

A Cost Comparison of No-Till and Tillage Farms

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Introduction

As shown in AgManager publications GI-2016.4 and GI-2016.5, farms practicing 100% no-till tend to have both higher yields and greater profitability than farms that practice some level of tillage. There are at least two possible explanations for this. First no-till could be a superior technology that is both higher yielding and also more profitable. Second, no-till producers could be doing a superior management job which would lead to greater yields and profits no matter the technology.

The one part of the no-till and tillage farm comparison that has yet to be addressed is the

comparison of the cost of production of the two systems. Since no-till requires fewer trips across a field and doesn't require a tillage tool, the assumption might be that no-till farms have less equipment costs. However actual machinery ownership vs custom field operations makes the machinery cost analysis not as clear as it might seem. In addition, the trade off between chemical weed control and tillage means that it is difficult to predict which system will have the lowest expenses. The cost side of the profit equation might provide some evidence about whether it is the production practice itself or better management that is leading to the greater profitability of no-till farms. Higher production costs could be a result of more intensive management. This article examines the cost of production of no-till and tillage farms to see how some of the expense categories compare.

As in the yield comparison publication, Kansas Farm Management Association farms (KFMA) have been marked as either tillage or no-till farms for at least the last five years. Farms that are labeled no-till farms practice no-till on all their crop acres. Farms that are labeled tillage farms practice some level of tillage

Year	Association ID / Tillage Type					
	North Central		South Central		Northeast	
	No-Till	Tilled	No-Till	Tilled	No-Till	Tilled
2010	69	132	36	194	58	100
2011	66	128	31	175	59	98
2012	62	115	36	166	60	99
2013	63	119	30	125	56	96
2014	72	105	29	140	65	83

Table 1. Number of Farms in Each Category by Region and Year for No-till and Tillage Farms

Year	Association ID / Tillage Type					
	North Central		South Central		Northeast	
	No-Till	Tilled	No-Till	Tilled	No-Till	Tilled
2010	0.7285	0.7934	0.7074	0.7738	0.6912	0.7721
2011	0.6756	0.7471	0.7715	0.8093	0.6499	0.7047
2012	0.7584	0.7419	0.7828	0.7258	0.7818	0.7633
2013	0.7410	0.7294	0.6848	0.7612	0.7453	0.7136
2014	0.8228	0.8365	0.8475	0.9477	0.8146	0.7743

Table 2. Median Total Expense Ratio by Region and Year for No-till and Tillage Farms

during a crop rotation cycle. On a tillage farm, some crops may still be planted no-till. The major distinction though is that tillage farms at some point disturb the soil to grow a crop.

Results

Table 1 provides the number of farms that were used in the analysis for the three regions of the state with enough data to compare tillage practices. Table 2 shows the median total expense ratio by region and year for no-till and tillage farms. The total expense ratio is computed by dividing accrual expenses (cash costs, accrual cost adjustments by the value of farm production. This ratio measures the ability of a farm to generate enough revenue to cover expenses. Normally, a lower ratio is preferred but there may be instances where a farm can increase this ratio and still earn higher net farm income (i.e., an extra expense that generates more revenue than the expense will raise NFI and in some instances raise the total expense ratio).

As shown in Table 2, there is no clear pattern for the total expense ratio. In 2010 and 2011, the total expense ratio was lower for no-till farms in all three regions. However, in 2012, the ratio was higher for no-till farms in all three regions. In the last two years, the ratio advantage was mixed.

Figures 1, 2, and 3, show the average total expenses per acre for no-till and tillage farms by region. No-till farms do have total expenses per acre that are at least the same or greater than tillage farms in every year and region. For the central regions this higher cost appears mostly in years 2012, 2013, and 2014. In the Northeast region, the higher per acre total cost occurs in all five years.

