On behalf of itself and its 970,000 members and supporters, Center for Food Safety appreciates the opportunity to comment on the draft Plant Pest Risk Assessment and draft Environmental Impact Statement that APHIS prepared for Bayer’s maize variety MON 87429, which is genetically engineered for resistance to dicamba, glufosinate, quizalofop and 2,4-dichlorophenoxyacetic acid (2,4-D), with tissue-specific glyphosate resistance.

Center for Food Safety (CFS) is a public interest, nonprofit membership organization with offices in Washington, D.C., San Francisco, California, and Portland, Oregon. CFS’s mission is to empower people, support farmers, and protect the earth from the harmful impacts of industrial agriculture. Through groundbreaking legal, scientific, and grassroots action, CFS protects and promotes the public’s right to safe food and the environment.

For over a decade, CFS has engaged both USDA and EPA in regulatory decision-making with respect to numerous herbicide-resistant (HR) crops and their companion herbicides. This includes comments to APHIS on HR crops resistant to the herbicides at issue with MON 87429. A quarter-century of experience with these crop systems has borne out much of the analysis we have provided and adverse impacts we predicted. Conversely, past APHIS assessments of HR crops have all too often relied excessively on registrant analysis and viewpoints that experience has shown were faulty.

Three years ago, CFS submitted detailed comments on APHIS’s Notice of Intent to Prepare an Environmental Impact Statement on MON 87429. Many issues that we discussed in those comments are either not addressed at all in the draft EIS or draft PPRA, or are treated inadequately. We discuss a few of these issues below.

However, first we comment on the lack of coordination inherent in APHIS’s Preferred Alternative of deregulating MON 87429.

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1 In the docket at APHIS-2020-0021-4125, dated May 28, 2021.
Discoordinated Framework

APHIS includes in the draft EIS boilerplate language that has been recycled numerous times over the past decades regarding the existence of a supposed “Coordinated Framework for the Regulation of Biotechnology” (1-2 to 1-3). However, there has been no productive coordination between APHIS and EPA with respect to herbicide-resistant crop systems like MON 87429, which comprise the majority of commercialized biotech crop acreage. APHIS deregulated dicamba-resistant (DR) soybeans and cotton in 2015, before EPA had had the opportunity to fully assess, much less approve, the dicamba formulations proposed for use on them. This discoordination triggered a rash of dicamba drift episodes due to unlawful use of dicamba on dicamba-resistant crops in 2016, and put tremendous pressure on EPA to rush its assessment process for the proposed over-the-top (OTT) dicamba formulations and approve them despite EPA scientists’ serious concerns about the potential for these putatively “low-volatility” products to volatilize and cause substantial drift injury. EPA felt constrained to approve, in the hopes that the new formulations would be at least a bit less volatile-drift-prone than the older ones, because Monsanto was preparing for a full-scale rollout of dicamba-resistant crops in 2017. EPA’s doubts were justified. XtendiMax and Engenia have caused a majority of the vapor and spray drift damage observed to soybeans and many other crops over the last seven years. If there had been coordination between APHIS and EPA, APHIS could have abstained from deregulating DR crops unless or until EPA had been able to satisfy itself that there was in fact a dicamba formulation that would prove safe for over-the-top use. This illustrates the urgent necessity for APHIS and EPA to overcome their respective regulatory silos and truly coordinate to assess herbicide-resistant crops jointly with the herbicides meant for use with them.

This is not just stale history, but rather highly relevant to MON 87429 today. On February 6th of this year, the District Court of Arizona vacated over-the-top dicamba

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2 See 2021 amicus brief filed by CFS and allied groups regarding the appeal of the Bader Farms case (in which a Missouri peach orchard was devastated by dicamba drift) to the Eighth Circuit Court of Appeals. The brief provides documentation of EPA scientists’ legitimate qualms about the volatility of OTT dicamba formulations, APHIS’s deficient assessment of DR crops, and the need for a systems approach in assessment and regulation of HR crops. [https://www.centerforfoodsafety.org/files/20-3665--nffc-et-al--bader-amicus-final-1_16111.pdf](https://www.centerforfoodsafety.org/files/20-3665--nffc-et-al--bader-amicus-final-1_16111.pdf).

