Agrochemicals, Environmental Racism, and Environmental Justice in U.S. History

by Jayson Maurice Porter | Northwestern University | February 2022

THE ORGANIC CENTER

Agrochemicals, Environmental Racism, and Environmental Justice in U.S. History

by Jayson Maurice Porter

Table of Contents

One Hundred Years of Silent Springs, 1862 to 1962

In theory, pesticides should have the toxicity to deter pests without harming plants or people. However, a closer look at pesticide history in the United States reveals an enduring legacy of environmental racism against communities of color and their collective action for environmental justice. Humans have harnessed the toxicity of chemicals to kill agricultural insects for millennia. However, the rapid proliferation of modern agrochemicals between 1870-1914 increased how much agriculture itself could hurt places and people. The burden of protecting people and places has always fallen on communities rather than governments and institutions.

Agrochemicals & First Generation Insecticides

An agrochemical is a chemical used in agriculture like pesticides and fertilizers. Whereas farmers use pesticides to kill or discourage agricultural pest infestations, farmers use fertilizers to put nutrients into the soil that have been stripped from intensive agricultural production. From approximately 1860 to 1930, the first generation of agrochemicals consisted of naturally occurring compounds like arsenic and guano that killed insects or added nitrogen, phosphorus, or potassium to the soil.

History of Agrochemicals in the U.S. South

Insecticides and fertilizers gained new popularity as labor-saving technologies after the abolition of slavery in 1862. Without enslaved Black field hands to pluck insects from crops and clear new lands, cotton planters invested in agrochemicals to kill insects and revitalize the land. Agrochemicals did not simply replace Black labor. They placed the burden of harm on Black laborers who had to use them with little to no education support. In South Carolina, the fertilizer industry even relied on Black laborers who dove down to river bottoms to collect phosphate-bearing rocks. Within years, the states of South Carolina, Georgia, and Maryland had burgeoning agrochemicals industries, and within decades the entire south was flooded with chemical inputs. Baltimore was fast becoming the first epicenter of agrochemical. The waterfront immigrant communities in the southernmost part of the city were ideal sacrifice zones for industrial production. By the 1880s, the port city was home to a growing cohort of fertilizer and arsenic companies. In addition to growing demand from southern cotton farmers, these early agrochemical companies like Allied Chemical increasingly provided chemicals to fruit-tree farmers across the eastern seaboard.

Environmental Racism

Robert Bullard defines environmental racism as any policy or practice that unequally affects or disadvantages individuals, groups or communities based on their race. Vann Newkirk II adds that environmental racism is the opposite of environmental justice and often ignores or belittles input from the affected communities of color.[2]

Sacrifice Zones

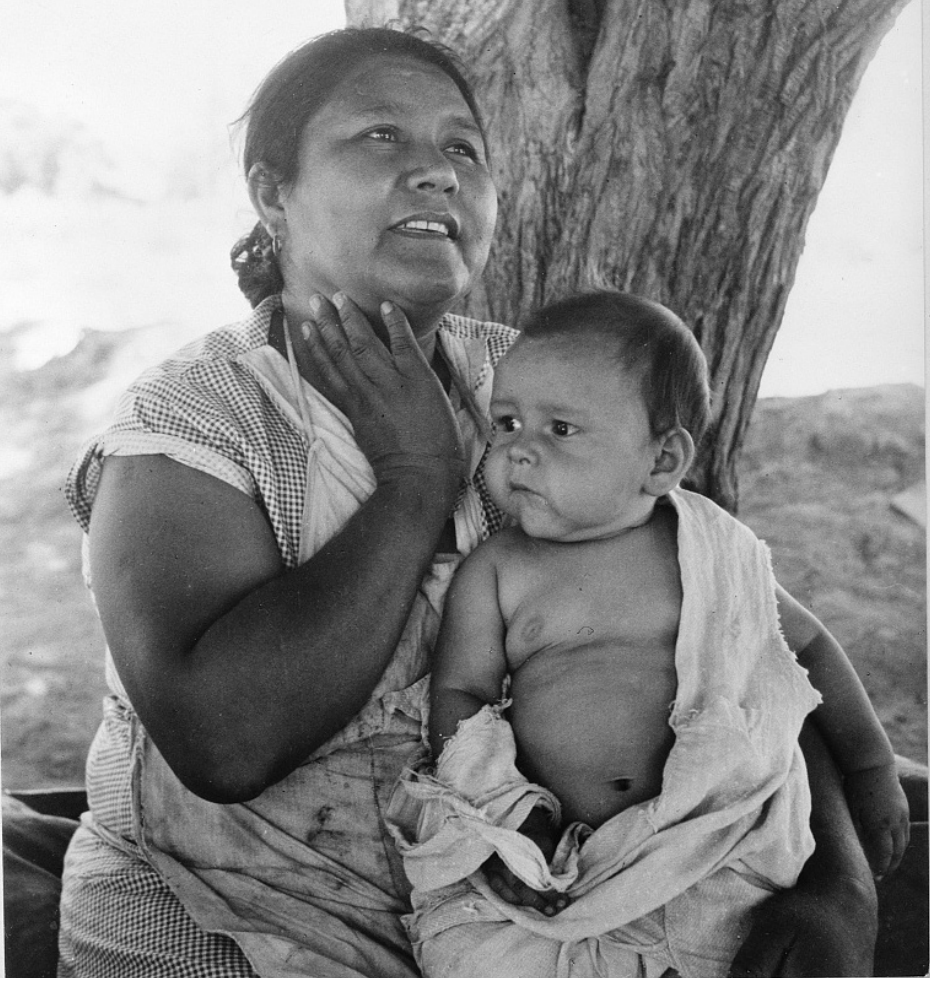
The U.S. Environmental Justice Movement emerged from Title IV in the Civil Rights Act of 1964, which prohibited the "use of federal funds to discriminate based on race, color, and national origins." As a result, grassroots environmental justice movements in the late 1960s usually protested federal projects that unevenly protected communities of color. Dr. Robert Bullard argues in Dumping in Dixie (1990) that the civil rights framework helped Black communities advocate for environmental justice and racial justice together

