

# BARRIERS TO FARMERS ADOPTING NO-TILL/STRIP-TILL PRACTICES IN MINNESOTA

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## Introduction

Tilling practices in the United States have remained similar since the plow was introduced. In some cases, such as the Dust Bowl, tilling land can lead to increased erosion and faster depletion of nutrients in the soil. Conservation agriculture offers alternatives such as no-till or strip-till practices that help with energy and time savings, along with other soil health and environmental benefits. In no-till farming, practitioners leave residues on the fields at harvest where it acts as a mulch to protect the soil from erosion and fosters soil productivity. Strip-till farming is similar to no-till, but uses minor tillage to prepare a narrow seed bed. However, the advantages seen from these tilling practices are based on proper soil conditions, leaving some skeptical of its viability. tilling techniques are not widely adopted among farmers. Why are farmers holding back from adopting these tillage techniques? This paper aims to analyze the barriers for farmers to adopt no-till and strip-till practices through literature analysis and interviews.



No-till field growing soybeans



Strip Till Farming

## Methods

- Literature review examined a brief history of farming to determine how no-till or strip-till practices evolved. Review also evaluated the impact of these practices on crop yield, soil health, economics, and potential limitations.
- Multiple interviews were conducted to gain insight on the practices. Farmers who practice no-till and strip till were interviewed, as well as farmers who do not. Representatives from the Le Sueur County and Stearns County Soil and Water Conservation Districts (SWCD) were interviewed to gain perspectives from agriculture experts. In addition, the University of Minnesota Extension's state tillage expert was also interviewed.

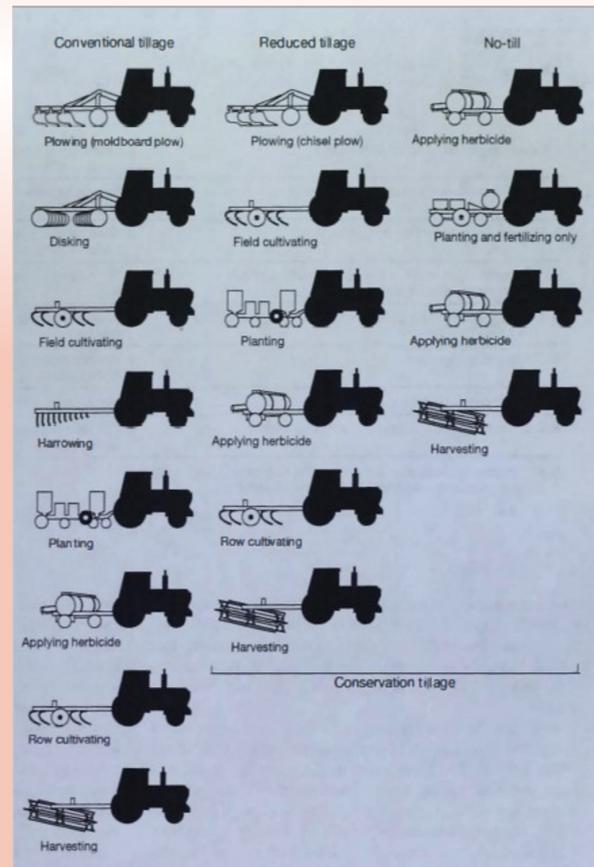


Figure 1. Fuel Cost Comparison

Pearson Learning Studio, *Ecosystems and Natural Resources*, vol. 2

Table 1. Relative comparison of common tillage practices with respect to cost (\$) and soil impact (E).

	1	2	3	4	5	6	7	8	9	10
Moldboard Plow									\$	E
Disk-rip								E	\$	
Zone Till					\$	E				
Chisel Plow								\$	E	
Strip Till			E			\$				
Ridge Till				E				\$		
Disk-harrow						\$			E	
Vertical Till					\$	E				
Field Cultivation			\$				E			
Tandem Disk				\$		E				
No-till	E	\$								

From lowest (1) to highest (10) soil impact due to depth and aggressiveness of tillage pass.

E = structural impact on the soil due to depth and aggressiveness of tillage pass.

\$ = the associated cost of the tillage equipment

Source: Jodi DeJong-Hughes, Aaron Daigh, Upper Midwest Tillage Guide, University of Minnesota Extension

## Benefits of no-till and strip-till:

- Uses significantly less fuel; minimizes GHG emissions in production
- Erosion minimized due to enhanced soil structure with cover crop incorporation
- Less fertilizer applications
- Increased soil organic carbon
- More natural system creating better ecological services
- Cover crops for nitrogen fixation and minimizing erosion

## Barriers for farmers adopting no-till and strip-till practices:

- Social influence was one of the greatest factors limiting this adoption
- Soil type (clay or sandy soils) influences the type of tillage practice used on a farm
- Major learning curve when first adopting this practice
- Often three or more years until soil health benefits start to emerge
- Additional equipment cost
- Disinterests farmers if current practice is already working
- Lack of education
- Livestock fertilizer restrictions and complications

## Conclusion

The goal of this project was to gather information about the barriers limiting farmers to adopt conservation tillage practices that help with increasing soil health, maintaining soil structure, decreasing cost of production in a growing cycle, and reducing GHG emissions in agriculture. No-till and strip-till practices have many benefits that farmers are not utilizing due to misguided views. County SWCD's are trying to educate farmers about these practices, but adopting them is slow. One of the biggest barriers limiting the adopting of this practice is the social influence of neighbors and peers. Some farmers do not want to be the first one's to try something new because of what others may say about it. However, some farmers are still trying it out. To get more farmers to try these two practices, more needs to be done to educate farmers about the benefits no-till and strip-till have on a farm. By educating farmers and showing them that the practice works, the social stipulation towards the practice will change into one that encourages farmers to attempt conservation tillage practices. Every farmers operates on a different field with varying soil types, but these practices are widely adaptable to suit a farmers needs. Le Sueur County SWCD has created incentives such as paying farmers \$30/acre to incorporate cover crops for three years. Programs like this help motivate farmers to try new things.