

With glyphosate-cancer legal battles poised to escalate, what are the ramifications for agriculture if the herbicide is restricted?

Now that a jury in San Francisco [has decided](#) that exposure to Monsanto's herbicide Roundup (glyphosate) was responsible for California groundskeeper Dewayne Johnson's cancer, the movement to restrict the herbicide has been re-energized.

Carey Gillam, director of research at the anti-GMO group U.S. Right to Know, who [worked closely](#) with the lawyers suing Monsanto, [said following the verdict that](#) "It is time for public officials across the globe to act to protect public health and not corporate profits." French President Emmanuel Macron is on record trying to ban it and activists organizations in numerous countries are already attempting to leverage the jury's verdict.

A judge in Brazil recently [suspended the use](#) of the herbicide, pending a review by the nation's agriculture ministry, and Europe may [reassess the costs and benefits of a ban](#) over the next five years. The UK retailer Homebase [is reviewing its sale](#) of the weed killer following the verdict. And depending upon how Bayer's announced appeal plays out (Bayer recently acquired Monsanto) and the fate of numerous glyphosate cancer suits to come, it's not out of the question that manufacturers of generic glyphosate will begin reassessing their potential liability in keeping the herbicide on the market.

The ruling comes despite hundreds of studies that have found that popular weedkiller to be safe as used. Regulatory agencies in every major industrial country have concluded that the herbicide is not carcinogenic. The verdict turned on one contrary finding, by a World Health Organization sub-group known as the International Agency for Research on Cancer (IARC). In May 2015, the agency concluded in a 'hazard' evaluation—which did not take into account exposure—that glyphosate is "probably carcinogenic to humans," putting it in the same category as coffee and salted fish. It was deemed less possibly carcinogenic than alcohol.



Image Credit: IARC

The IARC finding was also challenged by many scientists because of revelations in a [Reuters investigation](#) that the IARC glyphosate document underwent significant editing to remove benign results and to strengthen conclusions that suggested a possible cancer link. Journalist Kate Kelland obtained a draft, which became available as part of the lawsuit against Monsanto, and compared it with the final, published report. She found 10 significant instances in which “a negative conclusion about glyphosate leading to tumors was either deleted or replaced with a neutral or positive one.”

What might be the impact on farming and farmers if glyphosate is restricted or banned?

Experts suggest that severely restricting the herbicide and crops genetically engineered to tolerate it would have important ramifications for farmers. According to a [2016 study](#), GE crops account for about 56% of glyphosate usage. Such a policy shift would cut crop yields, raise food prices and cause severe environmental damage as farmers returned to older methods of weed control.

Food prices have dropped substantially since the introduction of glyphosate-tolerant genetically engineered crops in 1996. According to University of Wyoming weed scientist Andrew Kniss, the herbicide is relatively inexpensive at \$0.66/gallon. This savings is passed on to consumers. University of Saskatchewan agricultural economist [Stuart Smyth points out that](#) “Across North America, the benefit from [glyphosate tolerant] soybeans has been calculated at more than \$3 billion annually through lower food prices.”



Dave Walton

Moreover, farmers use it sparingly—it is not ‘poured on crops’ and farmers do not ‘douse their fields’ as many advocacy websites claim. Farmers use about 16 ounces per acre of land, Iowa corn and soybean farmer [Dave Walton](#) points out. Paired with crops engineered to tolerate glyphosate, farmers have a cost-effective weed control system that has helped boost their yields. In a [study published in December 2017](#), agricultural economist Graham Brookes and his colleagues estimated that this technology contributed “18.6 million tons, 3.1 million tons and 1.44 million tons” to the global production of soybeans, corn and canola, respectively, in 2015.

These gains in crop yields and the resulting lower food prices could be easily undone, however. If restrictions on glyphosate prevented farmers from planting herbicide-tolerant crops. “There would be an annual loss of global farm income gains of \$6.76 billion,” Brookes and his team wrote, “and lower levels of global soybean, corn and canola production equal to [the gains achieved since 1996].”

