10.5%, less than the record $509,708 spent in 2013, and the lowest since 2010 ($388,464).

This year, no-tillers plan to spend $422,342 on inputs, which is $33,639 less than 2014, or a planned cut of 8%. The deepest cuts are expected in equipment, fertilizer and fuel.

As for the seven regions represented in this study, all saw reduced total operating expenses in 2014 except for the Northern Plains and Western Corn Belt, which saw increases of 37% and 5.6%, respectively.

However, when reviewing expenditures on a per-acre basis, the Eastern Corn Belt (17.7%), Appalachia (16.1%) and Northern Plains (66.2%) showed substantial increases.

When looking at what no-tillers spent, on average, on a per-farm basis for operational expenses in 2014, there was a pullback from 2013 spending levels:

• **Land Rent** — Spending on land rent costs per farm declined last year by an average of $14,000, or 16.6%, compared to 2013.

• **Seed/Seed Treatment** — Growers spent about 8.8% less in this area last year compared to 2013, or $6,168 less on average per farm.

• **Pesticides** — No-tillers spent an average of $5,254 less in 2014 for this category compared to 2013, for a decline of 12%.

• **Fertilizer** — Respondents spent an average of $9,169 less on fertilizer per farm in 2014 over the previous year, a 9.7% decline.

• **Equipment** — Spending on equipment saw the largest decline last year vs. 2013, with the average per-farm drop totaling $22,983, or 26%.

• **Labor** — Spending on farm labor dropped by a per-farm average of $11,487 last year over 2013 levels, a decline of nearly 31%.

• **Fuel** — No-tillers spent $4,147 less, on average, per farm for fuel in 2014, a drop of 15% over 2013.

On a regional basis, no-tillers in the Appalachia region spent the most on inputs per acre last year, at $518.90 an acre with an average farm size of 1,379 acres. Not far behind were no-tillers in the Northeast, who spent $459.86 per acre on inputs, on average, with only 668 acres to spread out costs.

No-tillers in the Western Corn Belt reported that operational costs increased by 19.4% in 2014 vs. 2013, which left them spending $446.51 per acre, on average, at an average

Table 2. National Breakdown of Crop Operating Expenses (2011-15)

(Average Total Expenses Per Farm for Each Expense Category)

	2011	2012	2013	2014	2015*
Fuel	$22,786	$23,176	$27,813	$23,666	$20,415
Land Rent	$77,533	$75,534	$83,692	$69,732	$70,646
Seed/Seed Treatments	$56,464	$60,521	$69,307	$63,139	$61,831
Pesticides	$29,065	$33,706	$43,670	$38,416	$37,744
Fertilizer	$86,914	$94,713	$94,322	$85,153	$80,235
Lime/Soil Conditioners	$10,878	$10,226	$5,989	$5,968	$6,111
Equipment	$71,252	$70,900	$87,921	$64,938	$42,186
Machinery Parts/Service	$34,450	$33,664	$31,397	$29,617	$27,164
Precision Equipment	$8,864	$6,839	$4,180	$3,468	$2,674
Custom Application/Hauling	$13,636	$12,860	$10,656	$8,122	$8,208
Labor	$41,633	$36,897	$37,318	$25,731	$27,585
Interest	$19,766	$20,572	$13,443	$14,241	$13,998
Insurance	n/a	n/a	n/a	$23,790	$23,545
Totals	**$473,241**	**$479,608**	**$509,708**	**$422,575**	**$422,342**

**Estimated 2015 costs of production*

(The data in Tables 2 & 3 comes from a request by *No-Till Farmer* for readers to share line-item expenditures by various product input categories. Table 2 gives a U.S. breakdown of line-item operational expenses shared by readers. In Table 3, we've broken down these line-item expenses by region so you can compare your operation to the average farm in your region.)

Table 3. Breakdown of 2014 Crop Operating Expenses by Region

(Average Total Expenses Per Farm for Each Expense Category)

	2014	ECB	WCB	GL	NE	SP	NP	APP
Fuel	$23,666	$20,633	$25,300	$13,558	$20,957	$24,047	$50,765	$46,345
Land Rent	$69,732	$81,238	$116,135	$32,566	$40,454	$31,042	$128,841	$49,537
Seed/Seed Treatments	$63,139	$67,056	$79,024	$37,114	$34,734	$50,101	$136,160	$95,777
Pesticides	$38,416	$36,304	$42,868	$18,951	$20,849	$34,423	$87,820	$97,785
Fertilizer	$85,153	$74,954	$106,172	$63,193	$36,203	$98,241	$170,676	$145,441
Lime/Soil Conditioners	$5,968	$6,130	$5,582	$3,659	$8,598	$4,714	$5,520	$12,100
Equipment	$64,938	$47,518	$68,776	$61,875	$48,402	$68,851	$167,625	$92,369
Machinery Parts/Service	$29,617	$22,303	$32,437	$24,528	$26,197	$28,815	$62,679	$46,132
Precision Equipment	$3,468	$2,890	$3,371	$2,564	$1,125	$4,471	$12,817	$7,429
Custom App./Hauling	$8,122	$6,524	$6,395	$3,723	$11,242	$10,688	$19,963	$14,488
Labor	$25,731	$17,731	$28,085	$18,121	$28,343	$20,292	$58,106	$67,244
Interest	$14,241	$14,556	$12,995	$10,113	$18,695	$21,294	$9,821	$10,246
Insurance	$23,790	$20,367	$29,930	$15,172	$11,394	$20,825	$74,746	$30,676
Total	**$455,981**	**$418,204**	**$557,043**	**$305,137**	**$307,193**	**$417,804**	**$985,539**	**$715,569**

farm size of 1,256 acres.

No-tillers in the Great Lakes ($415.15 per acre), Eastern Corn Belt ($397.53), Northern Plains ($355.10) and Southern Plains ($244.18) followed behind.

Looking to Cut Costs

Based on this year's survey results, it appears no-tillers are poised to trim expenses in 2015.

Of the big-ticket items — fuel, land rent, seed/seed treatments, pesticides, fertilizer, equipment and labor — the biggest reduction may be in equipment, where growers spent an average of $64,938 in 2014 and plan to pare that back to $42,186 this year — a cut of 35%.

No-tillers also predicted year-over-year reductions in 2015 for fuel (13%), fertilizer (5.7%), precision equipment (22.8%) and machinery parts/service (8.2%), while increased spending may occur in labor (7.2%), lime/soil amendments (2.3%) and land rent (1.3%).

Typically, *No-Till Farmer*'s Benchmark Study has found growers tend to underestimate how much they will spend on many inputs in a typical year, given the uncertainty that lingers at the beginning of the growing season.

That is particularly true in the area of equipment, where *No-Till Farmer* readers have always spent more the next year than they thought they would. AEI

No-Till Acres Hold Their Own in 2014

The percentage of total cropping acres in no-till remained stable last year, while strip-till's share of acres saw further erosion.

By John Dobberstein, Managing Editor

No-till acreage appeared to stabilize among *No-Till Farmer* readers in 2014, according to data from the 7th annual No-Till Operational Benchmark Study.

Some 76.5% of the total cropping acreage for 2014 was managed in a no-till system — the same figure as 2013, but still 2 points lower than the 78.7% recorded in 2012.

About 7.7% of cropland acres were strip-tilled last year, a 1-point drop from 8.7% in 2013. Strip-till acres have seen an almost 4-point decline in acres since 2012.

Readers also said 7.1% of total crop acres in 2014 experienced vertical-tillage practices, compared to 6.7% in 2013.

Minimum-tilled crop acres were at 8.6% in 2014, up from 7.8% in 2013. When vertical-till and minimum-till acres are combined, the two practices increased their share of cropping acreage among readers from 14.5% in 2013 to 15.6% last year.

As for moldboard plowing, the practice decreased among readers from 0.3% of crop acres in 2013 to 0.1% last year.

Figure 1. What Tillage Practices Do You Use in Your Operation?

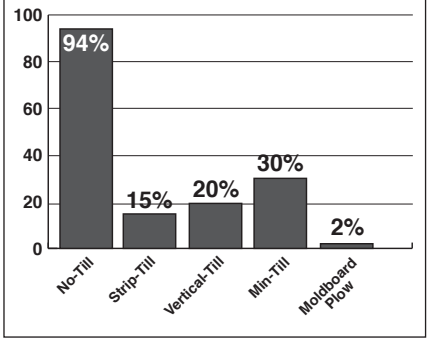


Figure 2. What Tillage Practices Do You Use as a Percentage of Your Corn Acres?

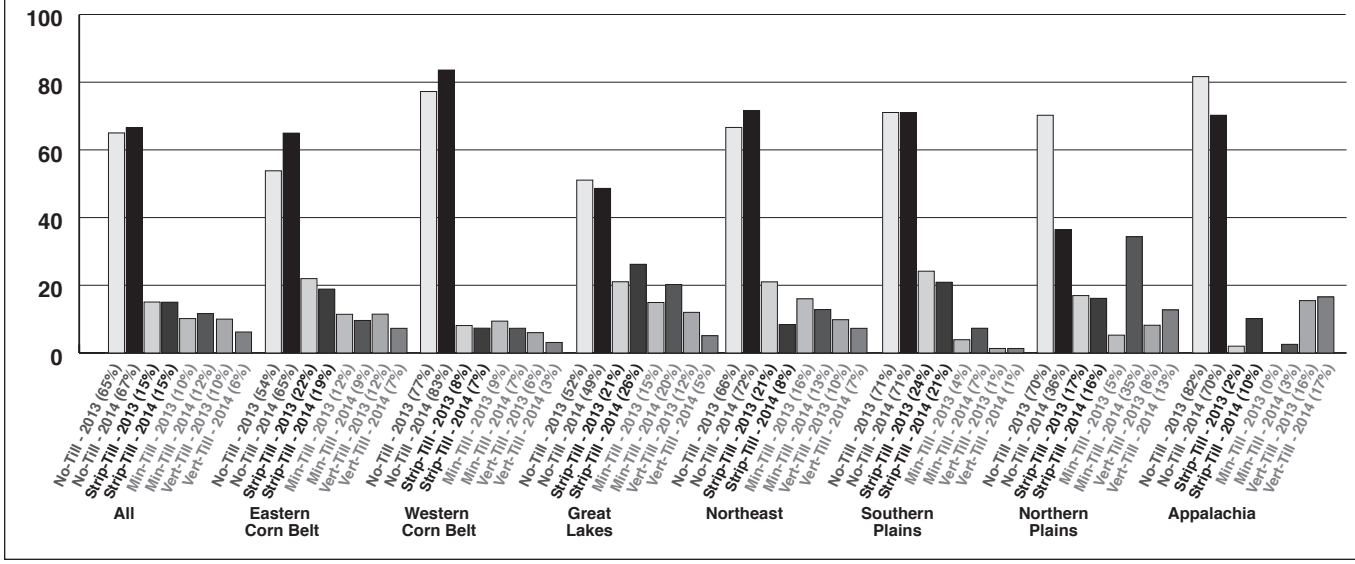


Table 1. Percentage of Acres for Different Tillage Practices			
	Corn	Soybeans	Small Grains
No-Till	67%	86%	86%
Strip-Till	15%	2%	–
Vertical-Till	6%	4%	5%
Min-Till	12%	8%	9%

As for general tillage practices across all regions, 94% of readers said they use some form of no-till on their farm, the same level as in 2013.

Strip-till practices fell by 1 point to 15% in 2014. Both minimum tillage (30%) and moldboard plow (2%) practices were unchanged, while vertical-tillage use among readers slipped from 23% in 2013 to 20% last year.

No-Till Corn Acres Grow

When looking at the tillage practices used on corn acres by *No-Till Farmer* readers, 67% of the corn acres were no-tilled in 2014, which is up 2 points from the previous year.

Strip-till remained unchanged last year at 15% of corn acres, while minimum-tillage practices in corn increased by 2 points to 12%. Vertical-tillage decreased by 4 points to 6%.

When examined by region, however, there were sizeable movements away from tillage in some areas and large jumps in tillage acres elsewhere. No-till seems to be on a nice rebound in the core Midwestern Corn Belt the last 2 years.

