

“Stranded Pesticides”: U.S. Agricultural Worker Vulnerability in the Wake of the 2021 Chlorpyrifos Food Ban

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In August 2021, after years of delay, the U.S. Environmental Protection Agency revoked food-based “tolerances,” or maximum allowable residues, for the neurotoxic pesticide chlorpyrifos. The new rule has been widely—and rightfully—heralded as a victory for children’s, environmental, and labor advocates. The tolerance revocation ends many of the most popular and pervasive uses of the pesticide. However, chlorpyrifos remains legal for a variety of non-food uses, both agricultural and otherwise. Many agricultural workers remain vulnerable to the occupational health risks associated with these uses. Their children and neighbors, too, continue to endure spray drift, take-home contamination, and prenatal exposure. Importantly, this population is often pushed to the margins of dominant policy discourse—an outcome bound up with a history of U.S. “agricultural exceptionalism” and the challenges of tenuous immigration status and linguistic isolation. This Note posits that chlorpyrifos’s persistent harm is attributable to and best described by the concept of “stranded” pesticide uses.

Stranded pesticides linger, quietly evading regulation and harming an already environmentally burdened community. This Note traces the legal advocacy efforts that culminated in the 2021 chlorpyrifos rule; explores why agricultural workers and their communities remain vulnerable in its wake; discusses how federal pesticides law and policy exacerbates both worker vulnerability and the likelihood of future pesticide “strandings”; and finally, contemplates legal and policy adaptations to mitigate these risks to agricultural workers.

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INTRODUCTION

In August 2021, after decades of vigorous advocacy from children’s, environmental, and public health organizations, the U.S. Environmental Protection Agency revoked food-based “tolerances,” or maximum allowable residues, for the popular and neurotoxic pesticide chlorpyrifos. The new rule marked a distinct change of course after decades of agency delay.

The new rule has been widely—and rightfully—heralded as a victory for children’s, environmental, and labor advocates. The tolerance revocation ends many of the most popular and pervasive uses of the pesticide. These uses have been associated with serious health consequences to children and adults. However, much of the discourse on the new rule inaccurately conflates it with a full ban on the pesticide. In reality, chlorpyrifos remains legal for a variety of non-food uses, including for application at tree farms, greenhouses, plant nurseries, and industrial facilities, as well as on ornamentals, wood structures, mosquito and tick habitat, ant mounds, fence posts, utility poles, and elsewhere.

Agricultural workers in particular remain vulnerable to the occupational health risks associated with these persistent legal uses. Their children and neighbors, too, continue to endure spray drift, take-home contamination, and prenatal exposure. Importantly, this population is often pushed to the margins of dominant policy discourse—an outcome bound up with a history of U.S. agricultural exceptionalism and the challenges of tenuous immigration status, linguistic isolation, and geographic mobility.

This Note frames chlorpyrifos’s persistent harm in relation to the concept of “stranded” pesticide uses. Stranded uses are those that remain quietly registered under federal law after food-based uses are cancelled. These legal uses linger, evading scrutiny while continuing to harm already environmentally burdened communities. This Note explores the story of chlorpyrifos, specifically, and the phenomenon of stranded pesticide uses, more broadly.

In Parts I and II, this Note explores the history of chlorpyrifos, from its introduction to cancellation, with particular focus on the pesticide’s observed health dangers and the advocacy efforts that drew attention to these risks.

Part III explores in depth how agricultural workers remain vulnerable even after the 2021 food tolerance revocation. This discussion explores the historical and contemporary factors that contribute to agricultural workers’ status as an “environmental justice population” and complicate the problem of stranded uses of chlorpyrifos.

Finally, in Part IV, this Note examines the role that federal pesticides law plays in facilitating persistent and inequitable health risks for agricultural workers. This Part concludes by discussing how the federal framework might be adapted to mitigate this harm.

I. CHLORPYRIFOS: A HISTORY OF POTENT HEALTH CONSEQUENCES, AGENCY INACTION, AND THE 2021 CANCELLATION OF FOOD-BASED USES

Agriculture and other industries in the United States have historically relied upon a menagerie of pesticides to protect crops and manage facilities, but chlorpyrifos has been a heavyweight for the past fifty years.¹ Recently, chlorpyrifos has been the focus of prominent pesticide reform efforts in the United States.² This Part outlines the origins of the pesticide, its potent human health consequences, and the efforts of scientists and advocates to limit its use in the United States.

A. *Chlorpyrifos Takes Hold in the United States*

Chlorpyrifos is a broad-spectrum insecticide, acaricide,³ and nematicide⁴ belonging to the class of chemicals called organophosphates.⁵ In 1965, Dow Chemical introduced chlorpyrifos to the U.S. market as an alternative to the neurotoxic dichloro-diphenyl-trichloroethane (DDT), which had itself come to market as a substitute for toxic lead arsenate.⁶ Cheap and effective, the substance soon became popular in both commercial farming and household insect control.⁷ Over the following fifty-some years, chlorpyrifos remained a popular pest control tool for both agricultural and non-agricultural purposes.⁸

In its pure form, chlorpyrifos appears as a white or colorless crystalline substance with a slightly rancid odor.⁹ When applied, the pesticide acts by binding to and inhibiting the enzyme acetylcholinesterase in insects and mammals—including humans.¹⁰ This, in turn, leads to the accumulation in the body of the neurotransmitter acetylcholine.¹¹ This accumulation over-stimulates the cholinergic pathways of the central and peripheral nervous systems, which

1. See JORGE FERNANDEZ-CORNEJO ET AL., ECON. RSCH. SERV., U.S. DEP'T OF AGRIC., PESTICIDE USE IN U.S. AGRICULTURE: 21 SELECTED CROPS, 1960-2008, at 55 (2014).

2. See Coral Davenport, *E.P.A. to Block Pesticide Tied to Neurological Harm in Children*, N.Y. TIMES, Aug. 18, 2021, <https://www.nytimes.com/2021/08/18/climate/pesticides-epa-chlorpyrifos.html>.

3. "Acaricides are chemicals used to kill ticks and mites." WILLIAM L. NICHOLSON ET AL., *Ticks (Ixodida)*, in MED. & VETERINARY ENTOMOLOGY 660 (3d ed. 2019).

4. "Nematicides are chemical agents used to control parasitic worms such as roundworms and threadworms." S.C. GAD, *Nematicides*, in ENCYCLOPEDIA OF TOXICOLOGY 473, 473-474 (3d. 2014).

5. K. Christensen et al., *Chlorpyrifos Technical Fact Sheet*, NAT'L PESTICIDE INFO. CTR., OR. STATE UNIV. EXTENSION SERVS. (2009), <http://npic.orst.edu/factsheets/archive/chlorptech.html>.

6. Xindi (Cindy) Hu, *The Most Widely Used Pesticide, One Year Later*, HARV. UNIV.: SCI. IN THE NEWS, <https://sitn.hms.harvard.edu/flash/2018/widely-used-pesticide-one-year-later/> (last visited Dec. 15, 2021).

7. Cassandra Lee, *The Chlorpyrifos Controversy*, MCGILL UNIV.: OFF. FOR SCI. & SOC. (June 7, 2017), <https://www.mcgill.ca/oss/article/environment/chlorpyrifos-controversy>.

8. Christensen et al., *supra* note 5, at 5.

9. *Id.*

10. S.E. KOSHLUKOVA & N.R. REED, *Chlorpyrifos*, in ENCYCLOPEDIA OF TOXICOLOGY 930 (3d ed. 2014).

11. *Id.* at 931.

can lead to neurotoxicity and eventually death.¹² In layman's terms, chlorpyrifos works by blocking an enzyme that controls messages traveling between nerve cells, causing the body to deteriorate.¹³

Agricultural applications for chlorpyrifos include food crops like corn, alfalfa, apples, almonds, grapes, peanuts, wheat, grapefruit, asparagus, and citrus, as well as animal feed crops.¹⁴ However, food-based uses constitute only a portion of the pesticide's applications.¹⁵ Chlorpyrifos has been a popular choice to control pests on non-food crops, as well as in public and industrial facilities.¹⁶ These applications include tree farms, plant nurseries, greenhouses, golf course turf, ornamentals, wood structures, mosquito and tick habitat, ant mounds, industrial plants and vehicles, and fence posts and utility poles.¹⁷ Until 2001, the pesticide was also approved for a variety of uses in residential spaces, such as small pest traps.¹⁸

B. Chlorpyrifos Carries Potent Human Health Risks

Over the past several decades, scientific evidence of chlorpyrifos's significant health risks to humans has accumulated.¹⁹ This evidence demonstrates that the same mechanism of action—inhibition of neurotransmitter uptake—that makes the pesticide effective on insects also makes it dangerous to humans.²⁰ Exposure to the pesticide via inhalation, contact with skin or eyes, ingestion via food or water, or while *in utero* can have harmful impacts on human health.²¹ Upon exposure, an individual may exhibit distressing symptoms within minutes or hours, and those symptoms may persist for days or weeks.²² Significant exposure can also result in death.²³

In children, exposure to chlorpyrifos is particularly serious and often associated with long-term neurodevelopmental impacts.²⁴ Prenatal exposure correlates with reduced working memory, increased incidence of attention disorders, delayed motor development, reduced IQ, and lower birth weight,

12. *Id.*

13. Christensen et al., *supra* note 5, at 8.

14. See EPA, EPA-HQ-OPP-2008-0850, CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION 11 (2020).

15. *Id.* at 5.

