Viewpoint: GM drought-tolerant crops: Here is one biotech innovation that only anti-GMO science rejectionists can demonize

If you think biotech crops have some role to play in fighting global hunger, the Non-GMO Project is here to set you straight. [Recently,] the "non-profit," which makes a killing by affixing its deceptive butterfly logo to everything from salt to green beans [1], tweeted this:

> *We hear again and again that #GMOs are necessary to feed a growing population on a warming planet, but does the evidence hold up? Not exactly. This #ClimateWeek, we're bringing back a blog that busts some of biotech's biggest and greenwashiest claims.*

The tweet linked to a blog post titled How useful are GMOs on a warming planet? Middling and its argument boils down to this: climate change is making earth less hospitable to agriculture as droughts increase in frequency and intensity. Developing countries will suffer the worst effects of these changes. Lots of money has been invested in drought-tolerant crops, yet these projects have yielded unimpressive results. Therefore, GMOs don't help feed the world—checkmate, Monsanto! [2]

We should correct two errors in the project's argument. First, no agricultural scientist believes GMOs will "feed the world." This is a caricature invented by environmental groups. What most experts say is that enhancing the crops we grow has a documented history of boosting food production. This effort must continue as the populations of developing countries expand in the coming years.

Second, efforts to develop drought-tolerant crops have been quite successful; in fact, they nicely illustrate the progress that can be achieved when scientists are allowed to do their jobs.

Drought-tolerant crops work

According to the Non-GMO Project:

> *In recent decades, a truly dizzying amount of money has been spent under the banners of philanthropy and international aid. Programs such as AGRA (A Green Revolution for Africa) offer hybrid seeds and fertilizers, while WEMA (Water Efficient Maize for Africa project) supplies high-yielding corn (or maize) seed and, more recently, GMOs. Despite these and other programs, success remains elusive.*

Incorrect. According to the Consultative Group for International Agricultural Research (CGIAR), more than 100 drought-tolerant maize varieties have been released in 13 African countries since 2006. Field trials showed that these crops can increase yields by as much as 35 percent. Two million farmers in sub-Saharan Africa currently grow these maize varieties, and the results thus far have been impressive:

Farmers are reporting yields 20–30% above what they would have gotten with their traditional varieties, even under moderate drought conditions. If farmers continue to adopt the technology, the project has the potential to reap nearly USD 1 billion in benefits to farmers and consumers.

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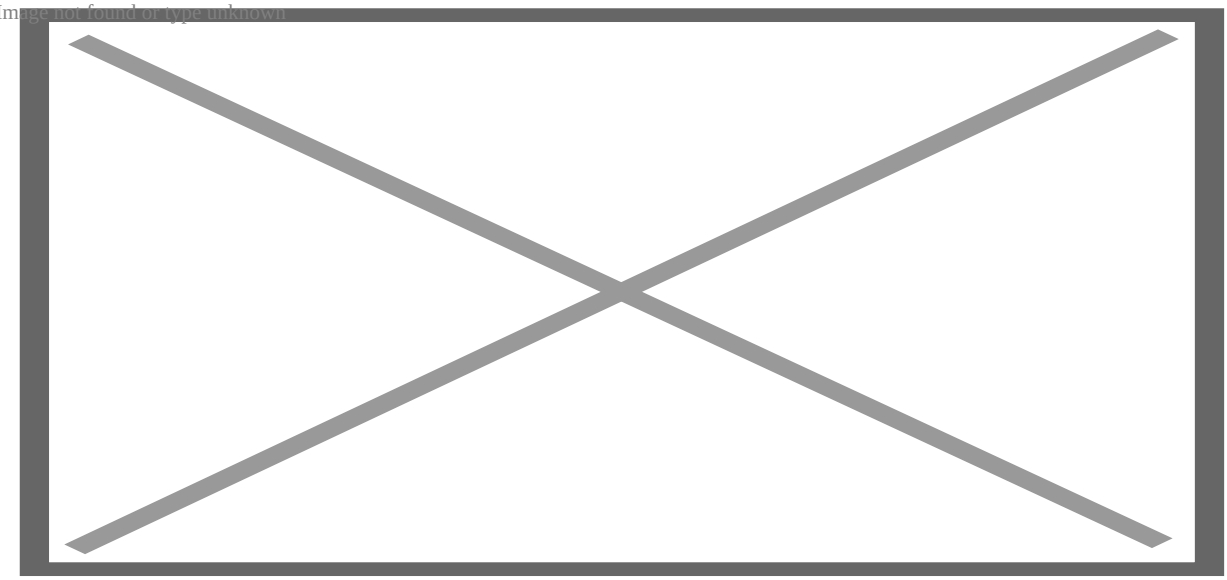

Credit: CGIAR

Needless to say, this result is about as far away from “middling” as you can get. More farmers could be growing drought-tolerant varieties, but these yield increases translate into greater profits and improved living standards for some of the poorest people in the world. According to one study conducted in Zimbabwe:

DT [drought tolerant] maize seeds gives an extra income of US $240/ha [hectare] or more than nine months of food at no additional cost. This has huge implications in curbing food insecurity and simultaneously saving huge amounts of resources at the household and national levels …

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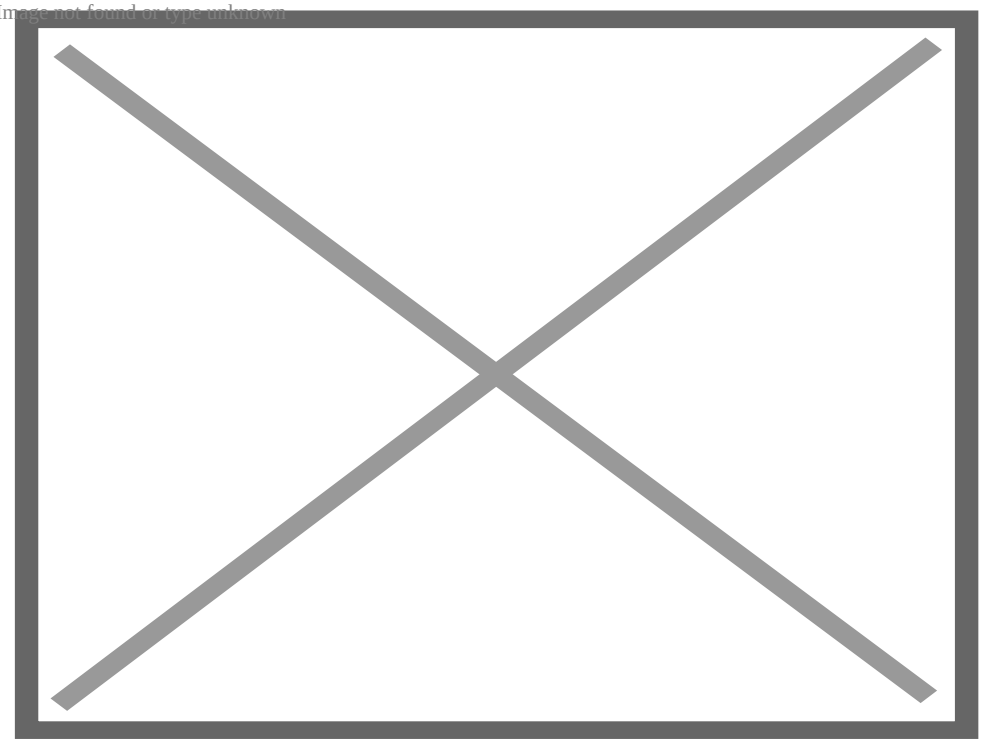

Kernel density estimates of drought tolerant (dashed lines) and non drought tolerant (solid line). It may not seem like much on the graph but it adds up. Credit: Lunduka et. al.

Are GMOs useless?

The rest of the Non-GMO Project’s case looks quite weak in light of this information, but we’ll press on nonetheless:

> *Adaptations to stressors such as drought are generally complex traits … Genetic modification operates at the level of a single gene or possibly a few genes, making it a poor tool for this particular job.*

This is one of the reasons we need to employ all plant-breeding techniques. They are unique tools with different strengths and weaknesses. Researchers use the tool best suited to develop the specific crop trait farmers need in a given context.

Still, since several countries have approved ‘GMO’ drought-tolerant soy, wheat, and corn, it’s fair to say that the project is mistaken about the utility of genetic engineering. Their blog post was published before

most of these crop varieties were approved, but it was still foolish to bet against plant breeders in these cases. Since the middle of the 20th century, GMO or not, high-yielding crop varieties have boosted food production by 40 percent. Steady increases in crop productivity are the rule, in other words. Critics of biotechnology continue to bet on the exception.