In the Eastern Corn Belt, 65% of corn acres were no-tilled in 2014, up a whopping 11 points from 54% in 2013. No-till corn acres in the Western Corn Belt (83%) and Northeast (72%) jumped 5 and 6 points, respectively, over 2012 figures. In fact, no-till's share of corn acres in the Western Corn Belt has grown by 21 points since 2012.

But in the Northern Plains, no-tilled corn acres slipped from 70% in 2013 to just 36% last year. The Great Lakes saw no-tilled corn acres drop by 3 points last year to 49%, and no-tilled corn acres in Appalachia fell by 12 points to 70% in 2014.

Strip-tilled corn lost acreage in every region but two, including the Great Lakes, where acres jumped by 5 points to 26%, and Appalachia, where acres jumped from 2% in 2013 to 10% last year.

The percentage of corn acres seeing vertical tillage dropped anywhere from 2-7 percentage points in the Eastern and Western Corn Belt, Great Lakes and Northeast. But in the Northern Plains, vertical tillage corn acres grew from 8% in 2013 to 13% in 2014. Meanwhile, in Appalachia, they went from 16% in 2013 to 17% last year.

Corn acres with minimum tillage jumped in some regions as well last year. In the Northern Plains, 35% of corn acres were minimum-tilled in 2014, compared to just 5% in 2013.

In the Great Lakes, minimum-tilled corn increased from 15% in 2013 to 20% last year, while minimum-tilled corn acres grew in Appalachia and the Southern Plains by 3 points each.

No-Tilled Soybeans Stable

For soybeans, no-till remains the dominant practice among *No-Till Farmer* readers, as 86% of soybean acres were no-tilled in 2014 across all regions surveyed — up 1 point from 2013.

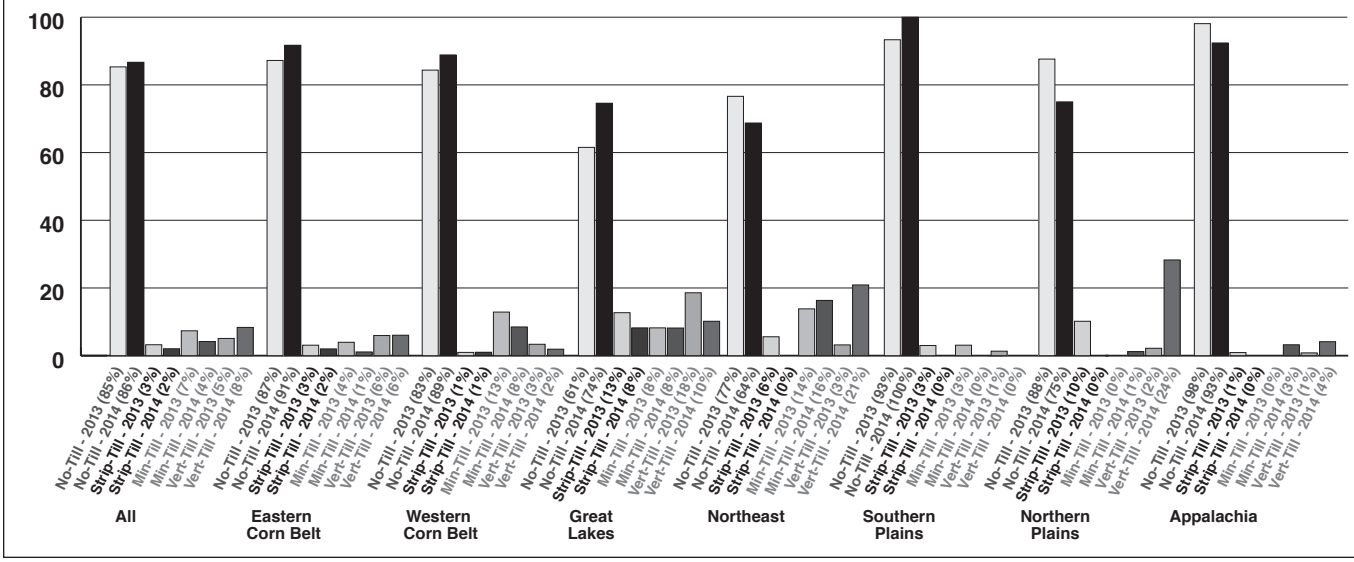
Strip-tilled soybean acres declined slightly from 3% in 2013 to 2% last year, minimum tillage dropped 3 points to 4%, and vertical tillage increased from 5% in 2013 to 8% last year.

Regionally, the movement of no-tilled soybean acres was a mixed bag. In the Great Lakes, no-till acres jumped from 61% in 2013 to 74% in 2014, while the Southern Plains grew from 93% in 2013 to 100%.

Soybean acres in the Eastern Corn Belt increased from 87% no-tilled in 2013 to 91% last year, while in the Western Corn Belt, no-tilled soybean acres grew from 83% in 2013 to 89% in 2014.

No-till acreage did suffer a large decline in the Northeast from 77% in 2013 to 64% last year. Similarly, no-till soybean acres in the Northern Plains dropped from 88% in 2013 to 75%

Figure 3. What Tillage Practices Did You Use as a Percentage of Soybeans Acres?



last year. Some 98% of soybeans were no-tilled in 2013 in Appalachia, but that fell to 93% in 2014.

Strip-tilled soybeans gained no acreage with *No-Till Farmer* readers last year, with acreage across regions falling anywhere from 1-10 points in 2014 over the prior year. The largest percentage of strip-tilled soybeans was reported in the Great Lakes region, but that fell to 8% of acres last year vs. 13% in 2013.

There were some notable increases last year in soybean acres treated with vertical tillage. In the Great Lakes, the acres jumped from 3% in 2013 to 18% last year, while vertical-tilled acres in the Northern Plains increased from just 2% in 2013 to 24% in 2014.

Vertical-tilled acres for soybeans dropped by 8 percentage points in the Great Lakes, while there was little or no change in the Eastern Corn Belt, Western Corn Belt and Southern Plains.

No-Till Small Grains Slip

For small grains, 86% of acres were no-tilled in 2014, down slightly from 88% in 2013. Strip-tilled small grains acres slipped from 2% in 2013 to 0% last year.

The acreage devoted to vertical tillage and minimum tillage in small grains both increased by 1 point last year. Vertical tillage acres increased from 4% in 2013 to 5% last year, while minimum-tilled acres went up from 8% in 2013 to 9% last year. AEI

No-Tillers Break Yield Records in 2014

No-tillers set a new high-water mark last year for the No-Till Operational Benchmark Survey by averaging 169-bushel corn and 52-bushel soybeans.

By John Dobberstein, Managing Editor

Buoyed by improved weather and planting conditions in most U.S. regions, corn yields rebounded for no-tillers in 2014.

No-Till Farmer readers participating in the 7th annual No-Till Operational Benchmark Study reported harvesting an average of 169 bushels per acre for corn, a record for this survey and an 8-bushel improvement over 2013.

Last year's 169-bushel average is a vast improvement over the drought year of 2012, when no-till yields hit an all-time low in the annual survey at 134 bushels per acre.

Strip-tilled corn yields also continued a big comeback with an average of 182 bushels per acre, a 10-bushel improvement over 2013 and the highest since strip-tillers recorded 175-bushel average yields in 2009. In 2012, strip-till corn yields averaged 146 bushels per acre.

Minimum tillage corn did not set a record yield last year. The 175-bushel-an-acre average was 3 bushels less than 2013, but that figure is still well above the 162-bushel average yield over the 7 years of the survey.

Corn acres that saw vertical tillage recorded 178 bushels, a 3-bushel increase over 2013, the first year that data was collected.

Table 1. 2014 Average Per-Bushel Yields for Corn
(Based Upon Tillage System Used)

	All	WCB	ECB	GL	NE	SP	NP	AP
No-Till	169	180	188	154	167	123	134	158
Strip-Till	182	204	189	174	169	160	150	179
Min-Till	175	179	199	154	164	–	168	190
Vertical-Till	178	185	196	164	171	–	163	169

Table 2. Comparison of Corn Yields by Tillage System (2008-2014)

	2014	2013	2012	2011	2010	2009	2008
No-Till	169	161	134	148	151	161	156
Strip-Till	182	172	146	173	171	175	166
Min-Till	175	178	133	162	160	166	163
Vertical-Till	178	175	—	—	—	—	—

Corn Belt Success

When corn yields are examined regionally, there were some noticeable differences, and it's clear the Eastern and Western Corn Belt had it good last year. ***(See Table 1.)***

The Eastern Corn Belt saw no-till corn average 180 bushels an acre, up 8 bushels from 2013, while the Western Corn Belt averaged 188 bushels, up 17 bushels from the previous year.

At 167 bushels per acre, no-tillers in the Northeast saw a 12-bushel improvement over 2013. The Southern Plains saw a similar improvement, as its 123-bushel average last year was 13 bushels better than 2013.

In the Great Lakes, where a cold, wet spring and a cool summer limited yield potential, no-till corn averaged 154 bushels an acre, down 3 bushels from 2013.

The Northern Plains (134 bushels) and Appalachia (158 bushels) also saw their per-acre production fall by 3 and 23 bushels, respectively.

(See Table 2 for 7-year history of corn yields by tillage system.)

Soybeans Break Through

Soybean yields rebounded a bit for no-tillers in 2014, as they reported

an average of 52 bushels an acre — a 3-bushel increase over 2013 and the highest no-till soybean yield reported since the Benchmark Study debuted in 2008. ***(See Table 4.)***

No-tillers in 2009 told us they averaged 50 bushels an acre, but yields stayed in the 47-49 bushel range for 4 years until a breakthrough in 2014.

Soybeans grown in a vertical-tillage system also yielded an average of 52 bushels an acre in 2014, up 2 bushels from the previous year. Growers either strip-tilling or minimally tilling soybeans both averaged 53 bushels per acre in 2014, up 6 and 5 bushels, respectively, from 2013.

No-till soybean yields were highest in the Western Corn Belt last year at 56 bushels, up 4 bushels from 2013, while yields in the Eastern Corn Belt in 2014 were 55 bushels, up 3 from the previous year. ***(See Table 3.)***

The highest strip-till soybean yields were in the Great Lakes at 54 bushels an acre, 6 higher than 2013. Strip-tilled beans yielded 51 and 52 bushels, respectively in the Eastern and Western Corn Belts.

Averaged across all tillage systems, the Western Corn Belt had the highest average soybean yields at 56.5 bushels an acre, followed by the Eastern Corn Belt (55.1), Northeast (53.5), Appalachia (49.3), Northern Plains (47.2), Great Lakes (46.2) and Southern Plains (38.8).

Minimum-tilled soybeans in the Western Corn Belt averaged 63 bushels an acre, up 9 bushels from 2013. It was the highest yield report for soybeans, regardless of tillage system, across the study's seven regions since the benchmark study debuted 7 years ago.

(See Table 4 for a 7-year history of soybean yields by tillage system.)

Table 3. 2014 Average Per-Bushel Yields for Soybeans
(Based Upon Tillage System Used)

	All	WCB	ECB	GL	NE	SP	NP	AP
No-Till	52	55	56	45	54	39	48	48
Strip-Till	53	51	52	54	–	–	–	–
Min-Till	53	56	63	45	52	–	39	55
Vert-Till	52	54	51	49	52	–	50	50

Table 4. Comparison of Soybean Yields by Tillage System (2008-2014)

	2014	2013	2012	2011	2010	2009	2008
No-Till	52	49	47	49	49	50	45
Vertical-Till	52	–	—	—	—	—	—
Min-Till	53	48	48	49	49	47	46

Top No-Till Corn Growers

Each year, *No-Till Farmer* editors like to examine the habits and practices of the top-third-yielding no-till corn growers. While soil type, moisture and regional growing conditions certainly play a factor in yields, it's interesting to note the characteristics of this group and any noteworthy trends.

No-tillers who finished in the top-third for corn yields in 2014 averaged 206.7 bushels per acre, up from 197 bushels in 2013.

With the average no-tiller hitting 169 bushels an acre last year, the top-third corn growers had a 20% yield advantage over the average no-tiller.

This group also had good success with no-tilling soybeans in 2014, with an average of 58.1 bushels an acre — up slightly from 57.8 bushels in 2013. Some 89% of top-yielding corn growers raise both corn and soybeans.