16. See *id.* at 11.

17. Christensen et al., *supra* note 5, at 8; CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 5.

18. CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 5.

19. See Virginia A. Rauh et al., *Brain Anomalies in Children Exposed Prenatally to a Common Organophosphate Pesticide*, 109 PROCS. NAT'L ACAD. SCIS. 7871, 7871 (2012).

20. See KOSHLUKOVA & REED, *supra* note 10, at 931–32.

21. Christensen et al., *supra* note 5, at 930.

22. *Id.*

23. KOSHLUKOVA & REED, *supra* note 10, at 932.

24. Rauh et al., *supra* note 19, at 7874.

among other consequences.²⁵ Additionally, infants and children may be particularly susceptible to chlorpyrifos exposure because of their tendency to place their hands in their mouths, as well as due to differences in how their bodies break down pesticides compared to adolescents and adults.²⁶

While not susceptible to the same developmental harms reported in children, adults and adolescents are also vulnerable to chlorpyrifos.²⁷ These age cohorts account for the vast majority of reported chlorpyrifos exposure incidents over the several past decades.²⁸ Upon contact, inhalation, or ingestion, individuals may experience runny nose, nausea, dizziness, or headache, among other symptoms.²⁹ With more significant exposure may come vomiting, muscle twitching, tremors, diarrhea, cramps, loss of coordination, blurred vision, loss of consciousness, difficulty breathing, convulsions, and even paralysis.³⁰ Death by respiratory and cardiovascular failure has also been reported.³¹

Occupational contexts account for the majority of reported chlorpyrifos exposures.³² Agricultural workers, in particular, are prone to frequent and intense pesticide exposures because they regularly mix and apply the chemicals or work in recently treated areas.³³ Occupational risk from chlorpyrifos can be mitigated by delaying re-entrance to recently sprayed areas and wearing personal protective equipment, like eyewear, long sleeves, and pants.³⁴ However, workers do not always receive safety training,³⁵ and, when they do, compliance with risk mitigation measures is not perfect.³⁶ Moreover, even full compliance with prescribed safety measures does not entirely eliminate risk.³⁷ Most agricultural workers, for example, wear personal protective gear made of woven materials that are easily penetrated by pesticides.³⁸

25. Virginia Rauh et al., *Seven-Year Neurodevelopmental Scores and Prenatal Exposure to Chlorpyrifos, a Common Agricultural Pesticide*, 119 ENV'T HEALTH PERSPS. 1196, 1196 (2011).

26. Somia Gurunathan et al., *Accumulation of Chlorpyrifos on Residential Surfaces and Toys Accessible to Children*, 106 ENV'T HEALTH PERSPS. 9, 9 (1998).

27. Christensen et al., *supra* note 5.

28. CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 29–31.

29. *Id.*

30. Christensen et al., *supra* note 5.

31. KOSHLUKOVA & REED, *supra* note 10, at 932.

32. CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 25.

33. See Manoch Naksata et al., *Development of Personal Protective Clothing for Reducing Exposure to Insecticides in Pesticide Applicators*, 17 INT'L J. ENV'T RSCH & PUB. HEALTH 1, 1 (2020).

34. *Id.* at 2.

35. JBS INTERNATIONAL, FINDINGS FROM THE NATIONAL AGRICULTURAL WORKERS SURVEY (NAWS) 2017-2018: A DEMOGRAPHIC AND EMPLOYMENT PROFILE OF UNITED STATES FARMWORKERS 28 (2021) [hereinafter NAWS FINDINGS].

36. Ratana Sapbamrer and Ajchamon Thammachai, *Factors Affecting Use of Personal Protective Equipment and Pesticide Safety Practices: A Systematic Review*, 185, ENVIRONMENTAL RESEARCH 8–9, 1–23 (2020).

37. Naksata et al., *supra* note 33, at 1–2, 8.

38. *Id.*

Importantly, the individuals who are most vulnerable to the health risks of chlorpyrifos are young people living or working in agricultural settings: the children of farmworkers exposed while pregnant, minors living in the same household as agricultural workers, children and adolescents working in agriculture, and young people living near treated sites.³⁹ These populations are both susceptible to the worst health impacts of chlorpyrifos and likely to encounter the pesticide more frequently than others in their age cohorts.⁴⁰

In the United States, fourteen is the federal minimum age to work in agricultural settings during non-school hours.⁴¹ But this age requirement may be reduced where a parent provides written consent on farms exempt from federal minimum wage provisions.⁴² In those cases, children as young as ten years old may work up to two months per year during out-of-school hours hand harvesting short season crops.⁴³ These growing and developing individuals may be exposed to pesticides like chlorpyrifos not only via trace residues on the foods they eat, but also by working in the very fields where those pesticides are sprayed in large volumes.⁴⁴

Additionally, both the children of farmworkers and young people living in agricultural areas are at particular risk for exposure.⁴⁵ Agricultural workers often continue to work throughout pregnancy,⁴⁶ and prenatal exposure to chlorpyrifos has been associated with long-term developmental impacts for children.⁴⁷ Moreover, because pesticides like chlorpyrifos linger on clothing and personal items for up to two weeks, when workers return home, children and infants living with them may also be exposed to residues.⁴⁸ Likewise, children living in agriculturally-intensive areas may be exposed to pesticide drift—the movement of pesticide dust or droplets through the air—during and after spraying near their homes, schools, and recreational areas.⁴⁹ It is worth noting, too, that children of color are more likely to live near agricultural areas than their white peers,⁵⁰ and

39. See Brenda Eskenazi et al., *Exposures of Children to Organophosphate Pesticides and Their Potential Adverse Health Effects*, 107 ENV'T HEALTH PERSPS. 409, 410 (1999).

40. See *id.*; Cynthia L. Curl et al., *Evaluation of Take-Home Organophosphorus Pesticide Exposure among Agricultural Workers and Their Children*, 110 ENV'T HEALTH PERSPS. 787, 792 (2002).

41. *State Child Labor Laws Applicable to Agricultural Employment*, U.S. DEP'T OF LAB. (Jan. 1, 2021), <https://www.dol.gov/agencies/whd/state/child-labor/agriculture>.

42. *Id.*

43. *Id.*

44. See HUM. RTS. WATCH, *FIELDS OF PERIL: CHILD LABOR IN US AGRICULTURE* 9 (2010).

45. Eskenazi et al., *supra* note 39, at 409.

46. Jennifer Runkle et al., *Occupational Risks and Pregnancy and Infant Health Outcomes in Florida Farmworkers*, 11 INT'L J. ENV'T RSCH. & PUB. HEALTH 7820, 7832 (2014).

47. Rauh et al., *supra* note 19, at 7871.

48. Gurunathan et al., *supra* note 26, at 9; Curl et al., *supra* note 40, at 792.

49. Eskenazi et al., *supra* note 39, at 409.

50. Amy Roost, *A Pesticide the EPA Won't Ban Is Sickening Low-Income Californians of Color*, CTR. FOR HEALTH JOURNALISM, UNIV. OF S. CAL. (Dec. 17, 2019) <https://centerforhealthjournalism.org/fellowships/projects/pesticide-epa-won-t-ban-sickening-low-income-californians-color>.

low-income children of color are more likely to have co-morbidities like asthma that may compound the health consequences of pesticide exposure.⁵¹

C. EPA Approved Ongoing Chlorpyrifos Registration Even as It Acknowledged the Pesticide's Health Risks

As researchers sounded the alarm to chlorpyrifos's health risks from the 1990s onward, the Environmental Protection Agency (EPA)—the federal agency tasked with the primary responsibility for regulating pesticides in the United States—conducted its own reviews of the pesticide.

EPA is required by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to periodically review the human health risks of all pesticides.⁵² FIFRA requires that all pesticides sold or distributed in the United States be registered with EPA.⁵³ Registration under FIFRA requires that an applicant demonstrate, among other things, that using the pesticide “will not generally cause unreasonable adverse effects on the environment.”⁵⁴ The statute defines this phrase to include unreasonable risks to humans.⁵⁵ After an initial registration, FIFRA requires that EPA conduct subsequent reviews every fifteen years through the “registration review” process.⁵⁶

EPA has conducted several registration reviews of chlorpyrifos since the pesticide was initially registered with the agency in the 1960s.⁵⁷ For each, EPA has prepared a human health risk assessment (HHRA). While these reviews have always been relatively restrained in their assessment of chlorpyrifos, over the past decade, EPA has increasingly acknowledged the health risks associated with the pesticide. In 2011, EPA prepared a preliminary HHRA, in which it noted the accumulation of evidence as to the pesticide's health effects.⁵⁸ Yet, the preliminary HHRA still concluded that the health risks of chlorpyrifos, when used as directed, were not unreasonable.⁵⁹ EPA's 2014 revision considered a greater range of populations, including infants, children, and women of child-bearing age, and acknowledged some significant health risks related to chlorpyrifos.⁶⁰ By the time the agency published its 2016 revised assessment, it

51. *Asthma and African Americans*, OFF. OF MINORITY HEALTH, U.S. DEP'T OF HEALTH & HUM. SERVS., <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=15> (last visited Feb. 11, 2021).

52. 7 U.S.C. § 136a(g)(1)(A)(iv).

53. *Id.* § 136a(a).

54. *Id.* § 136a(c)(5).