Figures 4, 5, and 6, examine the machinery costs per acre for no-till and tillage farms while Figures 7, 8, and 9 examine the machinery investment (value of machinery on a per acre ba-

sis) for the farms. No-till farms clearly have more machinery assets per acre than tillage farms although by 2014, the tillage farms caught up to the no-till farms. For all farm types, machinery was either added or new machinery purchased during the period from 2010 through 2013. These years also corresponded to higher net farm incomes as well.

The higher levels of machinery assets for no-till farms did not always lead to higher machinery costs as shown in Figures 4, 5, and 6. The South Central region had higher machinery costs for tillage farms while the Northeast region had higher machinery costs for no-till farms. The higher level of machinery assets for no-till farms is from either owning more of the machines needed to produce a crop while tillage farms used more custom operations or the no-till farms simply had newer and/or bigger equipment. Because an examination of the machine hire expenses shows little difference between the farm types, no-till farms likely had newer and/or bigger equipment when compared to tillage farms.

Figure 10 shows the fertilizer expense per acre for the entire state. Although not shown, the three regions showed the same trend as the state numbers. No-till farms consistently had greater fertilizer expenses than did tillage farms.

Conclusions

No-till farms had both higher machinery investments and higher fertilizer use than did tillage farms. These specific higher costs usually led to higher total costs per acre as well. However, the greater expenses were worthwhile as no-till farms had greater profits as well (see AgManager publication GI-2016.5). These higher expenses provide some evidence that no-till farms were managed more intensively than their tillage counterparts.

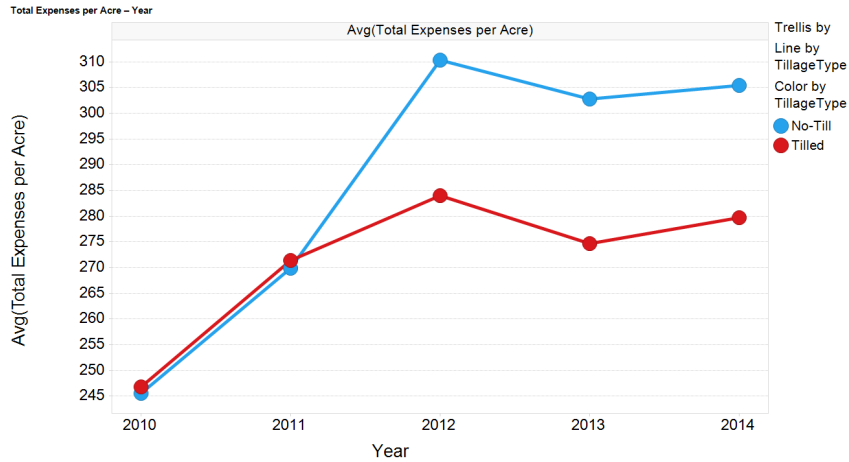


Figure 1. – Comparison of No Till and Tilled Total Expenses per Acres Non-Irrigated Crop Farms – North Central Region

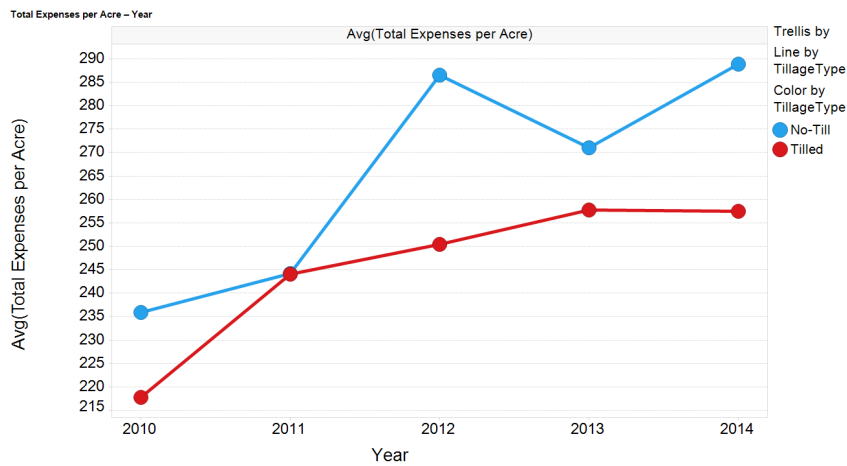


Figure 2. – Comparison of No Till and Tilled Total Expenses per Acres Non-Irrigated Crop Farms – South Central Region