Here are some of the trend lines among these high-yielding no-till corn growers:

• The top 20 corn growers on the list had yields of 238.6 bushels an acre. Eight of the top 20 were from Nebraska, with 11 located in the Western Corn Belt. Three growers each were from Indiana and Pennsylvania.

• The average cropping acres maintained by these top-third corn growers was 1,253 acres, about 91 acres more than the average no-tiller in 2014.

• Their farm expenditures were much higher than the average *No-Till Farmer* reader. Overall, average farm expenditures in 2014 were $550,802, which is 21% higher than the average no-tiller. These high-yielding growers spent $439.59 per acre, more than $47 per acre, or 12% more, than the typical no-tiller.

• These high-yielding no-tillers owned 45.2% of their acres, down nearly 4 points from 2013. This group rented 38.6% of acres, about 2.5 points lower than 2013, and about 16% of high yielders sharecropped in 2014, up from 10% in 2013.

• Historically, the top-yielding corn growers haven't been as enthusiastic about cover crops compared to the average no-tiller. But this trend is changing: In 2014, 73% of high-yielding corn growers told us they seeded covers, up from 68% in 2013 and 58% in 2012. Nearly 70% of all *No-Till Farmer* readers said they seeded cover crops last year.

• The average corn seeding rate of 32,947 seeds per acre last year for high-yielding no-tillers was 5% higher than the 31,268 seeds an acre for the average no-tiller.

• It looks like high-yielding no-tillers will be less diversified with their hybrids in 2015 than last year's top corn yielders. Some 88% plan to plant Roundup Ready corn (up 1 point from 2014), while 15% will plant LibertyLink (down from 25% in 2014) and 23% will plant non-GMOs, up from 20% in 2014.

Among the average no-tiller, 84% will plant Roundup Ready, 19.5% non-GMOs and 17.2% LibertyLink.

• High yielders will be more diversified in their choices for seed corn vs. the average no-tiller. Some 46.8% of high yielders will plant Pioneer seed corn, compared to 46.1% for average no-tillers, but they will plant a higher percentage of DeKalb (39.4%), Syngenta (22%) and Mycogen (8.2%) seed corn compared to the average no-tiller at 32.5%, 20% and 6.6%, respectively.

• The top-third-yielding no-till corn growers tend to use more technology than the average no-tiller. For example, 56.8% of top yielders use

yield-data monitor analysis, compared to 41.1% for average no-tillers. About 32% of high yielders use variable-rate seeding, compared to 20.6% for typical no-tillers. And some 50.4% of high yielders use variable-rate fertilizing vs. nearly 32% for average no-tillers.

• Compared to typical no-tillers, high-yielding corn growers were more reliant on row cleaners (86% to 78%) and more likely to use pop-up application devices (48.6% to 42.3%), down-pressure systems (47.7% to 40.3%) and metering systems (34.1% to 28.7%).

• The top-third of high-yielding corn growers were also big believers in fungicides, with 51.3% of them applying disease-control products in 2014 — up more than 3 points from 2013 and much higher than the 29% use rate for average no-tillers.

• Insecticide use among high yielders dropped from 37% in 2013 to 33% last year, but that was still higher than the average no-tiller (27.4%) in 2014.

• Some 11% of high-yielding corn growers applied gypsum on their farm in 2014, which is 4 points lower than the average no-tiller. About 48% of high yielders applied manure last year, compared to 45.4% for the typical *No-Till Farmer* reader.

• Overall, high-yielding no-tillers applied more micronutrients in 2014 than the average no-tiller. The more significant differences were for sulfur (79% vs. 70%), zinc (68% vs. 63%) and manganese (28% vs. 26%).

• The timing of nitrogen (N) applications for corn looks slightly different for the high-yielding no-till corn growers as well. Only 55% of high-yielders will make at-plant N applications, compared to 63.4% of all no-tillers. The high yielders are more likely to use fall (21% vs. 15%) and foliar (20% vs. 14%) applications of N vs. the average no-tiller.

• High yielders will use less urea (12.8% vs. 23.8% for typical no-tillers) but more will apply anhydrous ammonia by a large margin — 47.7% vs. 27.7%. This group applies 28% N less (34.8% vs. the 50.8% average) but goes more for 32% N (51.3% vs. 31.7%). About 28% of both groups of farmers use ammonium sulfate.

• While 36% of no-tillers as a whole will apply phosphorus (P) in the fall, 48% of high-yielding no-tillers will spread P in the fall. Some 53% of average no-tillers will apply P at-plant, compared to just 36% of high-yielders. But 18% of high-yielders will sidedress P vs. just 2% of all respondents.

• Similarly for potassium (K), 48% of high-yielding no-tillers apply it in fall vs. 41% for typical no-tillers. Fewer high-yielders will apply K at spring pre-plant (38% vs. 47%) and at-plant (26% vs. 36%) when compared to the average no-tiller.

Table 5. Operating Expenses of the Top-Third-Yielding Corn and Soybean Growers

	Average Farm Acres	Average Operating Expenses	Average Operating Expenses (Per Acre)
All Growers	1,162	$455,981	$392.41
Corn Growers	1,253	$550,802	$439.59
Soybean Growers	1,245	$555,559	$446.23

Top Soybean Growers

In a review of the top one-third of no-till soybean growers, the average yield of 61.2 bushels an acre is up from 59.9 bushels in 2013 — and they enjoyed a 7-bushel yield advantage over the typical *No-Till Farmer* reader.

Of the top 20 high-yielding no-tillers, seven were from Nebraska and three each were from Illinois, Indiana and Pennsylvania. At 43%, the Eastern Corn Belt had the largest chunk of these growers vs. 34.7% for the Western Corn Belt. Here are some notable statistics from these top no-till soybean producers:

• The average farm size of the top no-till soybean growers in 2014 was 1,245 cropping acres, which is 7% higher than the overall average of 1,162 acres.

• The top-yielding soybean growers spent far more in their operations than the typical *No-Till Farmer* reader. At $555,559, they out-spent the average no-tiller by nearly $100,000 last year. Their average, per-acre operating expenses in 2014, at $446.23, were $53.82 higher than the average no-tiller.

• Some 77% of high-yielding soybean growers seeded cover crops last year, up 10 points from 2013 and 7 points higher than the average no-tiller.

• The top soybean growers who use a no-till drill drop seed at a rate of 165,922 seeds per acre, which is 2.2% more than they reported in 2013 and 3.5% more than the national average of 160,231. Top soybean growers who used no-till planters dropped seed at a rate of 152,343, up just 0.25% from 2013.

• Some 86.5% of top soybean producers will use Roundup Ready varieties, which is 7 points lower than last year, and 4 points lower than the average no-tiller. Pioneer varieties lead the way at 39.7%, 3 points behind the average, followed by Asgrow (34.7%) and NK (19.8%).

• Some 67.3% of top-yielding soybean growers will inoculate soybeans in 2015, a 12-point drop from 2014 and 7 points off the average no-tillers this year.

• When it comes to growing corn, these high-yielding soybean growers finished with a yield average of 190.8 bushels an acre last year, up from 184 bushels in 2013, but 16 bushels short of the high-yielding corn growers profiled in this article.

• More than 16% of the top-yielders applied gypsum in 2014, 1 point higher than the 15% average.

• About 47% of high-yielding no-tillers applied fungicides to soybeans last year, 14 points higher than the average no-tiller. Insecticides were applied by 35% of top growers in 2014, 6 points higher than average.

• Top soybean growers are more likely this year, than average, to apply N in the fall (42% vs. 32%) and less likely to apply N at spring pre-plant (44% vs. 49%) and at-plant (18% vs. 25%). About 24% of top soybean producers plan to apply foliar N vs. 22% of all *No-Till Farmer* readers, and 4% of high yielders will sidedress soybeans vs. the average of 3%.

• As was the case last year, top-producing soybean producers are less likely to apply fertilizer to soybeans for 2015 vs. the average no-tiller. Nitrogen will be applied by 22% of these top growers vs. 27% nationally; P by 59% compared to 60%; K by 62% vs. 68%; and micronutrients by 38% vs. 40%. AEI

Farm Size Falls to 7-Year Low

Owned farmland hits highest percentage ever in benchmark study at 47%.

By Darrell Bruggink, Executive Editor

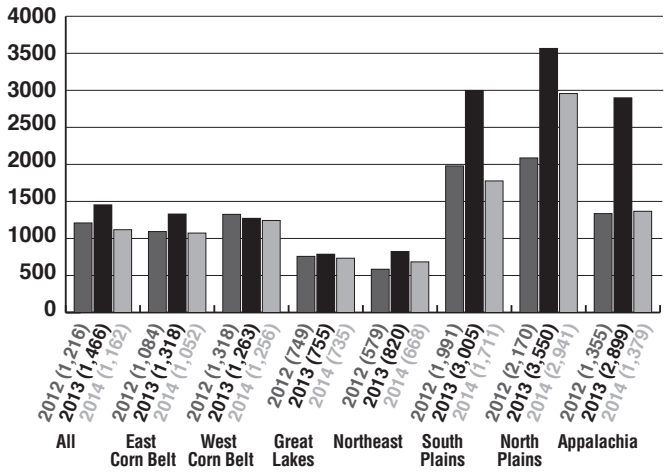
Just one year after hitting an all-time high, the average farm size of *No-Till Farmer* readers fell to a 7-year low in the No-Till Operational Benchmark Study conducted by *No-Till Farmer* editors.

The average farm size of the 436 farmers who completed our 70-question survey was 1,162 acres, which was well below the all-time-high mark of 1,466 acres per farm recorded last year. However, this year's average acreage was more in line with the historical farm sizes in the first 5 years of the survey.

The Eastern Corn Belt saw a substantial decline in farm size from 1,318 last year to 1,052, a decline of 20%. The Northeast saw a drop in average farm size from 820 to 668 acres, a decline of 18.5%.

However, some regions held steady. With an average farm size of 1,256, the Western Corn Belt was just 7 acres smaller on average than last year. Meanwhile, the Great Lakes region saw a minimal decline in farm size from 755 to 735 acres.

Figure 1. Average Acres Cropped by Region



Owned Acres Hit Record

The acreage owned by *No-Till Farmer* readers hit a record high for the third straight year.

No-tillers own 47% of their cropping acreage, which is up from 46.5% in the 2014 survey and nearly 4 points up from the 43.1% level of 2013.

Rented acres now stand at 36.1% of total cropping acres, which is nearly 7 points lower than 2009 (42.9%). After dropping for five straight years, share-cropped acres bounced back nearly 2 points this year from 15% to 16.9%.

The Great Lakes with 59% of cropping acreage owned by no-tillers edges the Northern Plains by 1 point, while the Western Corn Belt follows at 52%.

The Northeast has nearly all of its acreage either owned or rented, with 49% owned, 50% rented and 1% share-cropped. It has the greatest percentage of rented acreage among the seven regions.

Appalachia follows the Northeast for highest percentage of rented acres at 48%. The Eastern Corn Belt hits 45%.

Meanwhile, the Southern Plains leads in share-cropped acreage at 44% of total acres. AEI

Shift Toward Soybeans Continues in 2014

Corn acres slipped in most U.S. regions, while the picture for soybean plantings brightened.

By John Dobberstein, Managing Editor

As commodity prices continued their slide last year, no-tillers have continued to shift more of their acreage to soybeans.

Soybean acres increased by 2-6 percentage points in four of seven U.S. regions surveyed for the 7th annual No-Till Operational Benchmark Study.

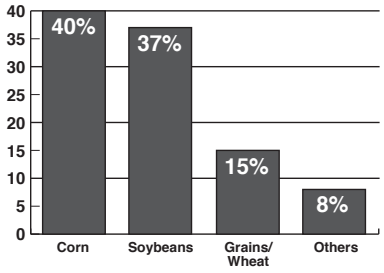
Some 94% of no-tillers grew corn in 2014, down by 0.3 points from 2013, and 88.5% grew soybeans, a 2.5-point drop. About 56% of growers raised small grains last year, up by 5 points.

Looking at crops raised as a percentage of total acres, corn's share grew by 1 point to 40% in 2014, while soybeans jumped 4 points to 37%, and grains/wheat remained unchanged at 15%. ***(See Figure 1.)***

But the picture is much more variable at a regional level. In the Great Lakes, Appalachia and Eastern Corn Belt, corn acres saw declines on the order of 4-16 percentage points, while soybeans picked up acres in all three of those regions.

