

# Tools that will help reduce nitrogen pollution

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A U.S. Department of Agriculture (USDA) soil scientist in Colorado is helping farmers grow crops with less nitrogen-based fertilizer.

The fertilizers are a major reason why agriculture is a significant source of both [greenhouse gas emissions](#) and pollution in estuaries like the Gulf of Mexico and the [Chesapeake Bay](#). If growers apply too little fertilizer, it reduces [crop yields](#). But if they apply too much, the excess can be released into the atmosphere as nitrous oxide or leach into waterways as nitrate.

Jorge Delgado, with the Agricultural Research Service (ARS) Soil Plant Nutrient Research Unit in Fort Collins, Colo., conducts research to help growers determine exactly how much nitrogen to apply to a field, when to apply it and what alternatives might work best. The right approach can vary from one location to the next and one crop to the next.

ARS is USDA's principal intramural scientific research agency, and this research supports the USDA priorities of responding to climate change and promoting agricultural sustainability.

Delgado helped develop a tool designed for fledgling "environmental trading" credit programs that reward growers for reducing nitrogen losses. Known as the "Nitrogen Trading Tool" (NTT), it can be used to determine how much a proposed management practice may be able to reduce nitrogen losses, and how much "trading credit" could be earned by switching to it.

The concept of trading nitrogen credits is in its formative stages, but efforts have been established in Pennsylvania and Ohio, with municipalities and state environmental agencies in several states and watersheds studying the concept.

Delgado has distributed the NTT and other tools to hundreds of users, including farmers, agribusinesses, scientists, extension agents, state and federal agencies and international users. He also has used them to convince growers to improve soil-management practices by using [conservation tillage](#), [crop rotation](#) and [cover crops](#) such as wheat, rye and other grasses. Such practices not only prevent nitrates from leaching into waterways, but prevent soils from eroding and keep carbon and nutrients sequestered in the soil.

Delgado also has published a peer-reviewed report in *Advances in Agronomy* showing how the NTT may be used to calculate the potential for nitrogen trading on a Virginia no-till operation, an Ohio farm where manure is applied, and irrigated barley and potato fields in Colorado. His efforts to reduce nitrogen losses in Mexico also have been published in the journal *Terra Latinoamerica*.

**More information:** Read more about this research in the September 2011 issue of *Agricultural Research* magazine.

[www.ars.usda.gov/is/AR/archive...p11/nitrogen0911.htm](http://www.ars.usda.gov/is/AR/archive...p11/nitrogen0911.htm)

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