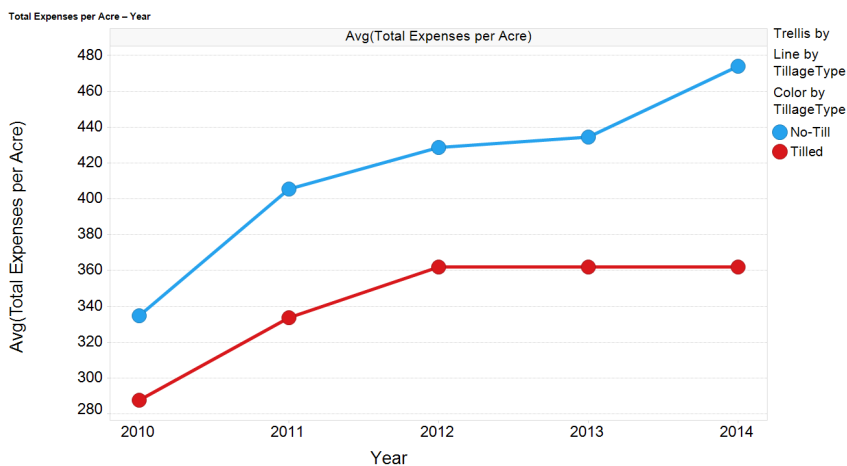


Figure 3. – Comparison of No Till and Tilled Total Expenses per Acre Non-Irrigated Crop Farms – Northeast Region

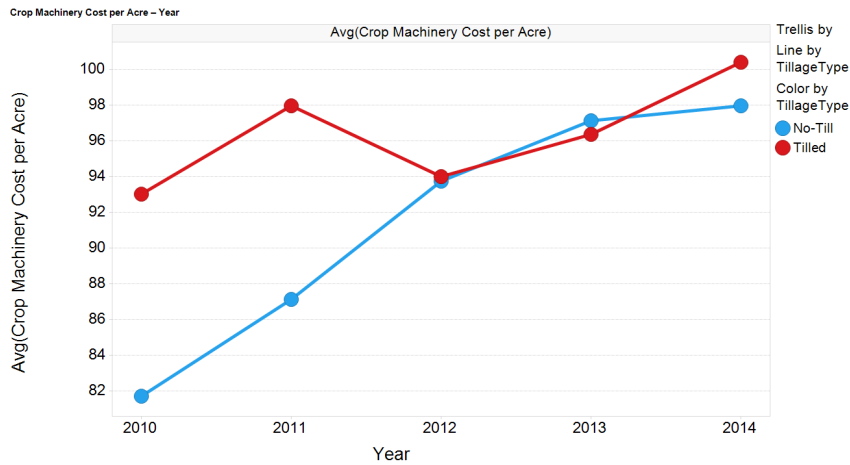


Figure 4. – Comparison of No Till and Tilled Crop Machinery Cost per Acre Non-Irrigated Crop Farms – North Central Region

