



RESHAPING KERN COUNTY'S AGRICULTURAL APPROACH TO PESTICIDES AND HEALTH



AGRICULTURE REPORT



ABOUT US

Since 2010, Building Healthy Communities—South Kern (South Kern BHC) has been diligently working through the Comunidades Unidas (United Communities) Action Team, led by Leadership Counsel for Justice and Accountability (LCJA), the Center on Race, Poverty and the Environment (CRPE), and the Central California Environmental Justice Network (CCEJN), to improve health and the environment for low-income county residents living in unincorporated communities. In addition, a network of community representatives and organizations has worked to address the urgent health and safety needs of Kern County’s most underserved neighborhoods. This network of equity advocates includes the leaders and members of Committee for a Better Arvin, Comite Progreso de Lamont, and Greenfield Walking Group.



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All photographs by Sarah Patterson, Development Director with the Center on Race, Poverty and the Environment (CRPE)



PURPOSE

Kern County ranks as the top agriculture-producing county in California and is second in its reliance on pesticides. Extensive research has shown that regular, long-term exposure to pesticides has serious impacts on people and the environment. Unfortunately, due to frequent pesticide exposure, many of the County's low-income residents are paying the price with their health outcomes. This report explores how the County can minimize the risk of human pesticide exposure by examining the County's regulatory practices. We conclude with practical recommendations on implementing better pesticide regulations and adopting environmentally-protective farming practices. One such example is the use of agroecology, which approaches farming through an environmentally and health-protective lens. Kern County has the opportunity to demonstrate to the region that it can maintain its dominance as a top agriculture industry while adopting innovative practices that protect human and environmental health.



LANDSCAPE OF KERN COUNTY

Kern County is located on the southern end of the San Joaquin Valley, a region in Central California that encompasses six other counties. The Valley, often referred to as the “the food basket of the world” is steeped in the agriculture industry, producing an array of crops such as nuts, fruits, and vegetables. At the same time, pollution—from intensive farming practices that rely heavily on pesticides—has contributed to the deteriorating air, water, and soil quality of the County. Beyond the environmental degradation, human health is directly at risk due to the frequent exposure to pesticides. Prolonged and frequent exposure to pesticides is known to cause cancer, birth defects, and a decreased immune system—among other ailments.

POPULATION DEMOGRAPHICS

Kern is 8,132 square miles and is currently home to 900,000 residents. By 2035, the County will hold 1.3 million residents due its 2 percent annual average population increase. The County’s residents are largely people of color, with 52 percent being Latino, followed by 36 percent white, 5 percent African Americans, 5 percent Asian, and the remaining 2 percent being other. Half of the total population are 25 years or older; of those, over 26 percent have no high school degree, 27 percent have a high school degree, 24 percent have some college experience, and 23 percent have a higher education degree.

Kern County is also one of the poorest counties in California. Nearly a fourth of the population—23 percent—live below the federal poverty level. As of December 2018, the unemployment rate was 7.6 percent, much higher than the state level of 4.2 percent. The median income for households is \$50,826 and the median price of a home is \$244,000 making homeownership more widely accessible, despite its poverty rates, in the region compared to coastal counties such as Marin County with a median household income of \$104,703 and the median price of a home over \$1.2 million.



INDUSTRY PROFILE

Kern County is known for its agriculture and oil industries. It consistently ranks among the top-most agriculture¹ and petroleum producing counties in the country.² Agriculture, government, transportation and utilities, and education and health services rank as the top four industries that drive the local economy. Twelve of the top employers are located in Bakersfield City with another cluster of top employers located in Ridgecrest; the remaining top employers are spread out throughout the county. While there are many agriculture companies countywide, the top five employers employ up to 5,000 people. Bakersfield Memorial Hospital, Grimmway Farms, Chevron Corporation, and Edwards Airforce Base are among the top 25 employers that employ between 1,000 and 4,999 individuals in the county.³ Grimmway Farms is the largest agriculture employer, largely producing carrots.

AGRICULTURE IMPACTS ON THE ENVIRONMENT

Kern County is the leading agricultural producing county in California, producing many of the country and state's grapes and almonds.⁵ In 2017, the County's agriculture industry grossed \$7.2 billion—mostly through the production of grapes, almonds, citrus, pistachios, and milk. The region's agriculture productivity increased by 1 percent compared to the previous year. While the industry is one of the top local employers and produces a large share of the state's fruits and vegetables, it does so at a cost to the health of the people and the environment. When not controlled or managed properly, pesticide- and fertilizer-reliant farming practices largely drive the negative impacts on people's health and the environment.