This trend seems to mirror what some analysts are seeing nationally. In its planting intentions sur-

Figure 1. Crops Raised by No-Tillers as a Percentage of Total Acres



vey released in late March, Doane Advisory Services predicts record soybean plantings of 87 million acres this year and a decline in corn plantings for the second straight year to 87 million acres, the lowest since 2009.

Here are some notable regional cropping observations:

• Corn's share of acreage in the Western Corn Belt was up by 1 point to 49% in 2014, but that's still much lower than its 54% share of acres in 2011. Soybean acres slipped by 2 points to 40% last year, while small grains rebounded by 2 points to 5%.

• After a string of gains in recent years, corn acres in the Eastern Corn Belt fell 4 points to 47% in 2014, while soybean acres increased from 42% in 2013 to 45% last year. Small grains rebounded by 1 point to 5% in 2014.

• In Appalachia, soybean acres rebounded and corn took a big drop. Corn only made up 21% of acres in 2014, down from 36% in 2013. Meanwhile, soybean acres jumped from 33% in 2013 to 39% last year. As a double-cropping region, wheat still has a strong presence at 19% of acres, but that's down from 23% the previous year.

• Corn acres took a big jump in the Northern Plains, rising from 25% in 2013 to 29.5% last year, while soybeans fell 4.5 points from 30% in 2013 to 25% in 2014. Small grains were still the largest crop at 32.5% of acreage, but that's down from 36% in 2013 and 39% in 2012.

• Soybean acreage rebounded last year in the Southern Plains, increasing from 14% in 2013 to 19% last year, while corn remained second at 20%. Small grains continued to lead the way with 39% of acreage, up from 33% in 2013. Sorghum acres also rebounded from 14% in 2013 to 16% last year.

• In the Northeast, corn remained at 47% of acres last year, but soybean's share of acres dropped to 24%, down from 29% in 2013. Hay and forage acres grew from 11% in 2013 to 15% last year, while small grains fell by half a point to 9.5%. Other crops accounted for about 5% of acres.

• Corn acres plummeted in the Great Lakes from 46% in 2013 to 36% last year. Soybean acres increased from 37% in 2013 to 39% last year, while small grains rebounded from 6% in 2013 to 9.5% last year. Hay and forage and other crops made up 14% of acres in 2014. AEI

Cover Crop Use Among No-Till Farmer Readers Hits Another Record

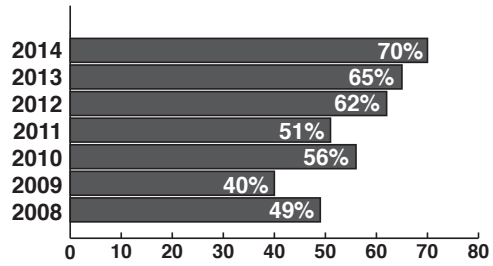
While there were some reports of no-tillers struggling to get cover crops planted in a timely manner last fall, the numbers from the 7th annual No-Till Operational Benchmark Study show that there was record usage of cover crops by *No-Till Farmer* readers for the third straight year.

Some 70% of no-tillers say they planted cover crops on some of their cropping acreage in 2014. That's a record high in the 7 years that the study has been conducted, including besting the 65% mark in 2013 and 62% level in 2012.

The 7-year average for cover crop use is 56.1%. The average *No-Till Farmer* reader applied cover crops to 38.5% of their cropping acreage.

Cereal rye remains the most commonly used cover crop by 58% of no-tillers (up 1% from 2013), followed by radishes at 35.5% (down 10.5%), small grains at 22%, annual ryegrass at 20% (down 8%) and clover at 19% (down 8%).

Percentage of No-Tillers Who Planted Cover Crops



No-Tillers Ready to Make Slight Cuts with Fertilizer

After increasing per-acre spends on fertilizer in 2014, no-tillers will try to trim expenditures mostly through cuts to soybean applications.

By Darrell Bruggink Executive Editor

Year after year, fertilizer is the big gorilla in the room when it comes to farm expenditures. In 2014, the readers of *No-Till Farmer* spent an average of $85,513 per farm to feed their crops — far outpacing the average of $69,732 spent on average, per farm, for land rent.

While that ended up being nearly $9,000 less than the 2013 average of $94,322 per farm, no-tillers actually spent more on fertilizer in 2014 on a per-acre basis. At $73.28 per acre, *No-Till Farmer* readers spent nearly $9 more per acre in 2014 than the $64.34 per acre they spent in 2013.

Figure 1. How Much Nitrogen Do You Plan to Apply vs. Your Targeted Corn Yield?

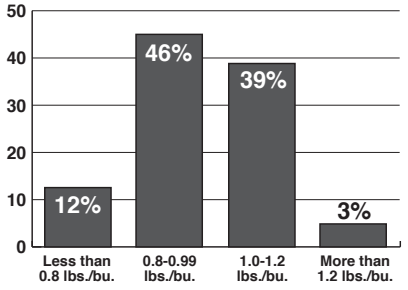
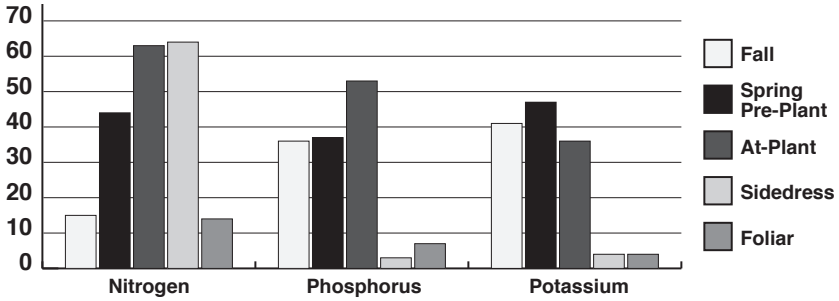


Figure 2. When Will You Make Fertilizer Applications for the 2014 Corn Crop?



Per-Acre Spend Increased

The higher per-acre spending is not a surprise, since no-tillers told us last year they were planning to increase their applied nitrogen (N) levels over 2013. But it looks like one year of cost increases is about all that no-tillers can stomach, as they told us in this year's survey that they're looking to reduce their fertilizer expenses to $80,235 per farm, or to $69.05 per acre.

It looks like most of those cuts could come from reductions to fertility applications in soybeans, with fewer no-tillers planning applications of N, phosphorus (P), potassium (K) and micronutrients in 2015.

However, no-tillers are not planning to back off on fertility to corn. That's because survey respondents told us they actually are expecting to ever-so-slightly increase their N application rates to corn in 2015.

While 15% of no-tillers said in 2014 they would apply less than 0.8 pounds of N per expected bushel of corn yield, only 12% are expecting to apply N at that low level this year. ***(See Figure 1.)*** Meanwhile, the no-tillers expecting to apply anywhere from 1-1.2 pounds of N per bushel of expected corn is increasing from 37% to 39%. Even no-tillers applying more than 1.2 pounds of N per bushel of expected corn yield is going from 2% to 3%.

Nitrogen application timing to corn is expected to change very little among no-tillers in 2015, with 64% applying N at sidedress and 63% at planting. That compares to 67% for sidedress and 64% for at-plant last year.

Spring pre-plant N will be applied by 44% of no-tillers (up 1 point), fall at 15% (unchanged) and foliar at 14% (up 1 point).

No-tillers will, on average, make 2 trips across the field to make N applications to corn vs. 2.02 in 2014.

The leading form of N applied to corn by no-tillers is 28% by 51% of *No-Till Farmer* readers. That's unchanged from a year ago, and is followed by 32% N at 32% (down 1 point), ammonium sulfate at 28% (up 2 points), anhydrous ammonia at 28% (down 2 points), urea at 24% (up 2 points) and ammonium nitrate at 4% (up 1 point).

Some 65% of no-tillers claim to use some type of nitrification inhibitor or N stabilizer, which is a 4-point rise over the 2014 respondents.

P & K for Corn

Only 7% of no-till corn growers will not apply P this year. At-plant applications are the most popular at 53%, although that's down 3 points from 2014. ***(See Figure 2.)*** Spring pre-plant applications will also decrease from 41% in 2014 to 37% this year.

Fall application of P comes in at 36% of no-tillers, while 4% make foliar applications and 3% apply sidedress.

For K applications to corn, spring pre-plant is the most popular timing at 47% (down 5 points from 2014). Fall timing dropped 1 point to 41%, while at-plant applications of K are increasing from 34% in 2014 to 36%.

Nearly 5% of no-tillers will make foliar K applications, while another 4% apply at sidedress. Only 11% of no-tillers will not apply K to corn this year.

Soybean Habits

While 81% of no-tillers are planning to apply some type of fertilizer to their soybeans, those making applications appear to be ready to make some cuts to their fertility program. ***(See Figure 3.)***

Last year, 82% of no-tillers applied K to soybeans, but that number will slip to 68% this year.

Phosphorus was applied to soybeans by 77% of no-tillers last year, but only 60% plan to apply P this year.

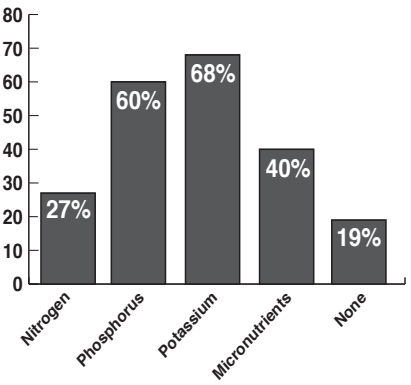
Only 27% of no-tillers will apply N to soybeans in 2015, after 30% and 36% said they would do so in 2013 and 2014, respectively.

Finally, micronutrient applications to soybeans will see a considerable decrease from 52% of no-tillers in 2014 to 40% this year.

When it comes to application timing of fertilizers to soybeans, spring pre-plant is used by 50% of *No-Till Farmer* readers. That is down, however, from 54% last year.

Fall applications are utilized by 32% (down 4 points), followed by at-plant at 25% (up 2 points), foliar at 22% (down 2 points) and sidedress at 3%.

Figure 3. What Fertilizers Will You Apply for the 2014 Soybean Crop?



While inoculant use is strong among no-tillers, their use will decline in 2015 to 75% of no-tillers vs. 79% in 2014 and 83% in 2013.

Micros Still Big Players

The use of micronutrients has grown steadily throughout the years of the No-Till Operational Benchmark Study, but their use has mostly plateaued. Here's a summary of results:

• Sulfur is now used by an all-time high 70% of *No-Till Farmer* readers, which is 1 point higher than the past 2 years. Sulfur use was at 52% in 2010.

• Zinc usage fell 1 point from last year's all-time high of 64% to 63% in 2014. Zinc usage was at 48% in 2010.

• Boron use rose for the fifth straight year from 39% to 42%. It was at 25% in 2010.

• Manganese, magnesium and calcium all saw slight declines from the previous year, with manganese at 26% (down 3 points), magnesium at 19% (down 2 points) and calcium at 17 points (down 3 points).

• Several other micros saw slight declines, including copper from 15% down to 13%; molybdenum and iron from 11% to 10%; and chloride from 5% to 4%.

Manure, Lime, Gypsum

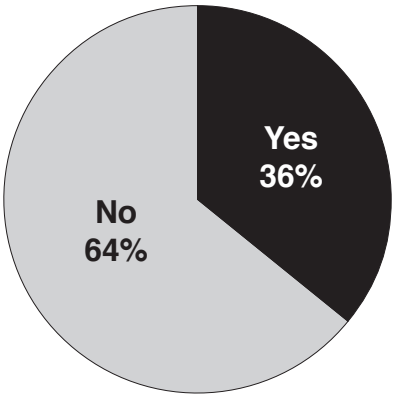
Some 45% of *No-Till Farmer* readers applied manure last year, which was 3 points higher than the previous year and falls between the average range of 42% and 47% in this survey since 2012.

Cattle manure remains the most commonly used source at 74% of applicators (up 1%), while 25% of manure users applied poultry and hog manure.