History of Agrochemicals in California

On the West Coast, the formation of California's vast agricultural infrastructure also relied on environmental racism and modern agrochemicals. First, white settlers weaponized ideas about efficiency and proper land use to seize lands from dozens of Indigenous communities, like the Yokuts, Miwok, and Kawaiisu.[3] Second, white settlers imported seeds and migrant laborers to foment this agricultural empire.[4]

As important as the 570 species of and varieties of trees and 260 vines from numerous countries, migrant laborers from China, Mexico, and the Philippines laid the foundation of the success of California agriculture.[5] In addition to raising crops, these migrant communities brought the agricultural knowledge necessary to help new crops grow in new lands. The most popular cherry in the United States, the Bing cherry (Prunus avium), was the product of a migrant Chinese foreman named Ah Bing. But while U.S. farmers produced $522 million worth of Bing cherries in 2020, U.S. history has forgotten Ah Bing. In the 1880s, Chinese Americans were violently expelled from many towns on the west coast, and despite working in the United States for more than 30 years, Ah Bing was not allowed to return to the U.S. after a visit to his family in China due to the Chinese Exclusion Act.[6]

Unfortunately for migrant farmers, the state-sanctioned vision for the extension of industrial agriculture in California, largely fueled by new arsenical solutions, did not include non-white landownership. Despite having bolstered California agriculture in the late nineteenth and early twentieth century, most farmers of color could not participate in the agricultural boom as landowners. New technologies did not replace migrant laborers but encouraged investment in modern, capital-intensive agriculture that further discredited their traditional knowledge and access to land. The overlapping nature of technology and labor continued to make pesticides an occupational hazard for farmers of color.



Agrochemical Expansion in North America

In addition to connecting industrial food systems within the United States, agrochemicals helped expand U.S. power beyond national borders. World War I (1914-1918) generated widespread acclaim for insecticidal solutions, and U.S. companies actively sought new markets for their products across the globe. The production of arsenic pesticides began to climb in the 1920s alongside a national depression in agriculture. By 1937, the United States was the second largest producer of arsenic in the world, and exported 1,792,060 pounds of calcium arsenate to Peru, 430,000 to Colombia, 260,023 to Argentina, 216,844 to Nicaragua, and 100,552 to El Salvador, to say nothing of white arsenic and lead arsenate sales.[7] In the case of Mexico, the third largest arsenic producer in 1937, arsenical chemicals followed the growing cotton economy as it stretched across the California-Baja California border. According to a contemporary entomologist, Mexico's West Coast became an extension of California's agricultural expansion. As more U.S. businesses began to buy land south of the border, Mexico increasingly became a site to experiment with different U.S.-made agrochemicals.[8] Agrochemical networks in Mexico and elsewhere would grow after DDT became more popular in World War II (1939-1945). And eventually, the U.S. government formally adopted pesticides as a diplomatic tool to combat global hunger.

Uneven Distribution of Agrochemicals

The uneven distribution of pesticides began with the uneven production of pesticides. At the onset of the Green Revolution in 1943, the United States held more patents on pesticides than its top three competitors: 367 compared to 115 in England, 113 in Germany, and 77 in France.[9] This discrepancy helped the U.S. leaders control where and how they produced agrochemicals, but they did not turn the Green Revolution by itself. The Green Revolution (1943-the 1960s), or the expansion of agrochemical-intensive industrial agriculture, emerged from the uneven agrochemical networks between the United States and Mexico. As a long-standing laboratory for U.S. agriculture, the western coast of Mexico served as the ideal location to experiment with new agrochemicals. Mexican and U.S. leaders imagined that industrial agriculture would increase yields and alleviate urban poverty, but industrial agriculture eroded economic security and public health in the countryside. Despite these poor results, U.S. leaders exported Green Revolution agriculture everywhere they feared the "red" threat of communism, from Columbia to China, India to Italy. In the context of the global contest between capitalism and communism, U.S. leaders hoped pesticides would protect western ideals.[10] But what or who would protect vulnerable communities from western ideals and their agrochemicals?

