
GROWING CONFIDENCE: A PROPOSAL FOR HERBICIDAL
REGISTRATION PROCEDURES THAT PROTECT BOTH FARMERS
AND THE ENVIRONMENT

PEYTON HAGERMAN*

Someone who first traverses the Midwest may understandably believe the fields of corn, soybeans, wheat, and cotton seem endless. These monotonous fields, however, fuel an agricultural industry that contributes trillions of dollars to the United States' gross domestic product (GDP). What is more, these fields are a necessity to nourish families from Maine to California. In order to maintain millions of acres of crops across the Midwest, farmers must plant unique seeds, and then fend off corrosive weeds that harm and destroy their valuable cash crops. These weeds are both evasive and powerful; they can decimate entire fields at a time. In order to effectively combat these weeds, farmers often rely upon synthetic herbicides. It is the EPA's responsibility, moreover, to analyze and approve herbicides that are more beneficial than costly to society. Herbicides, and the seeds they are meant to protect, are predominately manufactured by a select few agricultural conglomerates that dominate the agricultural industry. This market concentration drastically limits the amount of seeds and herbicides that farmers may choose from when preparing for planting season.

In addition to corn, soybeans and cotton are massive contributors to the agricultural industry as a whole. The most popular herbicide used by soybean and cotton farmers across the country is dicamba; it is highly effective against destructive weeds. Dicamba is solely produced by three of the largest agricultural entities in the world. Despite its effectiveness, dicamba comes with a significant cost: it has the tendency to drift to other, untargeted fields when used. If a nearby field is not planted with seeds that are resistant to dicamba, the field may be completely ravaged by the powerful herbicide.

In 2020, this drifting issue became so severe that the Ninth Circuit deemed the use of dicamba illegal; this occurred in the middle of growing season. Put differently, millions of farmers were left defenseless to powerful weeds during the most critical months in American agriculture. As an act of emergency, the EPA reinstated dicamba to avoid a disastrous growing

* J.D. Candidate, 2021, University of Illinois College of Law; B.S., University of Illinois, College of Agricultural, Consumer and Environmental Sciences. I am extremely grateful to the members and editors of the *University of Illinois Law Review*; as a whole, your ambition simply cannot go understated. I dedicate this Note my loved ones: my parents, Brooke and Andrew; my brothers, Sam and Eli; and my grandparents, Steve and Debbie. My greatest blessing is your unconditional support.

season. The herbicide's brief absence nevertheless sent shockwaves through all of agriculture.

Litigation surrounding dicamba illustrates the herbicide's uncertain future. In the meantime, however, farmers are left with two choices. On one hand, a soybean or cotton farmer can purchase dicamba-resistant seeds and herbicides from large agriculture conglomerates. The risk involved in this decision is that dicamba could get taken off the market at an inopportune time; ravenous weeds could then decimate the farmer's crops and income. On the other hand, a soybean or cotton farmer could purchase non-dicamba products and avoid the risk of their herbicide being taken off the market. The risk in this instance, of course, is that a neighbor using dicamba could destroy all nondicamba-tolerant fields in the general area.

In sum, farmers cultivating millions of acres across the country are handcuffed. Prior to planting their crops, farmers must make substantial investments that severely lack certainty. This Note proposes an alteration to the procedures applied by the EPA when approving herbicides for public use. If herbicide producers are incentivized to manufacture herbicides that may not decimate the hard work of one's neighbor, a realistic scenario exists where cotton and soybean farmers will not only invest with confidence, but also without fear.

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I. INTRODUCTION

After a long day working through the Midwestern summer heat, a soybean farmer finally returns home for the evening. Before he can enter his home to relax, however, a whole new level of stress captures his interest. To his dismay, he notices an unwanted intruder: a fast-spreading, destructive weed called Palmer Amaranth¹ has spread throughout his soybean field directly adjacent to his home.

The farmer has heard rumors of the destruction this weed can do to his crops. Bewildered, he grabs his phone to call another farmer for advice; he can't help but wonder what he could have done to prevent this vegetation from potentially decimating his yields.² The farmer then remembers an article he read in the newspaper that morning about the highly effective herbicide he had used on his soybeans until just weeks ago—it has surprisingly been reinstated by the EPA Environmental Protection Agency (“EPA”) until the end of growing season.³ He has also heard about the destruction he could cause his neighbors by using the chemical, but then considers the limited herbicidal choices he has to protect his soybeans. It is clear to him now that uncertain, crucial days lie ahead for him and other Midwestern farmers.⁴

An unsuccessful growing season brings stress to more than just farmers in the agricultural industry.⁵ Farmers are consumers in the agricultural supply chain; seed companies and herbicide retailers rely on the investments of farmers to fuel the multibillion dollar cash-crop industry.⁶ Crop seed production and distribution is highly competitive; firms of all sizes spend large amounts of money on research and development to produce unique seeds that create high yields.⁷

1. Christy Sprague, *Keys to Distinguishing Palmer Amaranth from Other Species*, MSU WEEDS (March 2013), <https://www.canr.msu.edu/weeds/extension/factsheets/DistinguishingPigweedSpeciesinMI-2013.pdf> [<https://perma.cc/EJ8S-C4QU>].

2. *Waterhemp Management in Soybeans*, TAKE ACTION, <https://www.canr.msu.edu/weeds/extension/factsheets/50737FINALFactSheetWaterhemp.pdf> (last visited June 7, 2021) [<https://perma.cc/GC27-RT3T>].

3. Jackie Pucci, *Federal Court Vacates Three Dicamba Registrations*, CROPLIFE (June 4, 2020), <https://www.croplife.com/crop-inputs/federal-court-vacates-three-dicamba-registrations/> [<https://perma.cc/Z7HX-NCP7>].

4. See, e.g., Emily Unglesbee, *EPA's Dicamba To-Do List*, PROGRESSIVE FARMER (Sept. 24, 2020, 9:26 AM), <https://www.dtnpf.com/agriculture/web/ag/crops/article/2020/09/24/dicamba-decision-time-epa-table> [<https://perma.cc/67XH-KKZ4>].

5. April Simpson, *Farmers in Upper Midwest Hurting: 'I Don't See an End in Sight'*, STARTRIBUNE (July 20, 2020, 6:18 AM), <https://www.startribune.com/farmers-hurting-and-i-don-t-see-an-end-in-sight/571793472> [<https://perma.cc/N8VJ-5EAA>].

6. *Seed Industry Structure is Characterized by Growth and Consolidation*, U.S. DEP'T OF AGRIC., https://www.ers.usda.gov/webdocs/publications/42517/13605_aib786g_1_.pdf?v=0 [<https://perma.cc/YG8B-TSGJ>].

7. *Id.*

Many of these seeds are engineered to maintain a resistance to certain herbicides, as herbicides are widely used across agriculture to fight off unwanted vegetation.⁸ Most notably, Palmer Amaranth has become ubiquitous in Midwestern fields; it has also evolved to withstand certain herbicides and can reduce certain crop yields by over fifty percent.⁹ Accordingly, when a powerful herbicide is taken off the market—and renders certain seeds vulnerable to corrosive weeds like Palmer Amaranth—both farmers and seed firms suffer economically.¹⁰ Farmers produce lower yields, and seed producers must go back to the drawing board and invest in new hybrids to maintain profitability.¹¹

Agricultural industries across the globe rely heavily upon herbicides.¹² Most seed types would fail to grow to their full potential without effective herbicides.¹³ This complementary nature between seeds and pesticides, and the demand that results from the relationship of these two products, incentivizes seed firms and chemical firms to enter joint ventures.¹⁴ With this in mind, the shape of the agricultural industry has taken an extreme turn in recent decades.¹⁵ Several mergers and acquisitions, particularly involving seed companies and multinational conglomerates, have left today's agricultural industry dominated by massive firms.¹⁶ This is called market concentration.¹⁷ Such widespread concentration, along with rapid increases in private research and development within the industry, has driven market growth at an exponential rate over the past several decades.¹⁸ In sum, the agricultural industry has become oligopolistic: a few large firms in the industry are able to block new entrants, hinder innovation, and increase prices for consumers.¹⁹

The widespread use of herbicides comes with another cost. Though certain seeds may be genetically engineered to withstand powerful herbicides, other parts of the environment are not.²⁰ The harm that herbicides can inflict upon

8. *Id.*

9. Melody M. Bomgardner, *Palmer Amaranth, the King of Weeds, Cripples New Herbicides*, C&EN (Aug. 3, 2019), <https://cen.acs.org/business/specialty-chemicals/Palmer-amaranth-king-weeds-cripples/97/i31> [https://perma.cc/4N8E-UUYK].

10. *Id.*; see Jeffrey D. Michler, Emilia Tjernstrom, Simone Verrkaart & Kai Maus, *Money Matters: The Role of Yields and Profits in Agricultural Technology Adoption*, 101 AM. J. AGRIC. ECON. 710, 710 (2018).

11. See *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

12. Bob Hartzler, *Managing Weeds to Protect Crop Yields*, IOWA STATE UNIV., <https://crops.extension.iastate.edu/encyclopedia/managing-weeds-protect-crop-yields> [https://perma.cc/6NJW-4UWQ].

13. *Id.*

14. See *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

15. See *id.*

16. *Id.*

17. *Id.*

18. *Id.*

19. *Id.*; The Investopedia Team, *Oligopoly*, INVESTOPEDIA (May 17, 2021), <https://www.investopedia.com/terms/o/oligopoly.asp#:~:text=Understanding%20Oligopoly,-Oligopolies%20in%20history&text=%20economic%20and%20legal%20concern,taking%20prices%20from%20the%20market> [https://perma.cc/SA95-6TVA]

20. Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency, 960 F.3d 1120, 1123 (9th Cir. 2020).

other crops and wildlife has led to massive legal disputes, several of which have taken the mainstage in American agriculture in 2020.²¹

Specifically, litigation surrounding popular herbicides such as dicamba, glyphosate, and the Enlist Duo (Enlist) created mass confusion during the 2020 growing season.²² This litigation particularly affects cotton and soybean farmers across the Midwest and the South regions of the United States.²³ Considering these disputes, the future of herbicidal use amongst Midwestern farmers is unpredictable.²⁴ Recent litigation may not be misplaced;²⁵ but these disputes have created investment uncertainty for both cotton and soybean farmers across the United States.²⁶ Additionally, negative effects on these growers can affect Midwestern economies as whole.²⁷

This Note begins by explaining the general nature of herbicide use in the United States. An analysis of the global market leaders within the herbicide industry is necessary to better understand the production and distribution of herbicides.²⁸ Next, this Note analyzes herbicidal litigation as it pertains to the EPA's controversial approval of specific herbicides.²⁹ The approval of some herbicides leads to product liability disputes that occur as a result of their widespread use.³⁰ Last, this Note recommends an adjusted cost-benefit analysis, which should be applied by the EPA in order to simultaneously protect farmers and the environment.

21. See Adam Allington, *With Dicamba Canceled, Legal Focus Now Shifts to Corteva's Enlist*, BLOOMBERG L. (June 26, 2020, 5:00 AM), <https://news.bloomberglaw.com/environment-and-energy/with-dicamba-canceled-legal-focus-now-shifts-to-cortevas-enlist> [<https://perma.cc/AV7H-YGCV>].

22. *Id.*

23. *Id.*; *Soybean Farmers in States with more Glyphosate-Tolerant Weed Species Appeared More Likely to Use Dicamba-Tolerant Seeds*, U.S. DEP'T OF AGRIC. (Oct. 2, 2019), <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=95050> [<https://perma.cc/43UN-GGR7>].

24. Allington, *supra* note 21.

25. *Court Decision Highlights Systemic Failure of Federal Pesticide Law to Protect Health and the Environment, Despite a Silver Lining and a Must-Read, Powerful Dissenting Opinion*, BEYOND PESTICIDES (Aug. 11, 2020), <https://beyondpesticides.org/dailynewsblog/2020/08/court-decision-highlights-systemic-failure-of-federal-pesticide-law-to-protect-health-and-the-environment-despite-a-silver-lining-and-a-must-read-powerful-dissenting-opinion> [<https://perma.cc/A3EJ-CLMR>].

26. Amy Hadachek *Soybean Evolves to Match Fight for Weed Control*, MIDWEST MESSENGER (Feb. 10, 2021), https://www.agupdate.com/midwestmessenger/news/crop/soybean-evolves-to-match-fight-for-weed-control/article_46d6b142-f83c-11ea-b47e-5b30b2ce7ee5.html [<https://perma.cc/U39D-YQTC>].

27. Simpson, *supra* note 5.

28. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

29. Allington, *supra* note 21.

30. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

II. BACKGROUND

A. *Herbicides in the United States*

Herbicidal use in American agriculture has contributed to decades of high crop yields.³¹ Thus, herbicides play a large role along the agricultural supply chain; the domestic herbicide market is projected to reach \$39.15 billion by 2022.³² Herbicides are first developed by agrochemical manufacturers and suppliers;³³ the agrochemical market is generally comprised of pesticide producers.³⁴ A “pesticide” is an umbrella term referring to chemicals used in agriculture to kill “pests,” which include animals, plants, weeds, fungi, bacteria, or any unwanted life form deemed particularly harmful to cash crops.³⁵ Herbicides, a narrower categorization of pesticides, are chemicals designed with the specific purpose of killing weeds that harm crops.³⁶ The herbicidal market is particularly nonorganic, which means the chemicals used to fight off weeds are typically man-made, or synthetic.³⁷

Herbicides are valued greatly by the entire agricultural industry.³⁸ The ability to apply powerful herbicides to genetically resistant crops enables farmers to fight off pesky weeds.³⁹ By not sharing sunlight and other nutrients with weeds, crops can grow in high yields consistently.⁴⁰ In turn, this generates predictable income and revenue for farmers.⁴¹ These economic impacts, however, are not limited to only farmers; a lack of agriculture-generated revenue can decimate rural economies⁴² and hinder an entire region’s ability to positively impact the United States’ gross domestic product (“GDP”).⁴³ In order to produce plants and

31. Carl Bell, *A Historical View of Weed Control Technology*, UC WEED SCIENCE (May 1, 2015), <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=17593> [<https://perma.cc/TA3Y-3NZR>].