Just like last year, 15% of no-tillers applied gypsum to some level of their cropland. That's 3 points down from the high of 18% in 2011, but well above the 5% mark in 2008, the first year of the benchmark study.

Lime applications were made by 44% of *No-Till Farmer* readers, with 55% applying calcitic lime, 47% dolomitic and 10% some other source of lime.

Figure 4. Will You Apply a Product Touted to Increase Soil Biological Activity?



Finally, 36% of no-tillers say they will apply a product this year touted to increase soil biological activity. That's 8 points lower than last year's survey. AEI

Machinery Buys Fall Further in 2015

While equipment purchases declined for a second straight year, no-tillers spent more than they anticipated even with lower grain prices.

By Darrell Bruggink, Executive Editor

For the second straight year, equipment purchases by no-tillers declined over the previous year. The drop in grain prices in 2014 certainly seemed to have an impact, as the average reader of *No-Till Farmer* eased back purchases from a farm average of $87,921 in 2014 to $64,938 ahead of the 2015 cropping season.

On a per-acre basis, that drop in equipment spending wasn't as dramatic, however, as no-tillers spent $55.88 per acre this year compared to $59.97 last year — only about a 7% decrease.

The following represents the percentage of *No-Till Farmer* readers that made equipment purchases ahead of the 2015 cropping season by specific product categories:

Tractors – 10.8% vs. 20% in 2014
Combines – 4.4% vs. 10% in 2014
Planters – 7.3% vs. 12% in 2014
Drills – 4.1% vs. 5.5% in 2014
Self-Propelled Sprayers – 4.4% vs. 5% in 2014
Pull-Type Sprayers – 2.3% vs. 3.3% in 2014

Throughout the history of our benchmark study, readers have always underestimated their future purchases.

Last year, *No-Till Farmer* readers said they would only spend an average of $59,337 this year, or $40.48 per acre. They ended up spending $64,938, or $55.88 per acre. Ahead of the 2016 cropping season, *No-Till Farmer* readers claim they will only spend $42,186 per farm, or $36.30 per acre.

Planters, Drills, Air Seeders

Some 54% of readers own a Deere planter (up 5%), while Kinze follows at 22% (down 2%). White planters are used by 11% of readers (up 1%), while Case IH remains unchanged at 10%.

Even with the average farm size down 300 acres vs. a year ago, 24-row planters increased in use from 10% of *No-Till Farmer* readers last year to 12% in 2015. However, 16-row planters slipped to 22% (down 2%). At 33%, 12-row planters remain the most popular and were unchanged vs. a year ago, while 6-row planters were up 2 points to 26%, a reflection of

Equipment No-Tillers Own and Operate

	2014	2013
No-till planter	95%	94%
Sprayer	82%	84%
Combine/harvester	82%	83%
No-till drill	62%	69%
Grain cart	58%	54%
Fertilizer applicator	37%	43%

the lower overall farm size sampled this year.

Nearly 91% of corn growers will plant corn in 30-inch rows, with another 9% using 36-inch rows, 6% on 15-inch rows and 5% on 20s. Nearly 4% of readers use twin rows.

For soybeans, 51% of readers use a planter only for seeding, while 25% rely solely on a drill. Another 13% use both a planter and a drill in their operation, while 12% go with an air seeder.

For seeding equipment of soybeans, John Deere leads the way at 51%, followed by Kinze (17%), Case IH (11%), White (9%) and Great Plains (7%).

Precision Tools

Likely a reflection of the smaller farm acreage sampled, the use of precision tools will decline with the exception of lightbars. With 42% of *No-Till Farmer* readers using lightbars, that's a 4-point rise over 2014.

GPS tractor auto-steer remains the most popular precision technology used by *No-Till Farmer* readers at 48% compared to 49% last year.

Yield monitor data analysis followed at 41%; field mapping at 40%; variable-rate fertilizing at 32%; variable-rate seeding at 21%; satellite aerial imagery at 8%; and soil electrical conductivity mapping at 5%. AEI

SECTION 3

U.S. No-Till Farming — Addendum

Starting in 2009, *No-Till Farmer* (*NTF),* a monthly newsletter of Lessiter Publications, has conducted a survey of its readers to establish operational benchmarks and provide the industry with additional data on no-till farming.

Each year, the data collected is compiled and an analysis is published in the May issue of *No-Till Farmer's* quarterly magazine, the *Conservation Tillage Guide*. Analysis of the 2015 survey results also appears in Section 2 of this report.

On average, 20% of the 2,500 farmers who *NTF* surveyed have responded in each of the 7 years the study has been conducted. In all, 26 states are covered in the annual survey, and the data is categorized into seven growing regions.

In addition to pure no-till practices, this group of farmers may also employ strip-till, vertical-till and minimum tillage farming practices on part or all of their acreage.

Operational Expenses

No-tillers spent an average of $392.41 per acre on inputs in 2014 — a 12.9% increase over the $347.69 spent in the prior year. But the average net profit per farm in 2014 was still a healthy $73,011, which shows no-tillers are continuing to reap the benefits of their investments. ***(See Table 1 on page 7 in Section 2 of this report for additional detail.)***

No-Till Farmer readers spent an average of $455,981 for their entire farm in 2014, which was $53,727, or 10.5%, less than the record $509,708 spent in 2013, and the lowest since 2010 ($388,464).

This year, no-tillers plan to spend $422,342 on inputs, which is $33,639 less than in 2014, or a planned cut of 8%. The deepest cuts are expected in equipment, fertilizer and fuel.

As for the seven regions represented in this study, all saw reduced total operating expenses in 2014 except for the Northern Plains and Western Corn Belt, which saw increases of 37% and 5.6%, respectively.

However, when reviewing expenditures on a per-acre basis, the Eastern Corn Belt (17.7%), Appalachia (16.1%) and Northern Plains (66.2%) showed substantial increases vs. the previous year.

No-Till Performance

When it comes to results, farmers using conservation tillage, including no-till, strip-till, minimum tillage and vertical tillage practices continue to improve their performance as measured by per-acre crop yields.

No-Till Farmer readers participating in the 7th annual No-Till Operational Benchmark Study reported harvesting an average of 169 bushels per acre for corn, a record for this survey and an 8-bushel improvement over 2013.

Last year's 169-bushel average is a vast improvement over the drought year of 2012, when no-till yields hit an all-time low in the annual survey at 134 bushels per acre.

Strip-tilled corn yields also continued a big comeback with an average of 182 bushels per acre, a 10-bushel improvement over 2013 and the highest since strip-tillers recorded 175-bushel average yields in 2009. In 2012, strip-till corn yields averaged 146 bushels per acre.

Minimum tillage corn did not set a record yield last year. The 175-bushel-an-acre average was 3 bushels less than 2013, but that figure is still well above the 162-bushel average yield over the 7 years of the survey.

Corn acres that saw vertical tillage recorded 178 bushels, a 3-bushel increase over 2013, the first year that data was collected.

Additional Detail

Section 3 of this report, which follows, includes additional detail that was not covered in the analysis that appeared in the May 2015 edition of the *Conservation Tillage Guide* or Section 2 in this report.

It includes data compiled from earlier surveys to provide a means of comparing changes and trends that have emerged in the last 7 years in expenditures, land use, weed control, fertilization practices, seeding and other pertinent data relevant to no-till and other conservation tillage farming practices. AEI

Background Data

What is your age?						
	2015	2014	2013	2012	2011	5-Year Avg.
65 and over	30.0%	31.6%	27.6%	26.3%	25.1%	28.1%
55-64	33.0%	32.8%	34.5%	33.2%	30.7%	32.8%
45-54	18.6%	16.9%	16.9%	24.0%	26.3%	20.5%
35-44	10.1%	11.6%	13.1%	12.0%	11.6%	11.7%
25-34	7.6%	6.8%	7.5%	6.9%	6.0%	7.0%
Under 25	0.7%	0.7%	0.5%	0.4%	N/A	0.6%

Averaged over the last 5 years, about 60% of U.S. no-tillers are 55 years old or older and only 7% are 35 years old or younger.

How many years have you no-tilled?						
	2015	2014	2013	2012	2011	5-Year Avg.
Never	2.3%	1.4%	0.7%	1.3%	1.2%	1.4%
Less than 5	9.5%	10.5%	7.7%	10.2%	9.3%	9.4%
5-15	33.8%	31.3%	38.4%	41.6%	39.2%	36.9%
16-25	29.8%	31.3%	31.2%	28.4%	30.5%	30.2%
More than 25	24.6%	25.6%	22.0%	18.6%	19.8%	22.1%

The 5-year average indicates that 52% of U.S. no-till farmers have been utilizing the practice for 16 years or more.

Cropping Data

Please enter your total cropping acres:	
2015	1,162 acres/farm
2014	1,466 acres/farm
2013	1,215 acres/farm
2012	1,253 acres/farm
2011	1,264 acres/farm

What acreage group do you fall into?						
	2015	2014	2013	2012	2011	5-Year Avg.
Under 250	17.0%	13.4%	15.6%	14.7%	16.0%	15.3%
250-499	18.2%	11.5%	17.4%	16.9%	19.5%	16.7%
500-999	21.7%	27.5%	23.3%	25.0%	25.1%	24.5%
1,000-1,749	23.1%	23.7%	21.5%	22.6%	21.0%	22.4%
1,750-2,499	7.5%	11.0%	9.7%	7.7%	6.1%	8.4%
2,500-4,999	10.0%	8.4%	9.2%	9.4%	9.3%	9.3%
5,000 or more	2.6%	4.6%	3.2%	3.7%	3.0%	3.4%

No-tillers, on average, are working 1,162 acres in 2015 (top table). Some 43% of those participating in the 2015 *No-Till Farmer* No-Till Operational Benchmark Study farmed 1,000 acres or more.

What crops do you raise/plan to raise?						
	2015	2014	2013	2012	2011	5-Year Avg.
Corn	94.7%	94.4%	93.0%	96.1%	96.0%	94.8%
Soybeans	88.5%	91.0%	91.6%	91.6%	91.4%	90.8%
Small grains	55.6%	51.6%	53.6%	51.9%	57.6%	54.1%
Forage	43.1%	41.8%	30.7%	28.6%	31.6%	35.2%
Sunflowers	3.4%	3.7%	4.7%	3.5%	5.0%	4.61%
Grain sorghum	7.8%	9.3%	8.5%	7.0%	8.2%	8.2%
Other	N/A	N/A	12.4%	16.1%	18.6%	15.7%

During the 5 years covered by the *NTF* surveys, an average of 94.8% of farmers reported planting corn on their no-till acres, while 90.8% planted soybeans. The percentage of no-tillers raising soybeans was down after holding steady at about 91% for 5 years.

How many acres do you grow or plan to grow of the following crops? (acres/farm)					
	2015	2014	2013	2012	2011
Corn	480	607	521	560	506
Soybeans	463	529	432	474	426
Small grains	302	420	352	279	364
Forage	115	129	N/A	N/A	N/A
Grain sorghum	377	510	N/A	N/A	N/A
Sunflowers	271	188	N/A	N/A	N/A

Among survey respondents, corn was raised most often on no-till acres, followed closely by soybeans.

Land Use Data

What percentage of cropland do you:						
	2015	2014	2013	2012	2011	5-Year Avg.
Own	47.0%	46.5%	43.1%	41.5%	42.3%	44.1%
Cash Rent	36.1%	38.6%	40.3%	40.9%	39.7%	39.1%
Share Crop	16.9%	14.8%	16.7%	17.6%	18.0%	16.8%

The number of no-tillers who own their cropland has gradually increased over the past 5 years (47% in 2015 vs. 42.3% in 2011) vs. those who rent over the same time period (36.1% in 2015 vs. 39.7% in 2011).

Please indicate the tillage practices you use:						
	2015	2014	2013	2012	2011	5-Year Avg.
No-Till	93.8%	94.2%	95.1%	95.0%	95.4%	94.7%
Strip-Till	14.9%	15.6%	18.0%	17.0%	13.7%	15.8%
Vertical-Till	20.2%	22.8%	17.8%	19.0%	14.5%	18.9%
Moldboard plow	1.8%	2.1%	2.5%	3.0%	2.6%	2.4%
Min-Till	29.8%	30.0%	25.3%	31.0%	35.7%	30.4%

When it comes to tillage practices, almost all of the farmers (95%) surveyed between 2011-15, utilized no-till. Next on their list is minimum-till, which is used by 30.4% of the farmers.