Rachel Carson's Call To Action

In 1962, at the height of the global green revolution, Rachel Carson published Silent Spring to warn the U.S. public about the dangers of pesticides for people and the environment. For one hundred years since the abolition of slavery, increasing reliance on pesticides in the United States helped create a series of silent springs or ruined environments where no birds sing.[11] Carson's main objective was to argue that DDT was the greatest pesticide threat to human and environmental health, but she also mentioned the long and persistent influence of first-generation pesticides like arsenic. And she was not the first person to raise concerns about arsenic. Beekeepers signaled the alarm on arsenic use as early as the 1880s. Whereas France banned arsenic-based pesticides in 1916, arsenicals became so popular among U.S. apple growers in the 1920s that Great Britain readily banned U.S. apples from entering the country.[12] In the following decade, U.S. journalists like Rachel Palmer and Ruth deForest Lamb even published books on the harm of unregulated arsenic chemicals, but only the advent of second-generation pesticides (like DDT) greatly reduced the impact of arsenic.[13] Unlike first-generation insecticides like arsenic, soap, and tobacco, second-and third-generation pesticides are synthetic compounds. These generations emerged in the 1940s, but second-generation organo-chlorinates like DDT grew popular earlier. Third-generation pesticides, such as 2,4-D and parathion organophosphates, are no less dangerous than second-generation organo-chlorinates. This did not prevent chemical manufacturers from promoting organophosphates heavily after the EPA banned DDT in 1972. Despite a long list of studies and activists that prove the harm of third-generation pesticides, they are still common in conventional agriculture today. After decades of community-based environmental justice, the U.S. government finally banned the superphosphate chlorpyrifos in 2021.Silent Spring encouraged the national DDT ban in 1972, but it would take another generation to ban arsenic use in U.S. agriculture. Even after the U.S. ban against lead arsenate in 1988, arsenic persists in other forms, such as an organic arsenic herbicide called MSMA, which the government did not phase out until 2013 or the arsenic-based drug nitrasone, used in poultry production, which was used through 2015. Arsenic is a reminder that environmental justice is not linear and has historically taken many steps backward.

Second and Third Generation of Agrochemicals

Unlike first-generation insecticides like arsenic, soap, and tobacco, second-and third-generation pesticides are synthetic compounds. These generations emerged in the 1940s, but second-generation organo-chlorinates like DDT grew popular earlier. Third-generation pesticides, such as 2,4-D and parathion organophosphates, are no less dangerous than second-generation organo-chlorinates. This did not prevent chemical manufacturers from promoting organophosphates heavily after the EPA banned DDT in 1972. Despite a long list of studies and activists that prove the harm of third-generation pesticides, they are still common in conventional agriculture today. After decades of community-based environmental justice, the U.S. government finally banned the superphosphate chlorpyrifos in 2021.

Meet Rachel Carson, Silent Spring

Rachel Carson (1907-1964) was a writer, marine biologist, and conservationist whose 1962 book Silent Spring launched the environmental movement. She was also the author of a trilogy of novels on ocean life, including a bestseller, Under the Sea Wind (1941), and a National Book Award winner, The Sea Around Us (1953). Carson could not swim, but her love for the shore and the ocean drove her writings against DDT and other pesticides. She died from cancer just two years after the publication of Silent Spring, but her legacy lives until today.[14]

Carson popularized the concepts of bioaccumulation and biomagnification to show how chemicals travel through the environment. Bioaccumulation refers to the build-up of toxins in a single organism across its lifespan. Biomagnification refers to how toxins transfer from lower to higher trophic levels at higher concentrations, devastating apex predators the most.

Environmental Racism and Agrochemicals

Robert D. Bullard is considered the father of environmental justice, but he adopted a movement born in the wake of Silent Spring (1962) and the Civil Rights Act of 1964. The 1960s witnessed an array of global social movements. In the United States, many of these revolved around race and the environment and sometimes both. Title VI of the Civil Rights Act gave language to the nascent environmental justice movement popping up across the country. In response to regional movements against pesticides and sewage treatment plants in California, Houston, and New York, the federal government enacted a series of modern environmental laws starting with the Environmental Protection Agency (EPA).[15] Despite a series of national policies to protect the environment in the 1970s, they were top-down and often reduced entire communities into sacrifice zones. According to Bullard, grassroots activists cemented the marriage of civil rights and environmentalism in the Environmental Justice Movement (EJM) in the 1980s and their battle against environmental racism.

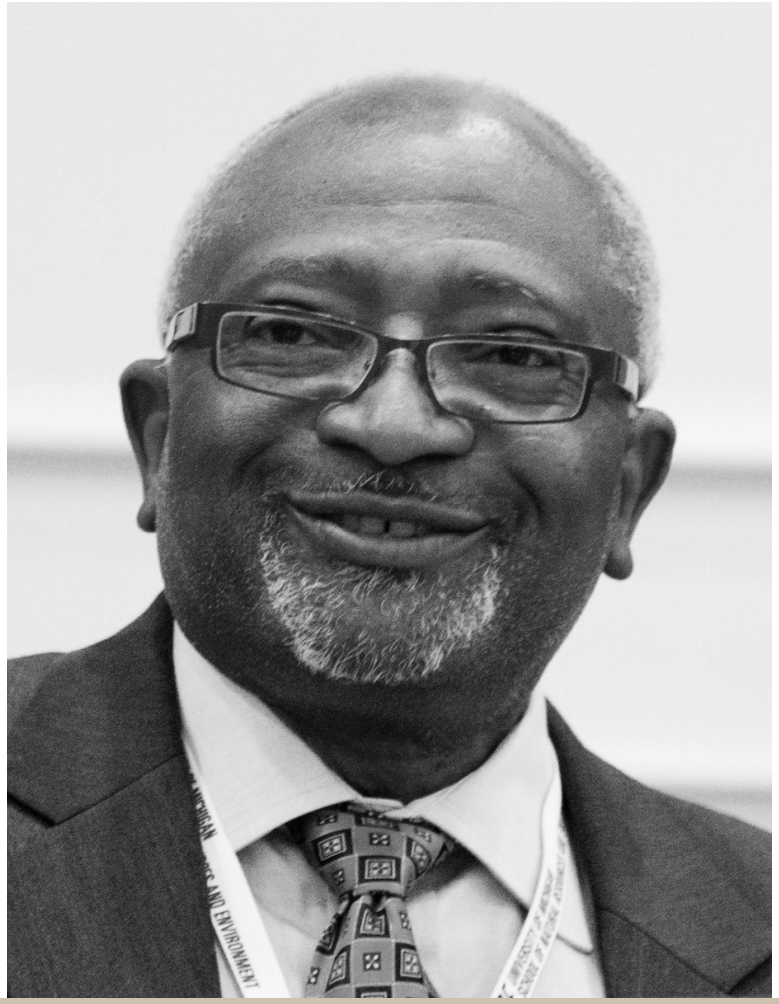
The Civil Rights Movement and Environmental Justice