32. HERBICIDES MARKET, MARKETS AND MARKETS (2017), <https://www.marketsandmarkets.com/Market-Reports/herbicides-357.html> [<https://perma.cc/3P89-XXNS>].

33. *Id.*

34. *Who Owns Nature?*, ETC GROUP (Nov. 11, 2008), <http://www.etcgroup.org/content/who-owns-nature> [<https://perma.cc/UCP6-J427>].

35. Caroline Carlson, *What’s the Difference Between Pesticides and Herbicides?*, ROOTSTOCK (Jan. 24, 2020), <https://www.organicvalley.coop/blog/what-are-pesticides-and-herbicides/> [<https://perma.cc/4J8Y-3SFA>].

36. *Id.*

37. *Id.*

38. *Id.*; *Court Decision Highlights Systematic Failure*, *supra* note 25.

39. Carlson, *supra* note 35.

40. Hartzler, *Managing Weeds to Protect Crop Yields*, *supra* note 12.

41. See Michler et al., *supra* note 10; Gary Schnitkey, *Projected Yield and Revenue Changes from 2018 to 2019 for Corn and Soybeans in Midwest States*, FARMDOC DAILY (Oct. 22, 2019), <https://farmdocdaily.illinois.edu/2019/10/projected-yield-and-revenue-changes-from-2018-to-2019-for-corn-and-soybeans-in-the-midwest-states.html> [<https://perma.cc/UJH2-2NG4>].

42. Simpson, *supra* note 5.

43. David Oppedahl, *Midwest Agriculture’s Ties to the Global Economy*, FED. RSRV. BANK OF CHI. (2018) <https://www.chicagofed.org/publications/chicago-fed-letter/2018/393> [<https://perma.cc/2Y86-6QS8>]; *Ag and Food Sectors and the Economy*, U.S. DEP’T OF AGRIC. (Oct. 12, 2021), <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/#:~:text=Agriculture%2C%20food%2C%20and%20related%20industries,about%200.6%20percent%20of%20GDP> [<https://perma.cc/HG9Z-926U>].

chemicals that sustain a weed killing system—and thus create more reliable production—manufacturers rely on advanced research and development to combat constantly evolving weeds.⁴⁴

The pesky weeds impacting crop yields can be identified with specificity. For example, waterhemp has maintained the attention of agricultural manufacturers for years.⁴⁵ Waterhemp is a relative of pigweeds; a genetic line of unwanted vegetation that has been pestering Midwestern farmers for decades.⁴⁶ Furthermore, the unwelcomed intruder Palmer Amaranth has entered the scene more recently: this corrosive weed has made its way to the Midwest in recent years and possesses the ability to both ravage yields and rapidly develop resistance to herbicides.⁴⁷ The presence of Palmer Amaranth has increased the demand for two particularly powerful herbicides, dicamba and Enlist.⁴⁸ The reliance upon these herbicides is justified by farmers far and wide: if Palmer Amaranth is left uncontrolled, a farmer can lose greater than fifty percent of their yield.⁴⁹

The widespread presence of these corrosive weeds inevitably creates a need for effective herbicides. Farmers, however, have limited herbicide producers to choose from.⁵⁰ Particularly, a farmer's options include products made by Bayer AG, Corteva Agriscience, BASF, or Syngenta. These four dominant agricultural entities maintain greater than a seventy-five percent market share of the *global* pesticide market.⁵¹ Herbicides comprise around one-third of the global agrochemical market—which itself is expected to reach \$300 billion by 2024.⁵² Such market concentration does not stop there: agrochemical giants also exert large control over the production of genetically engineered soybean seeds, which are specifically designed to withstand such herbicides.⁵³

Seeds and herbicides are complementary products, which means their worth and utility increase when purchased together.⁵⁴ Moreover, the top genetically modified soybean manufacturers in 2020 almost mirror the leaders of the

44. W.T. Rüegg, M. Quadranti & A. Zoschke, *Herbicide Research and Development: Challenges and Opportunities*, 47 *WEED RSCH.* 271, 271 (2007).

45. Bob Hartzler, *Waterhemp: A 'Friendly' Native Evolves the Cornbelt's Worst Weed Problem*, IOWA STATE UNIV. (Nov. 11, 2019, 7:08 AM), <https://crops.extension.iastate.edu/blog/bob-hartzler/waterhemp-friendly-native-evolves-cornbelts-worst-weed-problem> [https://perma.cc/3W4S-GXFK].

46. *Id.*

47. Bomgardner, *supra* note 9.

48. *Id.*

49. *Id.*

50. The Investopedia Team, *Monsanto's Main Competitors*, INVESTOPEDIA (Oct. 20, 2019), <https://www.investopedia.com/ask/answers/120314/who-are-monsantos-main-competitors.asp> [https://perma.cc/2C3P-NMUV].

51. *Id.*

52. Lucía Fernández, *Global Agricultural Chemicals Market Value Worldwide 2018-2025*, STATISTA (July 6, 2021), <https://www.statista.com/statistics/311943/agrochemical-market-value-worldwide/> [https://perma.cc/M587-XLAU].

53. *The World's Top 10 Pesticide Firms*, GMWATCH, <https://www.gmwatch.org/en/articles/gm-firms/10560-the-worlds-top-10-pesticide-firms-who-owns-nature> (last visited Oct 30, 2021) [https://perma.cc/8YZJ-7D7Y].

54. Caroline Banton, *Complementary Goods*, INVESTOPEDIA (Oct. 25, 2020), <https://www.investopedia.com/terms/c/complement.asp> (last visited Oct. 24, 2021) [https://perma.cc/P5LF-N5GL].

herbicide market: Monsanto, Syngenta, Corteva,⁵⁵ and Bayer AG.⁵⁶ Thus, in order to analyze the agricultural supply chain as it pertains to genetically modified seeds and herbicides (modern crop production), any form of thorough analysis necessarily involves the “big four” at the top of the supply chain.⁵⁷

B. *Legal Controversy Surrounding Herbicides*

A limited selection of herbicide producers has affected farmers for years.⁵⁸ The herbicides they choose from are separated into four general segments: herbicidal type, herbicidal mode of action, crop type, and geographic region of use.⁵⁹ Herbicidal type, however, is a distinct concern for American farmers, as it pertains to the chemical mixes that fight off evolving weeds.⁶⁰ Glyphosate, an ingredient in Monsanto’s popular herbicide named Roundup, was the most widely used herbicide across the United States for several decades.⁶¹ In recent years, however, domestically unique Glyphosate-resistant weeds like waterhemp and Palmer Amaranth have developed a resistance to glyphosate and negatively affect several types of economically significant crops.⁶²

Roundup also faces notable legal troubles. On June 23, 2020, Bayer AG set aside around ten billion dollars to settle cases brought against Roundup, which was found to cause non-Hodgkin’s Lymphoma in humans.⁶³ Accordingly, agricultural manufacturers have become imminently focused on Roundup’s replacement.⁶⁴ This is not because of cancer-causing agents found in the widely used chemical,⁶⁵ but because farmers need an effective way to fight off weeds and maintain high yields to earn a living.⁶⁶ There may be entire generations of farmers that have spent their entire careers applying glyphosate: “[s]ince the 1970’s,

55. Corteva is the crop protection spin-off of DowDupont, the entities together represent global market leaders. Press Release, Corteva, Corteva Separates from DowDupont to Form Leading Pure-Play Agriculture Company (June 3, 2019), <https://www.corteva.com/resources/media-center/corteva-separates-from-dowdupont-to-form-leading-independent-global-pure-play-agriculture-company.html> [https://perma.cc/LDK3-635B].

56. Ajay More, *Soybeans Seed Market 2021 by Global Market Size Estimation, Growth, Share, Top Manufacturers, Dynamics, Drivers, Research Methodology Forecast to 2025*, WBOC.COM (May 12, 2021, 5:19 AM) <https://www.wboc.com/story/43871580/soybeans-seed-market-2021-by-global-market-size-estimation-growth-share-top-manufacturers-dynamics-drivers-research-methodology-forecast-to-2025> [https://perma.cc/LJD7-4DDL].

57. Koen Deconink, *From Big Six to Big Four*, SEED WORLD (May 6, 2019), <https://seedworld.com/from-big-six-to-big-four/> [https://perma.cc/UQG7-L7L8].

58. Johnathan Hettinger, *Last Year it was Dicamba, This Year it’s 2,4-D*, ASSOCIATED PRESS NEWS (Mar. 30, 2019), <https://apnews.com/article/9eaf78c201294db38f4483e64108189e> [https://perma.cc/9ME3-XBKK].

59. MARKETS AND MARKETS, *supra* note 32.

60. Hugh J. Beckie, Ken C. Flower & Michael B. Ashworth, *Farming Without Glyphosate?*, 9 PLANTS 96, 100 (2020).

61. *Id.* at 96–97.

62. *Id.* at 100.

63. *Bayer Close to Glyphosate Settlement Worth \$8-10 Billion: Handelsblatt*, REUTERS (June 23, 2020, 5:40 AM), <https://www.reuters.com/article/us-germany-bayer/bayer-close-to-glyphosate-settlement-worth-8-10-billion-handelsblatt-idUSKBN23U1IU> [https://perma.cc/5HBU-7V8M].

64. Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 960 F.3d 1120, 1123 (9th Cir. 2020).

65. *Glyphosate*, U.S. Env’t Prot. Agency, <https://www.epa.gov/ingredients-used-pesticide-products/glyphosate> (last visited Oct. 30, 2021) [https://perma.cc/DL8U-X4VE].

66. *Bayer Close to Glyphosate Settlement*, *supra* note 63; see Hettinger, *supra* note 58.

[glyphosate was] used on corn, soybeans, and cotton crops to reduce weeds. Over time, however, certain noxious weeds have grown resistant to glyphosate. That resistance in turn decreases crop yield, with severe economic consequences.”⁶⁷

Cotton and soybean farmers in particular have shifted their focus to a new herbicide. Specifically, farmers began using dicamba, a toxic weed-killer that became an industry-wide necessity as glyphosate’s effectiveness gradually decreased against corrosive weeds.⁶⁸ Many farmers welcomed the new tool as “many weeds had developed a resistance to the widely used herbicide glyphosate, the main ingredient in Roundup brand-name products sold by the Monsanto Company (“Monsanto”). In response, Monsanto developed and patented genes that allowed soybean and cotton crops to tolerate dicamba.”⁶⁹ The new premier option for cotton and soybean farmers to fight off Palmer Amaranth and waterhemp sparked a new herbicidal era in United States agriculture.

The EPA first registered⁷⁰ modern dicamba-based herbicides in 2016.⁷¹ This registration included three separate dicamba-based herbicides which are manufactured separately by Monsanto, DuPont, and BASF.⁷² These herbicides became a valued commodity, and “in two years, dicamba went from being sprayed on zero acres of soybeans to more than 40 million acres.”⁷³ Nonetheless, in February of 2020, controversy surrounding dicamba products became national news.⁷⁴ In *Bader Farms, Inc. v. Monsanto Co.*, a federal jury in Missouri found in favor of a peach farmer who sued a maker of dicamba herbicides (Monsanto) due to off-target drift⁷⁵ of the chemical, which destroyed the peach farmer’s nearby peach farms.⁷⁶ Off-target drift (or herbicidal volatility) means that farmers applying dicamba-based herbicides to their soybeans or cotton could be inadvertently ravaging nearby crops and wildlife that are not genetically modified to withstand the herbicide.⁷⁷

The evidence introduced in *Bader Farms* was sufficient to prove herbicidal drift.⁷⁸ Subsequently, on June 3, 2020, the Ninth Circuit overturned the EPA’s registration of dicamba by vacating⁷⁹ the 2018 registration of the three dicamba

67. Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 966 F.3d 893, 905 (9th Cir. 2020).

68. *Id.*

69. This citation is to the litigation regarding dicamba, a case featuring the same parties as litigation surrounding the Enlist Duo, which is the case cited two footnotes above. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1123.

70. Registration refers to the EPA’s formal approval of an herbicide for widespread use. *Id.* at 1123–24.

71. *Id.* at 1125–26.

72. *Id.* at 1125.

73. Hettinger, *supra* note 58.

74. Gill Gullickson, *Bader Farms Wins \$265 Million Judgment in Dicamba Lawsuit Against Bayer, BASF, SUCCESSFUL FARMING* (Feb. 14, 2020), <https://www.agriculture.com/news/business/bader-farms-wins-dicamba-lawsuit-against-bayer-basf> [<https://perma.cc/F8X3-CYLM>].

75. This Note will refer to off-target drift and “volatility” interchangeably, as they refer to the same herbicidal tendency. *See Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084, 1088 (E.D. Mo. 2019).

76. *Id.*

77. *Id.*

78. *Id.* at 1090.

