EXECUTIVE SUMMARY

Less Fertilizer, Better Outcomes

USDA Conservation Programs Benefit Both Farmers and the Planet

HIGHLIGHTS

Every year, US farmers apply between 30 and 50 percent more synthetic nitrogen fertilizer than their crops can actually absorb, and the excess that runs off farm fields does harm to people, ecosystems, and the climate.

Voluntary conservation programs administered by the US Department of Agriculture offer scientifically proven ways for farmers to break this cycle of fertilizer dependency, but they are not sufficiently funded to meet demand, and disadvantaged farmers often can't afford the upfront investment. The next food and farm bill should make these programs accessible to more farmers, and prioritize practices that improve soil health without chemicals—which will also reduce the emissions that drive climate change.

The United States has a serious fertilizer overuse problem. Every year, producers apply millions of metric tons (MMTs) of synthetic fertilizers to agricultural farmland—for example, about 11.62 MMT of nitrogen fertilizer were used on US crops in 2023. Research shows that as much as 30 to 50 percent of applied nitrogen fertilizer is in excess of what crops can use, leading to enormous waste. The new Union of Concerned Scientists (UCS) report *Less Fertilizer, Better Outcomes: USDA Conservation Programs Benefit Both Farmers and the Planet* estimates that an excess of 3.5 to 5.8 MMT of synthetic nitrogen fertilizer was applied to US crops in 2023. How does fertilizer overuse hurt farmers and the environment?

- Synthetic fertilizers are expensive, costing farmers approximately $35.8 billion in 2023, according to the United States Department of Agriculture (USDA).
- Fertilizer overapplication leading to wasted fertilizer is thus costly for farmers, increasingly so as fertilizer prices rise.
- Excess nitrogen that is not absorbed by crops seeps into the surrounding environment, including bodies of water, and has harmful impacts on the environment and the health of people living in rural communities. Unabsorbed nitrogen fertilizer also transforms into heat-trapping gases, including nitrous oxide (N_2O) and carbon dioxide (CO_2), which travel into the atmosphere. N_2O is 273 times more powerful than CO_2 in capturing heat.
- In 2023, nitrogen fertilizer overapplication was responsible for emitting an estimated 36 to 60 MMT of heat-trapping gas, equal to the emissions from up to 14 million gasoline-powered cars driven for a year (see Figure ES-1).

USDA Programs Can Help, but They Need Strong Funding

To break the cycle of fertilizer dependency, producers need strong alternatives so they can move away from fertilizer practices that deplete soil health. Voluntary conservation programs administered by the USDA such as the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP) provide financial and technical assistance to producers to implement conservation practices such as cover crops, buffer strips, restored wetlands, and managed grazing that help keep nutrients in place and build long-term soil health. These programs are backed by decades of scientific evidence and farmer experience, providing farmers confidence that implementing these practices will have measurable environmental health benefits.

Currently, demand for USDA conservation programs far exceeds the funding and resources available to support them. Socially disadvantaged producers, including farmers of color and those who run small- and medium-sized farms, have even more difficulty accessing conservation programs because these programs often require upfront investments, with producers being reimbursed a portion of the total cost they incur.

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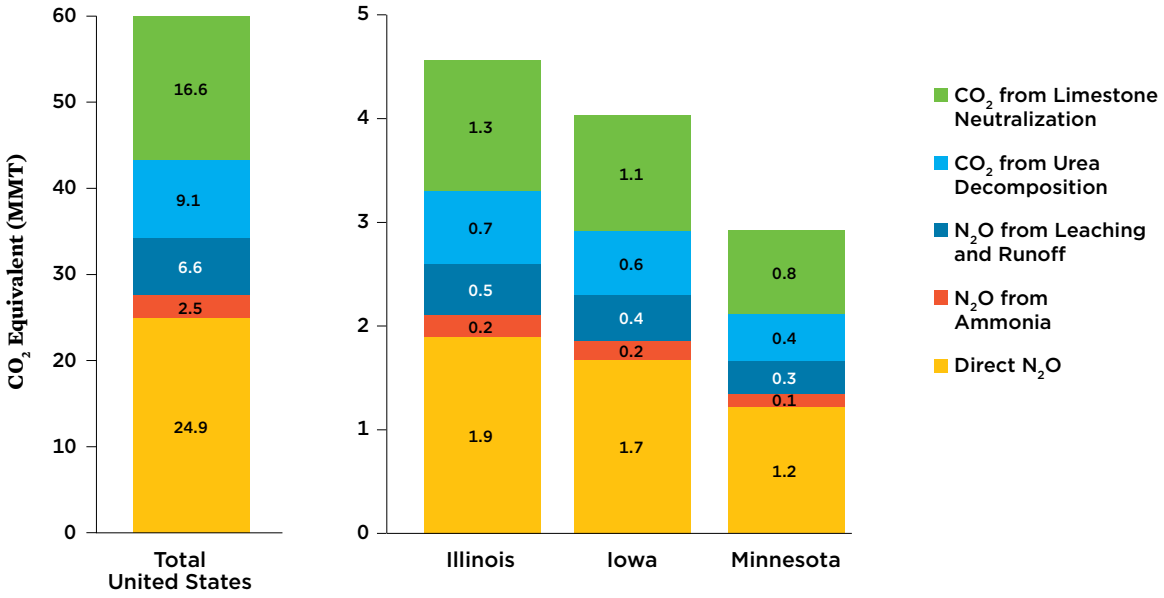
FIGURE ES-1. Emissions from Excess Applied Nitrogen Fertilizer Assuming 50 Percent Nitrogen Use Efficiency (NUE)



Estimated heat-trapping gas emissions (CO_2e) in 2023 attributable to excess nitrogen fertilizer—the portion of applied fertilizer not taken up by crops assuming an NUE of 50 percent. Stacked segments represent five emission pathways. Total excess-fertilizer emissions are estimated between 36 and 60 MMT CO_2e for the United States, and between 1.7 and 4.6 MMT CO_2e for Illinois, Iowa, and Minnesota.

Policy Recommendations

1. UCS recommends that the next food and farm bill supports producers in implementing climate resilience initiatives by increasing funding for CSP, EQIP, and the Sustainable Agriculture Research Program, which awards grants to research and education projects that advance sustainable agriculture knowledge and skills.
2. UCS recommends that CSP and EQIP prioritize practices that improve soil health, reduce emissions of heat-trapping gases, and focus on climate resilience. Our analysis finds that these conservation programs not only have the potential to boost rural economies but also play a critical role in reducing heat-trapping emissions.
3. Making voluntary federal conservation programs accessible to more producers is an important step. However, it is also critical to transition away from the current monopolistic model of agriculture that values corporate profits over people and the environment. We need to diversify farming operations by integrating livestock and adopting an agroecological approach in our food and farm system. Congress and the USDA should support producers in adopting farming practices that build soil health, replenish nutrients without harmful agrichemicals, clean water and air, protect soil biodiversity, and build resilience to extreme weather and other climate change impacts. These steps can help protect the environment and improve economic and environmental outcomes for producers.

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www.ucs.org/resources/less-fertilizer-better-outcomes

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