The U.S. Environmental Justice Movement emerged from Title IV in the Civil Rights Act of 1964, which prohibited the "use of federal funds to discriminate based on race, color, and national origins."[16] As a result, grassroots environmental justice movements in the late 1960s usually protested federal projects that unevenly protected communities of color. Dr. Robert Bullard argues in Dumping in Dixie (1990) that the civil rights framework helped Black communities advocate for environmental justice and racial justice together.

Environmental Justice and the EJ Movement

From October 24 to 27, 1991, the delegates to the First National People of Color Environmental Leadership Summit drafted and adopted seventeen principles of Environmental Justice (EJ). They did not provide a single or comprehensive definition of EJ. Instead, they believed that EJ "affirms the fundamental right to political, economic, cultural, and environmental self-determination." These "Principles" have served as a foundation for the growing grassroots movement for environmental justice.[17] According to Jane Johnson, environmental justice is a movement and a conceptual framework that emerged in the latter twentieth century to finally center social justice in environmentalism.[18]

Environmental racism was a rallying cry grassroots activists defined and highlighted to underscore how race shaped the uneven distribution of environmental burdens and benefits. For Bullard, environmental racism "refers to any policy, practice, or directive that differentially affects or disadvantages (whether intended or unintended) individuals, groups, or communities based on race or color."[19] In his seminal text Dumping in Dixie: Race, Class, and Equality (1993), 6 Bullard tracked instances of unjust waste disposal in Black communities in the 1980s U.S. South, like the fight against a PBC landfill in Warren County, North Carolina in 1982. Unlike the collective action against waste site disparities in the late 1960s, the Warren County case sparked a national debate about environmental racism. Warren County connected the dots between racial injustice, environmentalism, and public health disparities. New green policies for waste disposal and waste-to-energy incineration aimed to benefit the environment but actively sacrificed the poorest communities.[20]



Meet Robert D. Bullard, Dumping in Dixie

Dr. Robert Bullard is often called the father of environmental justice. He is a sociologist, who has authored eighteen books, including Dumping in Dixie (1990). He founded and directed several environmental, social, and climate justice institutions and has won numerous awards for his advocacy, leadership, and scholarship. Bullard's Dumping in Dixie still inspires conversations between environmentalists and civil rights advocates. Building on the grassroots efforts of the 1980s, Bullard demonstrates that both pollution and environmentalism in the United States are segregated. Nine of the ten states with the highest rates of hazardous waste production are southern. Moreover, Bullard highlights that economic and political vulnerability influenced Black participation in environmentalism before grassroots movements adopted frameworks from civil rights and racial justice advocates.[21]

Around the nation, other instances of environmental racism also intersected with sites of agrochemical production in urban areas and use in rural areas. Like waste treatment facilities, agrochemical production also shaped urban industrial centers in urban waterfront communities like the South Bronx and South Baltimore. In South Baltimore, in particular, the history of agrochemical production in Curtis Bay is one factor that resulted in that community having some of the nation's highest asthma rates in the country. Even though Curtis Bay is no longer a principal producer of agrochemicals, a wide range of chemical manufacturers continue to plague the health of residents. Agrochemical production left a similar stain on the strip of the Mississippi River between Baton Rouge and New Orleans, known as Cancer Alley. Due to pollution from nearly thirty chemical manufacturers, cancer rates for the historically Black communities in this industrial corridor are fifty times higher than the national average.[22] Although agrochemical runoff contributes little to these high rates, the historical overuse of arsenic for cotton in the region set a precedent for the Cancer Alley's relationship with chemical manufacturing.

