

Can Windbreaks Increase Crop Yields?

Study reveals mixed results on windbreak impact.



Arlen Klassen of Minnesota plants green ash as a windbreak.

Besides other benefits, do windbreaks increase yields of nearby crops? Maybe. Maybe not.

While a 1988 study indicates windbreaks increase yield as much as 12% in the dry Great Plains, farmers and a Minnesota agency decided to do their own study with new GPS yield-monitoring technology. Results from the two-year study of farms with established windbreaks indicate mixed changes – from reduced yields to 9.7% increases.

The wide ranges in yield reflect the variables in the study, says Gary Wyatt, University of Minnesota Extension educator, who coordinated the research as part of a Minnesota Department of Agriculture sustainable grants program. Windbreaks had different sizes and species of trees and shrubs. Though most of the soils were clay, the quality of the land varied. And, of course, weather always plays a big part in yields.

Overall, the study resulted with

recommendations for people considering adding windbreaks to their property.

The Landowners

The target area was southern and southwestern Minnesota, where strong winds commonly blow topsoil and snow off large soybean fields and cornfields.

Wind erosion isn't a big issue on the slightly hilly, clay land where he farms, says Arlen Klassen, Mountain Lake, Minnesota, one of the six study participants. But heavy rains can cause water erosion. He plants corn and soybeans on a rented 160-acre field that has 40-foot-tall ash trees and some poplar trees planted around the perimeter and down the middle.

Prior to the study, Klassen realized yields were decreased near the trees. Through the study's monitoring, he learned that corn yields were 9.7% above the field average from 90 to 270 feet on the south side of the windbreak in 2006. Yields were 5.7% higher on the north

side. The highest yields were at 178 feet on the south and 170 feet on the north.

For Nathan Hesse, Comfrey, Minnesota, nearly a half-mile-long row of 10-year-old honeysuckle trees effectively stops the snow from piling up on the highway next to his land.

"Honeysuckle is really fast-growing and is good for protection," Hesse says, "and the trees don't have big limbs that spread out to catch equipment."

Hesse says he can't judge whether his windbreak has a positive effect on crop yields, however, because when the highway was redone, topsoil was removed, which left poor clay soil.

Dennis Carlson of Trimont, Minnesota, had a few fields also with clay-type soil in the study that indicated a wide range of yield variations from -7% to +7%. As a longtime corn and soybean farmer, Carlson believes there are too many variables to obtain concrete results. He plants 25 different numbers of corn from two companies, for





example, which makes it difficult to determine an average yield.

Tall poplar windbreaks shade the north side of the field, so it takes longer for the soil to warm up. Large ash trees take more moisture out of the ground. Fertilizer differences, like the hog manure he spreads near one windbreak, also affected yields. Finally, weather is a big factor. During years with adequate rain, he says he didn't notice any reduced yield effect next to windbreaks.

Yield increases or not, Carlson sees big benefits in planting windbreaks. "To me it just beautifies the area so much," he says. "Field windbreaks make a night-and-day difference in driving and safety. They also attract deer; so much wildlife ends up in our tree lines."

Recommendations

Regardless of the type of windbreak and soil, yields were consistently low next to the windbreak. In general, Wyatt says yields peaked about 150 feet from the windbreak, then leveled off to the field average. While Klassen recorded the biggest gain, 2% and 5% increases were more typical 30 to 300 feet from the windbreak. The yields also varied on both sides of the windbreak.

While the south side of a windbreak typically warms up faster, the north side often fares better during a drought because of shading and wind protection.



above: Minnesota study reveals that the impact of windbreaks varies based on a number of contributing factors.
left: Nathan Hesse, another Minnesota farmer, creates a living snow fence with honeysuckle shrubs.

"We noticed shorter plants and reduced yields on the south side of east/west tree and shrub plantings, and taller plants and increased yields on the north side," Wyatt says. "Factors affecting yields were very site-specific."

Soil type, topography, and weather conditions affected yield, making it difficult to come up with comparable data. Yield increases with windbreaks were not as dramatic in Minnesota as they were in previous Great Plains studies. But Wyatt hopes that doesn't discourage farmers from planting them.

"Although this study did not show consistent yield increases or increases as great as found in drier parts of the country, we feel plantings are justified, especially when the multiple benefits of snow capture, soil and water conservation, snow protection on roadways, wildlife, and rural aesthetics are taken into consideration," Wyatt says.

He adds that there might be cost-share funds available through local FSA, NRCS, or conservation district offices. And landowners should see if their property is eligible for current CRP and EQIP programs.

"Producers need to be good stewards of the land in protecting our precious natural resources like soil, air, water, and wildlife," Wyatt says. "Planting well-designed windbreaks or living snow fences with site-appropriate native grasses/forbs, trees, and shrubs can provide multiple benefits in protecting our resources. Bioenergy uses may become another important benefit from these plantings in the future." □

Learn More

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