According to the California Department of Pesticide Regulation,⁶ farmers use pesticides to control pests that can damage or destroy their crops. Pesticides are chemicals intended to control, destroy, or repel a pest. Pesticide exposure can be harmful to adults and children and can cause serious damage to their physical well-being—making pesticide use potentially a public health risk.

TOP AGRICULTURE EMPLOYERS IN KERN COUNTY WITH THE NO. OF EMPLOYEES BETWEEN 1,000 – 4,999

Company	City	Category
Grimmway Farms	Arvin	Farms
Marko Zaninovich Inc.	McFarland	Fruits & Vegetables-Growers & Shippers
Sun Pacific	Bakersfield	Fruits & Vegetables-Growers & Shippers
WM Bolthouse Farms Inc.	Bakersfield	Value Added Agriculture ⁴ & Farms
Wonderful Pistachios & Almonds	Lost Hills	Farms

Table 1

Commonly Applied Pesticides in Kern County in 2016			
Pesticides	Pounds Applied	No. Applications	Acres
Sulfur	4,594,789	12,789	791,615
Mineral Oil	4,233,523	5,747	367,140
Petroleum Oil	2,839,592	2,470	199,579
Potassium N-Methyldithiocarbamate	2,556,918	201	11,723
1,3-Dichloropropene	2,186,837	244	10,314
Top Five Pesticides Total	16,411,659	21,451	1,380,371
Total Used in the County	28,903,992	183, 477	11,569,610
Percentage of Top Five Pesticides Over Total Used in County	57%	12%	12%



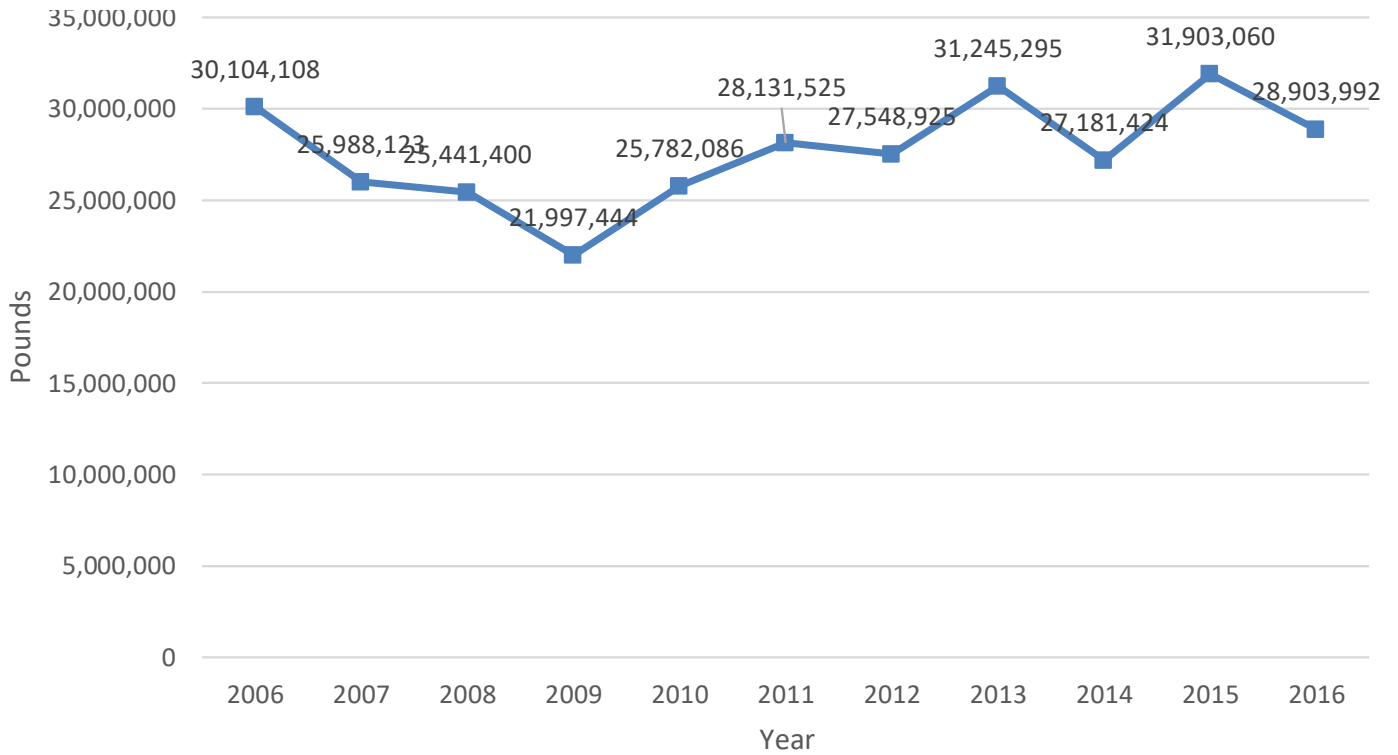
PESTICIDES AND HEALTH & ENVIRONMENTAL IMPACTS