Cancer Alley and Canada's First Nation

Sarnia, Ontario, is the largest city on Lake Huron, and it has long been a site of petrochemical development. In 2011, Sarnia recorded the worst air pollution in Canada, but the area's Aamjiwnaang First Nation residents experienced the highest rates of asthma, cancer, learning, and behavioral problems in children and miscarriages. In a classic case of environmental racism, over 50 registered polluters surround and actively contaminate the 3,100-acre Aamjiwnaang First Nation community south of Sarnia. For decades, residents like Ada Lockeridge have responded with lawsuits, political campaigns, and air monitoring of their own.[23]

Agrochemical Racism and Health Impacts

By contrast, agrochemicals have a more direct impact on poor health outcomes in sites of agricultural production.[22] This is especially true in California, where nearly one-third of the nation's farmworkers live.[25] As the largest food producer in the United States and the globe's fifth-largest producer of agricultural commodities, California is also an important site of agrochemical use. Combined with a legacy of racial segregation, California is also a site of environmental racism. Many agricultural regions, with high concentrations of low-income, Latinx communities, are not subject to special pesticide laws. For instance, the government permits certain chemicals, such as chlorpyrifos, for agricultural use that they ban for commercial use.[26] Counties with majority Latinx populations like Fresno, San Joaquin, and Kern face nationally low employment opportunities and all the public health burdens of living in an agricultural sacrifice zone.[27] According to the Pesticide Action Network, California farms have used an average of over 200 million pounds of pesticides annually since 2018, while low-income farmworkers receive unequal protection from these chemicals.

Over half of California pesticides are used in five majorities Latinx and low-income counties. This parallels the patterns in the U.S. South, where the government spends nearly eight times more money on pesticides in counties with populations over 40 percent people of color than in counties with less than 6 percent.[28] In the case of California, counties with Latinx majority populations use 906% more pesticides than counties with fewer than 24% Latinx residents.[29] A high percentage of residents encounter pesticides in

Arsenic in the South

Cotton shaped the use of arsenic in the United States. Cotton farmers used more calcium arsenate on their crops than other farmers. As arsenic consumption across the country jumped in the 1920s and 1930s, a disproportionate amount was used in the U.S. South. Slowly enough, southern cities also became sites of chemical manufacturing. Cotton-producing regions in the U.S. South still have some of the highest rates of arsenic contamination in the country.

the fields, and entire communities experience effects of pesticide drift and pesticide runoff, which contaminate the air and water shared by communities and cropland. School children are especially vulnerable where planners nestled schools between fields. According to Mary Ellen Flannery, Latinx students are 91 percent more likely to attend schools with the highest exposure to agrochemicals.[30] Studies of the impact of prenatal exposure to organophosphate pesticides on low-income Mexican and Mexican-American farmworkers are numerous, complex, and troubling. They generally highlight how unequal protection from pesticides causes several respiratory, stress-related, and developmental illnesses.[31] Despite California's regulatory system for pesticides and record environmental protection, pesticide-related illnesses continue to harm farm-working communities due to environmental racism.[32]

Environmental Justice and Agrochemicals

In response to the unequal burden of harm environmental racism placed on communities of color, those communities nurtured environmental-justice movements to advocate for themselves. Environmental justice consists of social-justice oriented and life-affirming environmental practices and it intersects with agrochemicals in many ways. The recent federal ban of chlorpyrifos is a case in point: decades of farmworker experiences, ideas, and efforts generated the local, state, and national momentum necessary to ban the pesticide.[33]

Pesticide Runoff and Drift

Agrochemicals travel through water and wind and contaminate areas beyond the sites of pesticide application. Pesticide runoff is the movement of contaminated water from the site application into a range of water sources from rivers, lakes, and oceans to wells, storm sewers, and groundwater. Chemical manufacturers also contribute to the pollution of waterways. In agricultural regions, wind can carry droplets of pesticides to off-target sites during spray applications. Pesticide drift is known to cause higher rates of asthma and has been linked to brain developmental issues in children.

The Impact of Pesticides on Other Animals, Burrowing Owls

Ninety percent of Western burrowing owls (Athene cunicularia hypugea) live in the San Joaquin and Imperial Valleys of California and most lay their eggs within a mile of agricultural land. Due to their breeding patterns, these owls are now a "species of special concern" in California. DDT and its analogs are still detectable in the soil and scientists have proven that newer generations of pesticides adversely affect the owls. Burrowing their nests in the contaminated ground has led to eggshell thinning and embryotoxicity. Moreover, as apex predators connected to terrestrial and aquatic food webs, burrowing owls are particularly vulnerable to biomagnification.[34]

Community Action around Chlorpyrifos

For instance, community groups helped bring about the federal ban of chlorpyrifos. Like arsenicals, chlorpyrifos has disproportionately impacted workers of color. For decades, scientific studies have indicated that prenatal exposure to chlorpyrifos causes brain development problems, such as attention deficit disorders, autism spectrum disorder, reduced IQ, and memory loss. But the government approved the pesticide for use on nearly eighty crops, such as oranges, berries, grapes, soybeans, almonds, and walnuts.[35] Groups like PAN, Californians for Pesticide Reform (CPR), and Earthjustice spearheaded lawsuits, which insisted that the environmental racism influenced which communities approved for chlorpyrifos, but delays constantly worked against activists. Between 1974 and 2017, farmers used nearly 61 million pounds of chlorpyrifos in just four counties (Fresno, Kings, Madera, and Tulare).[36] Due to how pesticide drift disperses chlorpyrifos in farm-working communities, lawyers suggest that residents of nearly 100,000 homes have contaminated belongings that need disposal.[37]