79. Vacating an herbicide, or vacatur, is when a registered herbicide is deemed illegal to use. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 960 F.3d 1120, 1125 (9th Cir. 2020).

herbicides.⁸⁰ The 2018 registration occurred after the 2016 registration had expired.⁸¹ Nonetheless, the Ninth Circuit analyzed the EPA's 2018 registration of dicamba-based herbicides and declared them illegal for farmers to use across the country.⁸² The 2018 registration (which was deemed legal to use) and its subsequent *vacatur* further affected the concentrated agrochemical market players—Bayer (who now owns Monsanto), Corteva, and BASF.⁸³ From 2013 to 2015, prior to the original 2016 registration, herbicidal drift complaints amounted to roughly 1,000 per year across the United States.⁸⁴ In 2017 alone, just after the registration of modern dicamba herbicides, herbicidal drift complaints increased to 3,000.⁸⁵

The Ninth Circuit vacated dicamba because it did not comply with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).⁸⁶ To vacate an herbicide means to revoke its registration and render it illegal for sale or application in the United States.⁸⁷ FIFRA, which controls this process, is a regulatory scheme that controls the distribution and use of herbicides.⁸⁸ Analogous to *Bader Farms*, the use of dicamba was found to result in detrimental effects on the nearby environment through off-target drift.⁸⁹ *Bader Farms* illustrates the tortious nature of these herbicides: the plaintiffs were initially awarded over \$250 million in punitive damages.⁹⁰ The Ninth Circuit's *vacatur*, which overturned the EPA's registration, considers the herbicide's use from a broad economic, social, and environmental perspective.⁹¹

The EPA was responsible for defending their own cost-benefit analysis to the Ninth Circuit.⁹² This cost-benefit analysis is what the EPA applies when registering any herbicide.⁹³ Notwithstanding a standard of review which provides relatively high deference to the agency's decision making, the EPA failed to win over the Ninth Circuit.⁹⁴ There were multiple risks associated with dicamba that caught the court's attention: understatement of dicamba tolerant seed acreage, understatement of dicamba-related complaints, failure to quantify the damage caused by dicamba around the country, substantial noncompliance with dicamba's application restrictions, the economic costs of furthering agricultural monopolies, and the social unrest dicamba creates among farmers.⁹⁵ These risks

80. *Id.* at 1124.

81. *Id.*

82. *Id.*

83. *Id.*

84. *Id.* at 1137.

85. *Id.*

86. *Id.* at 1123, 1124.

87. *Id.* at 1133 (explaining FIFRA procedures for determining whether an herbicide is allowed for public use).

88. *Id.* at 1126.

89. *Id.* at 1124. See generally *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084 (E.D. Mo. 2019).

90. Gullickson, *supra* note 74.

91. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1133.

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.* at 1124–25.

outweighed the benefits of dicamba's registration, which the EPA stipulated did *not include* higher crop yields.⁹⁶

The EPA promptly reacted to the Ninth Circuit's holding.⁹⁷ Five days after the Ninth Circuit's prohibition on dicamba's use, the EPA prohibited the sale of three leading dicamba products, however, the EPA permitted the use of dicamba products already in stock.⁹⁸ The EPA diverged from the Ninth Circuit's approach due, in part, to the economic drawbacks which would be thrust upon farmers in the midst of growing season.⁹⁹ At first the investments that farmers had made into the herbicide itself, and the seeds that were resistant to its application, seemed only temporarily protected.¹⁰⁰ Then, on October 27, 2020, the EPA maintained their market-driven approach and approved Dicamba application once again—for another *five year* term.¹⁰¹

Initially, Corteva Agriscience's Enlist was the most notable herbicide standing at the end of 2020's regulatory chaos.¹⁰² Enlist was at one point considered to be dicamba's replacement for many cotton and soybean farmers.¹⁰³ Corteva is a recent spin-off after the dissolution of DowDuPont, Inc., specializing in crop protection as a separate entity; DowDuPont shareholders maintain interest in Corteva.¹⁰⁴ Moreover, notwithstanding the fact that Enlist suffers from similar drift concerns as dicamba, the herbicide managed to maintain its own registration in July 2020.¹⁰⁵ This was despite its respective litigation in the Ninth Circuit with the same plaintiffs who previously defeated dicamba.¹⁰⁶

There is still room for skepticism regarding Enlist's legality. The Ninth Circuit expressed that the EPA failed to protect monarch butterflies with the registration of Enlist, and a dissenting opinion argued that the EPA applied an overly-generous risk standard upon approving Enlist.¹⁰⁷ Each of these cases involved the same problem: the EPA's process of reviewing controversial

96. *Id.* at 1136.

97. Jackie Pucci, *Fate of Dicamba Clearer, as EPA Allows Existing Stocks Use*, CROPLIFE (June 10, 2020), <https://www.croplife.com/crop-inputs/shock-confusion-surrounds-ninth-circuits-ruling-on-dicamba/> [<https://perma.cc/E9LD-X5W6>].

98. *Id.*

99. *Id.*

100. *Id.*

101. Press Release, U.S. Env't Prot. Agency Press Off., EPA Announces 2020 Dicamba Registration Decision (Oct. 27, 2020); *see also* Brigit Rollins, *The Deal with Dicamba: EPA Approves Dicamba Pesticides for 2021 and Beyond*, NAT'L AGRIC. L. CTR. (Oct. 28, 2020), <https://nationalaglawcenter.org/the-deal-with-dicamba-epa-approves-dicamba-pesticides-for-2021-and-beyond/> [<https://perma.cc/K2MS-NS76>].

102. Brigit Rollins, *Court Concludes: Enlist Duo Registration Upheld*, NAT'L AGRIC. L. CTR. (July 29, 2020), <https://nationalaglawcenter.org/court-concludes-enlist-duo-registration-upheld/> [<https://perma.cc/5JBU-W9UG>].

103. Allington, *supra* note 21; *see* Steve Davies, *9th Circuit Decision Allows Continued Use of Enlist Duo*, AGRIPULSE (July 22, 2020, 3:05 PM), <https://www.agri-pulse.com/articles/14120-th-circuit-decision-allows-continued-use-of-enlist-duo> [<https://perma.cc/8NUE-FQC3>].

104. Marty Leclerc, *Corteva Spinoff an Unfamiliar Gem for DowDuPont Shareholders*, FORBES (June 28, 2019, 2:55 PM), <https://www.forbes.com/sites/greatspeculations/2019/06/28/corteva-spinoff-an-unfamiliar-gem-for-dowdupont-shareholders/#3a27aa186ef9> [<https://perma.cc/B2CD-RAFG>].

105. Rollins, *supra* note 102.

106. Allington, *supra* note 21; Davies, *supra* note 103.

107. *Court Decision Highlights Systematic Failure*, *supra* note 25.

herbicides prior to their widespread use contained procedural flaws.¹⁰⁸ Expectedly, the registration of both dicamba and Enlist spurred skepticism from the Center for Biological Diversity and the Center for Food Safety.¹⁰⁹ These entities are two of the plaintiffs challenging dicamba and Enlist in the Ninth Circuit, stating that “[w]e will most certainly challenge these unlawful approvals. . . .”¹¹⁰

C. Supply Chain Volatility Moving Forward

The EPA’s October 2020 decision to approve dicamba for five additional years was supported by their desire for market certainty.¹¹¹ The EPA elaborated, “[w]ith today’s decision, farmers now have the certainty they need to make plans for their 2021 growing season.”¹¹² The EPA seemingly addressed the Ninth Circuit’s reasoning behind banning dicamba-based herbicides just three months prior: “[a]fter reviewing substantial amounts of new information, conducting scientific assessments based on the best available science, and carefully considering the input of stakeholders we have reached the resolution that is good for our farmers and our environment.”¹¹³

The EPA expressly supported cotton and soybean farmers during their October press release regarding the reinstatement of dicamba-based herbicides.¹¹⁴ On November 4, 2020, however, the American Soybean Association and Plains Cotton Growers, Inc. filed a lawsuit against the EPA disputing the registration.¹¹⁵ The lawsuit pertains, in part, to additional restrictions to comply with while applying the herbicide.¹¹⁶ Application restrictions were already a reason why dicamba-based herbicides were vacated by the Ninth Circuit just months prior.¹¹⁷

The EPA’s renewed registration of dicamba meant farmers had to make investment decisions in the November *prior* to this upcoming farming season; another unexpected *vacatur* could have occurred and soured investments.¹¹⁸ Furthermore, January of 2021 entailed the integration of a new administration into the United States executive branch; the Biden administration, which has publicly

108. See *id.*; Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 960 F.3d 1120, 1124 (9th Cir. 2020).

109. Press Release, Ctr. for Biological Diversity, EPA Reapproves Dangerous, Drift-prone Dicamba Pesticides Recently Banned by Federal Court for Causing Widespread Economic Harm to Famers (Oct. 27, 2020).

110. *Id.*

111. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

112. *Id.*

113. *Id.*

114. *Id.*

115. Brigit Rollins, *The Deal with Dicamba: Lawsuit Challenges Registration, EPA Changes FIFRA Policy*, NAT’L AGRIC. L. CTR. (Nov. 12, 2020), <https://nationalaglawcenter.org/the-deal-with-dicamba-lawsuit-challenges-registration-epa-changes-fifra-policy/> [<https://perma.cc/66UA-DUD8>].

116. *Id.*; Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 960 F.3d 1120, 1124 (9th Cir. 2020).

117. Rollins, *supra* note 115.

118. Given the timing of these transactions in respect to growing season, if the dicamba were vacated once again, farmers would suffer deadweight loss on these investments. Paulo Gonçalves & Jim Rice, *Investigating the Causes of Seed Returns in the Agribusiness Industry* (Proceedings of the 36th Hawaii International Conference on System Sciences 2003), https://www.researchgate.net/publication/221183240_Investigating_the_Causes_of_Seed_Returns_in_the_Agribusiness_Industry/link/0fcfd5146d91e4688e000000/download [<https://perma.cc/Z3UY-NQLL>].

addressed the pressing issues presented by volatile herbicides.¹¹⁹ Given the fact that growing season is now upon American farmers—and they have already invested into controversial volatile herbicides—new EPA officials have opted to extend court deadlines and evaluate their position.¹²⁰ Nevertheless, new officials question the motive behind the EPA’s November 2020 decision to approve dicamba herbicides for five additional years.¹²¹ It is unclear how the new administration would react to another mid-growing season *vacatur*.

Herbicidal policy has now entered a standstill. Legal analysis is thus necessary: farmers need transparency within the herbicidal registration process to make confident, justified investments ahead of their farming season.¹²² Without safeguards within the EPA’s registration process, farmers may invest in herbicides that are not legal come growing season—largely because the herbicide could destroy the crops being grown by their neighbors.¹²³

III. ANALYSIS

A. *The Aftermath of Herbicidal Litigation in 2020*

2020 illustrated the unpredictable nature of herbicidal regulation in American agriculture.¹²⁴ Most troubling, however, is that the legal sparring between the EPA and the Ninth Circuit produced no winners. Herbicidal litigation has provided no certainty to the agricultural market: farmers and intermediary wholesalers must continue to invest with caution¹²⁵ while environmental advocates and innocent farmers with no ties to controversial herbicides maintain a litigious frame of mind.¹²⁶ Further, agricultural firms continue to set aside money in order to settle expected legal claims.¹²⁷ A consolation victor amongst these parties, perhaps, may be the large agricultural firms who maintain substantial market shares in the herbicide industry.¹²⁸

119. Karen Ellis Carr, Katie Heilman & Donald McLean, *Biden Administration Promises Regulatory Changes for Pesticide Industry*, JD SUPRA (Mar. 5, 2021), <https://www.jdsupra.com/legalnews/biden-administration-promises-9435692/> [<https://perma.cc/AR3X-3L6E>].

120. *See id.*

121. Heather Chapman, *Biden EPA says Trump Administration Dicamba Decision was Political; Future for the Herbicide is Unclear*, AG UPDATE (Mar. 16, 2021), https://www.agupdate.com/rural_life/biden-epa-says-trump-administration-dicamba-decision-was-political-future-for-the-herbicide-is-unclear/article_c24b9a4b-cd74-5fc6-9702-91cd0bfbe179.html [<https://perma.cc/45K8-FD7K>].

122. *See* Brigit Rollins, *The Deal with Dicamba: EPA Approves Dicamba Pesticides for 2021 and Beyond*, NAT’L AGRIC. L. CTR. (Oct. 28, 2020), <https://nationalaglawcenter.org/the-deal-with-dicamba-epa-approves-dicamba-pesticides-for-2021-and-beyond/> [<https://perma.cc/K2MS-NS76>].

123. Hadachek, *supra* note 26.

124. *Id.*

125. *See* Rollins, *supra* note 102.

126. *Court Decision Highlights Systemic Failure of Federal Pesticide Law to Protect Health and the Environment*, *supra* note 25; Gullickson, *supra* note 74.

127. *See Roundup Lawsuit*, SOKOLOVE L. (July 1, 2020), <https://www.sokolovelawfirm.com/product-liability/monsanto-roundup/> (Sept. 2, 2021) [<https://perma.cc/57CH-PBJY>].

128. Krohnfeldt, *supra* note 50.

This victory has not gone unnoticed; when the Ninth Circuit vacated dicamba in June 2020, the court noticed the development of a “near monopoly” surrounding dicamba-resistant technology.¹²⁹ There are two parties that bear the burden of herbicidal litigation: farmers and those defending the environment; each must proceed with seemingly perpetual caution as litigants continue to spar with one another.¹³⁰

B. The EPA’s Failure to Comply with Environmental Laws

The 2020 herbicidal case law illustrates the EPA’s failure to comply with procedures under FIFRA.¹³¹ Understandably, the EPA has gone great lengths to support historical agricultural practices and protect the investments made by United States farmers.¹³² The application of widely used herbicides, however, is balanced by environmental safeguards under FIFRA.¹³³ Thus, herbicidal use in the United States presents a dichotomy: how can agricultural supply chain consumers—like farmers—invest confidently in herbicides necessary to maintain a steady income, while considering the possibility that the herbicide they invest in may get taken off the open market?