Harm from pesticides can arise from short- and long-term exposure, depending on the length of time and toxicity. Pesticide exposure has adverse effects that can result in cancer, decreased immune system, hormone disruption, birth defects, and negative heritable traits.⁷ Pesticide drift—the act of recently applied pesticides drifting in the wind or in water into nearby farms, schools, and communities—poses a serious risk to people’s well-being. Even more alarming are the effects pesticides have on pregnant women, infants, and children, which can cause long-term neurodevelopment and respiratory health issues.⁸ These concerns are salient due to the proximity of public schools to nearby farms, where the use of pesticides is common.⁹

The California Office of Environmental Health Hazard Assessment¹⁰ develops a list of chemicals linked to cancer cases or birth defects caused by pesticides; included in that list is chlorpyrifos, an insecticide used in Kern County on food and feed crops. Chlorpyrifos targets the nervous system of living organisms by causing symptoms such as dizziness, confusion, nausea, involuntary urination and defecation, and—in extreme cases—death.¹¹ One of the firms that used a pesticide which contained chlorpyrifos was fined by the commissioner last year.¹² According to State data, less than 1 percent of the pesticides applied in 2016 contained chlorpyrifos, an amount that is still too high for its toxicity levels. In 2018, a Federal Court order banned the use of chlorpyrifos¹³ due to its toxicity and harmful effects on humans.¹⁴

The use of pesticides not only has human health impacts but also degrades the quality of the air, water, and soil that people and animals rely on. Water discharged from agriculture farms through irrigation or storm runoff flushes pesticide residue into groundwater sources and into rivers and lakes. Fish,¹⁵ birds,¹⁶ and bees¹⁷ are among a few of many animals who are at-risk of dying and or having their habitat altered. These animals are vital to our food sources and to the local ecology.

FIGURE 1: POUNDS OF PESTICIDES APPLIED COUNTYWIDE ANNUALLY FROM 2006–2016



PESTICIDE PREVALENCE IN KERN COUNTY

In 2016, Kern applied 28.9 million pounds of pesticides¹⁸ making it second in the state for the most pesticides used. Almonds, grapes, carrots, oranges, and pistachios were the main commodities that attract the most use of pesticides.¹⁹ Over the years, the amount—in pounds—of pesticides applied in the County has fluctuated from year to year. For instance, between 2006 and 2009, there was a sharp reduction in the amount of pesticides applied in the county—but that amount began to climb every year thereafter. In the last 10 years, the County applied 27 million pounds of pesticides a year on average.

Table 1 clearly demonstrates the top five most commonly used pesticides in the County are sulfur, mineral oil, petroleum oil, potassium n-methyldithiocarbamate, and 1,3-Dichloropropene.²⁰ Combined, these pesticides represented 57 percent of pesticides used in 12 percent of the acres treated. Sulfur, the most used pesticide, treated grapes, pistachios, tomatoes, and pomegranates.



The toxicity—the capacity to injure a living system—of the most commonly used pesticides in the County varies largely by type and its contents. It is difficult to study the effects pesticides have on humans due to ethical limitations on scientific research. Therefore, to study toxicity, we rely on tests performed on laboratory animals for information on their potential effects and for anecdotes of pesticide exposure. Based on the Pesticide Action Network’s Pesticide Database—which tracks toxicity and regulatory information on hundreds of pesticides by linking to information directly from credible governmental agencies and higher education institutions—it is clear that Kern County still allows the application of large quantities of pesticides that are suspected of being carcinogens. The similarities in symptoms shared by pesticides with low levels of toxicity and pesticides that are moderately- to highly-toxic are alarming as can be gleaned from Table 2. These similarities, in essence, could mask the potential for an individual to be exposed to highly-toxic pesticides without realizing it.

Pesticide usage is concentrated in the regions surrounding Bakersfield, with the southern and northwest regions heavily applying pesticides, according to 2016 data pulled from the California Environmental Health Tracking Program. The program tracks sections of land—approximately one mile by one mile—demonstrating the amount of pesticides applied in that area, the types of pesticides applied, and their toxicity levels. For example, the following cases demonstrate the intensity of pesticides applied in areas close to schools and communities:

Half a mile from Myrtle Avenue Elementary School in Lamont: 20,000 pounds of pesticides treated 5,506 acres at the rate of 3.61 pounds per acre, with 49 percent of the pesticides used are known to be carcinogens and toxic air contaminants.