55. *Id.* § 136(bb).

56. *Id.* §§ 136a(g)(1)(A)(i)–(iii).

57. *Chlorpyrifos*, EPA, <https://www.epa.gov/ingredients-used-pesticide-products/chlorpyrifos> (last updated Jun. 29, 2022).

58. *See id.*; EPA, DP NO. D388070, CHLORPYRIFOS: PRELIMINARY HUMAN HEALTH RISK ASSESSMENT FOR REGISTRATION REVIEW (2011).

59. *See* CHLORPYRIFOS: PRELIMINARY HUMAN HEALTH RISK ASSESSMENT FOR REGISTRATION REVIEW, *supra* note 58.

60. *See generally* EPA, D424485, CHLORPYRIFOS: REVISED HUMAN HEALTH RISK ASSESSMENT FOR REGISTRATION REVIEW (2014).

acknowledged that chlorpyrifos posed more considerable risks, especially via food and pesticide drift and to young children.⁶¹ This conclusion was drawn with the impartial scientific advising of the FIFRA Scientific Advisory Panel (SAP), a cohort including biologists, toxicologists, statisticians, and other experts equipped to comment on an array of pesticides topics.⁶² In spite of EPA's increasing acknowledgment of chlorpyrifos's risks, however, it took no substantial steps to restrict the pesticide's legal uses.

II. ADVOCATES LEVERAGED ADMINISTRATIVE AND JUDICIAL TOOLS TO LIMIT THE USE OF CHLORPYRIFOS IN RESPONSE TO AGENCY DELAY

Until 2021, EPA resisted narrowing the scope of legal uses for chlorpyrifos, even as the agency increasingly acknowledged the pesticide's public health risks.⁶³ However, children's, workers', and environmental health advocates encouraged the agency to change course through persistent administrative and judicial advocacy.⁶⁴

A. *Anti-chlorpyrifos Advocates Targeted Food-Based Chlorpyrifos Uses*

Beginning in earnest in the mid-2000s, advocates targeted chlorpyrifos residues on food products.⁶⁵ While FIFRA is the primary regulatory apparatus for pesticides in the United States, the Federal Food, Drug, and Cosmetic Act (FFDCA) adds an additional layer of scrutiny for pesticide uses on foods.⁶⁶ The Act provides that EPA may allow a "tolerance"—an acceptable quantity—for a given pesticide residue in or on a food.⁶⁷ Establishing or leaving in effect such a tolerance is permissible only where the EPA Administrator determines that the quantity of the residue is safe, meaning that "no harm will result from aggregate exposure."⁶⁸ If EPA determines that a tolerance is not safe, the Administrator must modify or revoke it.⁶⁹ The practical implication of revoking a pesticide tolerance is that the chemical in question may no longer be used on food products.⁷⁰ This does not mean, however, that the pesticide may no longer be

61. See EPA, D436317, CHLORPYRIFOS: REVISED HUMAN HEALTH RISK ASSESSMENT FOR REGISTRATION REVIEW 6 (2016).

62. *FIFRA Scientific Advisory Panel (SAP) Basic Information*, EPA, <https://www.epa.gov/sap/fifra-scientific-advisory-panel-sap-basic-information> (last updated Jul. 26, 2022).

63. See generally *League of United Latin Am. Citizens v. Regan*, 996 F.3d 673 (9th Cir. 2021).

64. *Id.*

65. *EPA Withdraws All Food Uses of Chlorpyrifos; Advocates Celebrate*, PESTICIDE ACTION NETWORK: N. AM. (Aug. 18, 2021), <https://www.panna.org/press-release/epa-withdraws-all-food-uses-chlorpyrifos-advocates-celebrate>.

66. See generally 21 U.S.C. §§ 301–399.

67. 21 U.S.C. § 346a(b)(2)(A)(i).

68. *Id.* § 346a(b)(2)(A)(ii).

69. *Id.* § 346a(b)(2)(A)(i).

70. See *id.*

used for other purposes. Revoking a tolerance under the FFDCFA does not disturb a pesticide's FIFRA registration for non-food uses.⁷¹

In the case of chlorpyrifos, advocates set their sights on cancelling the pesticide's FFDCFA food tolerances.⁷² In general, there are a few reasons why anti-pesticides advocates might target FFDCFA tolerances rather than foundational FIFRA registration. One motivation might be to mitigate the overall resistance advocates are likely to meet from industry. Pesticides manufacturers are politically powerful, and EPA's Office of Pesticides Programs has been criticized in the past for its perceived deference to these interests.⁷³ It is possible that manufacturers might be less resistant to advocacy that results in *fewer* marketable uses for a given product, rather than outright cancellation. Additionally, there is good reason to target food-based uses for many pesticides. While children encounter pesticides through many different pathways in their day-to-day lives,⁷⁴ food is the primary vehicle through which most pesticides reach young people.⁷⁵ It is worth remembering, however, that food is not the only pesticide exposure pathway for children.⁷⁶ For example, children working in agriculture or living in farmworker households face non-food chlorpyrifos exposures.⁷⁷ Additionally, the vast majority of reported chlorpyrifos incidents in recent decades has impacted adults or adolescents; only a small number of incidents has impacted infants and children.⁷⁸ Moreover, focusing on food can be strategically savvy. It may be easier to convince the public and regulators that their dinner plates should be free of pesticides, rather than to explain the arcane and less emotionally evocative FIFRA registration process.

That said, advocates most likely choose to target FFDCFA food tolerances because the Act's legal standard is more rigorous than the standard for FIFRA registration.⁷⁹ The FFDCFA requires that EPA determine that "there is a reasonable certainty that no harm will result to infants and children" from food residues.⁸⁰ By contrast, FIFRA registration only requires that a pesticide "will not generally cause unreasonable adverse effects" to humans, and takes into

71. See generally *id.*

72. League of United Latin Am. Citizens v. Regan, 996 F.3d 673, 677 (9th Cir. 2021).

73. See, e.g., Michelle D. Boone et al., *Pesticide Regulation Amid the Influence of Industry*, 64 BIOSCIENCE 917 (2014); Eric Lipton, *Why Has the E.P.A. Shifted on Toxic Chemicals? An Industry Insider Helps Call the Shots*, N.Y. TIMES, Oct. 21, 2017, <https://www.nytimes.com/2017/10/21/us/trump-epa-chemicals-regulations.html>; Sharon Lerner, *The Department of Yes How Pesticide Companies Corrupted the EPA and Poisoned America*, THE INTERCEPT (June 30, 2021, 10:35 AM), <https://theintercept.com/2021/06/30/epa-pesticides-exposure-opp/>.

74. Richard A. Fenske et al., *Children's Exposure to Chlorpyrifos and Parathion in an Agricultural Community in Central Washington State*, 110 ENV'T HEALTH PERSPS. 549, 549 (2002).

75. *Id.*

76. *Id.* at 552.

77. *Id.*

78. CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 29–31.

79. See 21 U.S.C. § 346a(b)(2)(A)(ii).

80. *Id.*

account any economic benefits of the pesticide.⁸¹ FIFRA's standard, therefore, is more permissive of health risk than the FFDCa standard requiring "no harm." It is easier, then, for anti-pesticides advocates to demonstrate that FFDCa food-based tolerances should be revoked than it is to seek FIFRA cancellation.

Any of the foregoing reasons may have motivated the non-profit organizations Pesticide Action Network North America (PANNA) and the Natural Resources Defense Council (NRDC) to file a 2007 petition asking EPA to prohibit chlorpyrifos residues on foods.⁸² PANNA and NRDC's petition asserted that, even beneath the level established by chlorpyrifos tolerances, the pesticide posed unacceptable neurodevelopmental health risks to children and others.⁸³ EPA declined for over a decade to take final action on the 2007 petition.⁸⁴ Ultimately, PANNA, NRDC, and others pursued judicial relief.⁸⁵ The Court of Appeals for the Ninth Circuit issued multiple writs of mandamus requiring EPA to proceed in response to the petition.⁸⁶ Promisingly, in 2015 EPA published a Notice of Proposed Rulemaking proposing to revoke all chlorpyrifos food tolerances.⁸⁷ The following year, the agency affirmed in a risk assessment that present tolerances were "not sufficiently health protective."⁸⁸ However, even after these steps, the agency delayed taking final action on the tolerances.⁸⁹

In 2017, as a court-set deadline approached, EPA finally responded to the 2007 petition.⁹⁰ Departing from its gestures in 2015 and 2016, the agency rejected the petition.⁹¹ It did not conclude that the chlorpyrifos tolerances were safe, but rather stated that EPA would postpone review of their safety until chlorpyrifos had undergone registration re-review under FIFRA.⁹² This step would have delayed review through 2022, allowing continued distribution of foods with chlorpyrifos residues.⁹³

Environmental, health, and labor organizations subsequently challenged EPA's determination in the case *League of United Latin American Citizens v. Regan*.⁹⁴ The Ninth Circuit concluded that the FFDCa permitted no room for EPA's delay in responding to the 2007 petition.⁹⁵ The court stated that "EPA has had nearly 14 years to publish a legally sufficient response to the 2007 Petition. During that time, EPA's egregious delay exposed a generation of American

81. 7 U.S.C. § 136a(c)(5).

82. *League of United Latin Am. Citizens v. Regan*, 996 F.3d 673, 677 (9th Cir. 2021).