I. Dicamba Litigation: National Family Farm Coalition v. U.S. Environmental Protection Agency

The EPA and the Ninth Circuit are at odds over dicamba.¹³⁴ In *National Family Farm Coalition v. EPA*, the National Family Farm Coalition, the Center for Food Safety, and Pesticide Action Network North America (“Dicamba Petitioners”) successfully convinced the Ninth Circuit to vacate the registration of three dicamba-based herbicides.¹³⁵ The Ninth Circuit decided to vacate Dicamba’s registration because the initial registration of the herbicide itself violated FIFRA procedures.¹³⁶

FIFRA “is a comprehensive regulatory scheme aimed at controlling the use, sale, and labeling of pesticides.”¹³⁷ Registration is the EPA’s procedure used to “further this aim” of FIFRA’s regulatory scheme.¹³⁸ Before any pesticide can be used or sold in the United States, it must be registered by the EPA; this means that the EPA “provide[s] a license that establishes the terms and conditions under which a pesticide may be lawfully sold, distributed”¹³⁹ A license’s terms

129. Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 960 F.3d 1120, 1142 (9th Cir. 2020).

130. Hadachek, *supra* note 26; *Court Decision Highlights Systemic Failure of Federal Pesticide Law*, *supra* note 25.

131. *See, e.g., Nat’l Fam. Farm Coal.*, 960 F.3d at 1124.

132. *See id.* at 1123–24.

133. *Id.* at 1123.

134. *See, e.g., id.* at 1125.

135. *Id.* at 1124.

136. *Id.*

137. *Id.*

138. This is quoted from the Enlist litigation, involving the same parties. Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 966 F.3d 893, 912 (9th Cir. 2020).

139. *Id.*; *see also* 7 U.S.C. § 136a(a).

and conditions prescribe what exact product may be sold, how it can be packaged, how it can be used properly, and how the label should explain such proper use.¹⁴⁰

Stringent registration standards are safeguards provided by Congress to ensure that registered pesticides do not cause unreasonable adverse effects on the environment.¹⁴¹ If an herbicide causes unreasonable adverse effects, it will not be registered. To determine if unreasonable adverse effects are present, “FIFRA uses a cost-benefit analysis to ensure that there is no unreasonable risk created for people or the environment from a pesticide.”¹⁴² Regarding dicamba, the Ninth Circuit opined that the EPA erred in their cost-benefit analysis for three reasons.¹⁴³ Specifically, Dicamba Petitioners evidenced three types of off-target drift: drift caused by wind, drift caused by vaporization in hot weather, and drift caused by temperature inversions.¹⁴⁴

Some farmers actually began relying on dicamba decades ago.¹⁴⁵ In recent years, however, various weeds became resistant to Roundup—Monsanto’s glyphosate-based herbicide widely used across the country on various crops.¹⁴⁶ Roundup’s gradual decrease in effectiveness resulted in widespread farmer reliance on dicamba, which is also produced by Monsanto, along with two other large manufacturers (BASF and Corteva).¹⁴⁷ In 2016, these agricultural manufacturers advocated for and received registrations for three notable dicamba-based herbicides.¹⁴⁸ This 2016 registration granted by the EPA was pursuant to FIFRA and on a *conditional* two-year basis.¹⁴⁹

i. Types of Registration and Standards of Review

A registration may occur in more than one way.¹⁵⁰ The most common type of registration is an unconditional registration.¹⁵¹ For an herbicide to be unconditionally registered, the EPA must analyze all pertinent information in its possession to conclude “that no additional data [is] necessary.”¹⁵² Additionally, a given herbicide must also “not generally cause unreasonable adverse effects on the environment.”¹⁵³ An unreasonable adverse effect on the environment is “any

140. *Id.* § 136(p); 40 C.F.R. §§ 152.115, 156.10.

141. Procedural analysis from Enlist Ninth Circuit opinion. *Nat’l Fam. Farm Coal.*, 966 F.3d at 909.

142. This pertains to dicamba litigation opinion. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1133 (quoting Pollinator Stewardship Council v. U.S. Env’t Prot. Agency, 806 F.3d 520 522–23) (9th Cir. 2015)).

143. *Id.* at 1124.

144. *Id.* at 1123

145. *Id.*

146. *Id.*

147. *See id.* at 1123–24.

148. Each firm produces and distributes their own unique kind of a dicamba-based herbicide. *Id.* at 1125–26.

149. *Id.* at 1126.

150. This is an analysis from the Enlist opinion. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 966 F.3d 893, 912 (9th Cir. 2020).

151. *Id.*

152. 40 C.F.R. § 152.112(b), (c).

153. *Id.* § 152.112(e).

unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of use of any pesticide.”¹⁵⁴ The EPA may cancel registrations; they also use “registration review” as a “backstop” to monitor otherwise legal herbicides every fifteen years in case new data would alter the EPA’s cost-benefit analysis.¹⁵⁵

The EPA may also *conditionally* register or amend the registration of a pesticide for use in “special circumstances.”¹⁵⁶ Conditional registration requires less data than an unconditional registration.¹⁵⁷ The EPA must conclude that “the applicant has submitted satisfactory data” in regards to the use of the herbicide and that its amended registration “would not significantly increase the risk of any unreasonable adverse effect on the environment.”¹⁵⁸ Thus, conditional and unconditional registrations require differing standards of review by the EPA: unconditional registration requires the pesticide “not generally cause unreasonable adverse effects on the environment,” while conditional registration requires the pesticide “not significantly increase the risk of any unreasonable adverse effect on the environment.”¹⁵⁹

Conditional registration facially seems to require a more strict causation standard than unconditional registration.¹⁶⁰ Specifically, an herbicide fails conditional registration due to a mere “risk” of adverse environmental effects, whereas unconditional registration requires an herbicide actually “cause” an unreasonable adverse effect to the environment in order to fail.¹⁶¹ Conditional registration, however, actually requires a more limited review by the EPA: conditional registration and its risk standard typically apply “when a registrant is proposing to use an already-registered pesticide or active ingredient in a new way.”¹⁶²

Accordingly, since dicamba had once been registered in 2016, the EPA only used evidence that “bears on whether the new or additional use changes the EPA’s original conclusion that the pesticide or active ingredient ‘will not generally cause unreasonable adverse effects.’”¹⁶³ There is an exception, however: the EPA’s limited conditional causation standard may apply to herbicides that have not yet been registered in unique circumstances.¹⁶⁴ Particularly, the EPA may also register an herbicide conditionally *without* prior registration, “if the Administrator determines that use of the pesticide during such period will not cause any unreasonable adverse effect on the environment, and that use of the pesticide is

154. 7 U.S.C. § 136(bb).

155. *Nat’l Fam. Farm Coal.*, 966 F.3d at 918.

156. 7 U.S.C. § 136a(c)(7).

157. *See id.* § 136a(c)(7)(B).

158. *Id.*

159. 40 C.F.R. § 152.112(e); 7 U.S.C. § 136a(c)(7)(B).

160. 40 C.F.R. § 152.112(e); 7 U.S.C. § 136a(c)(7)(B).

161. 40 C.F.R. § 152.112(e); 7 U.S.C. § 136a(c)(7)(B).

162. 7 U.S.C. § 136a(c)(7)(A), (B); *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 966 F.3d 893, 912 (9th Cir. 2020).

163. *Nat’l Fam. Farm Coal.*, 966 F.3d at 916 (quoting 7 U.S.C. § 136a(d)(1)(B)).

164. *See* 7 U.S.C. § 136a(c)(7)(C).

in the public interest.”¹⁶⁵ Nonetheless, each standard hinges on the legal concept of unreasonable adverse effects on people and the environment.¹⁶⁶

The EPA’s compliance with FIFRA also merits a distinct standard of judicial review.¹⁶⁷ EPA compliance with FIFRA’s requirements must be based on “substantial evidence when considered on the record as a whole.”¹⁶⁸ To show substantial evidence, the EPA must show “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion even if it is possible to draw two inconsistent conclusions from the evidence.”¹⁶⁹ In short, courts review the EPA’s compliance with FIFRA under a standard that is “relatively deferential to the agency factfinder.”¹⁷⁰ In the end, EPA must provide substantial evidence supporting their conditional or unconditional registration.¹⁷¹

ii. The EPA’s Failure to Satisfy Deferential Judicial Review

Dicamba’s original 2016 conditional registration included unrealistic expectations.¹⁷² The two-year conditional registration was announced at the end of the 2016 growing season and was set to reshape cotton and soybean production across the country in 2017.¹⁷³ Each Monsanto, DuPont (now Corteva), and BASF, informed the EPA that their herbicides had such low volatility that there would be insignificant off-target drift.¹⁷⁴

Monsanto, moreover, conducted its own private supportive studies prior to its 2016 application for conditional registration—its dicamba formulation was not available for independent studies.¹⁷⁵ Nonetheless, this data was still used in the EPA’s cost-benefit analysis when determining to register the herbicide; twenty-seven million acres of cotton and soybeans across the country subsequently applied dicamba herbicides.¹⁷⁶ The EPA prescribed six separate restrictions for farmers to abide by while applying the chemical mix to growing crops, by which the EPA expected to eliminate all offsite exposures of dicamba.¹⁷⁷ Approximately 3.6 million acres of soybeans (four percent of all U.S. soybeans) were subsequently damaged by off-target dicamba spread.¹⁷⁸

165. *Id.*

166. *Nat’l Fam. Farm Coal.*, 966 F.3d at 913–16.

167. This pertains to the Ninth Circuit’s analysis of Dicamba. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 960 F.3d 1120, 1133 (9th Cir. 2020).

168. 7 U.S.C. § 136n(b).

169. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1132–33 (quoting *Nat. Res. Def. Council v. U.S. Env’t Prot. Agency*, 857 F.3d 1030, 1036 (9th Cir. 2017) (internal quotation marks omitted)).

170. 966 F.3d at 914 (quoting *Containerfreight Corp. v. United States*, 752 F.2d 419, 422 (9th Cir. 1985) (internal quotation and citation omitted)).

171. Dicamba analysis in the Ninth Circuit. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1133.

172. *Id.* at 1127.

173. *Id.*

174. *Id.* at 1126–27.

175. *Id.* at 1134.

176. *Id.* at 1127, 1134.

177. *Id.* at 1127.

178. *Id.*

Dicamba's registration was then set to expire in late 2018.¹⁷⁹ Prior to the 2018 growing season, the EPA implemented four additional restrictions for farmers to comply with while applying dicamba to cotton and soybeans.¹⁸⁰ Notwithstanding yet another year of record-setting off-target crop damage due to dicamba application, the herbicide was conditionally registered for two more years after the 2018 growing season.¹⁸¹ This registration was granted again upon the request of Monsanto,¹⁸² Corteva, and BASF.¹⁸³ The EPA then implemented an additional five restrictions for farmers to abide by while applying the pesticide over the next two years.¹⁸⁴

The Ninth Circuit intervened before dicamba's 2018 registration expired.¹⁸⁵ Dicamba Petitioners successfully convinced the Ninth Circuit to vacate the three dicamba-based products distributed by Bayer, Corteva, and BASF.¹⁸⁶ This was due to violations of FIFRA.¹⁸⁷ Specifically, "FIFRA provides two requirements for conditional amendment of an existing registration. The EPA must determine that (i) the applicant has submitted 'satisfactory data,' and (ii) the amendment will not 'significantly increase the risk of any unreasonable adverse effect on the environment.'"¹⁸⁸ The Ninth Circuit was not compelled to complete the entire conditional registration analysis.¹⁸⁹ The court explained, "We need not decide whether substantial evidence supports a finding that the applicants submitted satisfactory data . . . because we hold that the EPA substantially understated risks . . . and entirely failed to acknowledge other risks."¹⁹⁰ Based on the statutory description of unreasonable adverse effects on the environment, the Ninth Circuit concluded that dicamba-based products were more costly than beneficial to the economy, social affairs, and the environment as a whole.¹⁹¹

The EPA supported their registration by citing two benefits.¹⁹² First, they argued that the 2018 registrations provided growers with an additional tool for managing difficult weeds.¹⁹³ Second, the EPA asserted that dicamba delayed weed resistance to other herbicides.¹⁹⁴ Notably, the EPA stipulated that the

179. *Id.*

180. *Id.* at 1128.

181. *Id.* at 1128–29.

182. Between these conditional registrations, Monsanto was bought out in a landmark deal by Bayer for over sixty billion dollars. After years of litigation, Bayer won the antitrust suit; nonetheless, the agribusiness industry became further concentrated. *Bayer Wins U.S. Antitrust Approval for its \$66 Billion Takeover of Monsanto*, FORTUNE (May 29, 2018, 11:26 AM), <https://fortune.com/2018/05/29/bayer-monsanto-takeover-approval/> [<https://perma.cc/H7ZH-SYRD>].

183. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1129.

184. *Id.* at 1130.

185. *Id.* at 1131.

186. *Id.* at 1124.

187. *Id.*

188. *Id.*

189. *Id.*

190. *Id.*

191. *Id.* at 1144–45.

192. *Id.* at 1136.