With strategic legal and scientific support, farmworker community organizers made the federal ban possible. According to Margaret Reeves and Ángel García, who organized with California farmworkers, communities used their own lived experience and expertise to investigate the environmental injustices they face. In many cases, administrative districting formally excludes communities of color from land-use decisions and or decision-making bodies ignored communities with a perceived lack of scientific credentials.[38] While the federal government dragged its feet, grassroots organizers made strides toward justice. For instance, PAN organizers coordinated community-based air monitoring projects and bio-monitoring with farmworker communities.[39] Their "science with the people" approach recorded air exposure with a community-run Drift Catcher and determined chlorpyrifos levels in people's bodies through urine samples.[40] Farmworker organizing and lived experiences also bolstered studies with the University of California, such as the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS), which is an ongoing 20-year study that has followed roughly 800 children in a farmworker community in California's Salinas Valley.[41] With community support, this study isolated chlorpyrifos as a cause of numerous prenatal developmental issues. Together, community and science collaborated to protect farmworkers who quite literally feed the United States. The federal ban they made is an important step forward, but the CHAMACOS study is a reminder that the history of unequal protection from pesticides will continue to shape environmental justice efforts.

Who makes science, politics of knowledge

The production of information is not politically neutral and can disadvantage communities excluded from the knowledge production process. Knowledge and ways of knowing in environmental justice are local rather than universal and most appropriate and life-affirming when they center on community-based perspectives. Scientists are not the only people who make science, much less scientific solutions. Grassroots environmental justice movements remind us community-built science makes for the most appropriate solutions.

Alternative Agriculture

An environmental justice lens helps us think critically about food systems. For example, organic farming protects biodiversity and soil quality and reduces pollution from fertilizers and pesticide run-off. Since the 1980s, organic farming has advocated for an agriculture free of synthetic agrochemicals as an alternative to conventional agriculture. Organic farmers are also required to use such non-chemical techniques as crop rotation, selecting resistant varieties, using nutrient and water management, providing habitat for the natural enemies of pests, and releasing beneficial organisms such as ladybugs to protect crops from damage. If all these pest prevention strategies have failed and pests are present, organic farmers may use limited amounts of pesticides, but those chemicals are five times less likely to leave behind harmful residues.[42]

One area where organic could focus on when it comes to social justice is guidelines for fair and just working conditions. According to Elizabeth Henderson, the founder of the Agricultural Justice Project and its Food Justice Certification program, it is a common misconception that organic agriculture provides better working conditions for farmworkers. Organic agriculture also can be up to thirty-five percent more labor-intensive than traditional agriculture. As organic farming becomes more popular and profitable, farmers will have to center on social justice and increase compensation, transparency, and safety standards for their workers.

Black Farmer Justice

Thinking critically about Black-owned farms is another way the organic-farming community can address environmental racism through environmental justice. The institution of slavery first took African people from their Indigenous lands and subjected them to lives of hard and unpaid agricultural labor. According to Leah Penniman, the owner of food-justice certified Soul Fire Farm, the legacy of slavery still stains many Black people's ideas and relationship with agriculture. Rather than seeing growing foods as liberating, they think of slavery and oppression. Anti-Black racism also robbed Black people of positive experiences with the land after slavery. The history of Black agriculture since the Civil War is a history of violent displacement and fearful migration. In 1920, before the millions of Black people fled southern violence in the Great Migration, over fourteen percent of U.S. farmland was Black-owned. By 1992 Black farmers owned less than one percent of U.S. farmland.[43] Even with the increased attention to Black-owned farms like Soul Fire, historical Black-owned farms continue to face racism and injustice today. Look no further than Pembroke, Illinois, for an example.[44] Lastly, supporting Black-owned land helps center a wide range of Black environmental knowledge and activism. Similar to how Latinx farmworkers and activists have influenced chlorpyrifos policies, Black ecological knowledge and activism have shaped environmental justice movements in the United States. There is no history of environmental justice without Black environmental justice.

Battle for Historic Black Farm Land Pembroke

Uneven environmental protection is harming Black farmers in Illinois. About sixty miles south of Chicago, plans to create a national wild refuge at the Illinois-Indiana border are threatening the livelihood of Black farmers in Pembroke, Illinois. Black farmers got access to land in the early twentieth century because it was not ideal for agriculture; now conservation groups like The Nature Conservancy want to preserve the land. These groups highlight that at least eighteen threatened or endangered species call the sandy black oak savanna home. Black residents do not believe their practices, such as hunting, picking wild fruits, and horseback riding, threaten the local ecology. Black farmer knowledge has supported environmental stewardship in Pembroke for over a century. Many Pembroke farmers never adopted agrochemical use and have always farmed organically.