3 For instance, see: Dave Scott, Dicamba Discussion 2017-2019. Power Point presentation, Indiana Pesticide Review Board Meeting, Sept. 26, 2018, slides 15, 26, showing that 92% and 88% of processed dicamba injury complaints in Indiana in 2017 and 2018, respectively, were attributable to approved over-the-top dicamba formulations. [https://oisc.purdue.edu/pesticide/iprb/iprb_155_dicamba_discussion_presentation.pdf](https://oisc.purdue.edu/pesticide/iprb/iprb_155_dicamba_discussion_presentation.pdf).
formulations, the second time a federal court has taken this action, the first being the Ninth Circuit Court of Appeals’ decision in June 2020. Bayer recently applied to EPA for a new registration of a dicamba formulation for use on DR soybeans and cotton; but EPA has indicated it will take 17 months to review this application, which would postpone any decision until the fall of 2025, meaning there would be no approved dicamba formulation for use with dicamba-resistant soybeans or cotton in 2025. And it is possible and perhaps likely that EPA will not register (once again) these “new uses” even then, given how hazardous they have proven to be, in direct contradiction to Monsanto/Bayer’s repeated prevarications and junk regulatory science that falsely presented XtendiMax as safe.

It is also possible and perhaps likely that EPA will not register any new dicamba formulation for use with MON 87429. Thus, APHIS deregulation of MON 87429 would facilitate and invite increased farmer use of dicamba despite the probable absence of any formulation registered for use with it – just what APHIS did with respect to the original Xtend(flex) soybeans and cotton in 2015. And as APHIS states, even assuming EPA does grant a label: “Use of dicamba and 2,4-D based herbicides with MON 87429 corn hybrids would be expected to present the same risks for spray and vapor drift, injury to wild plants, and ornamental plants…” as has occurred with dicamba-resistant soybeans and cotton (Draft EIS, 4-77).

Scope of Dicamba Vapor and Spray Drift Damage
APHIS fails to convey the unprecedented scope of spray and vapor drift injury that dicamba applied over-the-top of resistant crops has caused. Andrew Thostenson, a pesticide program specialist with North Dakota State University Extension, stated, with respect to dicamba drift injury, that: "We are in unprecedented, unchartered territory. We’ve never observed anything on this scale in this country since we’ve been using pesticides in the modern era.” And this is a fair representation of the views of the weed science community.

One example of APHIS downplaying the scope of drift injury is the statement that approximately 4% of soybean fields were damaged by off-target dicamba movement in 2018, based on a USDA survey (ES-11, 4-41). However, APHIS fails to note, first, that that 4% figure

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5 Bill Freese. An herbicide so hazardous that courts have banned it twice. The New Lede, April 4, 2024. https://www.thenewlede.org/2024/04/an-herbicide-so-hazardous-that-courts-have-banned-it-twice/.
corresponds to 4.2 million acres of dicamba-damaged soybean soybeans, which is entirely unprecedented in terms of scope of injury caused by an herbicide. Yet even this is almost certainly an underestimate. APHIS also fails to report that the same survey provided estimates that 10% and 15.4% of fields were injured by dicamba, representing 11.3 and 15.7 million acres, respectively, when the same farmers were asked whether their neighbors or farmers in their county observed dicamba-injured soybeans.8

In short, if cultivation of MON 87429 presents “the same risks” for dicamba drift injury as DR soybeans and cotton, as APHIS states, then deregulation and widespread planting of MON 87429 clearly has the potential to greatly exacerbate dicamba spray and vapor drift damage that is already far beyond any acceptable bounds.

Conflation of Bayer Propaganda with Reality
APHIS appears to take at face value blatantly deceptive assurances by Bayer regarding, for instance, the company’s supposed commitment to stewardship, ensuring their products are “safe and sustainable, that their use is environmentally responsible” (draft EIS, ES-5). Anyone with even a little real-world knowledge of the dicamba debacle of the past seven years would assuredly not quote such corporate propaganda with a straight face. It may well be that the preparers of this EIS, none of whom appear to have any credentials or experience in the relevant fields of agriculture or plant science (draft EIS, 5-1),9 are ignorant of the company’s bad faith. We give one example to illustrate what Bayer-Monsanto’s assurances regarding “product stewardship” are worth.

In 2009, Monsanto had formed a “Dicamba Advisory Council” to help pave the way for introduction of its dicamba-resistant crop system. In the Breakout Notes to a meeting that had taken place on September 28, 2009, Monsanto reported on “issues/opportunities” associated with various stakeholders. As shown below, for stakeholders identified as farmers who “do not see value in the [dicamba-resistance] trait” because he/she “doesn’t have resistance issues,” the challenge is to persuade that grower to “pay for something I don’t need.” This requires Monsanto to “define value through education,” for instance by instructing the grower that dicamba-resistance in soybeans would provide “Protection’ from your neighbor.”

Clearly, Monsanto knew even 7-8 years before the launch of its dicamba system that the herbicide’s volatile nature and long history of causing drift injury would be greatly exacerbated

8 US EPA. Dicamba Use on Genetically Modified Dicamba-Tolerant (DT) Cotton and Soybean: Incidents and Impacts to Users and Non-Users from Proposed Registrations (PC# 100094, 128931), October 26, 2020, Table 8, p. 31.