193. *Id.*

194. *Id.*

application of dicamba does *not* increase crop yields in comparison to other herbicides.¹⁹⁵

The EPA substantially understated three separate risks to dicamba use.¹⁹⁶ First, the EPA understated the extent to which dicamba-tolerant soybeans were planted; the EPA relied on Monsanto's *own* assertion that only forty-million acres would be sown in 2018.¹⁹⁷ As it happened, however, fifty-six-million acres were planted.¹⁹⁸ Second, the EPA stated that off-target dicamba damage could be over or under reported,¹⁹⁹ but there was no explanation as to why there were 1,250 drift complaints in 2016, while there were 3,000 in 2017—the first year dicamba herbicides were applied.²⁰⁰ Finally, the EPA also understated the quantity of dicamba-based damages: the administration made no estimate during their cost-benefit analysis, despite the estimation across agricultural academia that 3.6 million acres had been damaged by drift in 2017.²⁰¹

The EPA entirely failed to acknowledge several additional risks.²⁰² One glaring issue is the physical inability for individuals to adequately follow the restrictions necessary to apply dicamba without causing for drift.²⁰³ By 2020, there were over ten separate requirements to follow while applying dicamba—all for the purpose of limiting off-target drift.²⁰⁴ At a glance, compliance with that many restrictions seems rather unlikely given the widespread use of dicamba-based herbicides.²⁰⁵ In June 2018, however, professors at Purdue University calculated that there were only forty-seven hours during the *entire month* that dicamba could have been legally applied.²⁰⁶ There were thousands of drift complaints across the Midwest in 2018, which indicates that by and large guidelines were not properly followed.²⁰⁷

Finally, the EPA is statutorily required to consider economic and social costs of a given herbicide.²⁰⁸ Under the circumstances, the Ninth Circuit found the EPA had “entirely failed to acknowledge” the “near-monopoly” that these agricultural producers possess in regard to herbicides.²⁰⁹ Particularly, “[b]y 2017, soybeans with Monsanto’s dicamba-tolerance trait comprised a quarter of U.S. soybeans, and more than [six] percent of all U.S. cropland. By 2018, Monsanto’s dicamba-tolerance trait was in approximately [fifty] percent of U.S. soybeans. Use of the three dicamba herbicides has increased commensurately.”²¹⁰

195. *Id.*

196. *Id.* at 1136.

197. *Id.*

198. *Id.*

199. *Id.*

200. *See, e.g., id.*

201. *Id.* at 1138.

202. *Id.* at 1139.

203. *Id.* at 1139–40.

204. *Id.* at 1140.

205. *Id.*

206. *Id.* at 1141.

207. *Id.*

208. *Id.* at 1142.

209. *Id.* (emphasis added).

210. *Id.*

In some areas containing widespread production of soybeans and cotton, farmers have no option but to purchase dicamba-tolerant crops to withstand inevitable off-target drift.²¹¹ The EPA indirectly aided widespread market concentration and thus ignored a glaring economic risk by registering dicamba-based herbicides.²¹² What is more, dicamba is turning neighbors against each other: “[t]he EPA also entirely failed to acknowledge a social cost that had already been experienced and was likely to increase. The record contains extensive evidence that [over the top] application of dicamba herbicides has torn apart the social fabric of many farming communities.”²¹³

iii. The EPA’s 2020 Registration of Dicamba-Based Pesticides

The EPA’s October 27, 2020 re-registration of dicamba-based products is counter-intuitive. First, the EPA’s justification behind registering dicamba does not cater to the Ninth Circuit’s holding in June: the EPA based its decision on *recently-received* data.²¹⁴ Data sufficiency, however, was not the reason such herbicides were vacated in spite of the EPA’s conditional approval in the first place.²¹⁵ The Ninth Circuit did not question the extent to which the EPA’s data was satisfactory.²¹⁶ Further, the EPA added *additional* restrictions required for the application of dicamba.²¹⁷ This is despite the fact that strenuous application restrictions were part of the reason that dicamba herbicides were vacated by the Ninth Circuit.²¹⁸

The EPA also claims the repeated registration of dicamba provides “certainty” to farmers.²¹⁹ Farmers are far from certain: they have already experienced the fact that the herbicide can be deemed illegal in the midst of their growing season.²²⁰ Furthermore, the EPA stipulated in June that dicamba-based herbicides do not increase the yields of the fields which the herbicide is applied.²²¹ In sum, dicamba seems to provide no more than speculative, impermanent “certainty” to farmers.²²²

211. *Id.*

212. *Id.*

213. *Id.* at 1143.

214. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

215. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1124.

216. *Id.*

217. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

218. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1124.

219. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

220. Johnathan Hettinger, *Farmers Struggle for Guidance After Federal Court Bans Popular Herbicide*, MIDWEST CTR. INVESTIGATIVE REPORTING (June 5, 2020), <https://investigatamidwest.org/2020/06/05/farmers-struggle-for-guidance-after-federal-court-bans-popular-herbicide/> [<https://perma.cc/5RCW-F34B>].

221. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1136.

222. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

2. *Enlist Litigation*: National Family Farm Coalition v. U.S. Environmental Protection Agency

Enlist was also subject to notable herbicidal litigation during 2020.²²³ Enlist is produced by Dow Agrosiences (Dow): similar to the producers of dicamba, Dow is one of the dominant market players in the global herbicide industry.²²⁴ Further akin to dicamba, the plaintiffs who pursued Enlist's *vacatur* in the Ninth Circuit included the National Family Farm Coalition, Center for Food Safety, Center for Biological Diversity, and Pesticide Action Network North America ("Enlist Petitioners").²²⁵ These are the same litigants who successfully defeated dicamba.²²⁶

Enlist is used to fight off weeds that affect the growth of soybeans, cotton and corn, which "have a gross production value of approximately \$103 billion per year."²²⁷ Similar to dicamba, Enlist is used as a fallback option because glyphosate has become defective against "noxious weeds."²²⁸ Dow engineered Enlist, however, with the use of glyphosate; Enlist is a combination of glyphosate and 2,4-D choline salt.²²⁹ This specific mixture is effective as compared to the chemicals when they are applied separately; "combining the two chemicals delays the development of the weeds' resistance and allows pesticide use later in the growing season, thereby improving yields."²³⁰ Enlist is one of modern agriculture's most widely used, and widely effective ways to combat weeds.²³¹

While dicamba was originally registered in 2016, Enlist was initially registered under FIFRA in 2014.²³² Enlist itself also has various label requirements and restrictions meant to limit its potential impact on the environment.²³³ These restrictions provided by the EPA prohibit application of Enlist from any aircraft; application of Enlist while wind speed is over fifteen miles per hours; and application of Enlist without the use of designated thirty-foot buffer areas within the field.²³⁴ These application requirements are significantly less stringent than the fourteen restrictions now required to apply dicamba herbicides.²³⁵

The same entities who fought dicamba and Enlist in 2020 also challenged the EPA's registration of Enlist in 2014.²³⁶ The herbicide was only registered in six states at the time.²³⁷ While this lawsuit was pending in 2015, however, the

223. See, e.g., *Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency*, 966 F.3d 893, 904 (9th Cir. 2020).

224. *Id.* at 905; Krohnfeldt, *supra* note 50.

225. *Nat'l Fam. Farm Coal.*, 966 F.3d at 905; *Nat'l Fam. Farm Coal.*, 960 F.3d at 1124.

226. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1125.

227. *Nat'l Fam. Farm Coal.*, 966 F.3d at 904.

228. *Id.* at 905.

229. Hence why it is called the Enlist Duo. *Id.*

230. *Id.*

231. Davies, *supra* note 103.

232. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1123; *Nat'l Fam. Farm Coal.*, 966 F.3d at 905.

233. This is due to its tendency to drift off-target. *Nat'l Fam. Farm Coal.*, 966 F.3d at 927.

234. *Id.*

235. See *Nat'l Fam. Farm Coal.*, 960 F.3d at 1141–42.

236. *Id.* at 1124; *Nat'l Fam. Farm Coal.*, 966 F.3d at 905–06.

237. *Nat'l Fam. Farm Coal.*, 966 F.3d at 905.

EPA registered Enlist in nine additional states.²³⁸ Though Enlist and dicamba Petitioners also challenged the 2015 registration, “briefing was never completed.”²³⁹ The EPA vacated their own registration when they learned that Dow had begun the formal process of obtaining a patent on Enlist’s technology, called “synergism.”²⁴⁰ Nonetheless, in 2017, the EPA relied on additional data surrounding synergism when it authorized use of Enlist in thirty-four states.²⁴¹

Enlist Petitioners sought the *vacatur* of Enlist in 2020 through multiple routes. Namely, claims were brought under both FIFRA and the Endangered Species Act (ESA).²⁴² The ESA claims, however, were largely unsuccessful.²⁴³ Analogous to the litigation surrounding dicamba in the Ninth Circuit, the EPA’s ability to comply with FIFRA was the crux of the court’s analysis.²⁴⁴ Thus, for Enlist’s registration to be upheld, “substantial evidence” must support the EPA’s cost-benefit analysis that concluded Enlist did not lead to “unreasonable adverse effects on the environment.”²⁴⁵ This cost-benefit analysis requires “taking into account the economic, social, and environmental costs and benefits of the herbicide.”²⁴⁶ Although dicamba was vacated by the Ninth Circuit under this analysis, Enlist’s registration was remanded to the EPA *without vacatur*.²⁴⁷ In short, this means the Ninth Circuit determined the herbicide was appropriate for widespread use.²⁴⁸

Enlist Petitioners maintained several arguments within their FIFRA claims.²⁴⁹ Notably, they argued that the EPA lacked substantial evidence supporting registrations that occurred in 2014, 2015, and 2017.²⁵⁰ This argument calls to question the standard that led to the *vacatur* of dicamba: substantial evidence must be of the type that “a reasonable mind might accept as adequate to support a conclusion even if it is possible to draw two inconsistent conclusions from the evidence.”²⁵¹ Enlist Petitioner’s only successful argument claimed that the EPA failed to assess harm to monarch butterflies as a result of increased use of Enlist.²⁵²

Enlist Petitioners also argued that the EPA failed to consider the tendency for Enlist to drift off-target.²⁵³ Dicamba’s tendency to drift off-target from the plants it is applied to, and destroy other crops, is the reason it was vacated by the

238. *Id.* at 905–06.

239. *Id.* at 906.

240. *Id.*

241. *Id.*

242. *Id.* at 904.

243. *Id.* at 929.

244. *See id.*

245. *Id.* at 913–14.

246. *Id.* at 913.

247. *Id.* at 929; Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency, 960 F.3d 1120, 1125 (9th Cir. 2020).

248. *Nat’l Fam. Farm Coal.*, 966 F.3d at 912, 929–30.

249. *Id.* at 909, 916.

250. *Id.* at 916.

251. *Id.* at 922.

252. This is what led to the remand, but without *vacatur*. *Id.* at 917.

253. *Id.* at 918.

Ninth Circuit just weeks before Enlist maintained its registration.²⁵⁴ Dicamba's volatility was severely understated by private studies conducted solely by the large market participants that produce and sell dicamba products.²⁵⁵ These private studies—which were not shared with independent researchers and led to the registration of dicamba—turned out to understate risks after thousands of drift complaints occurred across the United States.²⁵⁶

Despite lesser drift concerns surrounding Enlist, the EPA had significantly more data to justify its registration of Enlist compared to dicamba.²⁵⁷ First, the EPA began with the “Ouse” laboratory study.²⁵⁸ Next, cognizant that only one study would not meet regulatory standards, the EPA relied on six more publicly attainable studies; the “Havens” study and AERSCREEN modeling specifically helped the EPA reach a firm conclusion on the drift risks involved with Enlist.²⁵⁹ In further contrast to the data underlying dicamba's registration, the Enlist Petitioners “[did] not suggest that, in five-plus years since Enlist Duo was originally approved, their fears surrounding 2,4-D volatility have materialized in the real world.”²⁶⁰ Despite the use of several studies, and absent thousands of complaints across the United States, the Ninth Circuit still reasoned that “[u]ltimately, EPA's evaluation of 2,4-D probably could have been better.”²⁶¹ This logically speaks to the extent that dicamba was registered prematurely or erroneously altogether.

The opinions surrounding dicamba and Enlist pertain to contested herbicide registrations by the EPA.²⁶² In regards to herbicidal volatility,²⁶³ the EPA used vastly differing methods to determine that each herbicide would not have unreasonably adverse effects on the environment.²⁶⁴ Specifically, the EPA cited significantly more unbiased data supporting Enlist than it did dicamba, even though dicamba is accompanied with long-standing drift concerns.²⁶⁵ In 2016, dicamba merited EPA registration even though the data supporting it was independently provided by its producer that knew of its volatility.²⁶⁶ In contrast, Enlist—which was accompanied by less significant drift concerns—seemingly required much more public data to merit registration.²⁶⁷

254. *Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency*, 960 F.3d 1120, 1124 (9th Cir. 2020); Davies, *supra* note 103.

255. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1137.

256. *Id.* at 1134, 1137.

257. *Compare id.* at 1134–36, with *Nat'l Fam. Farm Coal.*, 966 F.3d at 918–21.

258. *Nat'l Fam. Farm Coal.*, 966 F.3d at 918.

259. *Id.* at 919.

260. *Compare id.* at 921, with *Nat'l Fam. Farm Coal.*, 960 F.3d at 1137.

261. *Nat'l Fam. Farm Coal.*, 966 F.3d at 920.

262. *See, e.g., id.* at 904.

263. Volatility is used as a word to indicate the presence of off-target drift exhibited by a given herbicide. *See, e.g., id.* at 918; *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084, 1088 (E.D. Mo. 2019).

264. *Compare Nat'l Fam. Farm Coal.*, 966 F.3d at 919, with *Nat'l Fam. Farm Coal.*, 960 F.3d at 1134–35.

265. *Compare Nat'l Fam. Farm Coal.*, 966 F.3d at 919, with *Nat'l Fam. Farm Coal.*, 960 F.3d at 1123, 1134–35.

266. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1134.

267. *See Nat'l Fam. Farm Coal.*, 966 F.3d at 919; *see also* 960 F.3d at 1123 (explaining the dicamba's reputation for volatility).

