

## Creating self-fertilizing crops to help address climate change

Roughly a quarter of greenhouse gas (GHG) emissions in the United States are a product of agriculture. Fertilizer production and use accounts for one third of those emissions and includes nitrous oxide, which has heat-trapping capacity 298-fold stronger than carbon dioxide, according to a 2018 *Frontiers in Plant Science* study.

Most artificial fertilizer production also consumes huge quantities of natural gas and uses minerals mined from nonrenewable resources. After all that, much of the nitrogen fertilizer becomes runoff that pollutes local waterways. For those reasons, this Climate Grand Challenges flagship project aims to greatly reduce use of human-made fertilizers.

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One tantalizing approach is to cultivate cereal crop plants — which account for about 75 percent of global food production — capable of drawing nitrogen from metabolic interactions with bacteria in the soil. Whitehead Institute’s [Weng](#) leads an effort to do just that: genetically bioengineer crops such as corn, rice, and wheat to, essentially, create their own fertilizer through a symbiotic relationship with nitrogen-fixing microbes.

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While the project is complex and technically challenging, its potential is staggering. “Focusing on corn alone, this could reduce the production and use of nitrogen fertilizer by 160,000 tons,” Weng notes. “And it could halve the related emissions of nitrous oxide gas.”

[This is an excerpt. Read the original post here](#)