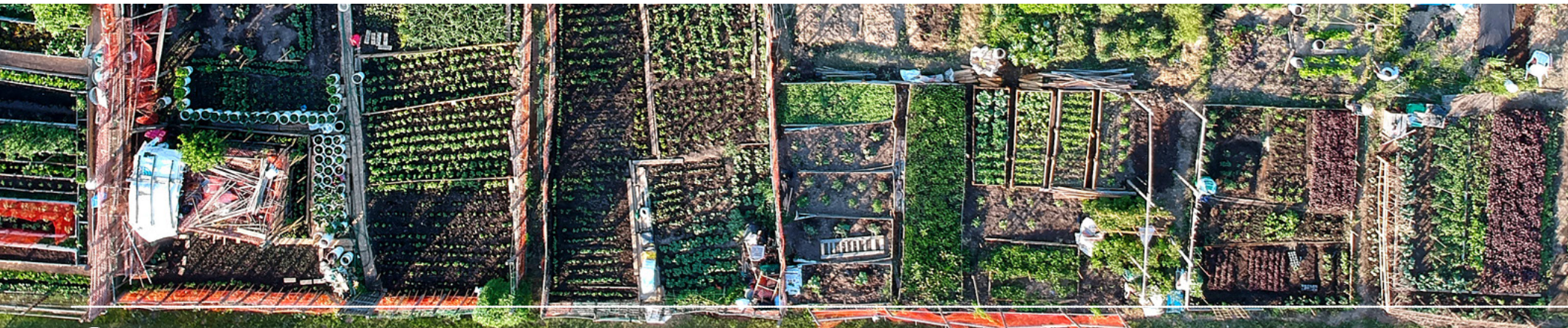
In a world where environmental racism persists like pesticides, history is medicine. From Fannie Lou Hamer in the Civil Rights movement to Robert D. Bullard in the environmental justice movement, generations of Black leaders have fought for environmental protection and racial justice together. There is also no shortage of contemporary Black environmentalists with whom to educate the youth. Farmer-activists like Leah Penniman and Karen Washington use community farming to advocate for food systems that are less racist from production to consumption. In addition to practicing agriculture that respects land and labor, Penniman provides healthy produce to low-income communities of color without access to better food systems otherwise.

In the realm of sacrifice zones, Black leaders have also spearheaded campaigns against harmful industrial chemical residues. In the past decade, three Black Americans—Hilton Kelley (2011), Destiny Watford (2016), and Sharon Lavigne (2021)—won the most prestigious international award honoring grassroots environmental activism, the Goldman Prize. Destiny Watford is a particularly great figure to teach youth as she was a teenager when she inspired a movement that would eventually defeat plans to build the nation's largest incinerator in her neighborhood. Perhaps her experience will encourage you and your family to learn more about the relationship between agrochemicals, environmental racism, and environmental justice in your neighborhoods.

Conclusion

Alternatives to industrial agriculture are possible, longstanding, and grassroots. Their ongoing struggle shows that grassroots food systems and activism face many threats and need a broad support base. This report shows that even though agrochemicals are the engine of industrial agriculture, which adversely impacts the environment and communities of color, many of those same communities fight back. Science and technology alone will not reduce inequalities in our food system, nor can organic alone be the sole tool for improving how food is grown and distributed. Social justice must be incorporated into all aspects of how we think about agriculture.

The future is far from bleak. While communities of color have historically carried the burden of harm and justice, focusing on the longstanding and ongoing activism of these communities offers a path toward fixing our food system. Supporting young environmental activists will continue to build on the work of earlier generations. With careful attendance to the history of agrochemicals and race, stakeholders build broader support bases that avoid placing the burden of making a better food system on the youth and people of color.



Artist's Statement and Content Description

The image depicts a landscape of Agrochemical Racism in the San Joaquin Valley. In the middle ground are agricultural spaces, a field of kale and an almond orchard. Growers apply various pesticides (represented in white) to these crops. Pesticide drift moves toward a school and homes in the surrounding areas. In the foreground are agricultural workers. In the background, a stormcloud forms, with pesticide-laden rain falling on the land and into the waterway that flows to the foreground of the page. In the lower left, demonstrators demand a ban on the pesticide chlorpyrifos. The EPA banned this chemical at the federal level in 2021, in part due to the demands of residents and workers in the Valley.

Alissa Ujie Diamond is an artist, landscape architect, and PhD candidate based in Central Virginia.

[COVER ART]

Photography Credits

[PAGE 4] Ansel Adams, Public domain, via Wikimedia Commons

[PAGE 5] Dorthea Lange, Library of Congress Farm Security Administration/Office of War Information Black-and-White Negatives Collection

[PAGE 7] U.S. Fish and Wildlife Service, Public domain, via Wikimedia Commons

[PAGE 8] Dave Brenner, CC BY 2.0, via Wikimedia Commons

Works Cited

[1] Shepherd W. McKinley, *Stinking Rocks and Rocks of Gold: Phosphate, Fertilizer, and Industrialization in Postbellum South Carolina* (University of Florida, 2014)

[2] Victoria Peña-Parr, "The complicated history of environmental racism," *UNM Newsroom*, August 4, 2020; Vann Newkirk II, "Trump EPA Concludes Environmental Racism Is Real," *The Atlantic,* February 28, 2018.

[3] S.F. Cook, The Aboriginal Population of the San Joaquin Valley, California, (University of California, 1955).

[4] Alan L. Olmstead and Paul W. Rhode, "A History of California Agriculture," 2017.

[5] Stoll, *The Fruits of Natural Advantages* p. 114.

[6] Anne Ewbank, "The Tragic Roots of America's Favorite Cherry," *Atlas Obscura,* June 19, 2018; Agricultural Marketing Research Center, "Cherries," *AgMRC,* September 2021.

[7] Jayson M. Porter, "Arsenic in North America: A Most Persistent Pesticide," *Discurso*, May 31, 2020; Herbert A. Franke, "Arsenic and Bismuth," *Minerals 1938 Yearbook,* pp. 626-629.

[8] 1926 quote from entomologist.

[9] Adolfo Olea Franco, "One Century of Higher Agricultural Education and Research in Mexico," (Ph.D. dissertation, History, Harvard 2001).