9 Academic qualifications of the four listed preparers of the EIS include degrees in health care administration, business administration, public health; wildlife biology, fisheries and human dimension in natural resources; marine science and environmental health; and forest science, ecology and evolution.
by over-the-top spraying. But rather than regard such damage as grounds for dropping development (or indeed, never embarking on the dicamba-resistant crop system in the first place), Monsanto saw and still sees a sales opportunity: buy our seed to avoid the damage a dicamba-using neighbor would otherwise wreak upon your soybean crop via drift.

In a similar vein, Monsanto cited “off-target movement” as an issue for “dicamba susceptible growers,” and proposed as one solution an “indemnity fund for crop loss,” but was clearly not eager to be on the hook for such damages, adding “who funds?” Of course, no such fund has ever been established. Instead, dicamba drift victims must either suffer their losses silently, or take the risky and expensive path of suing this agribusiness giant to try and recoup what they can. In any case, this is further evidence that Monsanto foresaw drift injury on a substantial scale, but decided to forge ahead and profit from that damage via defensive adoption.

There are many other such examples to show that Bayer-Monsanto “product stewardship” resembles Mafia extortion more than anything else. We suggest that APHIS take out all references to Bayer’s representations regarding product stewardship, since they are clearly not credible. For the same reason, whatever data Bayer presents in the petition must be carefully scrutinized, because the junk science used to persuade USDA and EPA to approve their
respective pieces of the dicamba crop system (e.g. misrepresenting XtendiMax’s volatility) have been revealed to be entirely unreliable.\textsuperscript{10}

**Conflation of Best Management Practices with Real-World Farmer Practice**

The draft EIS shows practically no understanding of how HR crop systems are deployed in the real world, but instead bases its assessment of MON 87429 on the assumption that best management practices (BMPs) would be deployed, when in fact they are quite frequently not followed by growers. This substitution of ideal-world farming practice for reality leads to vast understatement of the adverse agronomic and environmental impacts of the preferred alternative. It would be as if the National Highway Safety Administration were to project deaths from automobile accidents based on the assumption of perfect compliance with speed limits and other traffic safety laws, rather than on empirical data regarding actual accidents and how people actually drive their cars.

One area where this unjustified BMP-bias vitiates APHIS’s analysis is the issue of herbicide resistant weeds and their management.

**Herbicide-Resistant Weeds**

APHIS’s treatment of herbicide-resistant weeds is unsatisfactory. First, APHIS provided no response to our scoping comments regarding the tremendously enhanced potential for accelerated emergence of dicamba- and 2,4-D-resistant weeds if MON 87429 is deregulated. The arises from the likelihood that many farmers across tens of millions of acres who utilize corn/soybean rotations, and are currently growing Xtend soybeans, would also adopt MON 87429, and spray dicamba year-in, year-out on both crops of their rotations. The same would hold true with respect to current growers of Enlist soybeans who adopt MON 87429 and spray 2,4-D every year on both crops. The transition from every other year use of an auxin to application every year would dramatically increase selection pressure for auxin-resistant weeds, which are already emerging quite rapidly, especially those of the *Amaranthus* genus. It is no surprise that 70% of herbicide-resistant *Amaranthus* weeds globally are found in corn and soybean cropping systems in countries where these crops are mostly herbicide-resistant.\textsuperscript{11}

Instead, APHIS repeats generic BMPs regarding herbicide resistance management strategies such as using a diversity of herbicides, integration of non-chemical control tactics, cover crops, etc., but with no empirical assessment of BMP adoption by growers of comparable, currently grown stacked HR crops, to serve as a guide for assessing how farmers would utilize MON 87429.

\textsuperscript{10} See scoping comments cited in footnote 1 for details and documentation.

One obvious place to look is the EPA, which in 2021 reported that neither dicamba registrants nor growers were implementing effective herbicide resistance management plans with Xtend soybeans and cotton, as evidenced by the failure to apply two effective modes of action to weeds, and spraying dicamba a second time in an attempt to kill weeds that a first dicamba application had not killed; and also by the registrants’ failure to report dicamba-resistant weeds to the EPA, as required by the terms of the registration, even as weed scientists were identifying and reporting such weeds.\(^\text{12}\) EPA cited two extension weed scientists for the thoroughly alarming forecast that the rapid emergence of dicamba-resistant weeds since commercialization of the Xtend system recalls the early stages of glyphosate-resistant weed evolution with Roundup Ready crops,\(^\text{13}\) weeds which now infest at least 120 million acres of cropland.\(^\text{14}\)

Clearly, the best management practices APHIS cites are not being followed by many growers, which helps explain the rapid emergence of dicamba- and 2,4-D-resistant weeds. Most recently identified were dicamba- and 2,4-D-resistant waterhemp biotypes in Iowa.\(^\text{15}\) The fact that weed resistance to one of these auxins is often accompanied by some degree of resistance to the other is especially concerning, because these two HR crop systems dominate the weed control landscape in major field crops. This means that rather than providing truly alternative means of killing weeds, use of either the Xtend or Enlist systems will foster resistance to both auxins in weeds already resistant to glyphosate, ALS inhibitors and often still other modes of action like PPO inhibitors. By increasing use of these auxins across space and time, deregulation of MON 87429 maize would accelerate the emergence of auxin resistance in weeds.