What percentage of your acreage by crop is: (Percentage of acreage of growers who use the practice on their farm)						
	Corn		Soybeans		Small Grains	
	2015	2014	2015	2014	2015	2014
No-Till	67.0%	65.0%	86.0%	85.0%	86.0%	88.0%
Strip-Till	15.0%	15.0%	2.0%	3.0%	N/A	2.0%
Vertical-Till	6.0%	10.0%	8.0%	5.0%	5.0%	4.0%
Min-Till	10.0%	10.0%	4.0%	7.0%	9.0%	8.0%

No-till is most often utilized to grow soybeans and small grains (86%), while two-thirds of *No-Till Farmer* readers used no-till for corn in 2015.

How many acres of the following crops did you no-till in 2014?					
	No-Till	**Strip-Till**	**Vertical-Till**	**Min-Till**	**Moldboard Plow**
Corn	404.6 acres	450.9 acres	271.6 acres	239.5 acres	55.0 acres
Soybeans	428.0 acres	391.1 acres	286.3 acres	162.3 acres	100.0 acres
Small grains	278.7 acres	N/A	188.0 acres	229.9 acres	N/A
Forage	127.8 acres	N/A	112.7 acres	52.3 acres	N/A
Grain sorghum	506.5 acres	700.0 acres	N/A	90.0 acres	N/A
Sunflowers	231.7 acres	400.0 acres	N/A	N/A	N/A

Grain sorghum, corn and soybeans were the crops most often planted in no-till acres in 2014. Grain sorghum dominated strip-till acreage, with 300 more acres of grain sorghum being planted as sunflowers or corn.

Did you plant cover crops last year?						
	2015	**2014**	**2013**	**2012**	**2011**	**5-Year Avg.**
Yes	69.7%	65.1%	62.4%	51.0%	56.0%	60.8%
No	30.3%	34.9%	37.6%	49.0%	44.0%	39.2%

What cover crops did you raise?						
	2015	**2014**	**2013**	**2012**	**2011**	**5-Year Avg.**
Cereal rye	58.2%	50.4%	46.5%	41.5%	29.0%	45.1%
Small grains*	21.7%	18.0%	23.9%	24.9%	18.0%	21.3%
Annual ryegrass	20.4%	25.0%	26.3%	22.6%	17.0%	22.3%
Radishes	35.5%	40.9%	40.2%	40.4%	10.0%	33.4%
Others**	22.6%	20.5%	10.6%	10.2%	11.0%	15.0%
Peas	11.2%	14.0%	12.2%	12.8%	7.0%	11.4%
Clover	19.1%	23.9%	17.8%	16.6%	4.0%	16.3%

**includes wheat, oats, etc.*
***includes Hairy Vetch, Millet, Buckwheat*

Overall, the majority (69.7%) of no-till farmers planted cover crops in 2015 (middle table). More than half (58.2%) of the respondents report using cereal rye as their main cover crop (bottom table).

How many acres of cover crops did you plant last year?	
2015	297 acres/farm on average
2014	384 acres/farm on average

What percentage of your total cropping acreage did you plant to cover crops?	
2015	38.5%
2014	39.1%

Projected No-Till Acreage Increase		
Year	**Acres**	**Increase 1.5%**
2009	88,000,000	
2010	89,320,000	1,320,000
2011	90,659,800	1,339,800
2012	92,019,697	1,359,897
2013	93,399,992	1,380,295
2014	94,800,992	1,401,000
2015	96,223,007	1,422,015
2016	97,666,352	1,443,345
2017	99,131,348	1,464,995
2018	100,618,318	1,486,970
2019	102,127,593	1,509,275
2020	103,659,506	1,531,914
2021	105,214,399	1,554,893
2022	106,792,615	1,578,216
2023	108,394,504	1,601,889
2024	110,020,422	1,625,918
2025	111,670,728	1,650,306

The USDA recently estimated that acreage worked with continuous no-tillage is expected to grow by 1.5% per year, and increase to 32% of all cropland acres that will be no-tilled by 2025.

Yield Data

What were your average per-bushel yields (bushels/acre) on no-tilled land, strip-till land, vertical-till land and minimum-tilled land?

	2014	2013	2012	2011	2010	5-Year Avg.	USDA Est 2014-15
Corn							**171**
No-Till	169	161	134	149	151	153	
Strip-Till	182	172	146	173	171	169	
Min-Till	175	178	133	162	160	162	
Vertical-Till	178	175	N/A	N/A	N/A	177	
Soybeans							**47.8**
No-Till	52	49	47	49	49	49	
Strip-Till	53	47	50	49	56	51	
Min-Till	53	49	48	49	49	50	
Vertical-Till	52	50	N/A	N/A	N/A	51	
Double-Crop Beans							**N/A**
No-Till	37	37	30	34	30	34	
Min-Till	N/A	N/A	38	35	30	34	
Spring Wheat							**All Wheat: 43.7**
No-Till	52	56	52	55	57	54	
Min-Till	62	N/A	51	51	70	59	
Winter Wheat							
No-Till	69	66	67	62	61	65	
Min-Till	69	64	60	60	55	62	
Vertical-Till	59	67	N/A	N/A	N/A	63	
Oats							**67.7**
No-Till	N/A	N/A	86	70	77	78	
Min-Till	N/A	N/A	93	83	70	82	
Grain Sorghum							**67.6**
No-Till	96	87	61	97	85	85	
Vertical-Till	113	N/A	N/A	N/A	N/A	113	
Sunflowers (lb./acre)							**N/A**
No-Till	1,660	1,052	1,173	1,082	1,471	1,288	

This table provides a comparison for crop yields for selected crops for 2010-14, and provides a 5-year average for each crop. The last column is the USDA's projected yield for each crop as of April 9, 2015, for the 2014-15 marketing year.

Equipment Data

What equipment do you own and use in your operation?
(% of respondents)

	2015	2014	2013	2012	2011	5-Year Avg.
Drill	62.2%	68.8%	72.6%	65.0%	71.8%	68.1%
Planter	95.0%	94.2%	93.5%	93.0%	96.2%	94.4%
Air seeder	19.0%	12.6%	N/A	N/A	N/A	15.8%
Strip-till rig	13.3%	13.3%	15.7%	14.0%	12.2%	13.7%
Fertilizer applicator	37.2%	43.2%	39.1%	40.0%	39.2%	39.7%
Self-propelled sprayer	42.4%	50.5%	45.7%	42.0%	37.0%	43.5%
Pull-type sprayer	39.2%	33.6%	35.5%	42.0%	43.6%	38.8%
Combine	82.3%	83.3%	81.9%	81.0%	82.6%	82.2%
Grain cart	53.7%	57.7%	52.8%	54.0%	N/A	54.5%

The equipment most often owned and used by no-till farmers in the survey included planters (95%), combines (82.3%) and drills (62.2%).

What planter attachments do you use?						
	2015	2014	2013	2012	2011	5-Year Avg.
Closing wheel	85.3%	87.6%	82.2%	84.5%	77.6%	83.4%
Seed firmer	76.6%	74.9%	79.7%	77.7%	77.4%	77.3%
Row cleaner	78.7%	75.1%	77.3%	75.9%	73.5%	76.1%
Coulter	46.6%	51.0%	49.7%	53.6%	53.0%	50.8%
2x2 applicator	40.6%	42.8%	41.1%	37.2%	36.3%	39.6%
Down-pressure system	40.3%	41.3%	40.6%	38.2%	36.1%	39.3%
Pop-up applicator	42.3%	43.0%	42.1%	40.9%	35.3%	40.7%
Nitrogen applicator	24.4%	24.1%	27.3%	23.5%	24.6%	24.8%
Metering system	28.7%	28.6%	31.6%	29.9%	23.0%	28.4%

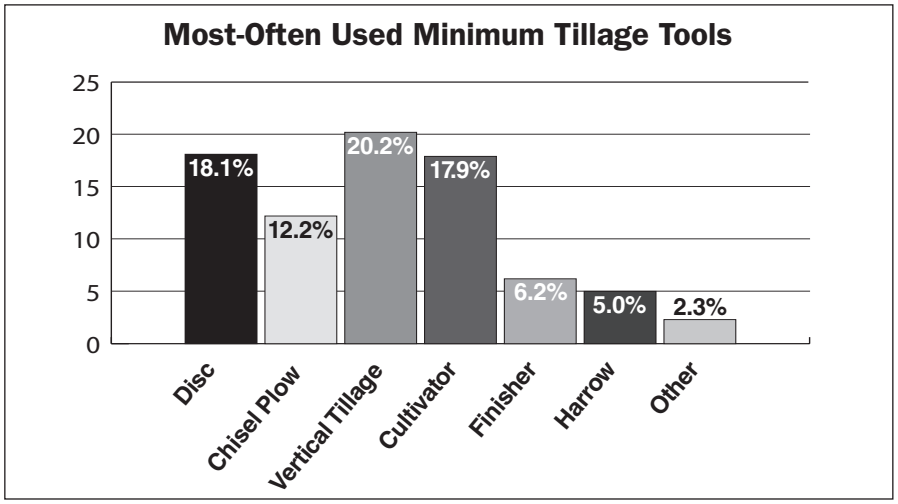
No-till farmers utilize a wide range of planter attachments. Over 85% of those surveyed used closing wheels and almost 79% used row cleaners.

What type of minimum tillage tools are you using?						
	2015	2014	2013	2012	2011	5-Year Avg.
Disc	18.1%	15.8%	16.3%	20.0%	17.5%	17.5%
Chisel Plow	12.2%	17.2%	14.0%	16.0%	15.7%	15.0%
Vertical Tillage	20.2%	20.1%	17.9%	18.0%	14.7%	18.2%
Cultivator	17.9%	15.3%	12.4%	15.0%	12.2%	14.6%
Finisher	6.2%	8.1%	7.8%	10.0%	8.4%	8.1%
Harrow	5.0%	6.0%	7.6%	5.0%	6.0%	5.9%
Other	2.3%	5.8%	2.8%	2.0%	3.8%	3.3%

Those farmers who practice minimum tillage most often use vertical tillage (20.2%), discs (18.1%) and cultivators (17.9%).

What equipment have you purchased or plan to purchase for the upcoming cropping season?					
	2015	2014	2013	2012	2011
Tractor	10.8%	17.5%	20.4%	19.0%	16.1%
Planter	7.3%	12.0%	15.1%	17.0%	13.7%
Combine	4.4%	10.0%	12.0%	11.0%	10.4%
Air seeder	2.3%	2.4%	N/A	N/A	N/A
Self-propelled sprayer	4.4%	5.3%	9.5%	8.0%	6.6%
Drill	4.1%	2.9%	10.0%	8.0%	6.4%
Tillage tools	2.8%	4.1%	4.0%	6.0%	4.0%
Pull-type sprayer	2.3%	3.3%	2.8%	4.0%	3.8%
Forage harvester	N/A	N/A	1.8%	N/A	1.4%

The highest number of farmers surveyed (10.8%) plan to purchase or have purchased a tractor in 2015.



No-till farmers who utilize minimum tillage tools most often employ vertical tillage tools, followed by discs and cultivators, usually to control crop residue build-up.

Which of the following technologies will you use in your cropping operation?					
	2015	2014	2013	2012	2011
GPS Guidance — Lightbar	41.7%	38.3%	41.5%	44.0%	42.0%
Yield Monitor Data Analysis	41.1%	44.5%	46.3%	44.0%	37.1%
Field Mapping	39.9%	43.3%	46.0%	41.0%	35.6%
GPS — Tractor Auto-Steer	48.4%	49.3%	44.4%	37.0%	34.1%
Variable-Rate Fertilizing	31.9%	33.4%	30.2%	34.0%	26.9%
Variable-Rate Seeding	20.6%	22.0%	17.8%	22.0%	13.7%
Satellite Aerial Imagery	7.8%	9.6%	11.3%	10.0%	8.4%
Soil Electrical Conductivity Mapping	5.3%	4.1%	3.0%	4.0%	2.8%
Variable-Rate Pesticide Application	N/A	N/A	N/A	3.0%	2.8%
Electronic Fertilizer Application	N/A	N/A	N/A	4.0%	2.8%
GPS — Implement Auto-Steer	6.9%	8.4%	6.0%	5.0%	2.6%
Remote Sensing	1.1%	2.6%	3.0%	3.0%	1.0%
Drones	2.5%	N/A	N/A	N/A	N/A

GPS — tractor auto-steer (48.4%) and GPS guidance — lightbar (41.7%) are the most popular technologies no-tillers use in their operations.