[10] Nick Cullather, *The Hungry World: America's Cold War Battle Against Poverty in Asia* (Cambridge, 2010).

[11] Rachel Carson (1907-1964), *Silent Spring* (Boston, 2002).

[12] "British Again Warned of Arsenic on Apples," *Washington Post,* January 8, 1926, p. 5.

[13] James C. Whorton, *Before Silent Spring: Pesticides and Public Health in Pre-DDT America* (Princeton, 1976).

[14] Jill Lepore, "The Right Way to Remember Rachel Carson," *The New Yorker,* March 19, 2018.

[15] David Heath, "How Politics Derailed EPA Science On Arsenic, Endangering Public Health," *Center of Public Integrity,* Jan. 15, 2015; Jedediah Britton-Purdy, "Environmentalism was once a Social-Justice Movement: It can be again," *The Atlantic,* Dec. 7, 2016.

[16] Eddy F. Carder, "The American Environmental Justice Movement," *Internet Encyclopedia of Philosophy.*

[17] National People of Color Environmental Leadership Summit, "The Principles," October 24-27, 1991.

[18] Jane Johnson, "Environmental Justice," *Encyclopedia of Applied Ethics* (Second Edition), (2012), pp. 124.

[19] Bullard, "The Threat of Environmental Racism," *Natural Resources & Environment, 7, 3,* (Winter 1993), pp. 23.

[20] Nicole Fabricant, "The Environmental Justice Movement in South Baltimore," New Politics, 16, (2018).

[21] Robert Bullard, *Dumping in Dixie* (1990); https://drrobertbullard.com/biography.

[22] Nina Lakhani, "Cancer Alley campaigner wins Goldman Prize for environmental defenders," *Grist,* June 22, 2021.

[23] "Aamjiwnaang First Nation resident taking Province to court," *The*

Canadian Press, July 30, 2017; Sean Craig et al., "'We expected cancer': Are industrial spills in Canada's 'Chemical Valley' making people sick?" *Global News,* October 14, 2017.

[24] Brian Williams, "'That we may live': Pesticides, plantations, and environmental racism in the United States South," *Environment and Planning E: Nature and Space, 1-2* (2018), pp. 243-267.

[25] Norah Anita Schwartz et al, "'Where they (live, work and) spray': Pesticide exposure, childhood asthma and environmental justice among Mexican-American farmworkers," *Health & Place,* (2015), p. 85.

[26] Amy Roost, "A Pesticide the EPA Won't Ban Is Sickening Low-Income Californians of Color," *Talk Poverty,* Dec. 17, 2019.

[27] Amy Roost, "A Pesticide the EPA Won't Ban Is Sickening Low-Income Californians of Color."

[28] Matt Griffith, Mansoureh Tajik, and Steve Wing, " Patterns of Agricultural Pesticide Use in Relation to Socioeconomic characteristics of the Population in the Rural US South," *Occupation and Environmental Health,* 37, (2007), pp. 259-277.

[29] Ángel García and Jane Sellen, "Pesticide use in California remains at record high, new data show," *Pesticide Action Network,* Jan. 21, 2021.

[30] Mary Ellen Flannery, "Schools in Farming Communities Surrounded by Dangerous," *NEA News,* Nov. 8, 2017.

[31] Lauren J. Stein et al., "Early childhood adversity potentiates the adverse association between prenatal organophosphate pesticide exposure and child IQ: The CHAMACOS cohort," *NeuroToxicology.*

[32] Jill Lindsey Harrison, *Pesticide Drift and the Pursuit of Environmental Justice* (2013).

[33] Margaret Reeves and Ángel García, "Op-ed: The Ban on Chlorpyrifos and the Power of Community Organizing," *Civil Eats,* September 2, 2021.

[34] Jennifer A. Gervais, "Burrowing Owls and Agricultural Pesticides: Evaluation of Residues and Risks for Three Populations in California, USA," *Environmental Toxicology and Chemistry,* 19, 2 (2000), p. 337.

[35] Don Thompson, "Pesticide caused kids' brain damage, California lawsuit say," *Associated Press,* July 12, 2021.

[36] Thompson, "Pesticide caused kids' brain damage, California lawsuit say."

[37] Thompson, "Pesticide caused kids' brain damage, California lawsuit say."

[38] Daniel J. Hicks, "Census Demographics and Chlorpyrifos Use in California's Central Valley, 2011-25: A Distributional Environmental Justice Analysis," *International Journal of Environmental Research and Public Health* (2020).

[39] Margaret Reeves and Ángel García, "Op-ed: The Ban on Chlorpyrifos and the Power of Community Organizing."

[40] Reeves and García, "Op-ed: The Ban on Chlorpyrifos and the Power of Community Organizing."

[41] Hicks, "Census Demographics and Chlorpyrifos Use in California's Central Valley, 2011-25."

[42] Anuradha Varanasi, "Is Organic Food Really Better for the Environment?" *State of the Planet,* Oct. 22, 2019; and María del Mar Gómez-Ramos et al, "Pesticide residues evaluation of organic crops. A critical appraisal," *Food Chemistry: X,* 5 2020.

[43] Brian Barth, "Black Land Matters," *Modern Farmer,* August 27, 2018.

[44] Tony Briscoe, "Conservationists See Rare Nature Sanctuaries. Black Farmers See a Legacy Bought Out From Under Them," *ProPublica,* October 14, 2021.