Half a mile from McFarland Middle School: 27,000 pounds of pesticides treated 11,500 acres at the rate of 2.33 pounds per acre with sulfur, representing 70 percent of the pesticides applied in that region.

Within the unincorporated Meridian area: 181,600 pounds of pesticides treated 6,160 acres at a rate of 29 pounds per acre, with 95 percent of the pesticides known to be carcinogens and reproductive and developmental

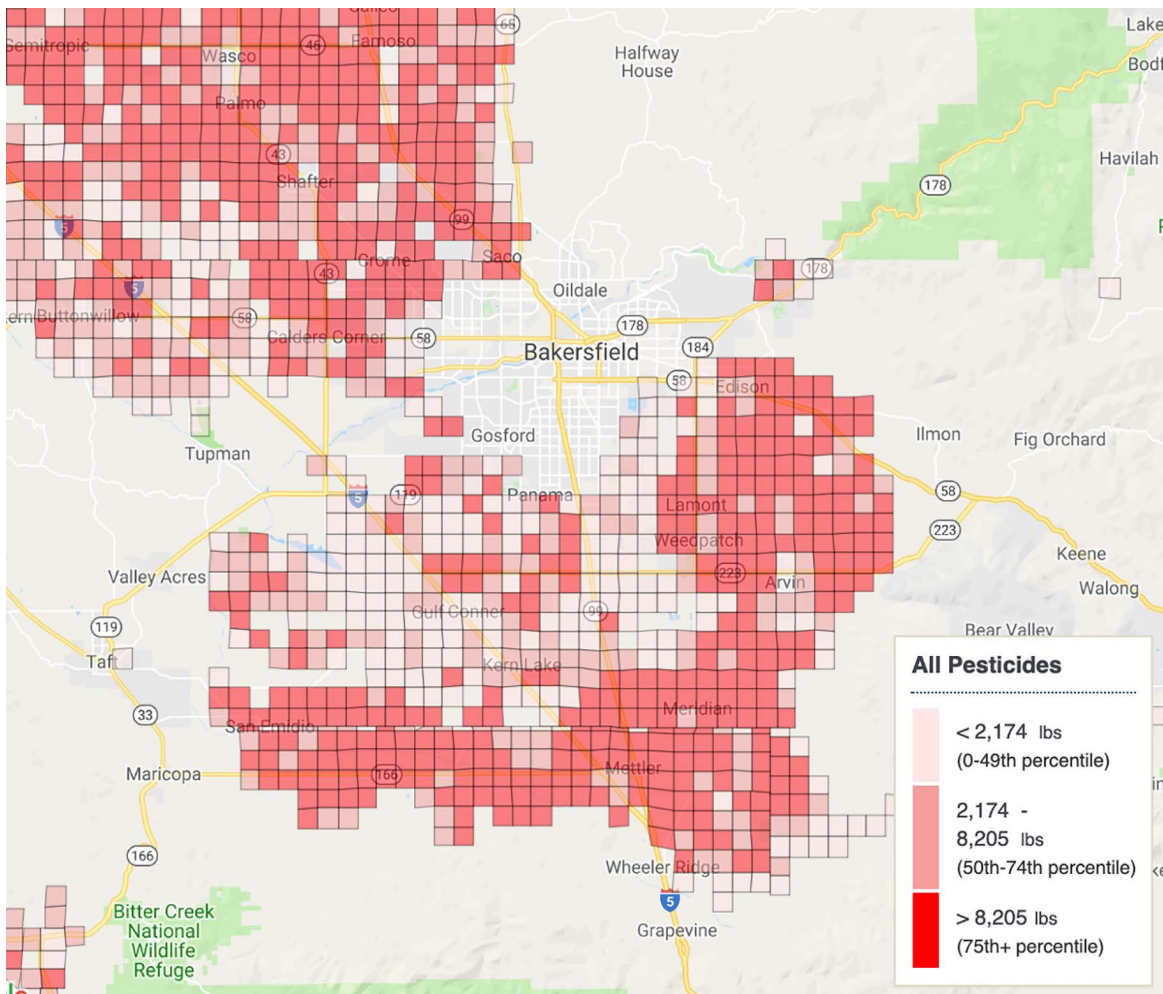
Table 2

Toxicity Levels of Commonly Applied Pesticides in Kern County		
Pesticides	Toxicity ²¹	Exposure Symptoms ²²
Sulfur	Not available	Burning sensation, cough, redness, sore throat, blurred vision, diarrhea
Mineral Oil	Not available	Dizziness, drowsiness, redness, cough, sore throat, vomiting
Petroleum Oil	Not available	Dizziness, drowsiness, redness, cough, sore throat, vomiting
Potassium N-Methyldithiocarbamate (Known as Metam Potassium)	Moderate to Highly toxic - Carcinogen ²³	Headache, dizziness, irritation to eyes, nose, and throat, nausea, diarrhea
1,3-Dichloropropene	Moderate to Highly toxic - Carcinogen ²⁴	Irritation of skin and mucous, nausea, vomiting, headaches, hyperglycemia, adult respiratory distress syndrome

toxicants, and/or are toxic air contaminants. El Camino Real Elementary School is located 12 miles away from the area applied.

Figure 2 indicates the total number of pesticides applied in pounds in a one mile by one mile area across Kern County. The darker the square the demonstrates a larger quantity of pesticides applied. Figure 3 shows the top 15 percent most pollution burdened communities encompassing the West and South of Delano, which includes Lost Hills and parts of Wasco, the southeastern edge of Bakersfield, the unincorporated communities of Greenfield, Weedpatch, and portions of Lamont. These areas overlapped with the communities that make less than 80 percent than the County median household income. When you compare Table 2 and Table 3 there is a clear overlap with areas with high concentrations of pesticides and the communities most affected by pollutants, disadvantaged communities, in Kern County.