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.*

88. *Id.* at 678.

89. *Id.*

90. *Id.*

91. *Id.*

92. *Id.*

93. *Id.*

94. *Id.* at 690.

95. *Id.* at 702.

children to unsafe levels of chlorpyrifos.”⁹⁶ The Ninth Circuit remanded the matter to EPA with instructions to produce a final regulation either revoking all chlorpyrifos tolerances or modifying tolerances and making the requisite safety findings based on aggregate exposure for children and infants.⁹⁷

B. EPA Revokes Food-Based Tolerances for Chlorpyrifos

Following this directive, in mid-August of 2021, EPA published that it would be revoking all food-based tolerances for chlorpyrifos.⁹⁸ EPA stated that “[b]ased on the currently available data and taking into consideration the currently registered uses for chlorpyrifos, EPA is unable to conclude that the risk from aggregate exposure from the use of chlorpyrifos meets the safety standard of the Federal Food, Drug, and Cosmetic Act [].”⁹⁹ The final rule became effective on October 29, 2021, and it established that all chlorpyrifos tolerances for food commodities would expire February 28, 2022.¹⁰⁰ Since February 2022, all food treated with chlorpyrifos has been considered “adulterated and unable to be distributed in interstate commerce.”¹⁰¹

The final rule leaves non-food uses of chlorpyrifos undisturbed.¹⁰² These uses will remain unchanged until and unless EPA decides to modify or cancel registration of the pesticide under FIFRA.¹⁰³ As of writing, EPA is in the process of closing its most recent chlorpyrifos registration review.¹⁰⁴ In December 2020, the agency released a Proposed Interim Registration Review Decision addressing “whether [the] pesticide continues to meet, or does not meet, the standard for registration” under FIFRA.¹⁰⁵ In the document, the agency proposes that chlorpyrifos remains legally registered for use (after 2021, of course, this would exclude food uses).¹⁰⁶ The Interim Decision does propose strengthening certain risk mitigation measures, including personal protective equipment, product labeling, and re-entry intervals for treated areas.¹⁰⁷ Chlorpyrifos registration review is expected to conclude in 2022, and the Proposed Interim Registration Review Decision strongly suggests that chlorpyrifos will remain legal for non-food uses for the foreseeable future.¹⁰⁸

96. *Id.* at 703.

97. *Id.*

98. *See generally* Chlorpyrifos; Tolerance Revocations, 86 Fed. Reg. 48,315 (Aug. 30, 2021) (to be codified at 40 C.F.R. pt. 180).

99. *Id.* at 48,315.

100. *Id.*

101. *Frequent Questions About the Chlorpyrifos 2021 Final Rule*, EPA, <https://www.epa.gov/ingredients-used-pesticide-products/frequent-questions-about-chlorpyrifos-2021-final-rule#question-1> (last updated Apr. 21, 2022).

102. *See generally* Chlorpyrifos; Tolerance Revocations, 86 Fed. Reg. at 48,316.

103. *See generally id.*

104. *See* CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 4.

105. *See id.*

106. *Id.* at 40.

107. *Id.*

108. *See id.* at 4-8; *Frequent Questions About the Chlorpyrifos 2021 Final Rule*, *supra* note 101.

III. AGRICULTURAL WORKERS AND THEIR FAMILIES REMAIN VULNERABLE TO CHLORPYRIFOS EXPOSURE IN SPITE OF THE 2021 CHLORPYRIFOS TOLERANCE REVOCATION

The revocation of food tolerances for chlorpyrifos is undoubtedly an enormous victory for those invested in safer pesticide use. It will protect many children and agricultural workers from harmful exposures. Yet, given that the pesticide remains legal for non-food uses, this change alone does not herald the end of chlorpyrifos, nor does it ensure that all vulnerable populations are protected from its health dangers. After the 2021 rule, chlorpyrifos remains a legal—and popular—pest-control tool for tree farms, greenhouses, nurseries, wood structures, mosquito and tick habitat, ant mounds, vehicles, fence posts, and utility poles.¹⁰⁹ As such, many workers, especially agricultural workers, remain vulnerable to harmful exposure. Child farmworkers, infants and children living with agricultural workers, and young people living near treated sites remain particularly vulnerable.¹¹⁰ These populations continue to experience direct occupational exposure,¹¹¹ take-home exposure,¹¹² and spray drift¹¹³ from non-food applications.

Since publishing the chlorpyrifos Proposed Interim Registration Review Decision in 2020 and revoking food tolerances in 2021, EPA has not moved to reconsider the pesticide's non-food uses. It appears likely that these remaining legal uses will persist quietly into the future, even though they pose significant health risks. These remaining uses may aptly be described as “stranded.”

If left undisturbed, these uses will harm a now smaller and less politically powerful subset of the population than before. The public and policymakers may not realize that chlorpyrifos remains a threat to this group. Moreover, even where they do realize it, they may not have the energy for additional advocacy after the 2021 victory. It is challenging to overcome agency delay and FIFRA's permissive pesticide standard under any circumstances, much less without a vocal base of support. Given all of this, it may be very difficult, then, to restrict or eliminate persistent chlorpyrifos uses.

While the concept of stranded pesticide uses is particularly relevant to chlorpyrifos, it is not relegated to this pesticide alone. It may be repeated in the future, and agricultural workers and their families will bear the brunt of harm. The following discussion explores the factors that make agricultural workers and their families uniquely vulnerable to both ongoing risk from chlorpyrifos and the phenomenon of stranded pesticide uses more generally.

109. *Chlorpyrifos—General Information*, MINN. DEP'T OF AGRIC., <https://www.mda.state.mn.us/chlorpyrifos-general-information> (last visited Dec. 3, 2021); Christensen et al., *supra* note 5; CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 5.

110. Eskenazi et al., *supra* note 39, at 410–11.

111. See HUM. RTS. WATCH, *supra* note 44, at 9.

112. Curl et al., *supra* note 40, at 792.

113. Fenske et al., *supra* note 74, at 551–52.

A. Political, Social, and Practical Factors Leave Agricultural Workers Uniquely Vulnerable to the Phenomenon of “Stranded” Pesticide Uses and Resultant Health Harms

A number of factors increase agricultural worker vulnerability to pesticides like chlorpyrifos and to the phenomenon of stranded uses discussed above. From a purely descriptive standpoint, agricultural workers in the United States are regarded as an environmental justice community.¹¹⁴ That is, a group that is disproportionately susceptible to environmental burdens—be they air pollution, flooding, or otherwise—compared to others, with this disproportionate burden falling along lines of historically marginalized identities.¹¹⁵

The U.S. agricultural workforce is not homogenous in race, ethnicity, or heritage. It includes Asian immigrants, Black Americans, Caribbean immigrants, and Native Americans, among others.¹¹⁶ A significant share of the workforce, however, is of Latinx or Hispanic heritage.¹¹⁷ As of 2021, the U.S. Department of Agriculture (USDA) reported that 64 percent of farm laborers, graders, and sorters—distinguished from managerial and supervisory roles—were of non-white Hispanic origin.¹¹⁸ Only 44 percent of the agricultural workforce reported being born in the United States, and 53 percent reported being U.S. citizens (though USDA notes that it is difficult to accurately measure immigration status, as few surveys query about it and undocumented individuals may be hesitant to respond candidly).¹¹⁹ Agricultural workers are also largely low-income and earn modest wages.¹²⁰ The most recent National Agricultural Workers Survey, hosted by the U.S. Department of Labor, surveyed farmworkers on how much they were earning per hour at their farm jobs in 2017-2018.¹²¹ The average reported wage was \$12.32, with workers paid by the hour earning an average of \$11.72 and workers paid by the piece—for example, by units harvested—earning an average of \$15.76 per hour.¹²²

Many of the identities and experiences shared by agricultural workers place them further from the resources, social capital, and political power that might otherwise shield them from significant environmental health risks. Ongoing vulnerability to chlorpyrifos—among other risky pesticides—is one example of an environmental injustice that agricultural workers experience.

114. Joan D. Flocks, *The Environmental and Social Injustice of Farmworker Pesticide Exposure*, 19 GEO. J. ON POVERTY L. & POL'Y 255, 255 (2012).

115. See generally Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 Env't L. Rep. (Env't L. Inst.) 10,681 (2000).

116. Thomas A. Arcury et al., *Overcoming Language and Literacy Barriers in Safety and Health Training of Agricultural Workers*, 15 J. AGROMEDICINE, 236, 237 (2021).

117. NAWS FINDINGS, *supra* note 35, at 4–5.

118. *Farm Labor*, U.S. DEP'T OF AGRIC.: ECON. RSCH. SERV., <https://www.ers.usda.gov/topics/farm-economy/farm-labor/#demographic> (last updated Mar. 15, 2022).

119. *Id.*

120. NAWS FINDINGS, *supra* note 35, at 26.

121. *Id.*

122. *Id.*

The following Subparts discuss historical and practical factors that exacerbate the vulnerability agricultural workers experience as an environmental justice population. Importantly, this discussion of vulnerability is not meant to suggest that U.S. agricultural workers and their allies are or have ever been impotent in the face of workplace indignities. Indeed, farmworkers have executed effective, creative advocacy campaigns in the past.¹²³ One need only consider the successful campaigns to unionize California grape harvesters or to end the Bracero Program, both in the 1960s.¹²⁴ Rather, this discussion is meant to draw out the challenges that have made these victories remarkable, and to frame the urgency of legal and policy change regarding pesticides use.