The EPA applies arbitrary standards when registering herbicides.²⁶⁸ Given dicamba's volatile reputation, it seemingly deserved the scrutiny of additional public data prior to registration—rather than Enlist.²⁶⁹ It follows that the Ninth Circuit then vacated dicamba and allowed for Enlist's continued use.²⁷⁰ Nevertheless, the EPA registered dicamba once again in October 2020 without addressing multiple arguments that led to its *vacatur* just months before.²⁷¹

The EPA seemingly avoided several well-grounded concerns surrounding the widespread use of dicamba.²⁷² Specifically, the EPA justified dicamba's volatility by citing a better herbicide market for farmers.²⁷³ Perhaps what underlies the EPA's reasoning is its support for large agricultural firms within the industry; it is the market's widespread concentration that has caused rapid developments in research and development across the agricultural sector as a whole.²⁷⁴ Though dicamba is an additional tool to combat corrosive weeds, the amount of tort claims it has caused across the United States is at minimum troubling.²⁷⁵

C. *Herbicide Drift and Tortious Liability Theories*

I. *Bader Farms, Inc. v. Monsanto Co.*

The EPA's registration of volatile herbicides also causes disputes between crop producers and their input suppliers.²⁷⁶ The herbicide litigation occurring in the Ninth Circuit throughout 2020 merely illustrates the procedures that allow for certain herbicides to be purchased and applied across the United States.²⁷⁷ As a result of these registrations, tortious legal claims have quickly substantiated across the Midwest and the South.²⁷⁸ In *Bader Farms, Inc. v. Monsanto Co.*, the damage that can be inflicted upon farmers—and upon the agricultural supply chain itself—was illustrated at a time when herbicide drift claims were accumulating across Midwestern and Southern states.²⁷⁹ *Bader Farms* involved a plaintiff-peach farmer pursuing damages from Monsanto and BASF²⁸⁰ because

268. Compare *Nat'l Fam. Farm Coal.*, 966 F.3d at 919, with *Nat'l Fam. Farm Coal.*, 960 F.3d at 1134–35.

269. See *Nat'l Fam. Farm Coal.*, 960 F.3d at 1123.

270. *Id.* at 1124; *Nat'l Fam. Farm Coal.*, 966 F.3d at 929.

271. Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

272. *Id.*; *Nat'l Fam. Farm Coal.*, 960 F.3d at 1134–44.

273. Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

274. See *Seed Industry Structure Is Characterized by Growth and Consolidation*, *supra* note 6, at 25–28.

275. See generally *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084 (E.D. Mo. 2019).

276. *Id.* at 1088.

277. See, e.g., *Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency*, 966 F.3d 893, 912–14 (9th Cir. 2020).

278. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d 711, 718 (E.D. Mo. 2019).

279. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1088.

280. Monsanto was later acquired by Bayer, but BASF received a significant amount of assets in the deal; along with a couple of other firms, they represent around 70% of the global pesticide market share. Spencer Chase, *Bayer-Monsanto Acquisition Leads to 'Massive Transformation' for BASF*, AGRI-PULSE (Sept. 25, 2019, 6:15 AM), <https://www.agri-pulse.com/articles/12636-bayer-monsanto-acquisition-leads-to-massive-transformation-for-basf> [https://perma.cc/8JT6-6QRR]; Krohnfeldt, *supra* note 50.

dicamba ravaged the plaintiff's peach farm.²⁸¹ Monsanto and BASF failed in a sweeping attempt to win summary judgment over each of the plaintiff's claims.²⁸² Subsequently, the \$75 million in damages assessed by a Missouri jury set the tone for herbicidal drift in 2020; this was a year that saw over \$450 million assessed against dicamba producers in order to remedy damaged farmers.²⁸³

The cause of tortious harm to farmers in *Bader Farms* was not actually dicamba herbicides.²⁸⁴ Note, moreover, that these herbicide producers also produce the *seeds* that are tolerant to such herbicides.²⁸⁵ The first claims made in response to widespread herbicidal drift were in 2015 and 2016; this was actually before modern dicamba herbicides were even registered by the EPA.²⁸⁶ The legal claims made by farmers are largely driven by market concentration²⁸⁷ and economic control exerted by the large companies that produce seeds; they are able to unduly influence the seeds that farmers plant.²⁸⁸

The mere presence of destructive, volatile herbicides leads to “defensive planting.”²⁸⁹ The prospect of having crops destroyed by a volatile herbicide is enough to influence a farmer's decision to plant seeds that can withstand that herbicide.²⁹⁰ Though the herbicide itself actually harms unprepared plants, “the key . . . is not the herbicide, it's the [dicamba-tolerant] *seeds*.”²⁹¹ The court explained in *Bader Farms* that the presence of dicamba-tolerant seeds showed causation if the plaintiffs could prove “Monsanto marketed and sold its dicamba-resistant seed to third-party farmers knowing that they would spray dicamba that may harm nearby, nonresistant crops.”²⁹² This is logically sensical: “why else would [dicamba producers] sell dicamba-resistant seed if not to encourage the use of dicamba . . . ?”²⁹³

Causation was the first of many legal concepts to survive summary judgment.²⁹⁴ The plaintiffs in *Bader Farms* successfully stated several tortious claims: dicamba's design defects; Monsanto and BASF's failure to warn of

281. Johnathan Hettinger, *Jury Awards \$265 Million to Bader Farms in Lawsuit Against Bayer, BASF*, MIDWEST CTR. INVESTIGATIVE REPORTING (Feb. 14, 2020), <https://investigatamidwest.org/2020/02/14/jury-deliberating-in-bader-farms-case-against-bayer-basf-over-dicamba/> [<https://perma.cc/EFU4-LHEY>].

282. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1090.

283. Emily Ashcraft, *Bader Farms Appeals \$75M Judgment in Peach Tree Dicamba Dispute*, L. ST. MEDIA (Dec. 23, 2020), <https://lawstreetmedia.com/agriculture/bader-farms-appeals-75m-judgment-in-peach-tree-dicamba-dispute/> [<https://perma.cc/3584-FJ7T>]; *\$400 Million Settlement Agreement Reached in Dicamba Crop Damage Multidistrict Litigation*, GRAY, RITTER & GRAHAM, P.C. (June 24, 2020), <https://www.grgpc.com/400-million-settlement-agreement-reached-in-dicamba-crop-damage-multidistrict-litigation/> [<https://perma.cc/U5W7-2JV2>].

284. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1090–91.

285. *Id.* at 1089.

286. *Id.*

287. This is due to the “increased demand,” and thus prices, as argued by the plaintiffs. *See id.* at 1088.

288. *Id.* at 1090.

289. *Id.*

290. *See id.*

291. *Id.* at 1090–91 (emphasis added).

292. *Id.* at 1090 (quoting *In re Dicamba Litigation*, 359 F. Supp. 3d 711, 720 (E.D. Mo. 2019)).

293. *Id.*

294. *Id.* at 1100.

dicamba's dangers; and negligent training for the use of dicamba products.²⁹⁵ Additionally, the relationship between Monsanto and BASF was of legal significance.²⁹⁶ Claims involving their joint venture and conspiracy liability also survived summary judgment.²⁹⁷

Bader Farms brings to light the oligopolistic strategy occurring at the top of the agricultural supply chain.²⁹⁸ Prior to the holding in *Bader Farms*, but after the damages alleged within the case, Monsanto was acquired by Bayer in a complex transaction.²⁹⁹ As a part of the deal, BASF obtained a significant amount of assets to aid their own crop-protection portfolio.³⁰⁰ This connection between Monsanto and BASF was evidenced in *Bader Farms*, as the \$75 million in assessed damages were due in part to the conspiracy between the two agricultural giants.³⁰¹

Opportunistic decision making began in 2010.³⁰² Specifically, this is when “Monsanto representatives warned others at Monsanto . . . widespread use of dicamba was incompatible with Midwestern agriculture due to its potential to cause widespread crop damage.”³⁰³ Further, Monsanto representatives knew as early as 2013 that “they would manage off-target issues with dicamba, and the answer was that everyone would have to plant [dicamba tolerant seeds].”³⁰⁴ BASF, on the other hand, knew by 2016 “[d]efensive [p]lanting” was a “[p]otential [m]arket [o]ppportunity,” and that a “growing concern” was cultivating in regards to crop producers using dicamba products “illegally.”³⁰⁵

During this time span, BASF and Monsanto had also “entered into multiple agreements pertaining to the development and commercialization of their dicamba tolerant system.”³⁰⁶ What is more, they “established joint working groups, through which Monsanto and BASF jointly pursued development, regulatory, and commercialization efforts pertaining to their [dicamba tolerant] [s]ystem.”³⁰⁷ The agreement even involved provisions which indemnified “each other for intellectual property violations and torts of gross negligence or willful misconduct.”³⁰⁸

295. *Id.*

296. *See id.* at 1093–98.

297. *Id.*

298. This pertains to Monsanto and BASF's attempted concentration of available herbicides, and the aim to force “Defensive Planting.” *See id.* at 1097–98.

299. Chase, *supra* note 280.

300. *Id.*

301. Carey Gillam, *Missouri Farmer Wins \$265 Million Verdict Against Monsanto*, SIERRA (Feb. 25, 2020), <https://www.sierraclub.org/sierra/missouri-farmer-wins-265-million-verdict-against-monsanto#:~:text=The%20jury%20found%20that%20Monsanto,of%20farmers%20such%20as%20Bader> [https://perma.cc/VJL8-WYNC].

302. *See Bader Farms, Inc.*, 431 F. Supp. 3d at 1097.

303. *Id.*

304. *Id.*

305. *Id.*

306. *Id.* at 1093.

307. *Id.* at 1095.

308. *Id.* at 1096.

A “ticking time bomb finally exploded” in *Bader Farms*.³⁰⁹ The scope of the damages caused by Monsanto and BASF is evidenced, in part, by the presence of punitive damages.³¹⁰ The true nature of the harms caused by dicamba volatility is unclear, as “[t]he one thing most acres of beans have in common is dicamba damage. There must be a huge cloud of dicamba blanketing the Missouri Bootheel”³¹¹ Similarly situated farmers have filed lawsuits throughout Southern and Midwestern states, but the plaintiffs in *Bader Farms* declined to be a part of this consolidation.³¹² Nevertheless, “[a]pparently it’s a miracle Bill Bader ever sold a pound of peaches” after 2015.³¹³

2. *In re* Dicamba Herbicides Litigation

Consolidated herbicidal drift complainants resulted in an additional \$400 million being collectively set aside by Monsanto, Bayer, and BASF in June of 2020.³¹⁴ This settlement was announced by Bayer alongside their decision to set aside \$10.9 billion to settle cases surrounding the side effects of using Roundup weedkiller.³¹⁵ These decisions occurred merely months after a jury awarded the plaintiffs in *Bader Farms* \$265 million³¹⁶ in damages caused by herbicidal drift.³¹⁷ *In re Dicamba Herbicides Litigation* consisted of twenty-one soybean farmers spread across eight states: Arkansas, Illinois, Kansas, Mississippi, Missouri, Nebraska, South Dakota, and Tennessee.³¹⁸ Each of these plaintiffs alleged the same harm as the plaintiff in *Bader Farms*; they suffered damaged crops as a result of other nearby farmers spraying dicamba herbicides over their own dicamba-resistant crops.³¹⁹

Similar to *Bader Farms*, *Dicamba Herbicides Litigation* included claims both before and after modern dicamba herbicides were being sold (“2016 plaintiffs”).³²⁰ Monsanto and BASF had not received registration for their dicamba herbicides until 2017; so claims prior to that year are based off the widespread use of dicamba-resistant seeds.³²¹ Subsequent claims (“2017 plaintiffs”) integrate the presence of dicamba-based herbicides into the logic of their

309. Johnathan Hettinger, *BASF: Monsanto is a ‘Fierce’ Competitor, Not a Co-Conspirator*, MIDWEST CTR. INVESTIGATIVE REPORTING (Feb. 12, 2020), <https://investigatamidwest.org/2020/02/12/basf-monsanto-is-a-fierce-competitor-not-a-co-conspirator/> [<https://perma.cc/3M6L-7DCP>].

310. Gillam, *supra* note 301.

311. Hettinger, *supra* note 309.

312. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1088.

313. Hettinger, *supra* note 281.

314. *\$400 Million Settlement*, *supra* note 283.

315. Jackie Pucci, *Bayer Settles Dicamba Drift Lawsuits; Moving on to Re-Registration*, COTTON GROWER (July 8, 2020), <https://www.cottongrower.com/protect-the-tech/bayer-settles-dicamba-drift-lawsuits/> [<https://perma.cc/KY4T-VDP6>].

316. These were eventually reduced to \$75 million. Ashcraft, *supra* note 283.

317. *Id.*; Gillam, *supra* note 301.

318. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d 711, 718 (E.D. Mo. 2019).

319. *Id.* at 718–19.

320. *Id.* at 718; *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084, 1088 (E.D. Mo. 2019).

321. Specifically, other farmers were purchasing dicamba resistance seeds and applying illegal dicamba herbicides. This led to defensive planting, nonetheless. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d at 720.

arguments.³²² Such claims after 2017 are analogous to those brought in *Bader Farms*: “[t]he claim . . . is that the defendants, in their pursuit of increased profits, pushed [dicamba resistant seeds] and [dicamba resistant herbicides] forward and misrepresented them as safe, knowing that nondicamba-resistant crops and plants would be damaged.”³²³ Further akin to *Bader Farms*, “plaintiffs contend[ed] that such damage was to the defendants’ benefit, as it would cause farmers to defensively purchase dicamba-resistant seeds to avoid damages.”³²⁴ Each plaintiff brought claims based on the laws of their own state.³²⁵

Dicamba Herbicides Litigation involved similar causation arguments to *Bader Farms*.³²⁶ Specifically, analogous to the arguments brought forward by the plaintiff *Bader Farms*, “the key to both the 2016 and 2017 claims . . . [was] not the herbicide—[but] the [dicamba-resistant] seed.”³²⁷ The 2016 plaintiffs, on one hand, claimed causation occurred “as with *Bader*’s claims . . . by foreseeable misuse of dicamba with [dicamba-resistant] seed.”³²⁸ The 2017 plaintiffs, in slight contrast, claimed “causation is supplied by either the third-party farmers’ legitimate use of [a] new dicamba herbicide that did not work as promised, or their foreseeable misuse of old dicamba herbicide.”³²⁹

The court agreed that “causation could be established if it is proved that Monsanto marketed and sold its dicamba-resistant seed to third-party farmers knowing that they would spray dicamba that may harm nearby, nonresistant crops.”³³⁰ In regards to both theories of causation, moreover, the “entity [that] manufactured the dicamba herbicide is not part of the causal link”³³¹ Just as in *Bader Farms*, Monsanto and BASF were accused under theories of joint venture liability, “under that theory, both defendants could be liable for injuries caused by third-party farmers’ use of the seed, regardless of which entity manufactured the dicamba herbicide itself.”³³²

Dicamba Herbicides Litigation resulted in a similar judicial outcome to *Bader Farms*.³³³ Sophisticated causation theories stabilized state tort claims.³³⁴ The

322. *Id.*

323. Compare *id.* at 719 (explaining the alleged agenda behind Monsanto and BASF’s marketing of dicamba-resistant seeds), with *Bader Farms, Inc.*, 431 F. Supp. 3d at 1088 (“Plaintiffs claim both defendants conspired to create an ‘ecological disaster.’”).