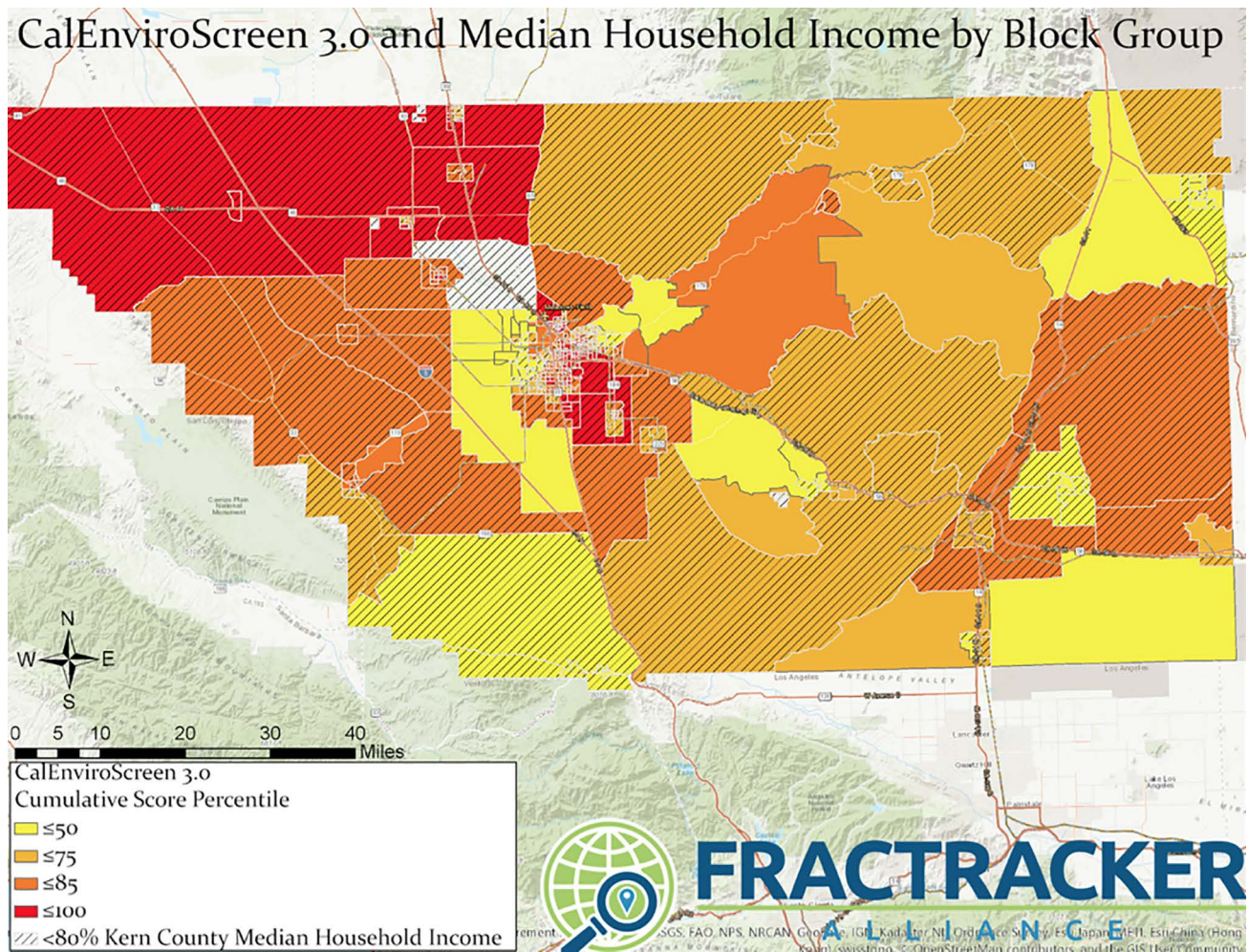
FIGURE 2: MAP OF AGRICULTURAL PESTICIDES APPLIED IN KERN COUNTY IN 2016



Note: Each square indicates a total number of pesticides applied in pounds in an approximate one mile by one mile area. The darker red boxes indicate a higher concentration of pesticides applied.

Source: California Environmental Health Tracking Program, California Department of Public Health. Agricultural Pesticide Mapping Tool. Data from California Department of Pesticide Regulation Pesticide Use Report Database, 1991–2015. 2017. Online at www.cehtp.org/pesticidetool.

FIGURE 3: CALENVIROSCREEN 3.0 AND MEDIAN HOUSEHOLD INCOME BY BLOCK GROUP



Note: This map shows the overlap between these top 15 percent CalEnviroScreen communities and block groups where 50 percent of the households make less than 80 percent of the Kern County median income of \$39,830.

Source: CalEPA Office of Environmental Health Hazard.



KERN COUNTY’S DEPARTMENT OF AGRICULTURE AND MEASUREMENT STANDARDS

The Department of Agriculture and Measurement Standards (Department), is the lead agency charged with “promoting and protecting Kern County’s agricultural industry, the environment, the general public and to provide consumers, buyers, businesses and sellers a fair marketplace.”²⁵ Led by the County Agricultural Commissioner Glenn Fankhauser, the Department’s main responsibility is to enforce State pesticide regulations and prevent the people and the environment from exposure to contamination. The Commissioner can open investigations into pesticide illnesses and can levy administrative penalties up to \$5,000 if they find violations. They can also revoke and/or suspend the right for a company or individual to use pesticides in the County, and issue civil and criminal penalties for companies who break the law. Finally, the Department is required to produce an annual crop report that includes data on food that is grown in Kern County, including the yield by acre and the value of the commodity.