B. A History of “Agricultural Exceptionalism” in the United States Has Resulted in the Erasure of Farmworkers from Public and Policy Discourse

The United States has historically excluded agricultural workers from protections afforded to those in other industries.¹²⁵ This legacy is termed “agricultural exceptionalism,” and it perpetuates farmworker vulnerability today.¹²⁶ This history is rooted in the United States’ brutal use of enslaved Africans in agriculture.¹²⁷ After slavery was abolished and an exploitative system of sharecropping emerged in its stead, southern agricultural interests sought to maintain the arrangement.¹²⁸ So, during the New Deal Era, they made their support of Roosevelt’s package of social programs contingent upon exception of agricultural workers from labor reforms.¹²⁹ Indeed, agricultural workers were exempted from the new protections of the National Labor Relations Act of 1935, the Fair Labor Standards Act of 1938, and the Social Security Act of 1935.¹³⁰ While farmworkers have been afforded more protections since these laws were passed, to this day, federal standards regarding occupational health and safety, overtime pay, minimum wage, unemployment

123. See Herman Luis Chavez & María Guadalupe Partida, *A Latinx Resource Guide Civil Rights Cases and Events in the United States*, LIBRARY OF CONGRESS RESEARCH GUIDES, <https://guides.loc.gov/latinx-civil-rights> (last updated Dec. 30, 2020).

124. See Herman Luis Chavez & María Guadalupe Partida, *1962 United Farm Workers Union, A Latinx Resource Guide Civil Rights Cases and Events in the United States*, LIBRARY OF CONGRESS RESEARCH GUIDES, <https://guides.loc.gov/latinx-civil-rights/united-farm-workers-union> (last updated Dec. 30, 2020).

125. Flocks, *supra* note 114, at 269.

126. See Susan A. Schneider, *A Reconsideration of Agricultural Law A Call for the Law of Food, Farming, and Sustainability*, 34 WM. & MARY ENV’T L. & POL’Y REV. 935, 935–36 (2010).

127. See *id.* at 938 (discussing Jim Chen, *Of Agriculture’s First Disobedience and Its Fruit*, 48 VAND. L. REV. 1262 (1995)).

128. See Sarah O. Rodman et al., *Agricultural Exceptionalism at the State Level Characterization of Wage and Hour Laws for U.S. Farmworkers*, 6 J. AGRIC. FOOD SYS. & CMTY. DEV. 89, 90–91 (2015).

129. *Id.*

130. *Id.* at 90.

insurance, and collective bargaining contain various exceptions for these workers.¹³¹

These carve-outs exempting agricultural workers from protections afforded to workers in other sectors are discordant with the taxing and frequently dangerous nature of agricultural work.¹³² In addition to engaging in physically demanding activities,¹³³ these workers regularly operate heavy machinery,¹³⁴ handle toxic substances,¹³⁵ and work in inhospitable weather and temperatures¹³⁶ that are increasingly exacerbated by climate change. Moreover, during the COVID-19 pandemic, farmworker advocates have expressed concerns regarding heightened risk due to crowded living spaces, transportation, and work environments, as well as limited access to healthcare.¹³⁷ The legacy of agricultural exceptionalism has left workers vulnerable to already challenging working conditions.

This history of exclusionary policy is relevant to the challenge of chlorpyrifos and to the specter of future stranded pesticide uses because it has tended to make these workers and their concerns less visible to the public and policymakers. Agricultural workers do not enjoy a protected right to unionize, and so face barriers to collectively organizing and asserting their needs in the workplace.¹³⁸ Likewise, the vast majority of agricultural workers are exempt from overtime wage requirements¹³⁹ and many are exempt from minimum wage protections.¹⁴⁰ These exemptions entrench economic insecurity, which may force farmworkers to dedicate their time and resources to basic survival, rather than to political engagement. Finally, repeatedly treating agricultural workers as if they are somehow different from workers in other sectors has tended to falsely reinforce the notion that they *are* different from other workers. The ugly and groundless conclusion of this reasoning is that many view farmworkers as disposable—a necessary sacrifice to the prevailing model of agriculture and to consumers who expect inexpensive products.

131. *Id.* at 90–92.

132. *Id.* at 90.

133. Arcury et al., *supra* note 116, at 236.

134. OCCUPATIONAL SAFETY & HEALTH ADMIN., AGRICULTURAL SAFETY FACT SHEET: PROTECTING AGRICULTURAL WORKERS FROM TRACTOR HAZARDS (2015), <https://www.osha.gov/sites/default/files/publications/OSHA3835.pdf>.

135. *Agricultural Operations*, U.S. DEP'T OF LAB.: OCCUPATIONAL SAFETY & HEALTH ADMIN., <https://www.osha.gov/agricultural-operations> (last visited Nov. 10, 2021).

136. *See generally* OCCUPATIONAL SAFETY & HEALTH ADMIN., HEAT ILLNESS PREVENTION TRAINING GUIDE: A LESSON PLAN FOR EMPLOYERS (2011), https://www.osha.gov/sites/default/files/osha_heattraining_guide_0411.pdf; Fenske et al., *supra* note 74, at 15.

137. *Statement by Farmworker Advocates on COVID-19 and the Risks to Farmworkers*, FARMWORKER JUST., <https://www.farmworkerjustice.org/blog-post/statement-by-farmworker-advocates-on-covid-19-and-the-risks-to-farmworkers/> (last visited Nov. 12, 2021).

138. *See* 29 U.S.C. § 152(3).

139. *Id.* § 213(b)(12)–(13).

140. *Id.* § 213(a)(6).

Agricultural workers' low visibility within dominant political and cultural spaces is likely to make it more difficult for these individuals to call attention to chlorpyrifos's ongoing harms. This, in turn, may be an obstacle to building the broad support necessary to restrict or eliminate remaining legal uses. Popular urgency toward chlorpyrifos appears to be tapering off now. Indeed, in the wake of the 2021 chlorpyrifos tolerance revocation, much of the media discourse inaccurately conflated the rule with a full ban on the pesticide. Given EPA's history of delay on regulating pesticides, this lull in public attention combined with the challenges posed by agricultural workers' marginalized status may prove a challenging hurdle to clear.

C. The Practical Circumstances of Immigration Status, Linguistic Isolation, and Geographic Mobility Also Exacerbate Agricultural Workers' Unique Vulnerability to Stranded Chlorpyrifos Uses

Agricultural exceptionalism's legacy of thrusting farmworkers to the margins is not the only factor that leaves this population uniquely vulnerable to persistent stranded pesticide uses, including that of chlorpyrifos. Practical factors, too, constrain workers' ability to call attention to pesticide dangers in the workplace. Chief among these are immigration status, language, and mobility.

It is impossible to discuss the experiences of contemporary U.S. agricultural workers without acknowledging the topic of immigration. While New Deal era agricultural workers were predominantly African American, today a large share is Latinx and foreign-born.¹⁴¹ While it is difficult to collect accurate origin and citizenship data, and different sources report a range of numbers, USDA reports that in 2021 only 44 percent of farm laborers, graders, and sorters were born in the United States, and only 53 percent were U.S. citizens.¹⁴² While many agricultural workers are U.S. citizens, a significant share is either undocumented or in the country on the very limiting terms of a guest worker program, like the H-2A visa.¹⁴³

The H-2A program permits U.S. employers to bring foreign workers to the United States to fill temporary or seasonal agricultural jobs.¹⁴⁴ To participate, an employer must demonstrate that there are not enough able, willing, and qualified U.S. workers to do this work.¹⁴⁵ Then, prospective workers outside of the United States may apply for an H-2A visa with the U.S. Department of State or seek H-2A classification with U.S. Customs and Border Protection in specific circumstances where an H-2A visa is not required.¹⁴⁶ Successful applicant

141. NAWS FINDINGS, *supra* note 35, at 4–5.

142. *Farm Labor*, *supra* note 118.

143. *Id.*

144. *H-2A Temporary Agricultural Workers*, U.S. CITIZENSHIP & IMMIGR. SERVS., <https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-2a-temporary-agricultural-workers> (last updated Nov. 9, 2021).

145. *Id.*

146. *Id.*

workers may stay in the United States through the program for up to three years.¹⁴⁷ After three years, these workers must depart the country, but may seek readmission as an H-2A nonimmigrant if they remain outside the United States for a period of at least three uninterrupted months.¹⁴⁸ In 2020, a total of 275,430 H-2A positions were certified.¹⁴⁹

An H-2A worker's ability to legally remain in the United States is tethered to their job.¹⁵⁰ That is, when a worker has completed, been fired from, or quit their contracted job, they lose their legal right to stay in the United States unless they have a new job offer ready from another H-2A-eligible employer.¹⁵¹ Employers are required to report to U.S. Customs and Immigration Services if H-2A workers fail to show up to work, if they are fired, or if they complete the labor or services for which they were hired sooner than expected.¹⁵² Moreover, if a worker violates their status with the H-2A program, as by quitting without securing new employment, they may be banned from the program altogether for five years.¹⁵³

Because the H-2A program hangs a worker's legal status in the United States on their job, workers may be deterred from doing anything they perceive as jeopardizing their current employment or chances of being hired in the future. H-2A workers may be deterred from expressing concern over workplace health and safety issues or from organizing with other workers to advocate for safer practices, for fear of retaliation. While workers have the legal right to report occupational health and safety concerns,¹⁵⁴ they may not realize it, or they may recognize that employers still engage in illegal retaliation in spite of this protection.¹⁵⁵ Under the present circumstances, fear of retaliation may prevent H-2A workers from calling attention to the significant health risks imposed by the continuing legal use of chlorpyrifos on non-food crops and elsewhere. Moreover, this chilling effect may make it challenging for workers to advocate against similarly stranded uses of other risky pesticides in the future.