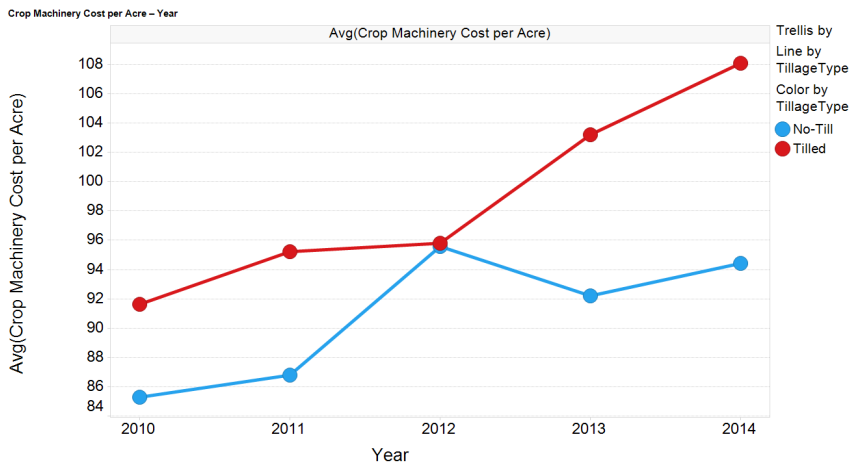


Figure 5. – Comparison of No Till and Tilled Crop Machinery Cost per Acre Non-Irrigated Crop Farms – South Central Region

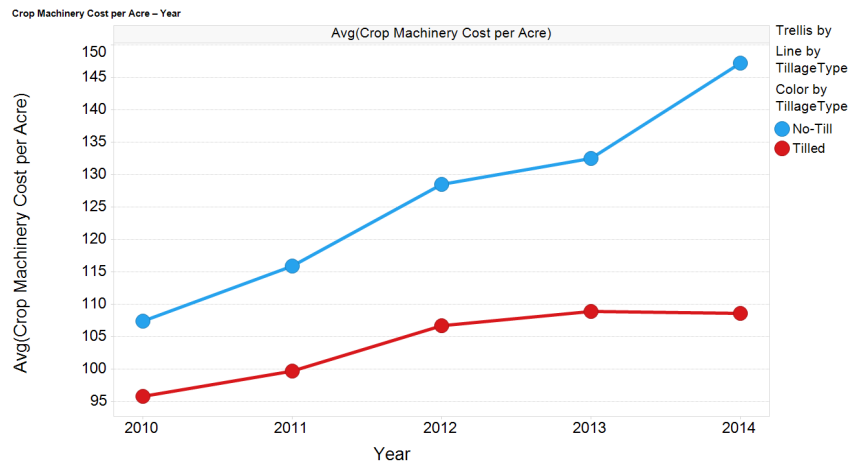


Figure 6. – Comparison of No Till and Tilled Crop Machinery Cost per Acre Non-Irrigated Crop Farms – Northeast Region

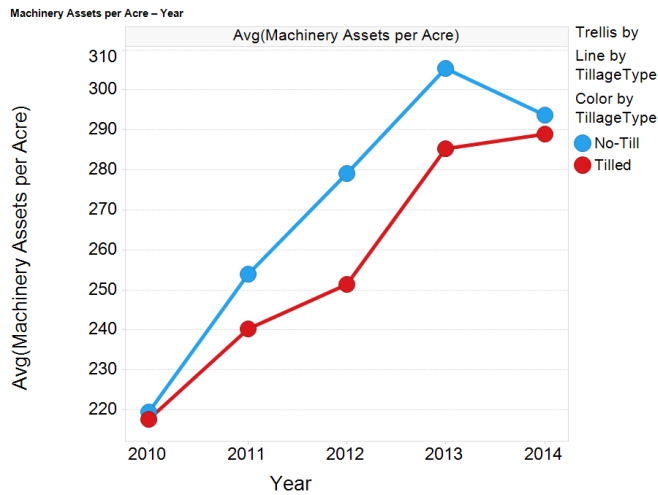


Figure 7. – Comparison of No Till and Tilled Machinery Values per Acre Non-Irrigated Crop Farms – North Central Region