The Department operates four divisions: Administrative Services, Agriculture Protection, Environment and Public Protection, and Weights and Measures. The Administrative Services division provides back-end administrative support for the Departments main functions. The Agriculture Protection division largely performs inspections to detect pests and evaluate bee colony healthiness in addition to compiling crop statistics. The Environmental and Public Protection division enforces pesticide laws and regulations through inspections and investigation of cases. Weights and Measures inspects crops once they are ready for the market to ensure quality. In fiscal year 2018–2019 (FY19),²⁶ the Department’s staff size had 48 permanent and 26 temporary positions, assigned accordingly; 35 percent for Agriculture Protection, 23 percent for Environmental and Public Protection, 23 percent for Weights and Measures and 19 percent for Administrative Services. The various divisions have not seen major fluctuations in staff levels within the last five years.

In FY19, Department had budget of \$7.6 million,²⁷ 77 percent, of which covers salaries and benefits and the remaining 23 percent covers services, supplies, and other charges. The Department receives 41 percent of its funds from intergovernmental sources, 31 percent from charges for services, and 28 percent from the County's discretionary funds. Since fiscal year 2009–2010 (FY10) the Department's budget has remained steady with modest increases and decreases on a year-to-year basis, while never breaking through \$8 million and never falling under \$5 million. In contrast, in FY19, Fresno County—the State's third largest agricultural producing county—funded their Agriculture Department at \$13.7 million²⁸ which is \$6.1 million more than Kern. While Fresno receives more intergovernmental funds, the County has historically contributed more of their countywide discretionary revenues to support the department's operations.

PESTICIDE APPLICATION POLICIES

Growers and pesticide applicators who seek to work in Kern County must apply for a restricted materials permit, valid for one-year, for the sites they intend to treat. Agricultural biologists will evaluate the site using Geographic Information Systems (GIS) prior to issuing the permit to check for sensitive areas that include proximity to residential areas, schools, churches, and parks.²⁹ Biologists are required to ensure that permitted applicants are qualified and have a restricted materials permit. Additionally, pesticide applicators are required to file a Notice of Intent (NOI) to the County prior to the application of a restricted pesticide.