Concerns regarding retaliation hold true—perhaps even more so—for undocumented agricultural workers. While H-2A workers may reasonably fear retaliation for speaking up about pesticides concerns in the workplace, they have the benefit of navigating their lives in the United States out in the open, as legal

147. *Id.*

148. *Id.*

149. EMP. & TRAINING ADMIN., U.S. DEP'T OF LAB., OFFICE OF FOREIGN LABOR CERTIFICATION: H-2A TEMPORARY AGRICULTURAL PROGRAM—SELECTED STATISTICS, FISCAL YEAR (FY) 2020 EOY (2020), https://www.dol.gov/sites/dolgov/files/ETA/oflc/pdfs/H-2A_Selected_Statistics_FY2020.pdf.

150. *See* 8 C.F.R. § 214.2(h)(1)(i) (2021).

151. *See Id.*

152. *H-2A Temporary Agricultural Workers*, *supra* note 144.

153. 8 U.S.C. § 1188(f); 8 C.F.R. § 214.2(h)(5)(viii)(B).

154. 29 C.F.R. § 501.4.

155. FARMWORKER JUST., NO WAY TO TREAT A GUEST: WHY THE H-2A AGRICULTURAL VISA PROGRAM FAILS U.S. AND FOREIGN WORKERS 30–31 (2012), <https://www.farmworkerjustice.org/wp-content/uploads/2012/05/7.2.a.6-No-Way-To-Treat-A-Guest-H-2A-Report.pdf>.

temporary residents with visas. This may make H-2A workers more comfortable asserting their rights or seeking legal assistance if they do suspect employer hostility. Undocumented workers, by contrast, are likely to feel greater urgency to keep a low profile. For them, retaliation may mean their employers making known their undocumented status, triggering deportation proceedings.

Related to the role of immigration status, language also complicates the reality of agricultural workers' relationship to harmful pesticides. As noted, a large share of agricultural workers is foreign-born. Many speak Spanish as their primary or only language.¹⁵⁶ According to the National Agricultural Workers Survey, as of 2018, 65 percent of farmworkers described Spanish as the language they were most comfortable conversing in, compared to 27 percent reporting English.¹⁵⁷ When asked to rate their English language skills, 23 percent reported that they could not speak English "at all," 41 percent that they could speak English "a little" or "somewhat," and 36 percent that they could speak English "well."¹⁵⁸ Likewise, 33 percent of workers stated that they could not read English "at all," 32 percent that they could read English "a little" or "somewhat," and 35 percent that they could read English "well."¹⁵⁹

The high representation of non-English-speakers among farmworkers is relevant to their vulnerability to chlorpyrifos and other risky, persistent pesticides for a variety of reasons. Linguistic barriers may limit workers' access to or comprehension of information bearing upon their health and safety, including information about the nature of certain pesticides; permissible uses for those pesticides; worker health and safety standards; employees' rights to voice health and safety concerns; and protections from employer retaliation. Lamentably, much still needs to be done to ensure that workers with limited English proficiency have access to the same information as others.¹⁶⁰ The consequences of poor language accessibility are significant: workers who do not realize, for example, the extent of health risks associated with a pesticide they handle will be less likely to advocate against its use. Likewise, workers who do not realize that they are legally protected from retaliation for raising health and safety concerns will be less likely to voice those concerns in the first place. Additionally, linguistic barriers may limit workers' ability to engage in discourse and policy advocacy in predominantly English-speaking spaces. This constrains workers' ability to secure the vital support of those with the most political or social capital.

Finally, a sizable share of U.S. agricultural workers is geographically mobile. This mobility may limit their engagement in sustained anti-pesticide advocacy, and it complicates efforts to accurately measure pesticide-related

156. NAWS FINDINGS, *supra* note 35, at ii.

157. *Id.*

158. *Id.*

159. *Id.*

160. *See generally* Arcury et al., *supra* note 116, at 236.

health consequences for this population.¹⁶¹ Many farmworkers move throughout the year to follow seasonal work opportunities around the country.¹⁶² The last National Agricultural Workers Survey found that 13 percent of U.S. farmworkers in 2017-18 were migrants, with “migration” meaning “moving from a ‘home base,’ the location where the migrant spent the greatest amount of time during the year preceding his/her NAWS interview, to one or more destination locations where work was available.”¹⁶³ Notably, this figure may not capture all guest workers in the United States, like those with H-2A visas who remain in one location throughout the surveyed year, but who are functionally very temporary U.S. residents.

This mobility may disrupt agricultural workers’ ability to engage in the advocacy required to call attention to their pesticide concerns. Effective advocacy generally requires relationship-building: without a chorus of voices, it is challenging to attract support to a cause—particularly one impacting an already marginalized population.¹⁶⁴ Frequent moves may frustrate this relationship-building, both among farmworkers themselves and with local advocates. Moreover, mobility may simply disincentivize participation in local advocacy that will not come to fruition until a worker has left.

Agricultural worker mobility may also undercut researchers’, regulators’, and farm professionals’ appreciation of this population’s healthcare needs. We have data on reported worker pesticide incidents¹⁶⁵ and the immediate health consequences these exposures trigger.¹⁶⁶ However, we have comparatively little peer-reviewed empirical literature on how these encounters shape farmworkers’ long-term healthcare needs and attitudes.¹⁶⁷ Moreover, there is little reliable information about these workers’ access to, utilization of, and satisfaction with healthcare resources.¹⁶⁸ This gap in the research may be exacerbated by the challenges of studying a mobile population. Thomas Arcury, a medical anthropologist and public health scientist at the Wake Forest School of Medicine, suggests that “mobility and the migrant lifestyle limit health services utilization. Simply knowing where health services are available is difficult when there is constant residential change. . . . Mobility also makes follow-up care (e.g., from a cancer screening) and long-term care (e.g., for tuberculosis or diabetes) difficult to provide.”¹⁶⁹ Absent an empirical record of how pesticide exposures shape

161. Thomas A. Arcury & Sara A. Quandt, *Delivery of Health Services to Migrant and Seasonal Farmworkers*, 28 ANN. REV. PUB. HEALTH 345, 345–57 (2007).

162. NAWS FINDINGS, *supra* note 35, at 7–8.

163. *Id.* at 7.

164. See GUSTAVO AGUIRRE, BEYOND ORGANIZING: THE INDISPENSABLE PRINCIPLES TO ORGANIZE AND EMPOWER PEOPLE 17–18 (2021).

165. CHLORPYRIFOS PROPOSED INTERIM REGISTRATION REVIEW DECISION, *supra* note 14, at 29–31.

166. Christensen et al., *supra* note 5.

167. See Arcury & Quandt, *supra* note 161, at 352.

168. *Id.*

169. *Id.* at 350.

farmworkers' needs and outlooks, regulators may not perceive the urgency of mitigating pesticide harms.

Together, public erasure of U.S. agricultural workers and the practical limitations imposed by immigration status, linguistic isolation, and geographic mobility make these individuals and their families uniquely vulnerable to harmful pesticide exposure. These factors make agricultural workers susceptible to both the phenomenon of stranded pesticides in the first place, and to the health consequences that result from continuing to use those risky chemicals. This vulnerability may pose a challenge to properly regulating remaining chlorpyrifos uses. The following Part considers how federal pesticides law and policy may be adapted to better account for and mitigate the unique challenges that agricultural workers face.

IV. THE THREAT OF “STRANDED” PESTICIDE USES—AND THE HEALTH RISKS ATTRIBUTABLE TO THESE USES—CAN BE AMELIORATED THROUGH REFORMS TO FEDERAL PESTICIDES LAW AND POLICY

As discussed in the previous Part, U.S. agricultural workers are vulnerable to stranded pesticide uses for a variety of reasons that extend beyond the traditional environmental realm: a legacy of labor and employment law failures; a flawed immigration system; and a quintessentially American history of xenophobia and racism. Meaningfully addressing these challenges is beyond the scope of this Note. However, farmworker vulnerability in the United States is also exacerbated by federal pesticides law and policy. This Part considers the federal pesticides framework and its role in the phenomenon of stranded pesticide uses more closely.

A. Pesticides Are Regulated by a Patchwork of Federal Law and Policy

Throughout this Note, I have referenced two significant components of the federal pesticides regime: the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug, and Cosmetic Act (FFDCA). The following discussion provides greater detail on the mechanisms of each statute, as well as information on relevant implementing regulations.

1. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA is the federal government's primary vehicle for pesticides management. The Act provides that all pesticides sold and distributed in the United States must be registered with EPA.¹⁷⁰ The EPA Administrator may limit the distribution, sale, or use of any pesticide in the United States that is not registered under FIFRA and that is not subject to an experimental use permit.¹⁷¹

170. 7 U.S.C. § 136a(a).