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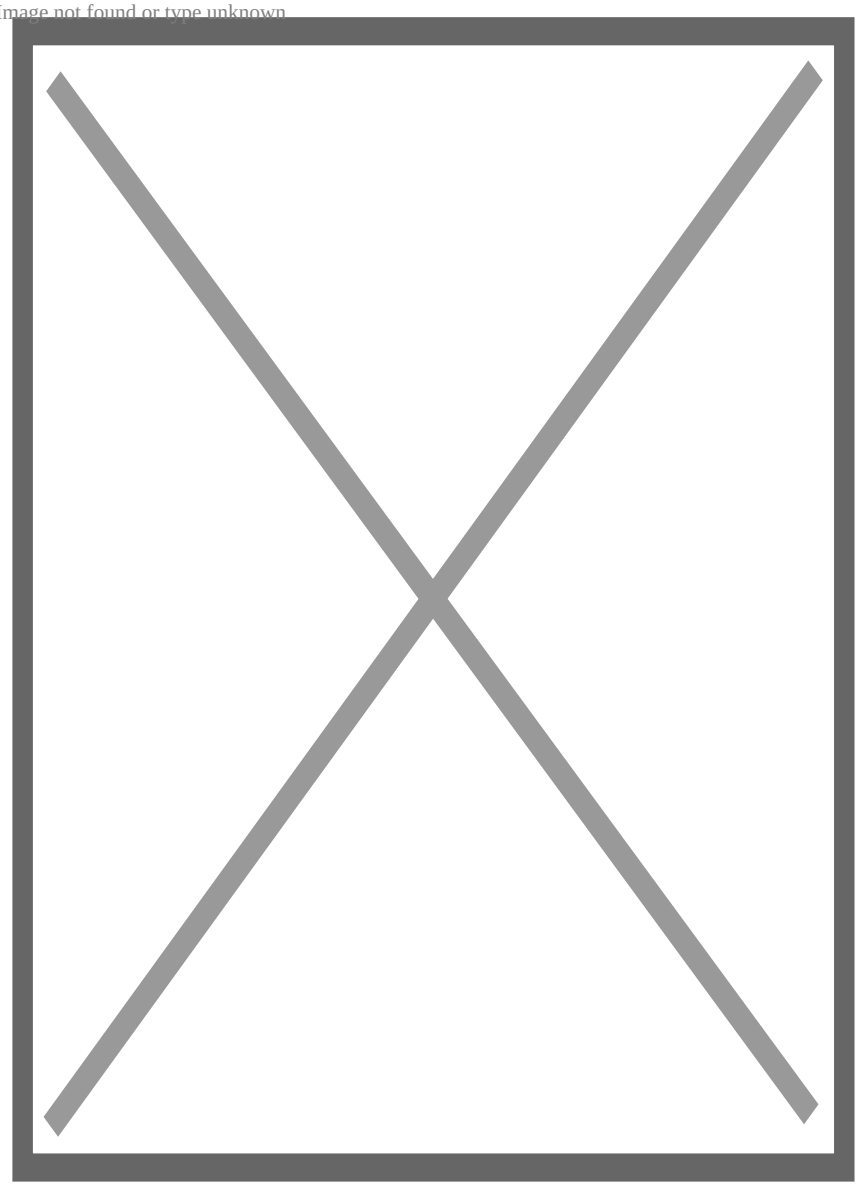

A tall wheat landrace (left) and a modern high yielding cultivar (right). Credit: Voss-Fels et. al.

A final thought about GMOs

There's another indirect but significant benefit that comes with planting genetically engineered crops: they're often paired with herbicides that reduce or eliminate tillage, used to control weeds. GE crops

therefore help promote soil health. And healthy soils “better capture and retain rain or irrigation water, and more effectively buffer nutrient supplies,” The Genetic Literacy Project noted in July. Might be useful to a farmer with limited access to irrigation, no?

Naturally, the Non-GMO Project and its allies have only complained about these herbicide-tolerant crops, alleging that they allow farmers to “douse” their fields in chemicals. That’s false, of course. Crop-protection chemicals are used rather sparingly. But if we’re not going to utilize all the technologies at our disposal, what does the project see as the solution?

> *We believe that the best solutions are based on local and Indigenous knowledge, evolving with the participation of small farmers. These solutions emerge with deep respect for the social and economic impacts of both action and inaction, they prioritize equity and autonomy, and they value food sovereignty over profit.*

Clear away the social justice lingo, and you can see what the project is really saying: smallholder farmers should employ growing techniques that are as old as agriculture itself. This doesn’t preserve “indigenous knowledge” or promote “equity,” it just traps billions of people in crippling poverty—who, by the way, want access to GE crops. Growers in developing countries routinely utilize enhanced seeds their governments have banned. This is partly because some smallholder farmers see technological advances as God’s appointed means of providing for them, as my colleague Dr. Chuck Dinerstein explained recently.

If the Non-GMO Project truly cared about the opinions of poor farmers, they’d wholeheartedly endorse the technology these growers want to use. But that won’t happen. The project’s lucrative business model hinges on the myth that biotech crops are uniquely harmful. Because they value *their* ill-gotten profits over food sovereignty, they will continue to lie to the public. Shame on them.

Notes:

[1] Salt has no DNA, and there are no “GMO” green beans on the market. The project certifies many products that can’t be or haven’t been genetically engineered. You can also find the butterfly logo on items that are made from genetically engineered ingredients. [2] Bayer purchased Monsanto several years ago. Still, the activists refer to Monsanto in their anti-GMO and anti-pesticide commentary.

Cameron English is a writer, editor and co-host of the Science Facts and Fallacies Podcast. Before joining ACSH, he was managing editor at the Genetic Literacy Project, a nonprofit committed to aiding the public, media, and policymakers by promoting science literacy. You can visit Cameron’s website here

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