Resurgence of more toxic herbicides

The use of glyphosate has soared by more than 15-times since its pairing with GE crops in 1996. But overall herbicide use has remained fairly constant and the per acre toxicity of herbicide use has actually gone down over the past 22 years, noted Brookes and his colleagues:

Since 1996, the [total] use of herbicides on [GMO crops] was reduced by 259.3 million kg of active ingredient (a 4.1% reduction) ...” But once a glyphosate ban took effect, “there would be a net increase in the use of herbicides of 8.2 million kg ...

Citing 2014 data from the United States Department of Agriculture (USDA), [Walton similarly explained](#) that the use of glyphosate paired with glyphosate-tolerant crops initiated a significant decrease in the use of more toxic chemicals. “[P]esticide use in the US peaked in 1981, and has trended downward since then,” he wrote. Farmers began using glyphosate on non-GE crops in increasing numbers during the 1980s. “I was able to cut down drastically on the use of far more toxic chemicals and substitute glyphosate, which was also more effective”

If glyphosate were no longer available, there would be a resurgence in the use of older, harsher herbicides as farmers attempted to control weeds in their fields. This list includes far more toxic herbicides like acetachlor, metalachlor, pendimethalin, atrazine, dicamba, and 2,4-D. Kniss highlighted the significance of such a reversion in a 2016 article. Reviewing the data on pesticide use, Kniss [said](#) glyphosate use increased with the introduction of glyphosate-tolerant crops. However:

The chronic toxicity hazard associated with herbicide use decreased in 3 out of 6 crops, while acute toxicity hazard decreased in 5 out of 6 crops. In GE glyphosate-resistant crops, glyphosate accounted for 26% of corn, 43% of soybean, and 45% of cotton herbicide applications. However, due to its relatively low chronic toxicity, glyphosate contributed only 0.1%, 0.3%, and 3.5% of the chronic toxicity hazard in these same crops, respectively.

Acceleration of climate change

Finally, the potential impact of a glyphosate ban on climate change would be considerable. Because the herbicide so effectively controls weeds, farmers began to practice no-till farming en masse in 1974 when glyphosate was first introduced, well before the debut of the first genetically engineered herbicide tolerant crops in the late 1990s.

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Image Credit: LawLex

Before the introduction of glyphosate and other herbicides, farmers had to till their fields with ploughs to eliminate weeds in early spring before planting a new crop. This process, though necessary at the time, “doesn’t do much good for the soil structure,” [Walton said](#). “[I]t speeds up the decomposition of crop residue and soil organic matter. That leads to increases in carbon release from the soil via CO₂.” Plant scientist Steve Savage [added that](#) the widespread adoption of glyphosate was part of a broader effort to make farming more sustainable:

[With] the introduction of herbicides in the 1960s, farmers, equipment companies and chemical companies began to develop ways to grow crops without tillage (no-till). Herbicide tolerant crops greatly enhanced [the] farmer’s ability to adopt these methods [in] the mid 1990s.

There are other implications in the battle to control carbon release, Brookes and his colleagues have [written](#):

[T]here would be additional carbon emissions arising from increased fuel usage and decreased soil carbon [storage], equal to the equivalent of adding 11.77 million cars to the roads Land use changes will arise, with an additional cropping area of 762,000 [hectares], of which 53% derives from new land brought into cropping agriculture, including 167,000 of deforestation. These land use changes are likely to induce the generation of an additional 234,000 million kg of carbon dioxide emissions.

As the world’s population grows, we will need to produce more food on a finite amount of land. Estimates vary, but humans are farming [approximately half](#) of the land on earth that is suitable for growing food, and the land already being used is the most fertile. Our best bet at surmounting this challenge, according to a [July 2018 study](#), is to practice land sparing, or maximizing crop yields per acre of land and leaving natural habitats like rain forests undisturbed. Doing that, however, would require the use of yield-boosting glyphosate-tolerant crops.

If the litigation against Monsanto were to result in further restrictions on glyphosate, it would severely hinder agriculture, Brookes wrote, in an email:

[The herbicide's] replacement will likely result in higher costs of production lower yields [and could also result in the] loss of the benefits of reduced greenhouse gas emissions Overall, it is important to recognize that a restriction or ban on the use of glyphosate will have negative economic and environmental consequences.

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