171. *Id.*

The first iteration of what would become FIFRA was passed in 1947 in response to the proliferation of pesticides after World War II.¹⁷² The statute served some of the same purposes as the modern version, including registering and labeling pesticides,¹⁷³ but it was administered by USDA and is now regarded as having been of limited efficacy.¹⁷⁴ In 1970, enforcement of FIFRA was transferred to EPA, and in 1972, Congress passed sweeping amendments to the statute.¹⁷⁵

These amendments added a cost-benefit calculation to the FIFRA registration and review processes.¹⁷⁶ Today, registering a pesticide under FIFRA requires that an applicant demonstrate that using the pesticide “will not generally cause unreasonable adverse effects on the environment.”¹⁷⁷ The statute defines the phrase “unreasonable adverse effects on the environment” to mean:

- (1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide, or
- (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act.¹⁷⁸

Under FIFRA, then, risk to humans is contextualized and cabined by the value, economic and otherwise, that a given pesticide may provide.

After EPA initially registers a pesticide, the agency must conduct a review of the substance every fifteen years through the “registration review” process.¹⁷⁹ During review, the agency again evaluates whether the pesticide can be used for its intended purpose without imposing unreasonable adverse effects on human health and the environment.¹⁸⁰ The registration review process for any pesticide involves multiple steps, including assessing any changes to available data, conducting new risk or benefit assessments if needed, and soliciting the input of the public and of registrants before publishing a final determination as to ongoing registration.¹⁸¹

172. See Keith Cunningham-Parmeter, *A Poisoned Field: Farmworkers, Pesticide Exposure, and Tort Recovery in an Era of Regulatory Failure*, 28 N.Y.U. REV. L. & SOC. CHANGE 431, 448 (2004); Pub. L. No. 80-104, 61 Stat. 163 (1947).

173. See Cunningham-Parmeter, *supra* note 172, at 448; 61 Stat. at 166–170.

174. Cunningham-Parmeter, *supra* note 172, at 448.

175. See *id.* at 449; Pub. L. No. 92-516, 86 Stat. 973 (1972).

176. Cunningham-Parmeter, *supra* note 172, at 449.

177. 7 U.S.C. § 136a(c)(5) (1996).

178. *Id.* at § 136(bb).

179. *Id.* at § 136a(g)(1)(A)(iv).

180. *Id.* at § 136a(c)(5).

181. *Registration Review Process*, EPA, <https://www.epa.gov/pesticide-reevaluation/registration-review-process#decision> (last updated Aug. 16, 2022).

2. *FIFRA Implementing Regulations: The Agricultural Worker Protection Standard (WPS)*

EPA also administers FIFRA via implementing regulations considering, among other things, pesticide labeling,¹⁸² packaging,¹⁸³ and workplace safety practices.¹⁸⁴ Of these, the Agricultural Worker Protection Standard (WPS) is particularly relevant.¹⁸⁵ The WPS is “designed to reduce the risks of illness or injury resulting from workers’ and handlers’ occupational exposures to pesticides used in the production of agricultural plants on farms or in nurseries, greenhouses, and forests and also from the accidental exposure of workers and other persons to such pesticides.”¹⁸⁶ The WPS requires adherence to practices that reduce or eliminate harmful pesticide exposure, and it dictates procedures for responding to “exposure-related emergencies.”¹⁸⁷

Specifically, the WPS protects two kinds of employees at farms, greenhouses, forests, and nurseries from occupational pesticide exposure: 1) employees who mix, load, apply, and assist with application of agricultural pesticides or maintenance of application equipment and 2) employees who perform tasks related to growing and harvesting plants at the listed facilities.¹⁸⁸ The WPS requires that employers provide these employees pesticide safety training;¹⁸⁹ that they refrain from retaliation against these workers;¹⁹⁰ that they provide on-site notice of pesticide applications at the establishment and related hazard and emergency information;¹⁹¹ that they provide decontamination supplies;¹⁹² and that they provide transportation to a medical facility and information about exposure in the event of a pesticide injury.¹⁹³ Employers are also required to restrict entry to areas being treated with pesticides, including for specific intervals afterward.¹⁹⁴ Moreover, employers whose workers actively apply pesticides must provide specific instruction, ensure equipment safety, and share labeling information.¹⁹⁵ They must also provide pesticide handlers sufficient personal protective equipment and ensure that they have a space to remove soiled items.¹⁹⁶

182. *See* 40 C.F.R. § 156 (2021).

183. *See id.* § 157.

184. *See id.* § 170.

185. *Id.*

186. *Id.* § 170.1.

187. *Id.*

188. *Id.* § 170.3.

189. *Id.* §§ 170.130, .230.

190. *Id.* § 170.7(b).

191. *Id.* §§ 170.120–122, .222.

192. *Id.* §§ 170.150, .250.

193. *Id.* §§ 170.160, .260.

194. *Id.* §§ 170.112, .210.

195. *Id.* §§ 170.230–234.

196. *Id.* §§ 170.240–250.

Notably, the WPS displaces any worker pesticide safety standards that the Occupational Safety and Health Administration otherwise would have developed.¹⁹⁷ The Occupational Health and Safety Act, passed in 1970, prevents the Secretary of Labor from regulating working conditions where another federal agency already has statutory authority to do so.¹⁹⁸ In the 1970s, workers' rights advocates filed an action to compel the Secretary of Labor to develop farmworker pesticide safety regulations.¹⁹⁹ The D.C. Circuit, however, held that Congress had conferred to EPA authority to do so.²⁰⁰ Since, the Occupational Safety and Health Administration has maintained a very limited role in protecting agricultural workers from pesticide risks at work.²⁰¹

3. *The Federal Food, Drug, and Cosmetic Act (FFDCA)*

Finally the FFDCA authorizes EPA to set food-based "tolerances," or maximum residue limits for specific pesticides.²⁰² The original version of the Act was passed in 1938, at which time it was administered by USDA.²⁰³ In 1954, Congress amended the law to include provisions protecting consumers from pesticide residues on food.²⁰⁴ In 1970, authority to establish tolerances was transferred to EPA.²⁰⁵ In 1996, Congress again revised the law, this time to establish the tolerance safety standard that remains in place today.²⁰⁶

In general, under the FFDCA, pesticide residues in or on food are deemed unsafe unless they fall within the range of a prescribed tolerance or where they pertain to a pesticide that has been granted an exemption.²⁰⁷ The FFDCA directs EPA to establish tolerances for a given pesticide only where the agency finds that there is a "reasonable certainty that no harm will result from aggregate exposure to the pesticide residue."²⁰⁸ When making this safety determination, EPA is directed to consider, among other factors: all anticipated dietary and non-dietary exposures to the pesticide;²⁰⁹ the validity, completeness, and reliability of available data on the pesticide;²¹⁰ the nature of any toxic effect on consumers;²¹¹ and any risks posed to infants and children.²¹²

197. Flocks, *supra* note 114, at 265.

198. 29 U.S.C. § 653(b)(1) (2018).

199. See *Organized Migrants in Cmty. Action, Inc. v. Brennan*, 520 F.2d 1161 (D.C. Cir. 1975).

200. *Id.* at 1163, 1169.

201. Flocks, *supra* note 114, at 265.

202. 21 U.S.C. § 346a(b)(1).

203. CONG. RSCH. SERV., RL31921, PESTICIDE LAW: A SUMMARY OF THE STATUTES 5 (2012).

204. *Id.*

205. *Id.*

206. *Id.*

207. 21 U.S.C. § 346a(a)(1).

208. *Id.* § 346a(b)(2)(A)(ii).

209. *Id.*

210. *Id.* § 346a(b)(2)(D)(i).

211. *Id.* § 346a(b)(2)(D)(ii).

212. *Id.* § 346a(b)(2)(C)(i)(III).

Finally, the FFDCA provides for basic coordination with FIFRA.²¹³ It states that “to the extent practicable. . . in issuing a final rule. . . that suspends or revokes a tolerance or exemption for a pesticide chemical residue in or on food, the Administrator shall coordinate such action with any related necessary action under the Federal Insecticide, Fungicide, and Rodenticide Act.”²¹⁴

B. Federal Law and Policy Fail to Sufficiently Protect Agricultural Workers Because They Unevenly Scrutinize Different Pesticide Applications and Neglect Equity and Environmental Justice Considerations

The federal pesticides regime insufficiently protects agricultural workers from stranded uses of the most dangerous pesticides. This outcome stems from two primary inadequacies: first, the federal framework unevenly scrutinizes the health risks associated with different pesticide uses, and second, this framework fails to adequately account for equity and environmental justice considerations.

FIFRA and the FFDCA each involve reviewing pesticide safety, but the former applies a more capacious, flexible, and risk-tolerant standard than the latter. Under FIFRA, when EPA initially registers a pesticide or approves its ongoing registration, the agency must find that using the substance “will not generally cause unreasonable adverse effects on the environment.”²¹⁵ The statute directs regulators to engage in a cost-benefit analysis to determine what constitutes these unreasonable effects, so EPA weighs the “economic, social, and environmental costs and benefits of the use of [the] pesticide” against adverse effects to humans.²¹⁶ This balancing exercise yields the registration of pesticides like chlorpyrifos that pose significant, documented risk to humans, but which are economically valuable to the agriculture industry. By comparison, the FFDCA demands that EPA find a “reasonable certainty that no harm will result from aggregate exposure to the pesticide residue” on foods.²¹⁷ Not only does this standard not permit cost-benefit balancing for food residues, it goes beyond FIFRA’s instruction to limit only unreasonable negative impacts, instead requiring confidence that no harm will result from the pesticide. In practice, this distinction means that EPA tolerates greater human health risks from non-food pesticide exposure pathways than it does from food-based pathways.

