LAND STEWARDSHIP PROJECT

LSP *Myth Buster* #17

An ongoing Land Stewardship Project series on ag myths & ways of deflating them.

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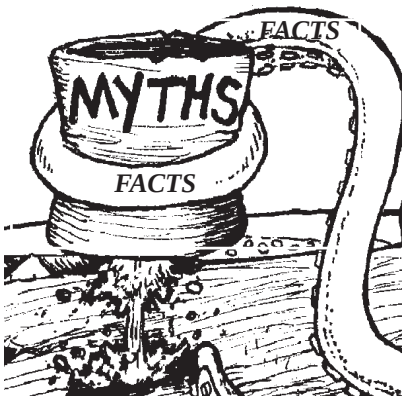
Myth: Conservation tillage reduces global warming by trapping much more carbon in the soil when compared to conventional tillage.

Fact:

It has become the conventional wisdom in recent years that conservation tillage, also called minimum or reduced till, traps significant amounts of carbon in the earth because it disturbs the soil profile (and anything in it) as little as possible. Such sequestering of organic carbon keeps it from being released into the atmosphere where it can contribute to global climate change as carbon dioxide gas, goes this thinking.



This is an exciting proposition, given that some soils in the U.S. have lost 30 percent to 50 percent of the carbon they stored prior to cultivation. The average American produces some 20 tons of carbon dioxide and similar gases annually, four times the world average, according to the *New York Times*. The idea that minimum tillage traps a significant amount of carbon has become so widely accepted that coal-burning utilities are forking over greenbacks to no-till farmers via "emissions-trading" arrangements through the Chicago Climate Exchange.

But a little digging shows no-till isn't as carbon hungry as once thought. In fact, according to an analysis of various studies related to carbon trapping and tillage, no-till systems sequester no more carbon than their tillage-intensive counterparts.

In a commentary published in *Agriculture, Ecosystems and Environment*, scientists John Baker, Tyson Ochsner, Rodney Venterea and Timothy Griffis conclude that a field under conservation tillage stores its carbon in a different place compared to a field that's being plowed. In no-till systems, sequestered carbon is found near the surface, while in conventionally-tilled fields that carbon is deeper down. So in the larger scheme of things, the same amount of carbon is stored, no matter how much tillage occurs.

Does this mean we should junk the strip-till planter and dig the moldboard plow out of the weeds? No. As Baker et al. are quick to point out, conservation tillage produces a lot of positive benefits, including reduced erosion, lower production costs and significant fuel savings (that reduced use of fossil fuel is probably helping reduce greenhouse gas emissions). But it's time to take one item off of the no-till "public good" list. "Though there are other good reasons to use conservation tillage, evidence that it promotes [carbon] sequestration is not compelling," writes Baker and his colleagues.

How did no-till get such a reputation as a carbon catcher? It may be sampling error, pure and simple. Baker and his colleagues found that studies which conclude minimum till sequesters significantly larger amounts of carbon are essentially always based on soil samples taken from depths of around a foot or less, even though crop roots often extend much further. Sure enough, studies that sampled soil beyond a foot found conventional tillage systems stored just as much carbon as their minimum till counterparts.

Don't expect the "no-till sequesters carbon" myth to die a quiet death—too many people and businesses are banking on it being agriculture's answer to global warming. That's too bad, because other farming systems do hold potential for reducing greenhouse gases. Perennial

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This Myth Buster is brought to you by the members and staff of the Land Stewardship Project, a private, nonprofit organization devoted to fostering an ethic of stewardship for farmland and to seeing more successful farmers on the land raising crops and livestock. For more information, call 651-653-0618 or visit www.landstewardshipproject.org.

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plant systems, such as pasture grass, sequester a lot of carbon. As perennial systems that cover the land year-round have been switched to annual crops, the loss of carbon has been tremendous, no matter what tillage system is being used.

And Baker's field research shows that cover crops —low-value crops planted to protect the soil between the harvest and planting of more financially lucrative crops like corn and soybeans—hold great potential for trapping greenhouse gases. Cover crops such as winter rye are planted in the fall, providing important ground cover and the kind of biological activity that ties up carbon during those times of the year—late fall and early spring—when corn and soybean fields are usually bare. As an added benefit, cover crops cut erosion and can help preserve soil moisture.

A recent paper co-authored by Edward Nater, head of the University of Minnesota's Department of Soil, Water and Climate, concludes that, "Although only limited data are currently available, they strongly suggest that cover crops have the potential to dramatically increase the potential of the corn-soybean system to sequester carbon in Minnesota."

That news needs to get out to those staffers at the USDA's Natural Resources Conservation Service who are failing to recognize the benefits of resource-conserving crop rotations when writing up Conservation Security Program contracts.

More Information

◆ To read the commentary, "Tillage and soil carbon—What do we really know?," see http://cnmp.unl.edu/Jan%2024%20Inservice/2006%20AEE%20Baker%20tillage%20and%20soil%20C%20sequestration.pdf.

◆ A summary of John Baker's study on cover crops and carbon sequestration is at http://a-c-s.confex.com/a-c-s/usda/techprogram/P29411.HTM.

◆ Edward Nater's paper (written with Megan Lennon), "Biophysical Aspects of Terrestrial Carbon Sequestration in Minnesota," is available at http://wrc.umn.edu/outreach/carbon/whitepapers/biophysical.pdf.