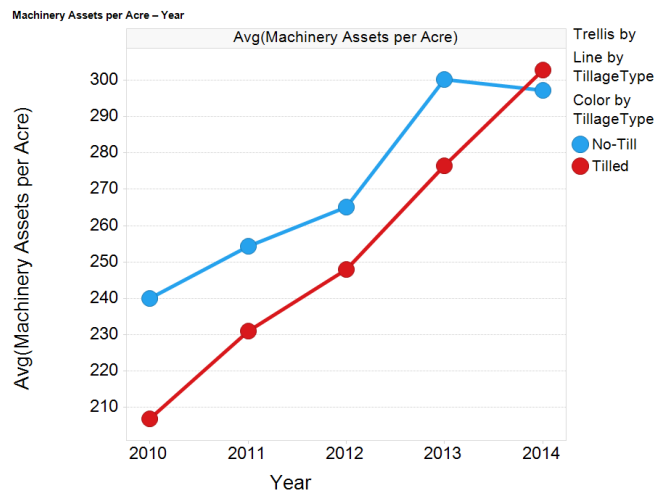


Figure 8. – Comparison of No Till and Tilled Machinery Values per Acre Non-Irrigated Crop Farms – South Central Region

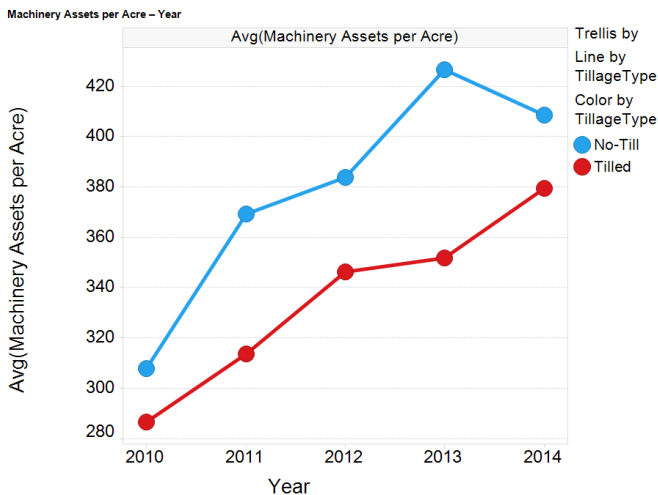


Figure 9. – Comparison of No Till and Tilled Machinery Values per Acre Non-Irrigated Crop Farms – Northeast Region

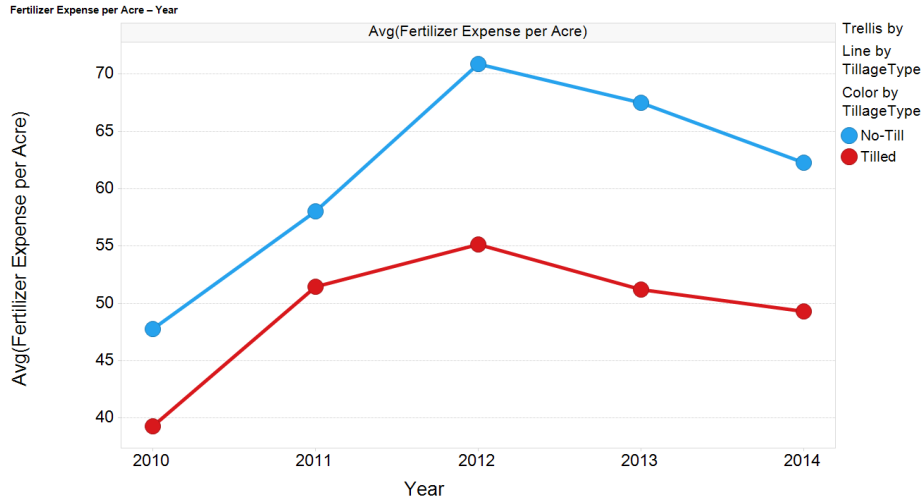


Figure 10. – Comparison of No Till and Tilled Fertilizer Cost per Acre
All Non-Irrigated Crop Farms