What tasks do you outsource?						
	2015	2014	2013	2012	2011	5-Year Avg.
Fertilizing	40.1%	35.9%	34.9%	32.0%	33.5%	35.3%
Spraying	29.8%	26.8%	28.4%	25.0%	29.2%	27.8%
Harvesting	16.3%	16.3%	15.8%	12.0%	13.3%	14.7%
Planting	5.5%	5.3%	3.7%	4.0%	4.4%	4.6%

Outsourcing of fertilizing, spraying, harvesting and planting have increased each year since 2011, except for a dip in all categories in 2012.

Do you use irrigation on any of your cropping acres?		
	2015	2014
Yes	14.6%	17.6%
No	85.4%	82.4%

Seeding Data

What brand of corn planter do you use?						
	2015	2014	2013	2012	2011	5-Year Avg.
John Deere	54.4%	48.7%	50.1%	51.3%	54.7%	51.8%
Kinze	22.3%	26.9%	24.2%	26.6%	21.6%	24.3%
Case IH	10.1%	9.8%	9.0%	10.3%	11.2%	10.1%
AGCO/White	11.0%	9.6%	12.0%	9.9%	9.6%	10.4%
Great Plains	N/A	2.5%	N/A	N/A	N/A	2.5%
Others	3.2%	2.5%	2.1%	5.9%	2.9%	3.3%

John Deere easily surpassed all other popular brands of planters used by no-tillers for the last 5 years.

What number of rows do you have on your corn planter?						
	2015	2014	2013	2012	2011	5-Year Avg.
6 Rows	26.0%	24.2%	27.8%	30.8%	30.7%	27.9%
8 Rows	10.4%	10.2%	12.8%	13.1%	9.8%	11.3%
12 Rows	32.7%	32.8%	30.8%	33.8%	30.1%	32.0%
16 Rows	22.1%	24.5%	23.8%	20.9%	16.0%	21.5%
24 Rows	11.9%	10.2%	7.9%	6.4%	6.1%	8.5%
36 Rows	0.8%	2.2%	N/A	N/A	N/A	1.5%
Other	9.6%	N/A	10.5%	7.5%	9.2%	9.2%

Over the last 5 years, on average six and 12 rows were the most common among those surveyed.

What row width (inches) will you use for corn?

	2015	2014	2013	2012	2011	5-Year Avg.
15 inches	5.7%	10.9%	7.9%	6.4%	4.3%	7.0%
20 inches	4.7%	3.7%	2.5%	2.9%	2.9%	3.3%
22 inches	1.2%	0.8%	0.7%	1.2%	0.4%	0.9%
30 inches	90.9%	88.3%	91.0%	89.1%	87.8%	89.4%
36 inches	8.9%	3.9%	3.8%	5.4%	4.1%	5.2%
Other	3.7%	N/A	3.6%	2.3%	2.9%	3.1%

Nearly all (89.4%) no-till farmers have planted 30-inch crop rows on average, which easily surpassed all other row widths utilized by this group.

Do you plant twin rows?

	2015	2014	2013	3-Year Avg.
Yes	3.6%	3.3%	3.7%	3.5%
No	96.4%	96.7%	96.3%	96.5%

According to *No-Till Farmer's* 2015 survey, twin-row planting is utilized by just 3.6% of no-till farmers.

What is your corn planting population?

2014	31,268
2013	31,267
2012	31,103
2011	30,736
2010	30,535

Corn seed populations have remained steady over the last 2 years, but continue to gradually increase.

What corn hybrids and seed brands will you plant in 2015?

Corn Hybrids		Seed Corn	
Roundup Ready	84.7%	**Pioneer**	46.1%
Conventional	19.5%	**DeKalb**	32.5%
LibertyLink	17.2%	**Syngenta Seeds**	20.2%
CRW Trait	50.0%	**Mycogen Seeds**	6.7%
ECB Trait	47.4%	**1 other seed brand**	37.0%
Other	2.7%	**2 or more other seed brands**	23.7%

U.S. no-till farmers plan to use Roundup Ready (84.7%) corn hybrids and Pioneer (46.1%) seed corn the most in 2015.

What equipment do you use to seed soybeans:

	2015	2014	2013	2012	2011	5-Year Avg.
Planter	50.9%	47.9%	50.2%	47.9%	46.2%	48.6%
Drill	24.8%	25.9%	33.9%	33.4%	34.1%	30.4%
Both	12.8%	18.3%	15.9%	18.7%	19.7%	17.1%
Air Seeder	11.5%	7.9%	N/A	N/A	N/A	9.7%

In 2015, the number of no-tillers surveyed using planters (50.9%) is double that of no-tiller using drills (24.8%).

What brand planter, drill or air seeder do you use for soybeans?

	2015	2014	2013	2012	2011	5-Year Avg.
John Deere	51.4%	50.3%	51.2%	55.3%	47.0%	51.0%
Kinze	16.5%	18.7%	18.2%	22.0%	17.2%	18.5%
Great Plains	7.3%	9.1%	10.6%	7.8%	12.3%	9.4%
Case IH	10.7%	8.8%	7.2%	9.9%	7.5%	8.8%
Sunflower	N/A	2.7%	1.1%	3.3%	2.6%	2.4%
White/AGCO	8.6%	5.4%	N/A	N/A	N/A	7.0%
Crustbuster	2.1%	1.6%	N/A	N/A	N/A	1.9%
Other	3.4%	3.5%%	10.5%	14.1%	13.4%	9.0%

John Deere planters, drills and/or air seeders have been the most-often used brand for planting soybeans on average over the last 5 years.

What is the width (feet) of the drill or air seeder you use for soybeans?

	2015	2014	2013	2012	2011	5-Year Avg.
10 feet	9.3%	9.8%	8.2%	13.5%	15.4%	11.2%
15 feet	36.3%	46.2%	47.2%	66.8%	44.2%	48.1%
20 feet	12.1%	11.9%	15.7%	19.7%	6.0%	13.1%
30 feet	19.1%	16.1%	N/A	N/A	N/A	17.6%
40 feet	14.9%	9.3%	N/A	N/A	N/A	12.1%
Other	8.4%	6.8%	34.3%	N/A	34.5%	21.0%

Overall, no-tillers most often utilize 15-foot wide drills (48.1%) for seeding soybeans.

What is the soybean seeding rate you will use with your drill or air seeder?

2015	160,231
2014	162,854
2013	164,894
2012	163,795
2011	168,585

The soybean seeding rate has consistently decreased over the last 5 years, except for a slight increase in 2013.

If you use a planter for soybeans, what will be your row spacing?

	2015	2014	2013	2012	2011	5-Year Avg.
15 inches	52.4%	53.9%	44.6%	49.3%	44.9%	49.0%
20 inches	5.7%	4.1%	3.6%	5.3%	4.8%	4.7%
30 inches	41.9%	42.0%	43.9%	45.4%	43.3%	43.3%
Other	N/A	N/A	7.9%	N/A	7.0%	7.5%

Nearly all no-till soybeans are planted in either 15- or 30-inch rows.

What will be your soybean seeding rate with the planter?

2015	147,193
2014	151,105
2013	146,997
2012	147,486
2011	148,205

Soybean seeds per acre seeded with a planter increased in 2014 before conintuing to decline in 2015.

What soybean varieties and brands will you plant in 2015?

Soybean Varieties		Soybean Brands	
Roundup Ready	90.8%	**Pioneer**	41.5%
Conventional	9.2%	**Asgrow**	30.1%
LibertyLink	10.8%	**Mycogen Seeds**	3.9%
Other	0.8%	**NK**	20.0%
		1 other seed brand	38.6%
		2 or more other seed brands	20.5%

When it comes to soybean varieties, Roundup Ready clearly dominates, while Pioneer is the soybean brand most often used by U.S. no-till farmers.

Weed Control Practices

Do you use glyphosate for weed control?

	2015	2014
Yes	97.7%	97.8%
No	2.3%	2.2%

Almost all no-tillers surveyed over the last 2 years have used glyphosate for weed control.

Do you use any of the following?

	2015	2014
Atrazine	75.0%	74.6%
2,4-D	75.5%	79.9%
Other residuals/contacts	76.7%	75.8%

All three categories were almost evenly used in 2014 and 2015 for weed control.

Percentage of growers who applied insecticide last year to:

	2015	2014
Corn	27.4%	33.7%
Soybeans	28.5%	34.3%
Cereals	21.1%	28.8%

Growers used insecticides less in 2015 on all three crops than in 2014.

If you use glyphosate, when do you apply it?

	2015	2014
Fall burndown	19.5%	27.2%
Spring burndown	71.8%	76.7%
Pre-emergence	25.4%	32.4%
Post-emergence	80.0%	80.9%
Harvest aid	2.8%	2.7%

Post-emergence and spring burndown are the most popular times to use glyphosate among growers surveyed.

If you use chemistries other than glyphosate, do you use them as:

	2015	2014
Tankmix with glyphosate	85.2%	83.9%
Rotate with glyphosate sprays	38.9%	38.5%
Exclusively (no glyphosate on farm)	2.3%	2.2%

The majority of growers (85.2%) who use chemistires other than glyphosate use them as tankmix with glyphosate.

How much glyphosate will you apply this year?

	2015	2014
More than last year	5.7%	5.8%
Same as last year	73.9%	74.3%
Less than last year	20.3%	20.0%

Almost 74% of no-tillers will apply the same amount of glyphosate this year as they did in 2014.

Percentage of growers who applied fungicide last year to:

	2015	2014
Corn	29.1%	34.5%
Soybeans	32.4%	38.3%
Cereals	40.9%	43.7%

Fungicide was applied to cereals (40.9%) most often last year.

Corn Fertilization Practices

When did you or will you make nitrogen applications for the upcoming corn crop?						
	2015	2014	2013	2012	2011	5-Year Avg.
Fall	15.1%	15.3%	17.6%	17.0%	15.2%	16.0%
Spring pre-plant	43.9%	43.1%	38.5%	40.0%	38.5%	40.8%
At-plant	63.4%	64.0%	62.5%	62.5%	61.9%	62.9%
Sidedress	64.4%	66.6%	60.9%	63.7%	58.1%	62.7%
Foliar	14.4%	12.8%	15.4%	15.0%	9.6%	13.4%

Nitrogen application for corn is most often done during planting or as a sidedress operation.

What forms of nitrogen will you use for the upcoming corn crop?						
	2015	2014	2013	2012	2011	5-Year Avg.
28%	50.9%	51.3%	52.7%	47.0%	50.0%	50.4%
32%	31.8%	32.9%	31.1%	31.9%	28.9%	31.3%
Anhydrous Ammonia	27.8%	29.8%	24.3%	28.5%	23.2%	26.7%
Urea	23.8%	21.8%	22.3%	24.5%	22.8%	23.0%
Ammonium Sulfate	28.0%	26.6%	30.9%	26.8%	20.9%	26.6%
Ammonium Nitrate	3.5%	5.2%	4.4%	5.0%	5.1%	4.6%

More than half of nitrogen applied to corn is a 28% blend.

Do you use nitrification inhibitors/nitrogen stabilizers?		
	2015	2014
Yes	64.8%	60.5%
No	35.2%	39.5%

Most growers (64.8%) surveyed use nitrification inhibitors/nitrogen stabilizers.

How much nitrogen do you plan to apply vs. your targeted yields for corn?

	2015	2014	2013	2012	2011	5-Year Avg.
Less than 0.8 lb./bu.	12.0%	11.1%	15.3%	14.9%	13.4%	13.3%
0.8-0.99 lb./bu.	45.8%	45.4%	45.7%	46.2%	45.3%	45.7%
1.0-1.2 lb./bu.	39.3%	40.9%	36.8%	36.1%	38.8%	38.4%
More than 1.2 lb./bu.	3.0%	2.6%	2.2%	2.7%	2.6%	2.6%

More no-tillers are applying less than 1 pound of nitrogen vs. their targeted yield goal.