Department staff has the opportunity to conduct a pre-application site inspection. The purpose a pre-application site inspection is to ensure applicator compliance with buffer zones and other mitigating conditions. However, site inspection only occurs on 5 percent of all the proposed NOI's.³⁰ For context, in 2016, pesticide applicators applied pesticides 183,477 times—according to the Pesticides Use Report Data submitted by the County Agriculture Commissioner. Based on the Department's low site inspection rate as discussed, agriculture biologists likely inspected less than 10,000 of proposed NOI's prior to their submission. This means that 95 percent—or



more than 174,000—of the applications were not checked by the Department for compliance with environmental and health regulations.

As indicated earlier, a significant role of the Agriculture Commissioner is to ensure there are no violations with pesticide laws and regulations. The Commissioner has the latitude to ensure compliance by opening investigations, by issuing civil and criminal penalties, and by suspending operators from working in the County. According to the Commissioner’s Multi-Year Workplan for 2018–2020³¹ an estimate of about 45 violation notices, 30 civil penalties, and three structural civil penalties with zero cases referred to the CA Department of Pesticide Regulations or the District Attorney are performed annually. The County uses the California Code of Regulations to determine when they are required to take compliance or enforcement action. Currently, the County is pleased with their effectiveness and their enforcement response plan.³²

PREVENTION PROGRAMS

The Kern County Board of Supervisors plays an important role in overseeing agriculture and farming practices. The Board has the ability to appoint the Commissioner and—through this authority—can choose an individual who is willing to do more than just comply with State law. The Board can also encourage the Commissioner to launch pilot programs to protect agriculture workers, set stricter restrictions on specific pesticides and their applications, require advance notification systems, and set buffer zones—to name a few. From our best estimate, the current programs enacted by the Department that are not state mandated include the following:

- **The Pilot Project to Protect Agricultural Workers**³³ improves communication among agriculture neighbors to reduce pesticide-related incidents with NOIs for specific restricted materials. The program notifies adjacent growers, by email, of applications of restricted materials 48 hours in advance.

- **Kern Rural Emergency Database** (Kern RED)³⁴ provides emergency responders with the grower's information online when an ambulance dispatches to rural areas of the County. Information provided also the chemicals likely applied in the area.

- **Pesticide Education Outreach**³⁵ provides educational presentations on pesticide laws and regulations, annually, to private applicators, growers, and community organizations.


Kern County is also required to implement additional state-mandated pesticide-use regulations to minimize residents' exposure to pesticides, including the following:³⁶

- **Drift Prevention** policies include limits on pesticides—that cannot be contained to the area applied by the use of buffer zones—and pesticide application, depending on wind speed.

- **School Buffer Zones** policies—to limit pesticide exposure to children—call for a quarter-mile buffer zone when school is in session or during school-sponsored activities.

- State regulation requires the County to prohibit certain modes of application and pesticides from being applied from 6 a.m. to 6 p.m. Monday through Friday within a quarter mile radius of schools and or childcare facilities. For example, aircraft pesticide sprayers and certain fumigants—a type of pesticide with label restrictions—must maintain the required distance. In addition, growers must notify school sites and childcare facilities³⁷ with an annual notification of the pesticides they intend to apply during the summer months.

- State regulations also limit certain pesticides from being applied by aircraft within a quarter-mile radius of residential communities, occupied labor camps, and or other areas designated by the Commissioner.



While these state policies and practices offer a good start to prevent pesticide exposure, more can be done to improve the grower-to-community communication. For example, policies requiring more training for those handling pesticides could be improved by putting safety procedures in place to protect workers. Another approach could be to send text notifications to community residents living within a mile radius of a farm of when a pesticide application will take place. Taking this approach requires the County to use more resources on outreach and prevention programs to ensure the safety of residents and the environment.

PESTICIDE EXPOSURE INCIDENTS IN THE COUNTY

While the County's current policies and programs aim to protect the public, they do not go far enough to ensure that there are zero cases of pesticide exposure incidents. Pesticide exposure occurs when an individual becomes ill from coming into contact with high amounts of pesticides and/or is exposed to pesticides with high levels of toxicity. In 2015, there were 474 agriculture-related pesticide exposure incidents statewide.³⁸ Kern County logged in 98 agriculture-related pesticide exposure incidents, about 21 percent of statewide incidents. Those most at-risk of exposure are production workers, sprayers, loaders, and agriculture farm workers. A majority of the incidents are drift-related with a smaller share due to direct contact.³⁹

Medical providers are the primary agents who report pesticides incidents by alerting the local Agriculture Commissioner who then reports to the State. Because physicians are those most likely to report pesticide incidents, it is likely that many incidents go unreported. This is especially likely if an individual does not seek medical attention due to lack of access to healthcare or for fear of their employer retaliating against them.