These different safety standards might be sensible if we knew that pesticide exposures from non-food-based pathways were universally less dangerous to humans than the exposures resulting from food residues. While there is evidence that direct ingestion of many pesticides can be quite harmful, ingestion does not occur solely via food residues.²¹⁸ For example, workers may (and do)

213. *Id.* § 346a(1).

214. *Id.* § 346a(1)(1).

215. *Id.* § 136a(c)(5).

216. 7 U.S.C. § 136(bb).

217. 21 U.S.C. § 346a(b)(2)(A)(ii).

218. See generally Christos A. Damalas & Spyridon D. Koutroubas, *Farmers’ Exposure to Pesticides Toxicity Types and Ways of Prevention*, 4 TOXICS 1, 1, 5 (2016).

accidentally ingest pesticides when they touch their faces, drink, or eat after working with pesticides.²¹⁹ The children of these workers may also accidentally ingest these chemicals when they touch their parents' contaminated personal belongings and then place their hands in their mouths.²²⁰ Moreover, repeated skin contact with or inhalation of pesticides used for non-food purposes can cause significant health consequences, too.²²¹ We know, for example, that even when agricultural workers utilize WPS-mandated personal protective equipment, the majority wears woven materials that are easily permeated by pesticides.²²² Dermal exposure to pesticides, including chlorpyrifos, has been linked to the high incidence of skin diseases among farmworkers.²²³ From a human health risk perspective, it betrays common sense to scrutinize non-food pesticide uses less rigorously than food uses.

The more rigorous safety standard under the FFDCa may exist because of a concern for children's health. The text of the Act explicitly mandates that EPA pay particular attention to "cumulative effects on infants and children" when determining whether a food tolerance may fairly be deemed safe.²²⁴ However, if legislators and regulators are particularly concerned about children's susceptibility to pesticides, they should be more alarmed by the exposures young people experience related to non-food uses under FIFRA as well. The health risks posed by spray drift, take-home exposure, child agricultural work, and prenatal exposures are comparable to and may even be more serious than those threatened by food residues.

The question of who these laws were designed to protect or benefit is bound up in questions of equity and environmental justice. The children harmed by non-food pesticide uses registered under FIFRA are predominantly rural, low-income people of color from families with mixed immigration status. This may not have been the consequence intended by FIFRA's original drafters. Yet, for decades now, advocates and scholars have called attention to the unequal burdens that pesticides, including chlorpyrifos, place on already disadvantaged communities, and little has changed.

Even if children were not susceptible to harms from stranded pesticide uses under FIFRA, it is worthwhile probing at why the statute applies such a flexible safety standard compared to that of the FFDCa. As explored throughout this Note, adolescents and adults experience significant occupational health harms from pesticides, too. The subtext to the less rigorous FIFRA standard seems to

219. *See id.* at 1–2, 5.

220. Gurunathan et al., *supra* note 26, at 9.

221. *See FARMWORKER JUST., EXPOSED AND IGNORED: HOW PESTICIDES ARE ENDANGERING OUR NATION'S FARMWORKERS* 5–8 (2013), <https://www.farmworkerjustice.org/wp-content/uploads/2013/07/Exposed-and-Ignored-by-Farmworker-Justice-email-version.pdf>.

222. Naksata, *supra* note 33, at 1–2.

223. *See* Thomas A. Arcury et al., *Diagnosed Skin Diseases Among Migrant Farmworkers in North Carolina Prevalence and Risk Factors*, 13 J. AGRIC. SAFETY & HEALTH 407, 407 (2007).

224. 21 U.S.C. § 346a(b)(2)(C)(i)(III).

be the notion that it is acceptable to register dangerous pesticides because workers might, if they wanted, simply choose not to pursue work that would expose them to these chemicals. This assumes, however, a flexibility of choice that does not exist. The population of workers that perform agricultural jobs is overwhelmingly immigrant, low-income, and linguistically isolated. These circumstances limit them to a much smaller range of available jobs, and those jobs tend to be more dangerous.

If the federal pesticides regime is to better account for the phenomenon of stranded pesticide uses and the excessive burdens these uses place on agricultural workers, it must scrutinize food and non-food pesticide applications more evenly and better incorporate considerations of equity.

C. Adaptations to Federal Pesticides Law and Policy Can Mitigate the Likelihood of Additional Pesticide “Strandings,” Reducing the Disproportionate Health Burden That Falls upon Agricultural Workers

The federal pesticides regime fails to effectively mitigate the worst harms of risky pesticides for a variety of reasons not solely relegated to the text of FIFRA or the FFDCA. Agency inertia, lackluster WPS enforcement, and the seemingly cozy relationship between EPA and pesticide manufacturers frustrate health-protective pesticides management. However, it remains worthwhile contemplating how we might improve FIFRA, the FFDCA, and the WPS to prevent the likelihood of future stranded pesticides.

Ultimately, the phenomenon of stranded pesticide uses is likely to persist until FIFRA’s registration process is amended to more rigorously screen for safety before authorizing or reauthorizing a pesticide. FIFRA’s permissive safety standard allows human health concerns to be weighed equally alongside those of other social or economic value. As a result, dangerous but effective or lucrative pesticides are regularly approved for use.²²⁵ In addition to allowing persistent health harms to agriculture workers, such a permissive standard leaves little incentive for manufacturers and the agriculture industry to innovate safer pest control methods. A more health-conscious safety standard would stimulate broadly beneficial research and development.

A more rigorous FIFRA safety standard could take any number of forms. The most health-protective version would entirely eliminate the cost-benefit element. Importantly, such a standard has an analog in the FFDCA’s well-established “no harm” standard.²²⁶ FIFRA might be aligned more closely, then, to this existing formulation. Such alignment might prove valuable not only for workers, but for stakeholders within the agriculture and pesticides industries. A more uniform standard between the two statutes could provide predictability to manufacturers wondering at the long-term marketability of a given product.

225. See generally Nathan Donley, *The USA Lags Behind Other Agricultural Nations in Banning Harmful Pesticides*, 18 ENV’T HEALTH 1, 1 (2019).

226. 21 U.S.C. § 346a(b)(2)(A)(ii).

Moreover, alignment might permit greater coordination of the safety review processes required by both the FFDCA and FIFRA. Such coordination could conserve agency resources and produce speedier registration and tolerance decisions for invested stakeholders in manufacturing and agriculture. Most importantly, a standard without a cost-benefit analysis would elevate regard for human health and environmental justice.

If, however, a cost-benefit standard is presumed inevitable, it might be valuable to consider instead adapting the formula so that human health is weighed more heavily than other factors. Such an adaptation would ideally be guided by analysis of whether a pesticide's registration or continuing authorization would burden already disadvantaged communities; whether these communities have been adequately represented in the public participation processes associated with review; and so forth.

Alternately, it may be worthwhile advocating for a more immediate safety valve to prevent pesticide strandings. When food tolerances are significantly revised or revoked, as occurred with chlorpyrifos in 2021, the FFDCA might be required to immediately "communicate" with FIFRA, triggering suspension of other registered uses until an expedited, emergency review of their health risks has been completed.

Finally, if no such systemic adaptations are readily achievable (and indeed, they would almost certainly face resistance), the WPS—the standard protecting workers on the job—should be adapted to more holistically protect workers. In particular, the WPS should be revised to ensure that its training and information-transparency functions are effectuated by real language accessibility. Additionally, the WPS would ideally incorporate a medical monitoring program and facilitate provisions of affordable and culturally responsive healthcare services.

These ideas constitute only the outlines of possible adaptations to the federal pesticides regime. It will be important for scientists and policymakers to engage critically with workers and environmental justice communities to ensure that any solutions are responsive to real needs.

CONCLUSION

The 2021 chlorpyrifos tolerance revocation is undoubtedly a victory for public health. However, the rule has not eliminated the risks that chlorpyrifos poses to agricultural workers, their families, and their neighbors. Many workers will continue to experience the health risks that the chemical poses, even as policymakers and the public celebrate the 2021 victory and begin to move on. It will be enormously important, then, for all those invested in the notion of environmental justice to remain attentive to the expressed concerns and desires of workers impacted by chlorpyrifos's stranded uses, among other harmful pesticides.

Of course, amid a crowded field of recent environmental and social injustices—including a fresh onslaught of climate-fueled disasters and a devastating pandemic—it may not feel intuitive to rank the somewhat niche phenomenon of stranded pesticides among the rest. However, I argue that the way we regard agricultural workers is intimately bound up with our capacity to address other significant challenges in this era. Global climate change and the COVID-19 pandemic are both characterized by dramatically inequitable distribution of suffering. These crises place greatest strain upon the already marginalized: the poor, the disabled, people of color, and immigrants. Attention to phenomena like stranded pesticides is important to ensure that we do not entrench the already inequitable positions from which these communities meet other challenges. More than this, however, exercising a regard for the dignity of agricultural workers, here, is a way of developing the muscle with which to advance equitable solutions elsewhere—be that regarding climate change, a public health crisis, or otherwise.

Agricultural workers, like all individuals, deserve dignified working and living conditions. It is this author's hope that the phenomenon of stranded, dangerous pesticides is short-lived.