When did you or will you make phosphorus applications for the upcoming corn crop?

	2015	2014	2013	2012	2011	5-Year Avg.
Fall	36.3%	34.7%	40.8%	41.1%	38.7%	38.3%
Spring pre-plant	36.9%	40.8%	39.3%	38.5%	32.2%	37.5%
At-plant	53.1%	55.7%	49.3%	54.0%	56.2%	53.7%
Sidedress	2.7%	2.7%	3.0%	1.9%	2.9%	2.6%
Foliar	4.2%	2.9%	4.4%	3.4%	4.0%	3.8%
None	6.7%	N/A	N/A	N/A	N/A	6.7%

A little more than half of no-tillers apply phosphorus to corn at planting, but spring pre-plant and fall applications are also popular.

When did you or will you make potassium applications for the upcoming corn crop?

	2015	2014	2013	2012	2011	5-Year Avg.
Fall	41.2%	42.2%	44.9%	43.3%	43.8%	43.1%
Spring pre-plant	47.1%	52.1%	42.1%	48.0%	39.7%	45.8%
At-plant	36.1%	32.6%	33.5%	37.3%	37.3%	35.4%
Sidedress	3.9%	4.0%	3.4%	3.3%	3.6%	3.6%
Foliar	4.5%	4.0%	5.6%	3.3%	4.5%	4.4%
None	11.2%	N/A	N/A	N/A	N/A	11.2%

No-till farmers apply potassium to their corn crop at various times with the most prevalent on average over 5 years being in spring pre-plant.

Will you apply any of the following fertilizers for the upcoming soybean crop?

	2015	2014	2013	2012	2011	5-Year Avg.
Nitrogen	26.7%	36.4%	30.3%	32.8%	30.4%	31.3%
Phosphorus	60.0%	76.7%	72.6%	72.3%	72.0%	70.7%
Potassium	67.5%	81.8%	79.6%	76.8%	79.6%	77.1%
Micronutrients	39.5%	51.8%	N/A	N/A	N/A	45.7%
None	19.4%	N/A	N/A	N/A	N/A	19.4%

Potassium and phosphorous remain the most popular fertilizers, though all categories of fertilizer slipped below the average in 2015.

When will you apply fertilizer for the upcoming soybean crop?

	2015	2014	2013	2012	2011	5-Year Avg.
Fall	31.9%	35.9%	38.2%	39.4%	35.6%	36.2%
Spring pre-plant	49.2%	53.8%	44.5%	46.5%	46.5%	48.1%
At-plant	24.6%	23.1%	27.0%	24.3%	25.0%	24.8%
Sidedress	2.9%	3.4%	2.0%	1.9%	1.9%	2.4%
Foliar	22.0%	24.1%	25.9%	23.5%	22.9%	23.7%

No-till soybean growers most often fertilize in the spring prior to planting.

Will you use inoculants for your soybeans?

	2015	2014	2013	2012	2011	5-Year Avg.
Yes	74.5%	78.6%	82.5%	82.3%	66.2%	76.8%
No	23.5%	21.4%	17.5%	17.7%	33.8%	22.8%

Over 75% of no-till producers have utilized inoculants with soybeans on average over the last 5 years.

General Fertilization Practices

Did you apply lime last year?				
	2015	2014	2013	3-Year Avg.
Yes	44.3%	45.2%	47.9%	45.8%
No	55.7%	54.8%	52.1%	54.2

More than half of no-till farmers did not apply lime in the past year.

If you applied lime last year, what type did you apply?						
	2015	2014	2013	2012	2011	5-Year Avg.
Dolomitic	47.1%	46.6%	45.6%	38.3%	46.7%	44.9%
Calcitic	55.0%	56.1%	53.6%	50.8%	50.0%	53.1%
Other	10.1%	5.3%	8.0%	10.9%	11.9%	9.2%

Of the no-tillers surveyed who applied lime last year, more than half used calcitic lime.

What micronutrients did you apply to your cropping acreage last year?						
	2015	2014	2013	2012	2011	5-Year Avg.
Sulfur	70.0%	69.1%	69.3%	66.5%	60.4%	67.1%
Zinc	63.3%	63.6%	62.0%	60.4%	53.2%	60.5%
Boron	41.5%	38.8%	34.6%	32.9%	29.1%	35.4%
Magnesium	19.0%	19.6%	20.7%	25.8%	21.3%	21.3%
Calcium	17.7%	19.6%	20.9%	19.6%	17.5%	19.1%
Manganese	26.2%	28.7%	N/A	N/A	N/A	27.5%
Copper	13.3%	15.3%	13.5%	12.1%	11.8%	13.2%
Molybdenum	10.3%	10.8%	11.5%	8.5%	7.0%	9.6%
Iron	10.1%	11.2%	10.5%	8.1%	6.2%	9.2%
Chloride	4.1%	4.8%	6.1%	3.3%	4.2%	4.5%

No-till farmers utilized a wide variety of micronutrients in their cropping practices, with sulfur and zinc used most often.

Did you apply gypsum last year?						
	2015	2014	2013	2012	2011	5-Year Avg.
Yes	15.1%	15.1%	17.0%	17.7%	13.7%	15.7%
No	84.9%	84.9%	83.0%	82.3%	86.3%	84.3%

Most no-tillers (84.9%) don't apply gypsum.

Did you apply manure last year?						
	2015	2014	2013	2012	2011	5-Year Avg.
Yes	45.4%	44.1%	43.2%	46.8%	33.1%	42.5%
No	54.6%	55.9%	56.8%	53.2%	66.9%	57.5%

On average, almost 43% of no-tillers applied manure to some of their fields during the past 5 years.

What manure source did you apply last year? (percentage of growers who said they applied manure)						
	2015	2014	2013	2012	2011	5-Year Avg.
Cattle	74.2%	73.3%	70.7%	66.7%	64.9%	70.0%
Hogs	25.3%	22.8%	23.6%	25.3%	19.0%	23.2%
Poultry	25.3%	26.7%	27.2%	27.8%	27.0%	26.8%

Cattle manure (74.2%) is used most often by no-till farmers.

Operating Expenses

What do you estimate were your total operating expenses last year?	
2014	$455,981

No-till farmers report that their overall operating expenses declined in 2014 compared to 2013 when they spent $509,708.

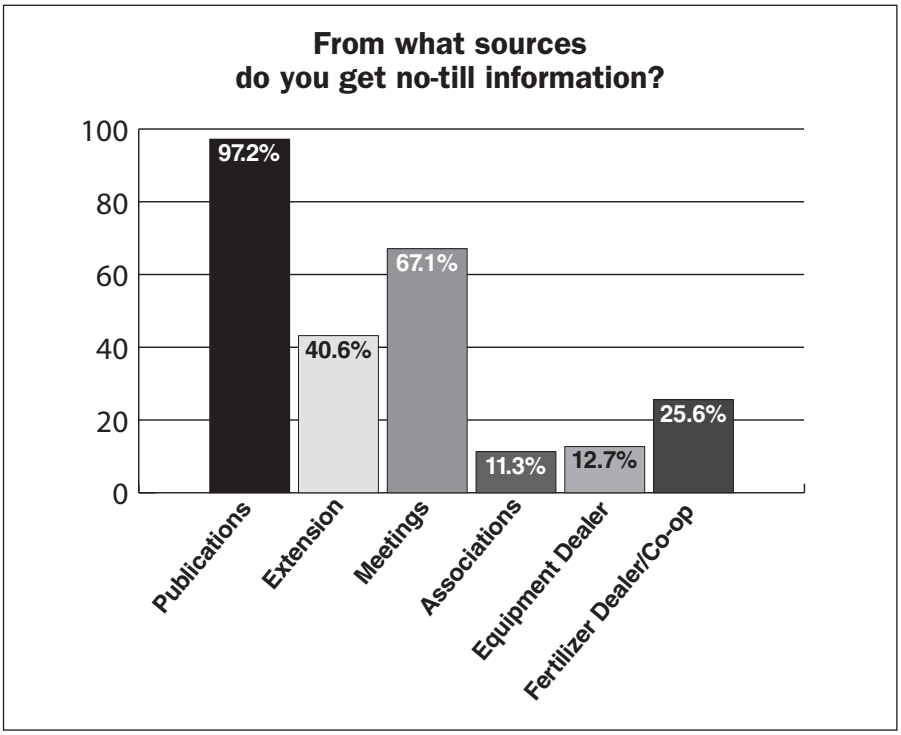
How much do you estimate your entire farming operation spent for the following:

	2014	2013	2012	2011	2010	5-Year Avg.	Estimated 2015 Costs
Fuel	$23,666	$27,813	$23,176	$22,786	$16,872	$22,863	$20,415
Land rent	$69,732	$83,692	$75,534	$77,533	$62,600	$73,818	$70,646
Seed/Seed treatments	$63,139	$69,307	$60,521	$56,464	$47,210	$59,328	$61,831
Pesticides	$38,416	$43,670	$33,706	$29,065	$29,203	$34,812	$37,744
Fertilizer	$85,153	$94,322	$94,713	$86,914	$58,896	$84,000	$80,235
Lime/Soil conditioners	$5,968	$5,989	$10,226	$10,878	$8,468	$8,306	$6,111
Equipment	$64,938	$87,921	$70,900	$71,252	$65,957	$72,194	$42,186
Machinery Service/Parts	$29,617	$31,397	$33,664	$34,450	$30,790	$31,984	$27,164
Crop/Property insurance	$23,790	N/A	N/A	N/A	N/A	$23,790	$23,545
Precision equipment	$3,468	$4,180	$6,839	$8,864	$7,980	$6,266	$2,674
Custom App./Hauling	$8,122	$10,656	$12,860	$13,636	$11,647	$11,384	$8,208
Labor	$25,731	$37,318	$36,897	$41,633	$28,533	$34,022	$27,585
Interest	$14,241	$13,443	$20,572	$19,760	$20,308	$17,665	$13,998
Total	$455,981	$509,708	$479,608	$473,240	$388,464	$461,400	$449,528

Expenses across the board declined in 2014 compared to 2013, moving closer to the 5-year average.

Education & Training

From what sources do you get no-till information?						
	2015	2014	2013	2012	2011	5-Year Avg.
Publications	97.2%	97.3%	96.8%	97.8%	97.8%	97.4%
Extension	40.6%	43.5%	43.2%	36.7%	37.3%	40.3%
Meetings	67.1%	74.2%	70.1%	67.3%	63.1%	68.4%
Associations	11.3%	15.2%	18.8%	15.3%	13.1%	14.7%
Equipment Dealer	12.7%	13.3%	15.0%	13.5%	14.3%	13.8%
Fertilizer Dealer/Co-op	25.6%	27.5%	27.4%	24.3%	23.5%	25.7%



No-till farmers rely most on ag publications and meetings as their major sources of information on no-till farming practices.

Have you ever attended the National No-Tillage Conference?						
	2015	2014	2013	2012	2011	5-Year Avg.
Yes	25.9%	30.4%	34.5%	27.3%	27.1%	29.0%
No	74.1%	69.6%	65.5%	72.7%	72.9%	71.0%

Almost a third of no-till farmers have attended one or more National No-Tillage Conferences.

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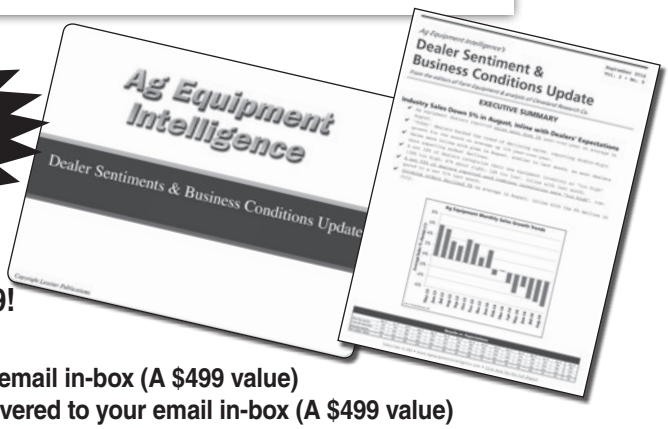

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