

Are GMOs necessary to feed the world?

Beginning in 1944, geneticist and plant pathologist [Norman Borlaug](#) led an initiative called the Cooperative Wheat Research and Production Program, which developed disease-resistant wheat varieties in Mexico. The research launched a period of dramatic growth in agricultural production that became known as the “[Green Revolution](#).” Borlaug’s work increased food production so much in fact that [a billion people](#) in Latin America, the Middle East and Africa avoided starvation.

Trying to build on the Green Revolution, proponents of crop biotechnology have noted that GMOs, which have been shown to increase yields over organic conventional farming by 15-40%, could help bring a [Green Revolution to Africa](#) and other parts of the developing world.

Anti-GMO activists have caricatured this argument as part of their broader strategy of demonizing crop biotechnology. “One of the most often touted benefits of GMOs is that they are essential to feed the world’s growing population,” the organic-supporting advocacy group [Green America](#) posts on its website. “Claims that GMOs will ‘feed the world’ don’t hold up,” [Environmental Working Group](#), a nonprofit funded by the organic food industry, posts.

It’s a strawman argument, however. No scientist claims that GMOs by themselves can ‘feed the world’. GMOs have been shown to increase crop yields over both conventional and organic agriculture and use less synthetic chemical inputs than non-GMO conventional farming. GMOs are one tool among many. More importantly, [estimates indicate](#) that we are farming approximately half of the available land on earth suitable for growing food, and almost all of the prime arable land. Very little of the prime land exists in the developing world, meaning biotechnology will be key in producing crops that can grow in less fertile soil.



Mischaracterizing the supplemental but key role biotechnology plays in producing more food at lower costs allows anti-GMO advocates to promote the alleged benefits of organic farming. [Green America:](#)

In order to sustainability produce the food we will need, we must support . agroecological methods of

farming . agroecology seeks ways to enhance agricultural systems by mimicking natural processes, thus creating beneficial biological interactions and synergies among the components of the agroecosystem.

But this promotion of agroecology ignores the large body of evidence that confirms biotechnology's role in producing more food. An [April 2018 analysis](#) of 6,000 studies, covering 21 years of data, concluded that genetic engineering increased corn yields by 25 percent, and provided more nutritious food as an added benefit. The classic meta-analysis on this controversy, an [independent study from 2014](#), found:

On average, GM technology adoption has reduced chemical pesticide use by 37%, increased crop yields by 22%, and increased farmer profits by 68%. Yield gains and pesticide reductions are larger for insect-resistant crops than for herbicide-tolerant crops. Yield and profit gains are higher in developing countries than in developed countries.

In contrast, the farming methods advocated by Green America, EWG and other anti-GMO advocacy groups require more land, according to a [2018 study](#), published in *Nature*. [Summing up the findings](#), study co-author, University of Sheffield researcher David Edwards:

Organic [farming] systems are often considered to be far more environmentally friendly than conventional farming, but our work suggested the opposite. By using more land to produce the same yield, organic may ultimately accrue larger environmental costs.

Biotechnology critics maintain that food insecurity is mostly a political and economic crisis. "Hunger is the result of distribution and infrastructure problems, and it won't be eliminated by growing . GMOs," organic advocacy group [Just Label It](#) writes on its website.

That's simplistic, maintains the World Health Organization (WHO). It says improving infrastructure is only one step on the way to establishing food security. As the Organization for Economic Co-Operation and Development (OECD) [explains](#), yield-boosting biotech crops have been widely adopted in many parts of the developing world, though infrastructure in these countries is still lacking. The WHO agrees, [pointing out that](#) developing a "sustainable variety of crops" is also needed to address world hunger.

Building [better infrastructure](#) to distribute food is an important food security issue but only indirectly related to the controversy over the pros and cons of crop biotechnology. The economic growth that will finance investment in infrastructure is underway in many developing countries, but the climb out of poverty is still slow and uncertain.

[According to the World Bank](#), market reforms cut the "1990 poverty rate in half by 2010." But gradual economic growth and agroecology aren't viable solutions for developing countries where food demands are growing dramatically, and their farmers whose crops are threatened by pests.