Even for those relatively few growers who do strive to use two effective modes of action on weeds,\(^\text{16}\) the rapid rise of metabolic resistance mechanisms casts serious doubt on the efficacy of this recommendation. In fact, researchers have demonstrated that herbicide


\(^{13}\) Ibid., p. 14.


\(^{15}\) See https://crops.extension.iastate.edu/cropnews/2023/09/dicamba-resistant-waterhemp-iowa and https://crops.extension.iastate.edu/cropnews/2024/02/suspected-24-d-resistant-waterhemp-population-discovered#:~:text=The%20particulars,ditch%20adjacent%20to%20the%20field.

\(^{16}\) Adopted by few farmers in part because this strategy entails at least double the cost of weed control versus using only one effective mode of action, see Kniss AR et al. (2022). The cost of implementing effective herbicide mixtures for resistance management. Advances in Weed Science 40(Spec1):e0202200119.
mixtures actually accelerate emergence of so-called “generalist” resistance (to multiple herbicides at once, via enzymes capable of detoxifying herbicides of different classes) in blackgrass,17 and the same phenomenon is being observed in broadleaf weeds, e.g. Amaranthus, of more relevance to U.S. growers. Meanwhile, multiple HR weeds of whatever provenance have become so problematic that weed scientists are recommending tank mixes of up to five different herbicides to control weeds like waterhemp with resistance to four.18 APHIS concedes the rapid rise in metabolic/generalist resistance in weeds, and cites the Comont et al. paper for how such resistance undermines the herbicide mixture strategy, but then fails to draw the necessary conclusion that herbicide mixtures facilitated by MON 87429 will exacerbate the emergence of weeds that evolve resistance to multiple herbicides via metabolic mechanisms.

Herbicide-Resistant Weeds as Plant Pests
Both the multiple HR weeds fostered by the utilization of stacked HR crops like MON 87429, and the volunteers of such crops that infest fields in the following year should be regarded a plant pests and/or noxious weeds by APHIS, both of which it has the statutory authority to address. Interestingly, herbicide-resistant weeds are understood by scientists to be plant pests,19 but APHIS remains stuck in its narrow and outdated understanding of the concept, which is entirely inappropriate to context of herbicide-resistant crops.

Conclusion
Ever more weed scientists are becoming disturbed by the current trajectory of weed management, seeing it as progressively less sustainable: herbicide costs are skyrocketing for growers, herbicide use (both in pounds per acre and more importantly acre-treatments) is rising rapidly in major field crops because they are dominated by herbicide-promoting stacked-HR varieties. And the environmental impacts of that surge in herbicide use are being increasingly seen, as with dicamba drift and its decimation of floral resources for pollinators in regions of intensive use.20 Increasingly, herbicide resistance is being compared to the long-

standing antibiotic resistance crisis: “Intense selection by pesticides and antibiotics has resulted in a global epidemic of evolved resistance.”

Stacked HR crops like MON 87429 are not a tool to fight weed resistance, but rather are promoters of resistance. They have no place in integrated weed management (IWM) programs, which can only thrive with a diversity of weed management techniques that include non-chemical tactics. In fact, these multiple-HR crops are by their very nature anti-IWM, in that they corral growers into reliance on the suite of herbicides to which the crop is resistant, and disincentivize alternative control methods. This is not merely our view at CFS. Mainstream members of the weed science community who have no issues with herbicidal weed control in general are saying this:

“Increased focus on developing multiple HR crops to manage HR weeds is slowing the development and adoption of nonchemical weed control methods and increased concern of interference by and management of multiple HR crop volunteers.”

“Too much focus on implementing herbicide mixtures may actually inhibit adoption of herbicide resistance management practices. .... herbicide resistance is a problem that is unlikely to be solved through the use of more herbicides.”

But “use of more herbicides” is precisely the point of MON 87429 and other stacked HR crops. Enable previously infeasible post-emergence use, foster evolution of resistant weeds, introduce stacks resistant to still more different modes of action, rinse and repeat.

For all of the reasons discussed above, and at more length in our scoping comments, we call on APHIS to reject the Preferred Alternative, and deny Bayer’s petition for deregulation of MON 87429.

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