324. Compare *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d at 719 (elaborating about the plaintiffs’ allegations that the defendants pursued defensive farming), with *Bader Farms, Inc.*, 431 F. Supp. 3d at 1090 (“Similarly, plaintiffs submit evidence that BASF employed a ‘defensive planting’ strategy . . .”).

325. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d at 719.

326. *Id.* at 720 (“This court has already ruled on the causation issue as it relates to the several products liability claims in the *Bader Farms* case, and the result is the same here.”).

327. *Id.*; cf. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1091 (“Again, the key . . . is not the herbicide, it’s the [dicamba-tolerant] seeds.”).

328. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d at 720.

329. *Id.*

330. *Id.*

331. This references the seed’s central role in the plaintiff’s causation theories; nonetheless, the defendants produced both the seeds and the herbicides. *Id.* (emphasis added).

332. *Id.*

333. See, e.g., *id.* (“This [c]ourt has already ruled on the causation issue as it relates to the several products liability claims in the *Bader Farms* case, and the result is the same here.”).

334. See *id.* (comparing the difference in causation claims between 2016 plaintiffs and 2017 plaintiffs).

plaintiffs sufficiently stated claims under several other theories: misrepresentations in violation of the Lanham Act,³³⁵ civil conspiracy, failure to warn,³³⁶ Illinois Consumer Protection Act claims, and Missouri Crop Protection Act Claims.³³⁷ Nevertheless, *Dicamba Herbicides Litigation*—in aggregate with *Bader Farms*—represents a nearly half-billion dollar outcome resulting from the prevalence of drifting herbicides.³³⁸

The “key” to this outcome, however, is “the seed, not the herbicide.”³³⁹ Destructive weeds have opened the door for herbicide and seed producers to take advantage of dicamba’s demand.³⁴⁰ As a result, “[d]icamba harmed tens of thousands of farmers, overwhelmed state agriculture departments and damaged research plots across the United States.”³⁴¹ To provide context, “[n]early 5,600 farmers reported dicamba damage to Bayer and BASF . . . from 2017–2019 . . . the EPA estimates this could be as much as a twenty-five-fold underreporting of incidents.”³⁴²

D. *The Impact of Drifting Herbicides on the Entire Supply Chain*

Dicamba-resistant seeds may be the technical causation of herbicidal drift damages rather than the herbicide itself.³⁴³ If these particular herbicides were not available, however, a farmer would not feel compelled to purchase the seeds in the first place.³⁴⁴ Thus, perhaps the EPA’s tendency to register controversial herbicides that run the risk of failing judicial scrutiny is the overlying issue. If it were predictable that the EPA is registering herbicides which do not run the risk of judicial *vacatur* or defensive planting, uncertain farmers could invest their money more confidently—without worry of their own crops being destroyed.³⁴⁵

Transparent herbicidal registration procedures are necessary for farmer protection.³⁴⁶ Before the EPA conditionally or unconditionally registers an herbicide, they must provide substantial evidence that it will not cause “unreasonable adverse effects on the environment.”³⁴⁷ The EPA uses a cost-benefit analysis to make this determination: the EPA determines during their registration process

335. The Lanham Act provides a cause of action for misleading advertising and branding which can confuse consumers. *Id.* at 721.

336. FIFRA can circumstantially preempt such claims. *See id.* at 736.

337. Many claims were also dismissed. *Id.* at 743.

338. Ashcraft, *supra* note 283; *\$400 Million Settlement*, *supra* note 283.

339. *In re Dicamba Herbicides Litig.*, 359 F. Supp. at 724.

340. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 960 F.3d 1120, 1123 (9th Cir. 2020).

341. Johnathan Hettinger, *EPA Documents Show Dicamba Damage Worse than Previously Thought*, ST. LOUIS POST-DISPATCH (Oct. 30, 2020), https://www.stltoday.com/news/local/state-and-regional/epa-documents-show-dicamba-damage-worse-than-previously-thought/article_36f21c52-7459-5ee0-8bae-21bf5e9f89d2.html [<https://perma.cc/98HU-NYEX>].

342. *Id.*

343. *In re Dicamba Herbicides Litig.*, 359 F. Supp. at 724.

344. *See Nat’l Fam. Farm Coal.*, 960 F.3d at 1123.

345. *See id.*

346. *See id.* at 1136.

347. *Id.* at 1124.

under FIFRA whether the “economic, social, and environmental” consequences of an herbicide’s use are more beneficial or costly.³⁴⁸

The EPA has not failed to consider market “certainty” in an attempt to combat evolving weeds.³⁴⁹ The attempt to combat these weeds has led to the repeated registration of dicamba, which is now applied across the United States.³⁵⁰ These registrations, however, seem to only provide certainty to agricultural conglomerates that maintain a growing 70% share of the global herbicide market.³⁵¹ These conglomerates also dominate research and development within the industry.³⁵² Farmers, in the meantime, are stuck investing in herbicides subject to unpredictable legal disputes: “[t]hey have been placed in this situation through no fault of their own.”³⁵³

IV. RECOMMENDATION

Herbicides are damaging the environment and innocent farmers on a large scale due to their volatility.³⁵⁴ Meanwhile, courts have recognized that the actual cause of herbicidal damages is the seeds which the herbicides are designed to be sprayed over.³⁵⁵ Nevertheless, the EPA has repeatedly registered herbicides which are complimentary³⁵⁶ to these seeds.³⁵⁷ Most recently, in the late Fall of 2020, the EPA decided to register dicamba once again for an additional five years.³⁵⁸ This enables the herbicide to be sprayed over the top of dicamba-resistant seeds; the decision was made despite unambiguous criticism of dicamba by the Ninth Circuit.³⁵⁹ The Ninth Circuit cited several “economic, social, and environmental costs” when it vacated dicamba; the EPA seemingly disregarded these assertions when it subsequently renewed the registration of the herbicide.³⁶⁰

This “unprecedented” freelancing by the EPA warrants adjustments to procedural considerations within FIFRA.³⁶¹ FIFRA is intended to be an elaborate framework which protects the American society from dangerous herbicides.³⁶² This statutory intention is better served by considerations which offset the prospect of off-target drift in herbicides now, and in the future. Such considerations serve the interests both farmers and the environment.

348. *Id.* at 1133.

349. *See, e.g.*, Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

350. *Id.*

351. Krohnfeldt, *supra* note 50.

352. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6, at 26.

353. 960 F.3d at 1145.

354. *In re Dicamba Herbicides Litig.*, 359 F. Supp. 3d 711, 718–19 (E.D. Mo. 2019).

355. *Id.* at 718.

356. *See Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

357. Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

358. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1123–24.

359. *See id.*

360. *Id.* at 1124; Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

361. Telephone Interview with Jonathan Coppess, Professor, University of Illinois College of Agricultural & Consumer Economics, Champaign, IL. (Feb. 8, 2021).

362. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 966 F.3d 893, 912–13 (9th Cir. 2020).

A. *Volatility as Rebuttable Presumption of Unreasonableness*

Off-target drift is a burden on the agricultural industry.³⁶³ Thus, its presence in a given herbicide—as supported by objective³⁶⁴ data—should result in a rebuttable presumption that the herbicide will have “unreasonably adverse effects on the environment.”³⁶⁵ As a result, such a herbicide would not satisfy the procedures set forth in FIFRA, and would be unavailable to the American public.³⁶⁶ This scheme adjustment could prevent the EPA from arbitrarily approving herbicides.³⁶⁷

Several considerations support such a rebuttable presumption. First, the damage caused to unprotected crops by off-target drift is a widespread issue for farmers across the country and the environment.³⁶⁸ Second, off-target drift results in defensive planting, which facilitates an oligopoly³⁶⁹ occurring within the agricultural supply chain.³⁷⁰ Finally, the possibility that volatile herbicides may be approved by the EPA hinders farmers from investing confidently in preparation for growing season.³⁷¹

Dicamba’s 2016 registration changed the landscape of agriculture.³⁷² This is due to damages caused by its off-target drift, and other drawbacks such as volatility has caused the environment.³⁷³ The national scope of drift damages is apparent but impossible to quantify: over one thousand drift complaints have surfaced since modern dicamba products have been approved by the EPA.³⁷⁴ What is more, off-target drift has caused extensive harm beyond farm fields; dozens of natural areas in the Midwest and the South have reported damages.³⁷⁵ State agricultural departments have even cited “dicamba fatigue.”³⁷⁶ In sum, herbicidal volatility has cost millions of dollars in legal claims, shattered the relationships of neighbors, and altered the day-to-day practices of farmers across the United States.³⁷⁷ Preventing such volatility from ever entering the market protects the financial interests of innocent farmers and the fragile environment they are farming in.

Off-target drift also causes defensive planting across American agriculture.³⁷⁸ Put specifically, farmers plant dicamba-resistant seeds in order to hedge

363. See, e.g., Hettinger, *supra* note 341.

364. Compare *Nat’l Fam. Farm Coal.*, 966 F.3d at 919, with *Nat’l Fam. Farm Coal.*, 960 F.3d at 1134–35.

365. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1124 (quoting 7 U.S.C. § 136a(c)(7)(B)).

366. *Id.*

367. See discussion *infra* Section IV.B.

368. See, e.g., Hettinger, *supra* note 341.

369. The Investopedia Team, *supra* note 19.

370. *Id.*; See *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

371. Hettinger, *supra* note 220.

372. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 960 F.3d 1120, 1136–45 (9th Cir. 2020).

373. *Id.*; Hettinger, *supra* note 341.

374. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1134.

375. Hettinger, *supra* note 341.

376. *Id.*

377. *Id.*; *Nat’l Fam. Farm Coal.*, 960 F.3d at 1133–38.

378. *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084, 1090 (E.D. Mo. 2019).

the risk that their neighbors are applying destructive dicamba herbicides.³⁷⁹ As a result, farmers across the country purchase seeds and herbicides that are produced by some of the largest agricultural firms in the world; such firms are the only ones that produce modern dicamba products.³⁸⁰ This worsens the market concentration that has been developing in the herbicide industry for decades.³⁸¹ Thus, procedurally preventing the registration of drifting herbicides combats the prospect of defensive planting, and obstructs market concentration within the agricultural industry.

Cotton and soybean farmers are also unable to invest in seeds and herbicides confidently. This is because volatile herbicides may be unexpectedly vacated;³⁸² this consideration is in addition to the reasonable concerns that entice farmers to partake in defensive planting.³⁸³ Large agricultural firms are well aware of these drawbacks.³⁸⁴ Nevertheless, these agricultural giants derive benefits that prevent competitors from entering the herbicide industry; these benefits also deter herbicidal innovation and increase the input prices paid by farmers.³⁸⁵ As a result, “increasingly powerful corporations pose a threat to the development of a sustainable food system that supports rural economies and the environment.”³⁸⁶ A rebuttable presumption seeking to curb the presence of herbicidal volatility supports an agricultural market focused less on protecting the controversial products of its dominant leaders, and more on protecting the investments of its consumers (farmers).³⁸⁷

Arguably, the presence of an herbicide like dicamba serves more benefits than costs to society. Particularly, dicamba is widely used due to its effectiveness against corrosive weeds like Palmer Amaranth, which can destroy a farmers’ yields.³⁸⁸ Further, the market presence of such an herbicide is an additional option for farmers.³⁸⁹ Without an effective but volatile herbicide like dicamba, there would be fewer herbicides, and today’s farmers would be harmed when herbicide prices increase due to limited product supply.³⁹⁰

379. *Id.*

380. *Nat’l Fam. Farm Coal.*, 960 F.3d at 1124.

381. *See Bader Farms, Inc.*, 431 F. Supp. 3d at 1097–98; Joseph E. Stiglitz, *Market Concentration is Threatening the U.S. Economy*, COLUM. BUS. SCH. (Mar. 12, 2019), <https://www8.gsb.columbia.edu/articles/chazen-global-insights/market-concentration-threatening-us-economy> [<https://perma.cc/Z4SJ-UCY2>]; *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6, at 27.

382. *See, e.g., Nat’l Fam. Farm Coal.*, 960 F.3d at 1124.

383. *Id.* at 1134–45.

384. *Bader Farms, Inc.*, 431 F. Supp. 3d at 1097–98.

385. *Id.* at 1088; The Investopedia Team, *supra* note 19.

386. Eva Perroni, ‘Pesticide Powerhouses’ and the Future of Farming, RESILIENCE (Dec. 20, 2016), <https://www.resilience.org/stories/2016-12-20/pesticide-powerhouses-and-the-future-of-farming/> [<https://perma.cc/575L-3A5E>].

387. *See Stiglitz, supra* note 381; *see also Seed Industry Structure is Characterized by Growth and Consolidation, supra* note 6.

388. *Nat’l Fam. Farm Coal. v. U.S. Env’t Prot. Agency*, 960 F.3d 1120, 1125 (9th Cir. 2020).

