

Continuous No-till – How It Pays Everyone from the Farm to the City

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Crop production tillage methods are in a stage of transition. Instead of moldboard plowing and turning the soil over the traditional way, farmers across the United States have been reducing and even eliminating tillage trips and adopting various forms of conservation tillage. Minimizing tillage trips saves the farmer time, labor, fuel, equipment, soil, and moisture. Minimizing tillage trips provides society improved water and air quality, improved wildlife habitat, increased water quantity, and fewer farm implements traveling rural roads.

The most efficient and environmentally friendly form of conservation tillage is no-till/strip-till, which has steadily increased in the U.S. over the past fifteen years. In 2004 no-till/strip-till was used on nearly 23 percent of the nation's cropland. In Georgia, no-till/strip-till has grown and is used on over one million acres or on one-third of all acres (2004 National Crop Residue Management Survey, CTIC). However, these numbers only reflect the acres planted to no-till in 2004 and do not reflect the amount of continuous no-till (no tillage for at least five years).

Continuous no-till, when combined with cover crops in the southern U.S., changes and improves several important soil properties; thereby, improving production yields and the environment. Over a period of several years continuous no-till results in increased organic matter in the soils surface, improved aggregate stability, better water infiltration and soil which are more resilient to the erosion process.

Continuous no-till can result in organic matter levels increasing approximately 0.1% per year in top 1-2 inches of the soil profile. Although this may seem like a very small amount, over 5-10 years, it can dramatically affect the way the soil functions. The increase in organic matter causes the soil's aggregate stability to improve and improves the soil's moisture holding capacity. With improved aggregate stability the soil doesn't seal over thus allowing rainfall or irrigation water infiltrates into the soil profile instead of running off. In one southeastern U.S. study, strip-till with a cover crop had two inches of water applied, 95 percent of this water

infiltrated into the soil and there was almost no run-off. In the conventional-tillage plot, about 25 percent of the water infiltrated the ground, so about 1.5 inches ran off. During the cotton growing season, 0.5 inches of moisture in the soil would amount last about three days. With strip-till and a cover crops, it would last about 11 days.

Nebraska recently restricted the amount of water which may be withdrawn for irrigation due to depletion of the water table. The restricted amount of water available means that growers using conventional tillage will not be able to produce their usual corn yields. However, studies have shown that it is possible to raise the typical 200+ bu/ac yield with strip-till and the reduced amount of water available for irrigation.

When no-till/strip-till with a cover crop is managed correctly in the southeastern U.S., yields are as good and frequently better, especially over time. The combination of reduced input costs due to fewer tillage trips and higher yields results in increased profits for the grower. However, the risk of reduced yields in the early years of no-till/strip-till makes some growers reluctant to change from their traditional crop production practice.

The improved soil properties associated with no-till/strip-till also brings benefits to society. Water quality in rivers, lakes and streams is improved as there is less soil erosion and sedimentation, runoff is reduced, phosphorus movement is reduced, and pesticides degrade quicker and are less likely to find their way into waterways. Reducing or eliminating runoff and the associated non-point pollutants is a major advantage for no-till/strip-till as compared to conventional tillage. Although results will vary depending on soil type, crop rotation, length of time in no-till/strip-till, and rainfall intensity, typically the following changes will apply with no-till/strip-till:

- Reduced run-off by 75 percent;
- Reduced sediment loss by 98 percent;
- Reduced nitrogen fertilizer losses in run-off by 95 percent;
- Reduced phosphorus run-off by 92 percent;

- Reduced pesticide losses by 80 percent.

If no-till/strip-till is used by most farmers in a watershed along with needed conservation buffers, pollutants typically associated with conventional agriculture will be drastically reduced or eliminated. Water quality will improve and those involved in fishing, swimming and boating will have a better experience as they enjoy these recreational opportunities. Changes in water quality may even attract visitors by improving the water resources for boating, fishing, eco-tourism and other means to enjoy the outdoors.

Leaving crop residue on the soil's surface and planting cover crops also benefits wildlife. Both game species, such as quail, and non-game species have improved habitat which may increase wildlife numbers if other critical items are present. This can provide increased opportunities for ag and urban hunters and for non-hunting activities such as bird watching.

As more individuals want to experience life in the countryside as opposed to living in cities, conflicts between these individuals and agricultural producers frequently arise. The noise of tractors tilling the soil at night, transporting tillage equipment from field to field, and the odor from livestock are just some of the frequent conflicts which sometimes arise. Although no-till/strip-till can not solve all of these issues, these practices can reduce the potential conflict.

Continuous no-till, when combined with cover crops in the southeastern U.S., has the potential to improve water and air quality and wildlife habitat and also water quantity. This benefits the farming community as well as society.