

# No-till farming helps capture snow and soil water

August 30 2012, by Ann Perry

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Wheat stubble left standing by no-till management helps generate a smoother snow cover, which boosts dryland crop productivity in the summer, according to new ARS research. Photo courtesy of Exactrix™ Global Systems

A smooth blanket of snow in the winter can help boost dryland crop productivity in the summer, and no-till management is one way to ensure that blanket coverage, according to U.S. Department of Agriculture (USDA) research.

Agricultural Research Service (ARS) soil scientist David Huggins conducted studies to determine how standing crop residues affect [snow accumulation](#) and [soil water](#) levels across entire fields. ARS is USDA's chief intramural scientific research agency, and this work supports the USDA priority of responding to climate change.

Huggins, who works at the ARS Land Management and Water Conservation Research Unit in Pullman, Wash., carried out this investigation on two neighboring farms. Both farms have the hilly topography typical of the Palouse region in eastern Washington. But much of one farm has been under continuous no-till management since 1999, while the fields on the other farm were conventionally tilled.

For two years, [snow](#) depths, density and soil water storage were measured manually at hundreds of points across the fields on both farms. Residue height at data collection points was also measured on the no-till fields.

Huggins found that standing wheat residue on the no-till farm significantly increased the amount and uniformity of snow cover across the entire field. Snow depths on the no-till field ranged from 4 to 39 inches, with an average depth of 11 inches, while snow depths on the conventionally tilled field ranged from 0 to 56 inches, with an average depth of 8.5 inches.

The snow distribution pattern on the no-till farm made soil water distribution more uniform and increased soil water recharge rates there. The more uniform snow distribution under no-till was particularly apparent for ridge tops and steep south-facing slopes where there was typically 4 to 8 inches more snow than on conventionally tilled fields.

Huggins calculated that the greater storage of soil water in no-till systems could increase winter wheat yield potential by 13 bushels per acre on ridge tops, six bushels per acre on south facing slopes, and three bushels per acre in valleys. As a result, regional farmers could increase their winter wheat profits by an average of \$30 per acre and as much as \$54 per ridge-top acre.

Producers affected by the 2012 drought might also benefit from using

no-till to increase the amount and uniformity of snow cover on their fields. This would increase soil water recharge rates and soil moisture storage, which would facilitate the return of drought-stricken fields to their former productivity.

Results from this work were published in 2011 in *Transactions of the ASABE*.

Provided by United States Department of Agriculture

Citation: No-till farming helps capture snow and soil water (2012, August 30) retrieved 26 April 2024 from <https://phys.org/news/2012-08-no-till-farming-capture-soil.html>

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