THE PROMISES OF AGROECOLOGY

Agroecology—defined as the integration of ecology in agriculture and food systems—encompasses ecological, economic, and social dimensions.⁴⁰ Agroecology approaches farming through an environmentally- and health-protective lens by ending the use of pesticides and introducing alternative methods for managing and developing crops. In essence, this method improves the quality of production while avoiding and or minimizing environmental impacts.⁴¹

For example, agroecology promotes the planting of trees in fields, which provides shade for crops, clean the air, and also provides a habitat for organisms that contribute to crop growth.⁴² Crop diversification is another cornerstone practice in agroecology, which supports the maintenance of natural enemies of certain species—thereby minimizing the needs for pesticides.⁴³ In addition, crop diversification can help sustain crop production in the face of climate change—without endangering the health of people and animals. See [Counting on Agroecology](#) for additional agroecological farming practices.

Recent studies show that agroecology practices have the potential to contribute at competitive levels to the global food supply while minimizing the environmental impacts caused by industrialized farming.^{44,45} Agroecology is also attractive to farmers who can reduce their reliance and overhead expenses on pesticides and or reducing their reliance on water.⁴⁶ Exploring other methods of farming will increase the agriculture industries' resiliency in the face of climate change. Kern County has the opportunity to lead on this front by providing more incentives for growers to move in this direction.





RECOMMENDATIONS

The following goals, policies, and implementation measures aim to reduce pollution and health impacts driven by the agriculture industry. By adopting these recommendations, the County will begin addressing the disproportionate burdens faced by disadvantaged communities across the County. This can be done by encouraging and incentivizing agroecology in Kern County.

- 1.** Create Agriculture Innovation Zones and incentivize environmental farming practices within these zones that practice agroecology. Agroecology promotes the well-being of ecosystems, air quality, water quality, soil health, public health, biodiversity, and the protection of wildlife and wildlife habitat. The County should prioritize establishing voluntary Agriculture Innovation Zones in the most disadvantaged communities according to CalEnviroScreen 3.0. Agriculture Innovation Zones could occupy the area within a quarter mile distance to schools, homes, and hospitals. Incentives could include loans, grants, technical assistance, monitoring, education, and demonstration projects.
- 2.** Collaborate with small farmers and farmers of color in disadvantaged communities to access state and federal grants that incentivize conservation agricultural management practices (e.g., composting), including the Healthy Soils Program.
- 3.** Place a moratorium on any expansion of existing Confined Animal Facilities operations. In addition, continue the countywide moratorium on new dairies that has been in place since 2004.
- 4.** Place a moratorium on new or any expansion of existing anaerobic digestion facilities (dairy digesters) or similar facilities.
- 5.** Draw a one-mile buffer between agricultural areas treated with restricted-use pesticides (e.g., chlorpyrifos) and sensitive sites such as homes, hospitals, and schools.

6. Create and operate a countywide advance notice system. This system will notify homes, schools, hospitals, and other sensitive sites—at least 72 hours in advance—if the sites are located within two miles of areas that will be sprayed with restricted-use pesticides (e.g., chlorpyrifos).

7. Develop a countywide, bilingual pesticide incident prevention and post-incident rapid response education program. Mandate the implementation of this program by all commercial agricultural operations. This incident prevention and rapid response education program should build on the existing Kern County Rural Emergency Database.

In particular, the Department of Agriculture and Measurement Standards should conduct annual training for supervisors and managers of commercial agricultural operations so that these operations can effectively respond to workers when an incident occurs. This training should include, at minimum, the following items:

- classification of pesticides applied in an agricultural operation;
- insurance coverage;
- medical back up plan and specific hospital and contact information; and
- supervisors' contact information.

Operators should have this information visible to workers, so that workers and emergency response personnel would be able to provide accurate and timely responses to any incidents. Operators should also keep a detailed log of every complaint received, to correct the current practice of managers often dismissing incident or related illness complaints from employees.

8. Allow the sale of local agricultural products by small roadside vendors to improve access to fresh, affordable produce by disadvantaged community residents.

9. Discourage biomass burning and instead encourage biomass disposal through composting practices.

10. Work with community-based organizations and Kern County residents to create County-sponsored community gardens in the most disadvantaged communities.

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