389. Pucci, *supra* note 97.

390. David Zilberman, Andrew Schmitz, Gary Casterline, Erik Lichtenberg & Jerome B. Siebert, *The Economics of Pesticide Use and Regulation*, 253 SCI. 518, 518 (1991).

Such an argument is similar to the EPA's when it registered dicamba in October of 2020.³⁹¹ Several points are raised, but the argument as a whole is short-sighted. First, dicamba may be used due to its effectiveness against corrosive weeds like Palmer Amaranth that have spread across the South and Midwest.³⁹² Dicamba specifically, however, was never actually argued to increase crop yields by Monsanto or the EPA; this indicates it was merely a replacement for the glyphosate herbicides that lost their effectiveness against powerful weeds.³⁹³ If the EPA could not sustain an argument that dicamba increases crop yields, supporting its registration due to its effectiveness is a baseless argument worsening widespread market concentration.

A volatile herbicide like dicamba would not diversify the herbicide market over time, either. The presence of an herbicide like dicamba would cause the opposite and further the herbicidal oligopoly.³⁹⁴ This drawback is illustrated by exponential increases in herbicidal drift complaints since modern dicamba's 2016 registration, which has led to defensive planting.³⁹⁵ Defensive planting concentrates the herbicide and seed market.³⁹⁶ Specifically, dicamba is being applied by more farmers on a yearly basis.³⁹⁷ This is because its widespread use causes farmers across the country to invest in the herbicide—not as a result of educated choice—but largely in an attempt to protect their own crops and income from destruction.³⁹⁸

The EPA correctly asserts that without dicamba, the amount of currently available herbicides decreases. As a result, this would temporarily drive the price of herbicides up until new herbicides entered the market.³⁹⁹ This drawback, however, was one the Ninth Circuit was willing to accept.⁴⁰⁰ Furthermore, registering an herbicide for the sake of controlling price is why the EPA's argument is short-sighted; a rebuttable presumption that volatile herbicides should not be registered would *incentivize the production of nonvolatile herbicides*.⁴⁰¹ Without the prospect of herbicidal volatility, producers would neither feel compelled nor have the option to capitalize on defensive planting.

391. See Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

392. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1123.

393. See *id.* at 1123, 1136.

394. See *Bader Farms, Inc. v. Monsanto Co.*, 431 F. Supp. 3d 1084, 1090, 1097–98 (E.D. Mo. 2019); Stiglitz, *supra* note 381; *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6; Perroni, *supra* note 386; The Investopedia Team, *supra* note 19.

395. Hettinger, *supra* note 341; *Bader Farms Inc.*, 431 F. Supp. 3d at 1090.

396. *Bader Farms Inc.*, 431 F. Supp. 3d at 1090, 1097–98; Perroni, *supra* note 386; The Investopedia Team, *supra* note 19.

397. Hettinger, *supra* note 34; *Nat'l Fam. Farm Coal.*, 960 F.3d at 1136–37.

398. *Bader Farms Inc.*, 431 F. Supp. 3d at 1090.

399. Zilberman et al., *supra* note 390.

400. *Nat'l Fam. Farm Coal.*, 960 F.3d at 1145.

401. *Id.*

B. Significant Factors: Market Diversification and Geographical Reliance

The rebuttable presumption created by herbicidal volatility must actually be rebuttable. This can be accomplished by attaching significant weight to certain factors when deciding if an herbicide is more costly or beneficial to society. Perhaps, applying one of these factors can lead to registration on a conditional basis to address the industry's urgent needs; recall that an otherwise unregistered, new herbicide is eligible for registration if it accords with *public interest*.⁴⁰² One factor deserving significance is market diversity.⁴⁰³ Market diversification would seek to break up market concentration and diversify the overall market with new, unique products.⁴⁰⁴ Market concentration, in contrast, is detrimental to economies.⁴⁰⁵ Concentration refers to the concept of few suppliers and few products, which leads to high demand and high prices.⁴⁰⁶

Market diversification could also increase market certainty, which is desirable in any supply chain.⁴⁰⁷ Market certainty allows consumers to forecast risks, price fluctuations, and idiosyncratic shocks within a given market; the EPA cited increased market certainty as a benefit in its most recent registration of dicamba.⁴⁰⁸ When the EPA registered dicamba, however, it managed to facilitate both uncertainty and concentration.⁴⁰⁹ Market concentration was aided through the allowance of foreseeable defensive planting.⁴¹⁰ Market uncertainty was facilitated through the possibility that the judicial system once again vacates dicamba during growing season.⁴¹¹

Farmers, the consumers on the supply chain,⁴¹² are currently left with an entirely concentrated herbicide market.⁴¹³ Given that herbicides and seeds are complementary products, farmers must invest in a highly concentrated, oligopolistic market.⁴¹⁴ This drives up the prices of these supplies, which only benefits manufacturers.⁴¹⁵

402. See discussion *supra* Section III.B.1.i.

403. CRISTINA ARELLANO, YAN BAI & PATRICK KEHOE, FINANCIAL MARKETS AND FLUCTUATIONS IN UNCERTAINTY 2 (2012).

404. Stiglitz, *supra* note 381.

405. *Id.*

406. *Id.*

407. See, e.g., CRISTINA ARELLANO, YAN BAI & PATRICK KEHOE, FINANCIAL MARKETS AND FLUCTUATIONS IN UNCERTAINTY 1 (2012).

408. *Id.*; Press Release, EPA Announces 2020 Dicamba Registration Decision, *supra* note 101.

409. See Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency, 960 F.3d 1120, 1136–45 (9th Cir. 2020).

410. *Id.* at 1145; Bader Farms, Inc. v. Monsanto Co., 431 F. Supp. 3d 1084, 1090, 1097–981097–98 (E.D. Mo. 2019); ARELLANO, BAI & KEHOE, *supra* note 403.

411. Hettinger, *supra* note 220.

412. Oppedahl, *supra* note 43; *Ag and Food Sectors and the Economy*, *supra* note 43; *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

413. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6; Stiglitz, *supra* note 381.

414. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6; The Investopedia Team, *supra* note 19.

415. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

Combating market concentration with a particular emphasis on market diversification is thus desirable policy. Most importantly, if market diversification increases the chances of registration, manufacturers would be incentivized to develop a wider portfolio of products.⁴¹⁶ If there are more products within a market to choose from, farmers will not find themselves in precarious situations like the growing season of 2020.⁴¹⁷ Namely, farmers will have replacement products to fall back on if an herbicide is vacated unexpectedly, which as a result, decreases uncertainty.⁴¹⁸

During the growing season of 2020, farmers were left with no fallback option.⁴¹⁹ Yields were nearly left vulnerable to ravenous weeds without remedy.⁴²⁰ If several herbicides are available on the open market, farmers at least have the option to use herbicides that won't destroy the hard work of their neighbors.⁴²¹ What is more, the presence of more herbicides prevents destructive weeds from mutating and eradicating the effectiveness of popular herbicides; unlike increased yields, this was a benefit cited by the EPA when dicamba was conditionally registered in 2018.⁴²² Policy supporting market diversification could increase the amount of products in the herbicidal market, limit the mutation of destructive weeds, and also lower the market barrier for smaller, less-advantaged producers.⁴²³

Arguably, policy that incentivizes market diversity could detriment the agricultural supply chain. For example, as the industry has concentrated, the size of the industry has continued to skyrocket.⁴²⁴ Further, the success of large firms maintains funding towards cutting-edge research and development in the industry.⁴²⁵

Incentivizing the development of diverse herbicides, however, does not hinder the overall market from expanding.⁴²⁶ As long as there are herbicides available on the open market, farmers will invest into herbicides that can fight off corrosive weeds.⁴²⁷ Furthermore, herbicide manufacturers, which facilitate much of the industry's expansion, are not burdened with mid-growing season uncertainty to the extent of farmers.⁴²⁸ For instance, when dicamba was vacated by the Ninth Circuit in June of 2020, large scale transactions from herbicidal producers to consumers had occurred months before.⁴²⁹ Farmers were the parties within these transactions that were almost left with an illegal, and thus useless,

416. See Stiglitz, *supra* note 381.

417. Hettinger, *supra* note 220.

418. Compare *id.*, with Pucci, *supra* note 97.

419. Hettinger, *supra* note 220.

420. *Id.*

421. *Id.*

422. Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency, 960 F.3d 1120, 1136 (9th Cir. 2020).

423. The Investopedia Team, *supra* note 19.

424. *Seed Industry Structure is Characterized by Growth and Consolidation*, *supra* note 6.

425. *Id.*

426. Stiglitz, *supra* note 381.

427. See Gonçalves, *supra* note 118.

428. See *id.*; Hettinger, *supra* note 220.

429. Hettinger, *supra* note 220.

product during a time of extreme need. A diverse market aids this problem because farmers could be left with more options on the market to fall back on; to the benefit of manufacturers, the transactions nevertheless still occur.⁴³⁰ This has no impact on the ability for the industry as a whole to expand; farmers across the country will cyclically invest in herbicides that protect their seeds.⁴³¹ Unique circumstances can necessitate the need for an additional herbicide on the market for a period of time.⁴³² Thus, placing significance on market diversification can act as a narrow exception to the rebuttable presumption that volatile herbicides should not be registered.

Second, the EPA should attach significant weight to the *geographic* necessity of certain herbicides. Although herbicidal volatility is undesirable on a national level, the EPA can also register herbicides in certain states.⁴³³ If weeds such as Palmer Amaranth are particularly detrimental to a certain region or state's crops, the risk of herbicidal drift in that region or state may be more tolerable.⁴³⁴ In aggregate with market diversification, placing significance upon geographic necessity would narrow the policy implication of the rebuttable presumption discussed in Section IV.A. For example, Illinois—both the soybean production and off-target drift complaint leader in the United States—may be a state whose economy relies upon effective herbicides enough to justify their volatility.⁴³⁵

Considering geographic necessity, however, is arguably counterintuitive. Particularly, a rebuttable presumption aimed at preventing herbicidal volatility is to protect regions that rely on herbicides.⁴³⁶ Thus, considering potential geographic reliance on an herbicide arguably undercuts the rebuttable presumption's aim to protect these regions and states in the first place.⁴³⁷

Such a counterargument is misplaced. Placing significance on geographic necessity would narrow the policy implication of the rebuttable presumption—not to undercut it all together. An herbicide such as Enlist, for example, has displayed a tendency to become volatile.⁴³⁸ At the same time, it has not caused an exponential increase in national drift complaints to the same extent that dicamba has.⁴³⁹ A rebuttable presumption that a volatile herbicide should not be registered would cause both Enlist and dicamba to never reach the market. Enlist—which

430. *Id.*; Pucci, *supra* note 97; see Stiglitz, *supra* note 381.

431. See Gonçalves, *supra* note 118; Hettinger, *supra* note 220.

432. Hettinger, *supra* note 220.

433. Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency, 966 F.3d 893, 905–06 (9th Cir. 2020).

434. PARMINDER S. CHAHAL, JATINDER S. AULAKH, M. JUGULAM & AMIT J. JHALA, 13 HERBICIDE-RESISTANT PALMER AMARANTH (*AMARANTHUS PALMERI* S. WATS.) IN THE UNITED STATES — MECHANISMS OF RESISTANCE, IMPACT, AND MANAGEMENT (2014).

435. Jonathan Hettinger, *Despite Federal, State Efforts, Dicamba Complaints Continue*, WILL (Aug. 31, 2019), <https://will.illinois.edu/news/story/despite-federal-state-efforts-dicamba-complaints-continue> [<https://perma.cc/3YGN-NSLT>].

436. Nat'l Fam. Farm Coal., 960 F.3d at 1124.

437. *Id.*

438. Nat'l Fam. Farm Coal., 966 F.3d at 905.

439. Compare *id.*, with Nat'l Fam. Farm Coal. v. U.S. Env't Prot. Agency, 960 F.3d 1120, 1136–39 (9th Cir. 2020).

is supported by objective⁴⁴⁰ data to lack the volatility of dicamba—may be necessary to combat weeds in a region that particularly relies on herbicides to aid their agriculturally-driven economy.⁴⁴¹ Further, there is no evidence that suggests Enlist leads to defensive planting.⁴⁴²

A rebuttable presumption against the registration of volatile herbicides provides clarity to the agricultural industry. Market diversity and geographic necessity considerations, however, facilitate narrow exceptions to this broad presumption. These procedural considerations, in sum, have the potential to subdue the sparring that is occurring between the Ninth Circuit and the EPA.⁴⁴³ Furthermore, farmers across the country could invest in products they desire, not the products that protect them from tortious damage.

V. CONCLUSION

The agricultural industry is a critical contributor to the United States' economy and GDP.⁴⁴⁴ Presently, there are thousands of crop producers who help fuel the entire agricultural industry, who are left with no option but to invest large amounts of money with minimal certainty.⁴⁴⁵ As illustrated in 2020, farmers do not know which herbicides will survive the EPA's analysis, then subsequently a judicial analysis.⁴⁴⁶ This is due to a lack of transparency, predictability, and objectivity surrounding the EPA's herbicidal registration procedures.⁴⁴⁷ Registering only herbicides that lack unreasonable volatility, while also promoting a more diverse market catered to geographic necessities, would have a positive impact on one of the world's preeminent agricultural industries.

440. Compare *Nat'l Fam. Farm Coal.*, 966 F.3d 893 at 919, with *Nat'l Fam. Farm Coal.*, 960 F.3d at 1134–35.

441. See Hettinger, *supra* note 220; Oppedahl, *supra* note 43.

442. See *Nat'l Fam. Farm Coal.*, 966 F.3d 893 at 919–21.

443. See discussion *supra* Section III.B.

444. Oppedahl, *supra* note 43.

445. Hettinger, *supra* note 220.

446. *Id.*

447. See *id.*

