

Agriculture and Climate Change in Minnesota

Climate change is a worldwide problem that is already affecting Minnesota. In the coming decades, Minnesota may experience warmer temperatures and wetter weather due to climate change. To reduce the impacts of climate change, Minnesota has set a goal to reduce greenhouse gas emissions by 80% by 2050, but we are behind schedule.

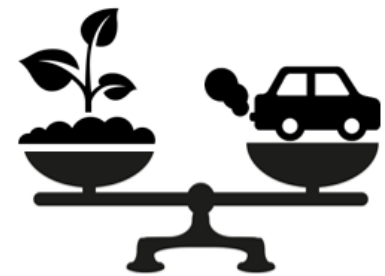
Agriculture accounts for approximately one-quarter of Minnesota's greenhouse gas emissions, so strategies to reduce emissions from this sector are critical to reaching statewide goals. In addition to greenhouse gas reduction benefits, some strategies may help farmers maintain soil health and reduce erosion, which will help them adapt to warmer and wetter climate conditions. A new technical report estimates the impact of 21 different agriculture best practices on greenhouse gas emissions.



What do we know?

Many Minnesota farmers already implement best management practices like planting shelterbelt trees and reducing tilling to protect soil health and water quality. Agriculture creates greenhouse gas emissions, but through best practices, it can reduce emissions or even remove greenhouse gasses from the atmosphere and be part of our climate solution.

This report quantifies the climate co-benefits of certain agricultural practices based on existing research. The report estimates greenhouse gas reductions for 21 agricultural best management practices. The emission reductions per acre range are small, but implementing best management practices across the 20 million acres of Minnesota cropland could reduce overall agriculture emissions by 5-10%.



Twenty-five acres of cover crops remove as much atmospheric carbon as taking one car off the road!

What does it mean for Minnesota?

Agricultural practices that protect our water and our soil can also help reduce greenhouse gas emissions and protect our climate. This report provides evidence for practices that have the strongest climate co-benefits. Minnesota should support farmers with funding and technical assistance to implement these practices. Widespread implementation of these practices will be good for farmers, good for Minnesota's water quality, and good for the global environment.

Early adopters of these practices are already making a difference. Water and soil conservation programs from the Board of Water and Soil Resources have reduced cropland agriculture emissions by 600,000 tons per year, approximately 1% of cropland emissions. This report could help focus future work to achieve water quality, soil health, and greenhouse gas reduction goals statewide.

What impact can agricultural best practices make?

Some agricultural practices are more effective than others at reducing greenhouse gases. Practices that take land out of agricultural production have the highest reductions per acre, but may not be widely implemented. Cropping and fertilizer changes may achieve smaller emission reductions per acre, but could be implemented on millions of acres while maintaining or improving agricultural production. Three practices are highlighted below.



Riparian Grass Buffers

Riparian grass buffers are already required for lakes, rivers, streams, and public ditches in Minnesota. Grass buffers help filter out phosphorous, nitrogen and sediment and protect water quality. This report estimates that riparian grass buffers reduce greenhouse gas emissions by 0.77 tons/acre.



Cover Crops

Cover crops are planted in the fall after harvest and grow slowly through the winter. The crops capture excess soil nutrients and are plowed under in the spring. The most common cover crop in Minnesota is cereal rye. Winter cover cropping can reduce greenhouse gas emissions by 0.20 tons/acre.



Biochar

Biochar is charcoal produced from crop residues. When placed in soil, it can improve soil fertility and reduce greenhouse gas emissions by 1.23 tons/acre. Biochar is a relatively new technique with limited field research, so this estimate is preliminary and will be updated as more research is available.

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